Teck Coal Limited
Water Quality Management
P.O. Box 1777
421 Pine Avenue
Sparwood, B.C. Canada V0B 2G0

+1 250 425 8086 Tel
www.teck.com

Technical Report Overview

Report: Koocanusa Reservoir Monitoring Program Three-Year Report, 2017 to 2019

Overview: This report presents the results of a three-year monitoring study undertaken in the Canadian portion of the Koocanusa Reservoir, from 2017 to 2020. The study was implemented to characterize and compare chemical and biological conditions downstream from the Elk River compared to upstream.

This report was prepared for Teck by Minnow Environmental Inc.

For More Information
If you have questions regarding this report, please:

- Phone toll-free to 1.855.806.6854
- Email **feedbackteckcoal@teck.com**

Future studies will be made available at **teck.com/elkvalley.**

Koocanusa Reservoir Monitoring Program Interpretive Report, 2017 to 2019

Prepared for:
Teck Coal Limited
Sparwood, British Columbia

Prepared by:
Minnow Environmental Inc.
Georgetown, Ontario

November 2020

Koocanusa Reservoir Monitoring Program
Interpretive Report, 2017 to 2019

Heidi Currier, Ph.D., R.P. Bio.
Project Manager

Paul LePage, M.Sc.
Senior Project Advisor

EXECUTIVE SUMMARY

The Elk River flows into Koocanusa Reservoir, which is a widening of the Kootenay River that was created by the Libby Dam in Montana. Three Canadian rivers, the Kootenay (62% of mean annual inflow), Elk (26%), and Bull (11%), supply most of the reservoir's inflow and are the major influences on the limnology of Koocanusa Reservoir.

Characterization of chemical and biological conditions in Koocanusa Reservoir has been ongoing since existing conditions were established as part of the 2014 to 2016 monitoring program. Results of the most recent three-year monitoring period (i.e., 2017 to 2019) are summarized below. Consistent with the study design, only water quality was assessed in the Canadian portion of the reservoir in 2017, with monitoring of sediment and biota resuming in 2018 and 2019.

Mean monthly concentrations of Order constituents in water were consistently below site performance objectives at RG_DSELK from 2017 to 2019, with the exception of selenium in April 2018; however, this sample was collected from the shoreline and not from the permitted sampling location due to safety concerns. Of the other water quality constituents that were assessed, only nickel and zinc had one or more samples with concentrations above respective guidelines and benchmarks in 2017 and/or 2018. Except for sulphate and selenium downstream of the Elk River, none of the Order constituents or other constituents increased in concentration from 2014 to 2019. Monthly nitrate and selenium loadings to Koocanusa Reservoir were estimated to be higher from the Elk River than the Kootenay River, and generally higher in 2018 than in 2019; however, the loadings appear to be consistent with those observed previously from 2014 to 2017.

Consistent with results from 2014 to 2016, annual median nitrogen:phosphorus ratios indicated phosphorus limitation throughout the reservoir from 2017 to 2019. Changes in the trophic status of the reservoir throughout the year (primarily in the spring) were observed from 2017 to 2019 and were reflective of the rapid changes in water levels that take place that take place from April to June during freshet and in response to seasonal reservoir operation adjustments.

Reservoir levels in April 2019 were much higher than those observed in April 2017 and 2018, but similar in June and August in both years. In April and June of both years, the Elk River appeared to be confined to the eastern half of the reservoir basin, but more mixed under full-pool conditions in August. August was also defined by the appearance of a specific conductance “inversion-layer”, which was occasionally observed at the lower third of the water column at downstream stations.

Concentrations of several metals and polycyclic aromatic hydrocarbons (PAHs) were consistently higher downstream of the Elk River compared to upstream in 2015, 2016, 2018, and 2019. However, concentrations of all metals and PAHs in sediment remained below provincial Severe Effect Level guidelines in all monitoring years (2013 to 2019) throughout the reservoir. Except for phosphorus, metals that had higher concentrations downstream of the Elk River decreased in concentration in 2018 and/or 2019 compared to 2015. In addition, concentrations of several PAHs were lower in 2019 relative to 2015 for sediment sampled downstream of the Elk River.

Phytoplankton density, biomass, and richness did not differ between the downstream and upstream areas in 2018, nor were there differences in phytoplankton density, biomass, and richness, or dominant taxonomic group density and biomass from 2014 to 2018 (except for inconsistent differences in the density and biomass of chrysophytes and cryptophytes in some monitoring years). Overall, the phytoplankton community had substantially lower density, biomass, and richness within the reservoir in 2016 and 2018, indicating lower primary productivity, compared to 2015, but the differences in community structure among these years were not related to the Elk River discharge based on similar differences observed both downstream and upstream of the mouth of the river.

Zooplankton density, biomass, and richness, as well as the density and biomass of the major taxonomic groups, were all higher downstream of the Elk River than upstream in June 2018 and 2019; however, differences in community were observed between years. In mid- to late-summer, following a prolonged period in which near full-pool reservoir levels were maintained, the zooplankton community was well established both downstream and upstream of the Elk River with both areas dominated by copepods. Total density and biomass of Rotifera, Cladocera, and Copepoda were higher throughout the reservoir since 2015. Overall, changes that occurred between years appeared to be due to seasonal fluctuations in reservoir water levels rather than related to mine-influence.

With few exceptions, mean selenium concentrations in zooplankton tissue throughout the reservoir (both Canadian and Montana portions) were below the interim British Columbia (BC) selenium guideline for dietary effects to benthic invertebrates in 2018 and 2019, and were consistently below the Elk Valley Water Quality Plan (EVWQP) Level 1 benchmark. Since 2016, concentrations of selenium in zooplankton were higher downstream of the Elk River compared to upstream in summer, but concentrations were lower at both areas from 2016 to 2019 compared to 2015.

The key differences in benthic invertebrate community structure between study areas in 2018 included lower density of nematodes and Ostracoda, and lower Shannon's Diversity downstream compared to upstream of the Elk River. Temporally, no changes in richness nor consistent

changes in density were apparent between 2015 to 2018, but Shannon's Diversity and the density of Nematoda were consistently lower downstream than upstream of the Elk River. These differences appear to be based on differences in habitat (i.e., particle size) and not mine-related.

With few exceptions, selenium concentrations in benthic invertebrate tissues were above the interim BC guideline of 4 µg/g dw both downstream and upstream of the Elk River, in both the Canadian and Montana portions of the reservoir in 2018 and 2019, but remained below the EVWQP Level 1 benchmark for fish (11 µg/g dw), the EVWQP Level 1 benchmark for invertebrates (13 µg/g dw; except for one sample in Tenmile in 2019), and the Level 1 benchmark for birds (15 µg/g dw). In general, selenium concentrations in benthic invertebrate tissues collected at areas from the Canadian portion of the reservoir in 2018 and 2019 were within the range of concentrations observed in previous years (2014 to 2016), and selenium concentrations were higher downstream relative to upstream.

Temporally, there was no evidence of a mine-related effect on health endpoints for peamouth chub from 2014 to 2018. Redside shiner downstream versus upstream of the Elk River also showed limited differences in health endpoints from 2015 to 2018, except for greater growth (i.e., weight-at-age and length-at-age) in females from the Gold Creek area compared to the upstream (i.e., Sand Creek) area.

Although the catch-per-unit-effort of redside shiner was lower at the areas downstream of the Elk River compared to the Sand Creek upstream area in 2018 and 2019, young-of-the-year were all captured in one or two seine hauls at each area, indicating that redside shiner were plentiful at all three study areas. A higher proportion of young-of-the-year was observed downstream compared to upstream in 2018, but no differences were observed in 2019.

Redside shiner in Tenmile in May 2018, westslope cutthroat trout from Elk River and Rexford in 2018, and mountain whitefish from Sand Creek in 2018 had selenium muscle concentrations above the BC Guideline (4 µg/g dw) but below the US EPA criterion (11.3 µg/g dw), but neither westslope cutthroat trout or mountain whitefish selenium muscle concentrations were above their species specific EVWQP Level 1 benchmarks (15.5 µg/g dw and 29.3 µg/g dw respectively). Selenium concentration in fish muscle in 2018 and 2019 from the remaining fish muscle samples were below both the BC guideline and the US EPA criterion. Mean selenium concentrations in ovary tissues of peamouth chub, redside shiner, and northern pikeminnow collected downstream and upstream of the Elk River in 2018 and 2019 were frequently greater than the BC chronic guideline (11 µg/g dw). Redside shiner and NSC were also frequently above the US EPA criterion (15.1 µg/g dw) both downstream and upstream of the Elk River in 2018 and 2019, and NSC even exceeded and the EVWQP Level 1 benchmark for reproductive effects to fish (18 µg/g dw)

upstream of the Elk River in 2019.. Generally, selenium concentrations in fish muscle showed no consistent difference between downstream and upstream of the Elk River, and selenium concentrations in ovaries are subject to uncertainty regarding ovary development. A recent study on the reproductive effects of selenium on northern pikeminnow identified that elevated selenium concentrations were often associated with immature ovaries, and further work is being done to understand species specific selenium toxicity for northern pikeminnow.

Results from the 2017 to 2019 monitoring in Koocanusa Reservoir suggest that changes are variable between seasons and years, with changes often observed throughout the reservoir. For example, although metal concentrations were generally higher in sediment downstream relative to upstream of the Elk River, metals that were elevated relative to guidelines were elevated both downstream and upstream of the Elk River. Similarly, although higher zooplankton and benthic invertebrate tissue selenium concentrations have been observed downstream of the Elk River, concentrations above the BC guideline were noted at various times in both downstream and upstream areas. In addition, ovary selenium concentrations in northern pikeminnow in 2018 and 2019 were higher upstream of the Elk River compared to all other areas. Some study components, such as plankton community and trophic status, also appear to be primarily driven by the dynamic changes in reservoir levels, and dependent on whether the reservoir is in riverine or lentic condition. Overall, the results suggest that mine-related influences associated with the Elk River are having limited effects on the biota within Koocanusa Reservoir. Instead, the results appear to indicate that changes in reservoir levels, which change drastically between seasons, and also vary between years, may play a more integral role in the observed effects in the measured endpoints. Moving forward, changing reservoir levels should be factored into the overall analyses in addition to the comparisons between upstream and downstream of the Elk River.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

ABMP – Area-based management plan (refers to Elk Valley Water Quality Plan)

ADIT – Aquatic Data Integration Tool

AMP – Adaptive Management Plan

ANOVA – Analysis of Variance

ANCOVA – Analysis of Covariance

APHA – American Public Health Association

AWTF – Active Water Treatment Facility

BACI – Before-After Control-Impact

BC – British Columbia

BCMOE – British Columbia Ministry of Environment

BCWQG – British Columbia Water Quality Guidelines

BIC – Benthic invertebrate community

BAL – Brooks Analytical Laboratory

CABIN – Canadian Aquatic Biomonitoring Network (Environment Canada 2012a, b).

CES – Critical Effect Size

CI – Calcite Index

CIp – Calcite Presence Score (Number of particles with calcite)/(Number of particles counted)

CIc – Calcite Concretion Score (Sum of particle concretion score)/(Number of particles counted)

CMO – Coal Mountain Operation

COI – Constituents of interest

COSEWIC – Committee on the Status of Endangered Wildlife in Canada

CSM – Conceptual Site Model

CPUE – Catch-per-unit-effort

CRC ICP-MS – Collision Reaction Cell Inductively Coupled Plasma-Mass Spectrophotometry

CRM – Certified Reference Material

CVAFS – Cold Vapour Atomic Fluorescence Spectrophotometry

CV – Coefficient of Variation

QA/QC – Quality Assurance/Quality Control

DCWMS – Dry Creek Water Management System

DELT - Deformities, Erosions, Lesions, and Tumors

DO – Dissolved Oxygen

DOC – Dissolved Organic Carbon

DQR – Data Quality Review

DQO – Data Quality Objective

DS – Downstream

DSS – Digital Sampling Sensor

dw – Dry Weight

EA – Environmental Assessment

EEM – Environmental Effects Monitoring

EMC – Environmental Monitoring Committee

ENV – British Columbia Ministry of Environment and Climate Change Strategy (formerly BCMOE)

EPA – Environmental Protection Agency

EPT – Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (caddisflies)

EVO – Elkview Operation

EVWQP – Elk Valley Water Quality Plan

EWT – Early Warning Trigger

FLNRORD – Ministry of Forest, Lands, and Natural Resource Operations, and Rural Development

FRO – Fording River Operation

GIS – Geographic Information System

GHO – Greenhills Operation

GLM – Generalized Linear Model

GPS – Global Positioning System

HR – High Resolution

HRT – Hydraulic Retention Time

HSD – Honestly Significant Differences

ICP-MS – Inductively Coupled Plasma Mass Spectrometry

IS – Independent Scientist

ISQG – Interim Sediment Quality Guideline

KNC – Ktunaxa Nation Council

km – Kilometres

K-M – Kaplan-Meier method

KS – Kolmogorov-Smirnov

LAEMP – Local Aquatic Effects Monitoring Program

LCO – Line Creek Operation

LEL – Lowest Effect Level

LLM – Linear Mixed-effect Model

LPL – Lowest Practical Level, referring to taxonomic identification of benthic invertebrates

LRL – Laboratory Reporting Limit

LSU – Longnose Sucker

m – Metres

MAD – Median Absolute Deviation

MCT – Measure of Central Tendency

MOD – Magnitude of Difference

MQ – Management Question

MT DEQ – Montana Department of Environmental Quality

MU – Management Unit

MW – Mountain Whitefish

NMDS – Non-metric Multi-dimensional Scaling

N:P – Nitrogen to Phosphorous Ratio

NSC – Northern Pikeminnow

PAH – Polycyclic Aromatic Hydrocarbon

PCC – Peamouth Chub

PEL – Probable Effect Level

Qx – referring to calendar quarters

QA/QC – Quality Assurance / Quality Control

QAPP – Quality Assurance Project Plan

r – Correlation Coefficient

RAEMP – Regional Aquatic Effects Monitoring Program

RDA – Redundancy Analysis

RSC – Redside Shiner

RWQM – Regional Water Quality Model

SPO – Site Performance Objective

SQI – Sediment Quality Guideline

WSQG – Working Sediment Quality Guideline

SD – Standard Deviation

SEL – Severe Effect Level

SPO – Site Performance Objective

SRC – Saskatchewan Research Council

TDS – Total Dissolved Solids

TEL – Threshold Effect Level

TKN – Total Kjeldahl Nitrogen

TOC – Total Organic Carbon

TSI – Trophic Status Index

TSS – Total Suspended Solids

US – Upstream

US ACE – United States Army Corps of Engineers

US EPA – United States Environmental Protection Agency

UTM – Universal Transverse Mercator system

WCT – Westslope Cutthroat Trout

WSC – Water Survey of Canada

WSQG – Working Sediment Quality Guideline

ww – Wet Weight

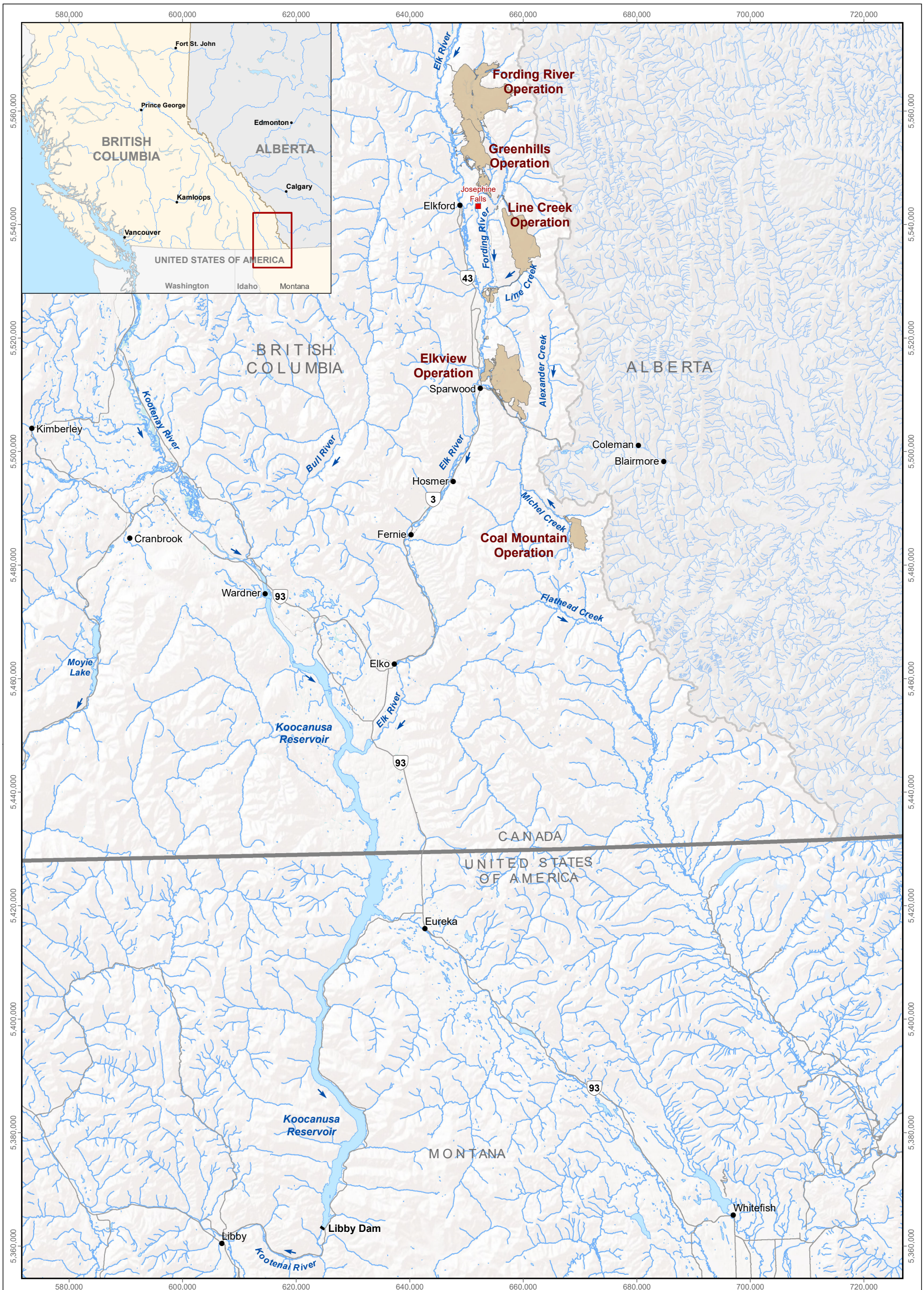
YOY – Young-of-the-year

1 INTRODUCTION

1.1 Background

Teck Coal Limited (Teck) owns and operates five steelmaking coal mines within the Elk River watershed of southeastern British Columbia (BC; Figure 1.1). From its headwaters near Elk Lakes, the Elk River flows southwesterly into Koocanusa Reservoir approximately 20 kilometres (km; 12 miles) upstream from the border between Canada and the United States (US). Koocanusa Reservoir was created by the construction of Libby Dam in Montana and is operated by the United States Army Corps of Engineers (US ACE) to provide flood protection, hydroelectric power, and recreational benefits. At full pool, the reservoir is 155 km (96 miles) in length, approximately 68 km (42 miles) of which occurs within Canada and the remaining 87 km (54 miles) within the United States (Figure 1.1). In addition to the Elk River, the Kootenay (Kootenai) and Bull rivers supply the majority of inflow to the reservoir (26%, 62%, and 11%, respectively, of mean annual inflow; Woods 1982; Hamilton et al. 1990). Water levels within Koocanusa Reservoir are generally lowest in late winter/early spring (March through May) and highest in summer/early fall (August and September). The normal annual pool fluctuation of the reservoir is about 25 m. At maximum drawdown, a reduction in reservoir total length up to 53%, volume up to 85%, mean depth up to 51%, and total surface area up to 69% generally occurs, with the largest relative changes occurring in the Canadian portion of the reservoir (Hamilton et al. 1990). This results in riverine conditions during low-pool for the section of the reservoir that extends to just below Gold Creek.

In 2014, the Elk Valley Water Quality Plan (EVWQP) served as a basis for issuance of Permit 107517 from the British Columbia Ministry of Environment and Climate Change Strategy (ENV; formerly Ministry of Environment [MOE]). The Permit specifies water quality limits and site performance objectives (SPOs) for monitoring stations located downstream from the mines and the requirement to implement a Regional Aquatic Effects Monitoring Program (RAEMP). Overarching objectives of the RAEMP are to monitor, assess, and interpret indicators of aquatic ecosystem condition related to mine operations and to inform adaptive management relative to expectations established in approved plans for mine development and the Permit at each of six management units (MUs). These objectives are consistent with the Koocanusa Reservoir (MU6) Monitoring Program and are used to inform adaptive management relative to expectations established in approved plans for mine development and in Permit 107517. In accordance with Permit 107517 and the RAEMP, annual monitoring programs were designed, ENV accepted, and implemented for Koocanusa Reservoir beginning in 2013, which was followed by the development of a comprehensive three-year monitoring program referred to as the Koocanusa Reservoir Monitoring Program (Minnow 2014, 2015a, 2016). A second cycle of the three-year monitoring



LEGEND

- Libby Dam
- Teck Coal Mine Operation

Location of Teck Coal Mine Operations Relative to Koocanusa Reservoir

0 10 20 40
km

N
W E
S

Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.0008

minnow environmental inc.
A Tetra Tech Consultants Company

Figure 1.1

Document Path: S:\Projects\187202\187202.0007 - Teck Koocanusa 2018\GIS\Report\18-07 Figure 1.1 Teck Coal Limited Operation USA.mxd

plan was initiated in 2018 (Minnow 2018a, b, 2019). Although no biological/environmental (i.e., sediment chemistry) data was collected in 2017, water chemistry data was still collected as part of Teck's permitted water quality monitoring program in the reservoir. Together, these programs assess whether physicochemical and biological conditions in Koocanusa Reservoir differ downstream compared to upstream of the Elk River confluence within the Canadian portion of the reservoir, and whether these conditions are changing over time. Questions specific to the Canadian portion of the reservoir, listed below, were developed to focus the monitoring program:

- Are concentrations of mine-related water quality constituents different downstream of the Elk River compared to upstream?
- Are concentrations of key mine-related water quality constituents (i.e., nitrate, selenium, sulphate, and cadmium) changing over time, are the changes consistent with projections, and are concentrations below respective guidelines and SPOs?
- Is productivity (based on nutrient concentrations in water) different downstream of the Elk River compared to upstream and is productivity changing over time?
- Are concentrations of mine-related constituents in sediment that benthic invertebrates are exposed to different downstream of the Elk River compared to upstream and are concentrations changing over time?
- Do phytoplankton, zooplankton, and/or benthic invertebrate community structure differ downstream of the Elk River compared to upstream, and are the differences changing over time?
- Are selenium concentrations in zooplankton different downstream of the Elk River compared to upstream, and are the differences changing over time?
- Are selenium concentrations in benthic invertebrates greater than guidelines or effect thresholds, do they differ downstream of the Elk River compared to upstream, and are the differences changing over time?
- Is fish health different downstream of the Elk River compared to upstream, and are differences in fish health endpoints changing over time?
- Are there differences in fish recruitment downstream of the Elk River compared to upstream?
- Are selenium concentrations in fish tissue greater than guidelines or effect thresholds, do they differ downstream of the Elk River compared to upstream, and are the differences changing over time?

The Koocanusa Reservoir Monitoring Program was designed with technical advice and input from an Environmental Monitoring Committee (EMC)[1], whose role includes review of submissions and provision of technical advice and input to Teck and the ENV Director as a condition under Permit 107517. In the most recently amended version of the Permit (April 4, 2019; Section 10.8), requirements outlined for the Koocanusa Reservoir Monitoring Program were expanded to include:

> *"The Permittee must prepare on an annual basis a report summarizing activities and monitoring results. The report must be submitted to the Lake Koocanusa Monitoring and Research Working Group (Lake Koocanusa Working Group) and the EMC by June 30 of each year."*

Accordingly, this report provides an overview of environmental monitoring activities conducted in the Canadian and US portions of Koocanusa Reservoir, along with the associated results, from 2018 and 2019. For cases in which US data were excluded from the analyses, a technical rationale is provided. Based on the final Koocanusa Reservoir Study Design acceptance letter (ENV 2018), additional analyses and data were collected in 2018 and 2019 compared to previous years including a summary of selenium and nitrate loadings to the reservoir, turbidity measurements with all *in situ* profiles, dissolved selenium in suspended sediment at Order station RG_DSELK, and additional zooplankton samples in June to assess seasonal changes.

1.2 Linkages to Teck's Adaptive Management Plan

As required in Permit 107517 Section 11, Teck has developed an Adaptive Management Plan (AMP) to support implementation of the EVWQP in achieving water quality and calcite targets, protect human health and the environment, and to facilitate continuous improvement of water quality in the Elk Valley (Teck 2018a). Following an adaptive management framework, the AMP identifies six Management Questions that are re-evaluated with each AMP updates. The AMP also identifies key uncertainties that need to be reduced to fill gaps in current understanding and support achievement of the EVWQP objectives.

Monitoring data and evaluations conducted within the Koocanusa Reservoir Monitoring Program are designed primarily to provide supportive information to help answer specific AMP Management Questions. Additional investigations or adjustments may be required to support responses under the adaptive management framework.

[1] The EMC consists of representatives from Teck, ENV, the Ministry of Energy and Mines, the Ktunaxa Nation Council (KNC), Interior Health Authority, and an Independent Scientist (IS).

2 METHODS

2.1 Overview

The Koocanusa Reservoir Monitoring Program was designed to evaluate changes in water quality, sediment quality, and/or biota in the reservoir downstream relative to upstream of the Elk River confluence, and whether any identified changes can be attributed to influences from the Elk River and mining activities. To address study questions described in Section 1.1, the Koocanusa Reservoir Monitoring Program included evaluation of the following components (Table 2.1):

- Water quality;
- Sediment quality (physical and chemical);
- Mixing assessment;
- Phytoplankton and zooplankton community assessment, and zooplankton tissue;
- Benthic invertebrate community and tissue;
- Fish health and recruitment assessment; and
- Fish tissue.

Objectives of this 2017 to 2019 monitoring report are to provide an interpretation of environmental monitoring activities conducted during this three-year period in the Canadian portion of Koocanusa Reservoir, as well as to report data that were collected from the US portion of the reservoir during the same timeframe. No biological/environmental data (with the exception of routine water quality) was collected in 2017, as the current cycle of the Koocanusa Reservoir program occurs from 2018 to 2020. However, in order to integrate the data into the 2017 to 2019 RAEMP report, water chemistry data collected as part of Teck's permitted water quality monitoring program in the reservoir was combined with monitoring activities from 2018 and 2019 to complete a three-year period. Biological/environmental sampling in 2018 and 2019 was conducted during two spring sampling events (April and June), and one late summer sampling event (August; Table 2.2). Analysis of results include statistical evaluations to identify potential differences in key endpoints between areas located downstream and upstream of the Elk River confluence in the Koocanusa Reservoir, and to statistically compare these results to data from previous years of monitoring (2014 to 2016).

To the extent possible, sampling locations used in biological/environmental sampling conducted in 2018 and 2019 were similar to those used in previous monitoring (2014 to 2016; Minnow 2018a), and consistent with the accepted 2018 to 2020 study design (Minnow 2018b).

Table 2.1: Summary of Receptors, Assessment Endpoints, Measurement Endpoints, and Evaluation Criteria for Koocanusa Reservoir, 2018 to 2019

Receptor Group	Focal Species (if Relevant)	Assessment Endpoint	Measurement Endpoint	Evaluation Criteria	Indicator Type
All	Not specific	Not specific	Sediment chemistry	Comparison of results relative to guidelines, between downstream and upstream of the Elk River, and to past observations	Indirect
			Water chemistry	Comparison of concentrations of mine-related constituents relative to SPOs and guidelines, nutrients relative to trophic classifications, between downstream and upstream of the Elk River, and to past observations	Indirect
Phytoplankton and Zooplankton	Not applicable	Abundance and assemblage	Density	Comparison of results between downstream and upstream of the Elk River and to past observations	Direct
			Richness		
			Biomass		
			Major community group		
			Tissue selenium concentrations	Comparison of results relative to guidelines and effect benchmarks, between downstream and upstream of the Elk River, and to past observations	Indirect
Benthic Invertebrates	Not applicable	Abundance and assemblage	Density	Comparison of results between downstream and upstream of the Elk River and to past observations	Direct
			Richness		
			Major community group		
			Tissue selenium concentrations	Comparison of results relative to guidelines and effect benchmarks, between downstream and upstream of the Elk River, and to past observations	Indirect
Fish	Peamouth chub and redside shiner	Population health assessment	Survival (age)	Comparison of results between downstream and upstream of the Elk River and to past observations	Direct
			Growth (body weight against age)		
			Reproduction (gonad weight against body weight)		
			Energy storage (condition - body weight against length and liver weight against body weight)		
			Tissue selenium concentrations	Comparison of results relative to guidelines and effect benchmarks, between downstream and upstream of the Elk River, and to past observations	Indirect
	Redside shiner	Recruitment (non-lethal assessment)	Survival (length frequency distribution)	Comparison of results between downstream and upstream of the Elk River and to past observations	Direct
			Growth (whole body weight and length)		
			Reproduction (relative abundance / % composition of young-of-the-year)		
			Energy storage (condition - body weight against length)		
	Northern pikeminnow, yellow perch, bull trout, etc.	Fish health, and human health risk from fish consumption	Tissue chemistry	Comparison of results relative to guidelines and effect benchmarks, between downstream and upstream of the Elk River, to past observations, and to human health effect benchmarks (evaluated outside of the monitoring program)	Indirect

Table 2.2: **Overview of the 2018 to 2019 Koocanusa Reservoir Monitoring Program Study Design**

Study Area	Biological Area Code	Biological Area Description	UTMs		2017		2018																															
							April										June							July	August												Sept	
					Water		Water			Sediment	Benthic Invertebrates	Fish					Water			Sediment	Plankton		Fish	Sediment	Water			Sediment		Plankton			Benthic Invertebrates		Fish		Sediment	Fish
					Chemistry	*In Situ* Water Quality	Mixing Study	Chemistry	*In Situ* Water Quality	Quality (Chemistry and Composition)	Tissue Chemistry	Fish Health		Tissue Chemistry			Mixing Study	Chemistry	*In Situ* Water Quality	Large-Volume Particulate	Zooplankton Tissue Chemistry	Zooplankton Community	Sport Fish Tissue Chemistry	Large-Volume Particulate	Mixing Study	Chemistry	*In Situ* Water Quality	Quality (Chemistry and Composition)	Large-Volume Particulate	Phytoplankton Community	Zooplankton Tissue Chemistry	Zooplankton Community	Community	Tissue Chemistry	Sport Fish Tissue Chemistry	Redside Shiner Recruitment	Large-Volume Particulate	Sport Fish Tissue Chemistry
			Easting	Northing								Peamouth Chub	Redside Shiner	Peamouth Chub	Redside Shiner	Sport Fish [a]																						
Upstream of the Elk River	RG_SC	near the mouth of Sand Creek	625624	5457296	-	-		1	1	5	5	55	80	10	10	up to 8		1	1	-	-	-	up to 8	-		1	1	-	-	-	-	-	-	-	up to 8	100	-	-
	RE_KERRRD	permitted water quality station upstream of the Elk River	626575	5454366	R	R		R	R	-	-	-	-	-	-	-		R	R	-	-	-	-	-		R	R	-	-	-	-	-	-	-	-	-	-	-
	RG_TN	near the RG_KERRRD permitted water quality station	627112	5453380	-	-		1	5	-	1	-	-	-	-	-		1	5	-	5	5	-	-		1	5	5	-	5	5	5	5	1	-	-	-	-
MFWP Canadian Sampling (upstream and downstream of Elk River Confluence)	Kikomun[d]	area encompassing Kikomun Park to below confluence with Elk River	625641	5459945	-	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	up to 8	-	-	up to 8
Elk River	RG_ER	near the mouth of Elk River	627959	5447572	-	-		1	1	5	5	55	80	10	10	up to 8		1	1	-	-	-	up to 8	-		1	1	-	-	-	-	-	-	-	8	100	-	-
Downstream of the Elk River	RG_DSELK	Order station downstream of the mouth of the Elk River	627017	5445677	-	-	1	R	R	-	-	-	-	-	-	-	1	R	R	1	-	-	-	1	1	R	R	-	1	-	-	-	-	-	-	-	1	-
	RG_GRASMERE	permitted water quality station downstream of the Elk River	629326	5441735	R	R		R	R	-	-	-	-	-	-	-		R	R	-	-	-	-	-		R	R	-	-	-	-	-	-	-	-	-	-	-
	RG_T4	near the RG_GRASMERE permitted water quality station	629235	5441654	-	-		1	5	-	1	-	-	-	-	-		1	5	-	5	5	-	-		1	5	5	-	5	5	5	5	1	-	-	-	-
	RG_USGOLD	permitted water quality station downstream of the Elk River	630811	5439055	R	R		R	R	-	-	-	-	-	-	-		R	R	-	-	-	-	-		R	R	-	-	-	-	-	-	-	-	-	-	-
	RG_GC	near the mouth of Gold Creek	630926	5436344	-	-		1	1	5	5	55	80	10	10	up to 8		1	1	-	-	-	up to 8	-		1	1	-	-	-	-	-	-	-	8	100	-	-
	RG_BORDER	permitted water quality station downstream of the Elk River	633383	5430700	R	R		R	R	-	-	-	-	-	-	-		R	R	-	-	-	-	-		R	R	-	-	-	-	-	-	-	-	-	-	-
	Rexford[e]	near Rexford Montana	632993	5418872	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 [b]	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1	up to 8
	Tenmile[f]	near Tenmile Creek Montana	628092	5377582	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 [b]	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1	up to 8

Note: "'-" indicates that no sampling is occurring for a specific monitoring component during that time period. "number" indicates number of samles collected. "R" indicates routine sampling by Teck.

[a] Up to 8 individuals of each sport fish (bull trout, Kokanee, mountain whitefish, rainbow trout, westslope cutthroat trout, yellow perch) species were captured over the course of the sampling year. Sport fish collected by Montana Fish, Wildlife, and Parks (MFWP) were lethally sampled and provided to Minnow for sample collection.

[b] Sampling conducted in May.

[c] Zooplankton could not be sampled at RG_TN in June in sufficient mass for tissue analysis.

[d] Fish Tissue samples collected by MFWP and provided to Minnow on up to 15 female northern pikeminnow and 8 females from all other fish species captured.

[e] Fish Tissue samples collected by MFWP and provided to Minnow on up to 15 female northern pikeminnow and 8 females from all other fish species captured. Study area encompasses a large portion of the reservoir downstream of the international border. One epilimnion and one hypolimnion (two total) bulk water samples were collected at International Border (LIBBOR) station by US Army Corps of Engineers during May, July, and September 2019.

[f] No fish sampling was conducted at Tenmile Area by MFWP in 2019. Study area encompasses a large portion of the reservoir downstream of RG_Rexford down to near the vicinity of Libby Dam. One epilimnion and one hypolimnion (two total) bulk water samples were collected at Forebay (LIBFB) station by US Army Corps of Engineers during May, July, and September 2019.

Table 2.2: Overview of the 2018 to 2019 Koocanusa Reservoir Monitoring Program Study Design

Study Area	Biological Area Code	Biological Area Description	UTMs		2019																													
					April							June							July	August														Sept	
					Water				Benthic Invertebrates	Fish			Water			Sediment	Plankton		Fish	Sediment	Water			Sediment		Plankton			Benthic Invertebrates		Fish		Sediment	Fish
			Easting	Northing	Mixing Study	Chemistry	*In Situ* Water Quality	Tissue Chemistry	Tissue Chemistry: Peamouth Chub	Tissue Chemistry: Redside Shiner	Tissue Chemistry: Sport Fish [a]	Mixing Study	Chemistry	*In Situ* Water Quality	Large-Volume Particulate	Zooplankton Tissue Chemistry	Zooplankton Community	Sport Fish Tissue Chemistry	Large-Volume Particulate	Mixing Study	Chemistry	*In Situ* Water Quality	Quality (Chemistry and Composition)	Large-Volume Particulate	Phytoplankton Community	Zooplankton Tissue Chemistry	Zooplankton Community	Community	Tissue Chemistry	Sport Fish Tissue Chemistry	Redside Shiner Recruitment	Large-Volume Particulate	Sport Fish Tissue Chemistry
Upstream of the Elk River	RG_SC	near the mouth of Sand Creek	625624	5457296	1	1	1	-	10	10	up to 8	1	1	1	-	-	-	up to 8	-	1	1	1	-	-	-	-	-	-	-	-	up to 8	100	-	-
	RE_KERRRD	permitted water quality station upstream of the Elk River	626575	5454366		R	R	-	-	-	-		R	R	-	-	-	-	-		R	R	-	-	-	-	-	-	-	-	-	-	-	-
	RG_TN	near the RG_KERRRD permitted water quality station	627112	5453380		1	5	1	-	-	-		1	5	-	5[c]	5	-	-		1	5	5	-	5	5	5	5	1	-	-	-	-
MFWP Canadian Sampling (upstream and downstream of Elk River Confluence)	Kikomun[d]	area encompassing Kikomun Park to below confluence with Elk River	625641	5459945		-	-	-	-	-	-		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	up to 8
Elk River	RG_ER	near the mouth of Elk River	627959	5447572		1	1	-	10	10	up to 8		1	1	-	-	-	up to 8	-		1	1	-	-	-	-	-	-	-	8	100	-	-
Downstream of the Elk River	RG_DSELK	Order station downstream of the mouth of the Elk River	627017	5445677		R	R	-	-	-	-		R	R	1	-	-	-	1		R	R	-	1	-	-	-	-	-	-	-	1	-
	RG_GRASMERE	permitted water quality station downstream of the Elk River	629326	5441735		R	R	-	-	-	-		R	R	-	-	-	-	-		R	R	-	-	-	-	-	-	-	-	-	-	-
	RG_T4	near the RG_GRASMERE permitted water quality station	629235	5441654		1	5	1	-	-	-		1	5	-	5	5	-	-		1	5	5	-	5	5	5	5	1	-	-	-	-
	RG_USGOLD	permitted water quality station downstream of the Elk River	630811	5439055		R	R	-	-	-	-		R	R	-	-	-	-	-		R	R	-	-	-	-	-	-	-	-	-	-	-
	RG_GC	near the mouth of Gold Creek	630926	5436344		1	1	-	10	10	up to 8		1	1	-	-	-	up to 8	-		1	1	-	-	-	-	-	-	-	8	100	-	-
	RG_BORDER	permitted water quality station downstream of the Elk River	633383	5430700		R	R	-	-	-	-		R	R	-	-	-	-	-		R	R	-	-	-	-	-	-	-	-	-	-	-
	Rexford[g]	near Rexford Montana	632993	5418872	-	-	-	-	-	-	-	-	-	-	1[b]	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1	up to 8
	Tenmile[h]	near Tenmile Creek Montana	628092	5377582	-	-	-	-	-	-	-	-	-	-	1[b]	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1	up to 8

Note: "-" indicates that no sampling is occurring for a specific monitoring component during that time period. "number" indicates number of samles collected. "R" indicates routine sampling by Teck.

[a] Up to 8 individuals of each sport fish (bull trout, Kokanee, mountain whitefish, rainbow trout, westslope cutthroat trout, yellow perch) species were captured over the course of the sampling year. Sport fish collected by Montana Fish, Wildlife, and Parks (MFWP) were lethally sampled and provided to Minnow for sample collection.

[b] Sampling conducted in May.

[c] Zooplankton could not be sampled at RG_TN in June in sufficient mass for tissue analysis.

[d] Fish Tissue samples collected by MFWP and provided to Minnow on up to 15 female northern pikeminnow and 8 females from all other fish species captured.

[e] Fish Tissue samples collected by MFWP and provided to Minnow on up to 15 female northern pikeminnow and 8 females from all other fish species captured. Study area encompasses a large portion of the reservoir downstream of the international border. One epilimnion and one hypolimnion (two total) bulk water samples were collected at International Border (LIBBOR) station by US Army Corps of Engineers during May, July, and September 2019.

[f] No fish sampling was conducted at Tenmile Area by MFWP in 2019. Study area encompasses a large portion of the reservoir downstream of RG_Rexford down to near the vicinity of Libby Dam. One epilimnion and one hypolimnion (two total) bulk water samples were collected at Forebay (LIBFB) station by US Army Corps of Engineers during May, July, and September 2019.

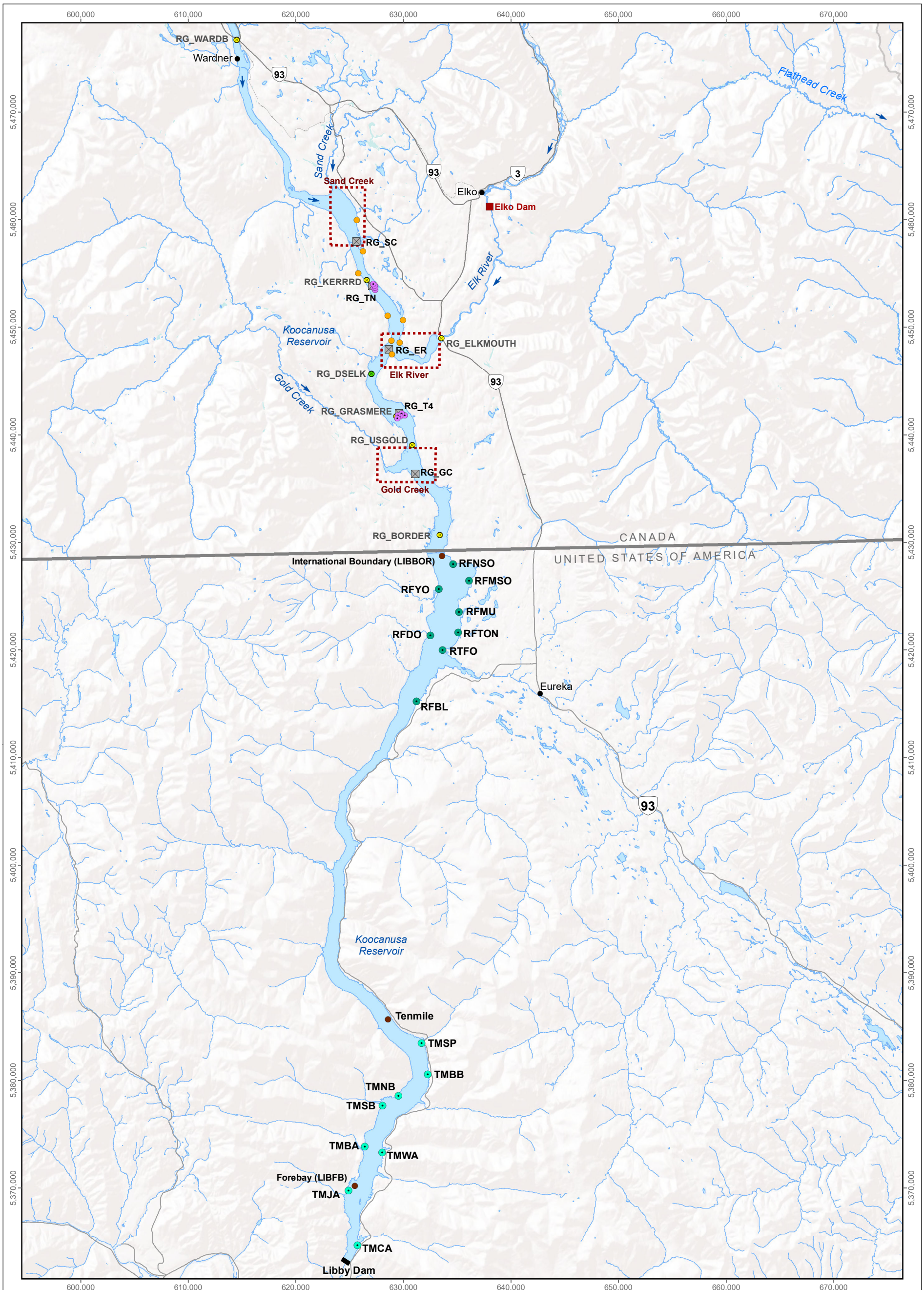
- Routine water quality monitoring data collected by Teck at permitted downstream water quality monitoring stations (RG_DSELK, RG_GRASMERE, RG_USGOLD, and RG_BORDER, of which RG_DSELK is an Order station), and an upstream water quality monitoring station (RG_KERRRD; Figure 2.1; Teck 2019a).
- Biological/environmental sampling (sediment chemistry, large volume suspended sediment chemistry, plankton community and tissue, and benthic invertebrate community and tissue) was completed at one transect downstream of the Elk River (RG_T4) and one transect upstream of the Elk River (RG_TN), with each transect including five sampling stations (Figure 2.1).
- Fish sampling (fish tissue and redside shiner recruitment) were conducted at two areas downstream from the mouth of the Elk River (Elk River [RG_ER] and Gold Creek [RG_GC]), and one upstream area (Sand Creek [RG_SC]; Figure 2.1).
- In addition, data collected in Montana in 2019, including large volume suspended sediment chemistry (International Border and Forebay), benthic invertebrate tissue data (Rexford and Tenmile), and fish tissue data from two areas (Rexford and Kikomun; Figure 2.1), were included in the data evaluations where appropriate.

2.2 Water Quality

2.2.1 Overview

Water quality evaluation for 2017 consisted of water chemistry data from Teck's permitted water quality monitoring program in the reservoir (RG_KERRRD, RG_DSELK, RG_GRASMERE, RG_USGOLD, and RG_BORDER; see Figure 2.1). Water quality evaluation for 2018 and 2019 included water chemistry data from Teck's permitted water quality monitoring program in the reservoir, the collection of water chemistry samples and *in situ* field measures collected concurrently with biological samples (RG_SC, RG_TN, RG_ER, RG_T4, and RG_GC; Figure 2.1; Table 2.2). Routine water quality monitoring data from the Montana portion of the reservoir (International Boundary, Tenmile, and Forebay collected by US ACE; Figure 2.1) were incorporated and included in analyses where applicable. Water chemistry data collected during Teck's routine water quality monitoring was also used to evaluate productivity.

In addition, as per the ENV (2018) study design approval letter, a summary of monthly nitrate and selenium loadings to the Koocanusa reservoir are provided for 2018 and 2019. An assessment of mixing of the Elk River within the Canadian portion of the Koocanusa Reservoir (based on specific conductance, water temperature, and turbidity measurements) was completed during three separate events in 2018 and 2019 to capture low (April), intermediate (June), and full-pool conditions (August).



LEGEND

- Permitted Water Quality Station
- Order Water Quality Station and Large-volume Suspended Sediment Location
- Profundal Sediment, Plankton (Community and Tissue Chemistry), and Benthic Invertebrate (Community and Tissue Chemistry) Sampling Location
- Montana Fish Sampling Location
- US ACE, Large-volume Suspended Sediment and Water Quality Monitoring Station
- Montana Benthic Invertebrate (Tissue Chemistry) and Fish Sampling Location
- Montana Benthic Invertebrate (Tissue Chemistry) Samping Location
- Water Chemistry and In Situ Monitoring Station
- Approximate Fish (recruitment and fish tissue) Sampling Area

Sampling Locations in Koocanusa Reservoir, 2019

0 5 10 20
km

N W E S

Projection: North American Datum 1983 UTM Zone 11

Date: October 2020
Project 197202.0008

minnow environmental inc.

Figure 2.1

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Teck - 197202.0008 - Koocanusa\4 - GIS\Annual Report June 2020\19-08 Figure 2.1 Sampling Locations.mxd

2.2.2 Water Chemistry Sampling and Laboratory Analysis

2.2.2.1 Sampling and Laboratory Analysis

Permit 107517 requires the collection of water samples at five permitted stations located within the Canadian portion of the reservoir ('Permitted Water Quality Station' on Figure 2.1). These stations are referred to as receiving water sampling stations (RG_KERRRD, RG_DSELK, RG_GRASMERE, RG_USGOLD, and RG_BORDER), of which RG_DSELK (EMS E300230) is an Order station for which SPOs have been established. Water samples were collected weekly from April 1st to July 15th, and monthly during ice-free conditions outside this period. Five water quality samples (RG_SC, RG_TN, RG_ER, RG_T4, and RG_GC; 'Water Quality Station' on Figure 2.1) were also collected concurrent with biological sampling events (Table 2.2). Methods used for the collection of all water samples were consistent with those outlined in Teck's Koocanusa Reservoir Water Quality Monitoring Plan (Teck 2018b). Because thermal stratification was not observed during any of the sampling events in 2018 or 2019, up to three water chemistry samples were collected at each station (depending on total depth), including one sample collected 3 m below the water surface, one sample collected 3 m above the substrate, and one sample collected at the mid-point, of the water column. In addition, transect samples were collected at each of the five stations in 2019 (Teck 2020).

Water samples from the five permitted stations were analyzed for conventional parameters, major ions, nutrients, total and dissolved metals, and chlorophyll-a (Table 2.3). Samples associated with the biological monitoring components were also analyzed for polycyclic aromatic hydrocarbons (PAHs; Table 2.4). Water chemistry samples from all Canadian stations were analyzed by ALS Environmental (ALS; at either their Burnaby, BC or Calgary, Alberta location). The analyses were conducted in accordance with procedures described in the most recent edition of the "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials, and Discrete Ambient Air" (Province of BC 2020) as per Permit 107517 requirements. Quality assurance and quality Control (QA/QC) applied to the laboratory analyses included assessment of the ability to achieve minimum laboratory reporting limits (LRLs; Table 2.4), show undetectable parameter concentrations in blank samples, and evaluation of matrix spikes, certified reference materials (CRMs), and laboratory duplicates, the latter of which was used to assess accuracy and precision of laboratory data (see Appendix A for Data Quality Report).

2.2.2.2 Data Analysis

The Koocanusa Reservoir Monitoring Program (Minnow 2018b) was designed to address the following questions specific to water quality:

Table 2.3: Summary of Koocanusa Reservoir Routine Water Quality Monitoring Program

Permitted Station		ENV EMS Number	Sampling Parameter and Associated Monitoring Frequency							
			Field Parameters [a]	Conventional Parameters [b]	Major Ions [c]	Nutrients [d]	Total and Dissolved Metals Scan [e]	Secchi Depth and Chlorophyll-a	Selenium Speciation Sampling [f]	Transect Sampling [g]
Order	RG_DSELK	E300230	M	M/EH	M/EH	M/EH	M/EH	M	Q	M/EH
Receiving	RG_KERRRD	E300095	M	M/EH	M/EH	M/EH	M/EH	M	-	M/EH
	RG_GRASMERE	E300092	M	M/EH	M/EH	M/EH	M/EH	M	-	M/EH
	RG_USGOLD	E300093	M	M/EH	M/EH	M/EH	M/EH	M	-	M/EH
	RG_BORDER	E300094	M	M	M	M	M	M	-	M/EH

Notes: M = Monthly frequency. M/EH = Monthly frequency, unstratified column samples consist of three grabs (3m from surface, 3m from bottom, mid-column). Stratified samples consist of one epilimnetic composite of water sampled from three depths (e.g., 1 m, 5 m, 10 m) and another hypolimnetic composite of water sampled from three depths (e.g., 20 m, 32 m, 45 m). Q = Quarterly frequency. "-" indicates no sampling requirements.

[a] Field parameters include specific conductance, dissolved oxygen, temperature, pH, and vertical profiles of dissolved oxygen and temperature.

[b] Conventional Parameters include specific conductance, total dissolved solids, total suspended solids, hardness, alkalinity, dissolved organic carbon, total organic carbon, turbidity.

[c] Major Ions include bromide, fluoride, calcium, chloride, magnesium, potassium, sodium, sulphate.

[d] Nutrients include ammonia, nitrate, nitrite, TKN, orthophosphate, total phosphorous.

[e] Metals (dissolved and total) include aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc.

[f] Additional selenium speciation sampling in support of EVWQP baseline information and to fulfill the requirements of the West Line Creek Active Water Treatment Facility Bypass Approval (February 26, 2018).

[g] Additional monthly transect samples collected perpendicular to the five permitted sample locations, 2019 only. Transects include up to 6 additional sampling locations for water quality (using the same sampling process used at the permitted stations), standard field parameters, and an *in situ* water profile of the station at 1 m increments.

Table 2.4: Laboratory Reporting Limits (LRLs) for Water and Sediment Samples

Analyte	Water [a]		Sediment	
	Units	LRL	Units	LRL
Moisture	-	-	%	0.25
pH	-	-	pH	0.10
% Gravel	-	-	%	1.0
% Sand	-	-	%	1.0
% Silt	-	-	%	1.0
% Clay	-	-	%	1.0
Total Organic Carbon (TOC)	mg/L	0.50	%	0.050
Dissolved Organic Carbon (DOC)	mg/L	0.50	-	-
Hardness (as CaCO3)	mg/L	0.50	-	-
Turbidity	NTU	0.10		
Alkalinity	mg/L	1.0	-	-
Total Dissolved Solids (TDS)	mg/L	10	-	-
Total Suspended Solids (TSS)	mg/L	1.0	-	-
Ammonia, Total (as N)	mg/L	0.0050	-	-
Bromide (Br)	mg/L	0.050	-	-
Chloride (Cl)	mg/L	0.50	-	-
Fluoride (F)	mg/L	0.020	-	-
Nitrate (as N)	mg/L	0.0050	-	-
Nitrite (as N)	mg/L	0.001	-	-
Total Kjeldahl Nitrogen	mg/L	0.050	-	-
Phosphorous (P)-Total	mg/L	0.0020	-	-
Orthophosphate	mg/L	0.0010	-	-
Sulphate (SO4)	mg/L	0.30	-	-
Aluminum (Al)	mg/L	0.0030	mg/kg dw	50
Antimony (Sb)	mg/L	0.00010	mg/kg dw	0.10
Arsenic (As)	mg/L	0.00010	mg/kg dw	0.10
Barium (Ba)	mg/L	0.000050	mg/kg dw	0.50
Beryllium (Be)	mg/L	0.000020	mg/kg dw	0.10
Bismuth (Bi)	mg/L	0.000050	mg/kg dw	0.20
Boron (B)	mg/L	0.010	mg/kg dw	5.0
Cadmium (Cd)	mg/L	0.0000050	mg/kg dw	0.020
Calcium (Ca)	mg/L	0.050	mg/kg dw	50
Chromium (Cr)	mg/L	0.00010	mg/kg dw	0.50
Cobalt (Co)	mg/L	0.00010	mg/kg dw	0.10
Copper (Cu)	mg/L	0.00050	mg/kg dw	0.50
Iron (Fe)	mg/L	0.010	mg/kg dw	50
Lead (Pb)	mg/L	0.000050	mg/kg dw	0.50
Lithium (Li)	mg/L	0.0010	mg/kg dw	2.0
Magnesium (Mg)	mg/L	0.0050	mg/kg dw	20
Manganese (Mn)	mg/L	0.00010	mg/kg dw	1.0
Mercury (Hg)	mg/L	0.0000050	mg/kg dw	0.0050
Molybdenum (Mo)	mg/L	0.000050	mg/kg dw	0.10
Nickel (Ni)	mg/L	0.00050	mg/kg dw	0.50
Phosphorous (P)	-	-	mg/kg dw	50
Potassium (K)	mg/L	0.050	mg/kg dw	100
Selenium (Se)	mg/L	0.000050	mg/kg dw	0.20
Silver (Ag)	mg/L	0.000010	mg/kg dw	0.10
Sodium (Na)	mg/L	0.050	mg/kg dw	50
Strontium (Sr)	mg/L	0.00020	mg/kg dw	0.50
Sulphur (S)	-	-	mg/kg dw	100
Thallium (Tl)	mg/L	0.000010	mg/kg dw	0.050
Tin (Sn)	mg/L	0.00010	mg/kg dw	2.0
Titanium (Ti)	mg/L	0.010	mg/kg dw	1.0
Uranium (U)	mg/L	0.000010	mg/kg dw	0.050
Vanadium (V)	mg/L	0.00050	mg/kg dw	0.20
Zinc (Zn)	mg/L	0.0030	mg/kg dw	2.0
Acenaphthylene	-	-	mg/kg dw	0.0050
Anthracene	-	-	mg/kg dw	0.0040
Benz(a)anthracene	-	-	mg/kg dw	0.010
Benzo(a)pyrene	-	-	mg/kg dw	0.010
Benzo(b)fluoranthene	-	-	mg/kg dw	0.010
Benzo(b+j+k)fluoranthene	-	-	mg/kg dw	0.010
Benzo(g,h,i)perylene	-	-	mg/kg dw	0.010
Benzo(k)fluoranthene	-	-	mg/kg dw	0.010
Chrysene	-	-	mg/kg dw	0.010
Dibenz(a,h)anthracene	-	-	mg/kg dw	0.0050
Fluoranthene	-	-	mg/kg dw	0.010
Fluorene	-	-	mg/kg dw	0.010
Indeno(1,2,3-c,d)pyrene	-	-	mg/kg dw	0.010
2-Methylnaphthalene	-	-	mg/kg dw	0.010
Naphthalene	-	-	mg/kg dw	0.010
Phenanthrene	-	-	mg/kg dw	0.010
Pyrene	-	-	mg/kg dw	0.010

Note: "-" indicates no data available.

[a] Total and dissolved metals analyzed in water. Laboratory reporting limits are the same.

1. Are concentrations of mine-related water quality constituents different downstream of the Elk River compared to upstream?
2. Are concentrations of key mine-related water quality constituents changing over time, are the changes consistent with projections, and are concentrations below respective guidelines or SPOs?
3. Is productivity (based on nutrient concentrations in water) different downstream of the Elk River compared to upstream, and is productivity changing over time?

Assessment of water quality data included comparison to applicable guidelines and EVWQP benchmarks, spatial comparisons between downstream and upstream stations, and qualitative comparisons to data collected during previous monitoring. The assessment of water chemistry was based on comparisons of monthly mean (arithmetic) concentrations of constituents for which early warning triggers (EWTs) have been established (i.e., dissolved cadmium, nitrate, total selenium, sulphate, total antimony, total barium, total boron, dissolved cobalt, total lithium, total manganese, total molybdenum, total nickel, nitrite, total dissolved solids, total uranium, and total zinc; Teck 2019c).

Monthly mean concentrations were estimated using the Kaplan-Meier method. The method involves transforming the left censored (i.e., < value) dataset to a right censored (i.e., > value) dataset, and then using the K-M estimator (used to estimate the mean survival time in survival analysis) to estimate the mean. The calculation was conducted using the survfit() function in the survival package (Therneau 2017) in R (R Core Team, 2019) and involves calculating the area under the K-M survival curve. The K-M method is non-parametric and can accommodate multiple LRLs. The method of estimating the mean is equivalent to using the distribution of detectable values below the LRL to represent values that are < LRL. For example, the mean of the data set {1, 2, <4, 5} is estimated as the mean of 1, 2, [½×1 + ½×2], and 5 which is 2.4. The value <4 is replaced by the distribution of values below 4 (i.e., 1 and 2 with equal weight of ½). Similarly, the mean of the data set {1, 1.6, 2, 2.1, <4, 5} is estimated as the mean of 1, 1.6, 2, 2.1, [¼×1 + ¼×1.6 + ¼×2 + ¼×2.1], and 5 which is 2.2. Again, the value <4 is replaced by the distribution of values below 4 (i.e., 1, 1.6, 2, and 2.1 with equal weight of ¼). If there is only one LRL and no detected values below the LRL, then the K-M estimate of the mean is equivalent to replacing the value below the LRL with the LRL (i.e., the best estimate for the values < LRL is the LRL).

Monthly means of constituents with EWTs were screened against British Columbia Water Quality Guidelines (BCWQG; BCMOE 2017a, b). Plots of average concentrations[2] at each station,

[2] Water quality data is plotted as monthly averages. The long term WQG is based on a 30-day average, while the short term WQG is based on an instantaneous maximum.

together with applicable BCWQG and SPOs, were prepared as the basis for qualitative comparisons among stations. Data from the Montana portion of the reservoir collected prior to 2019 were incorporated into the plots. These data were also compared to United States Environmental Protection Agency (US EPA) criteria for dissolved selenium. Water chemistry data from major inflows into Koocanusa Reservoir, namely the Kootenay River (Station RG_WARDB) and Elk River (Station RG_ELKMOUTH), which are monitored on a regular basis, were also included in the plots. Data for RG_USELK were included for historical reference only[3]. Water chemistry data collected at biological monitoring stations/areas (RG_SC, RG_TN, RG_ER, RG_T4, and RG_GC) in 2018 and 2019 were screened relative to BCWQG (where applicable), but were not included in the plots due to small sample sizes (three samples per year collected during the field sampling events in April, June and August).

Quantitative tests for temporal trends in monthly mean concentrations were conducted using multiple approaches. The non-parametric seasonal Kendall test described by Hirsch et al. (1982) was used, which was conducted using scripts written in R software (R Core Team 2019). The seasonal Kendall test assesses temporal trends separately for each season (or month in this case) and combines the results for each season into an overall test for trend. The test is non-parametric and assesses whether there is a monotonic increasing or monotonic decreasing trend over time. The test is conducted by calculating the test statistic S_i which is equal to the sum of the number of increases and decreases from a time period t to all time periods after t for each observation in season i. The overall test statistic S is computed as the sum of S_i for all seasons. The significance of the observed S is determined by comparing it to a critical value of S (at the significance level α = 0.05) determined from the exact sampling distribution of S (calculated by determining all possible permutations and combinations of S based on the increases and decreases from the number of pairwise comparisons made; Hirsch et al. 1982). If more than 45 pairwise comparisons are made (equivalent to the number of pairwise comparisons for n = 10 in a single season), then the normal approximation is used to calculate a p-value and to assess significance (Hirsch et al. 1982). The standard normal deviate Z is calculated as:

$$Z = \begin{cases} \frac{S-1}{\sqrt{\sigma_S}} if\ S > 0 \\ 0 \quad if\ S = 0 \\ \frac{S+1}{\sqrt{\sigma_S}} if\ S < 0 \end{cases}$$

[3] RG_USELK was the upstream station prior to 2015, but due to its proximity to the Elk River, this monitoring station was relocated farther upstream, renamed RG_KERRRD, and sampled as the upstream station thereafter.

where $\sigma_S = \sum_{i=1}^{k} \frac{n_i(n_i-1)(2n_i+5)-\sum_{T_i} t_i(t_i-1)(2t_i+5)}{18}$ and n_i is the number of samples in month i, t_i is the number of tied values for each tied value T_i, and k is the number of seasons (Hirsch et al. 1982).

An estimate of the trend slope over time was estimated by computing the median of all slopes between data pairs within the same month (Helsel and Hirsch 2002). The slope was reported as a change in concentration per year and as a percentage change in concentration per year. The intercept of a line through the time series was estimated as the median intercept of all lines through each point with the estimated slope (Pohlert 2016). The trend analysis was only conducted with a minimum number of 5 pairwise comparisons, the minimum number required for all consecutive increases or decrease to be significant at α = 0.05.

Temporal changes in monthly mean water concentrations were also evaluated for each station (reference and mine-exposed) from 2013 to 2019 using an Analysis of Variance (ANOVA). Only years with at least 6 months and only stations with at least 2 years of data were included in the analysis. Because of the presence of LRLs for most parameters, a censored regression ANOVA model with factors *Year* and *Month* and assuming a log-normal distribution of the response variable was fit with maximum likelihood estimation for each station. The significance of each term in the model was assessed using likelihood-ratio tests to determine if there is a significant change in log-likelihood with the addition of the term in the model. This tested for an overall difference among years and including the *Month* term in the model controlled for seasonal effects within a year. If the year term was significant (α = 0.05) then post-hoc contrasts were conducted to test for all pairwise differences among years with an α = 0.05 in a Tukey's Honestly Significant Difference test (HSD) which corrects for the number of comparisons.

For each year, a percent magnitude of difference from the base year (i.e., first year with minimum number of months) was calculated as:

$$\frac{Year_i - Base\ Year}{Base\ Year} \times 100\ \%$$

and the significant difference between 2019 and all other years and with last year of the previous cycle (2016) was assessed. All statistics were conducted in R (R Core Team 2019).

For constituents with established EWTs, data were also compared statistically between upstream (RG_KERRRD) and downstream (RG_DSELK, RG_GRASMERE, RG_USGOLD, RG_BORDER, International Boundary, Tenmile, and Forebay) permit stations to evaluate potential mine-related

influences on water quality[4]. Statistical comparisons were conducted on the differences in $\log_{10}$ transformed monthly mean concentrations between stations (i.e., $\log_{10}$ mean concentration downstream of the Elk River less the $\log_{10}$ mean concentration upstream of the Elk River) to remove the potential influence associated with differing sampling months. When concentrations upstream and downstream of the Elk River were at the laboratory reporting limit (LRL) no difference could be calculated. When one of the concentrations was at the LRL (upstream or downstream) the LRL value was replaced with the LRL and the difference was calculated. Potential changes over time at downstream stations compared to the upstream station were tested using an ANOVA on the differences with factors *Year, Station* and *Year* x *Station.* When the *Station* and *Year* terms (or their interaction) were significant, post-hoc tests were conducted to determine if upstream concentrations differed from each downstream station by testing the hypothesis:

H_{01}: $\mu_d = 0$

where μ_d is the difference in $\log_{10}$ mean concentrations. If *Station* and/or *Year* terms were not significant, post-hoc contrasts were adjusted accordingly (e.g., if *Station* was not significant, differences grouped over station were compared against zero for each year). When differences were significantly different from zero, a magnitude of difference (MOD) in parameter concentrations between stations was calculated as (using RG_USGOLD as an example):

$$\text{MOD} = \frac{(MCT_{RG\_USGOLD} - MCT_{RG\_KERRRD})}{MCT_{RG\_KERRRD}} \times 100\%$$

where MCT_{RG_USGOLD} and MCT_{RG_KERRRD} were the estimated geometric means for the downstream and upstream stations, respectively. In addition to comparisons against zero, contrasts were conducted to test for changes in differences across time for all areas (*Station* term not significant) or for each station individually (*Station* term was significant). For years that were significantly different than the base year (i.e., first year of sampling) MODs were calculated as:

$$\text{MOD} = \frac{(10\text{^}[Difference_{yeari}] - 10\text{^}[Difference_{baseyear}])}{10\text{^}[Difference_{baseyear}]} \times 100\%$$

All post-hoc contrasts were corrected for the number of tests using an $\alpha = 0.05$ and Tukey's (HSD) correction. The statistical analyses were conducted using R statistical software (R Core Team 2019).

[4] The only EWT parameter collected in 2018 at the Montana stations (International Boundary, Tenmile, and Forebay) was sulphate; however, sample replication was insufficient from these stations to allow inclusion of these data in the water chemistry statistical comparisons discussed herein.

Monthly mean total phosphorous, total nitrogen, and chlorophyll-a concentrations, together with Secchi depth measurements, were used to categorize trophic status at permitted water sampling stations in the Canadian portion of Koocanusa Reservoir based on Nordin (1985) classifications for BC freshwaters (Table 2.5). In addition to qualitative comparison of trophic status (e.g., oligo-, meso-, or eutrophic), comparisons of plotted total phosphorous, total nitrogen, chlorophyll-a, Secchi depth, and nitrogen-to-phosphorous ratio[5] data were conducted to evaluate whether trophic status differed downstream compared to upstream of the Elk River confluence. Trophic status was assessed at stations within the Montana portion of the reservoir where data for parameters were available.

Nitrate and selenium loadings to Koocanusa Reservoir were calculated using methods outlined in the "Permit 107517 2017 Report of Monitoring Results in the Koocanusa Reservoir" document (Teck 2018d). Briefly, monthly average concentrations of selenium and nitrate measured at RG_ELKMOUTH and flow data pro-rated from applicable Water Survey of Canada (WSC) gauging stations on Elk River were used to estimate loadings into the reservoir. A scaling method derived by Golder Associates Ltd. (Teck 2018d) used WSC hydrometric gauging stations located on the Elk River at Fernie (Station 08NK002; recent data) and at Phillips Bridge (Station 08NK005; historical data) to prorate monthly flow at the mouth of the Elk River as follows: RG_ELKMOUTH = RG_FERNIE x 1.53. The scaling factor was developed by Golder Associates Ltd. from prorated flow based on a relationship between monthly flows from a scatterplot as presented in the 2017 Permit 107517 Summary Report for the Koocanusa Reservoir (Teck 2018d). Similar scaling methods were used to calculate nitrate and selenium loadings from the Kootenay River at Station RG_WARDB using the WSC Kootenay River hydrometric gauging station located at Fort Steele (Station 08NG065) to prorate monthly flow based on the following relationship: RG_WARDB = 08NG065 x 1.18. Estimated loads of nitrate and selenium (in kg/month) were calculated by multiplying the calculated daily load by the number of days in each month to result in a monthly loading rate using the following formula:

Flow (m^3/s) * concentration (mg/L) * 86.4 = kg/day * number of days in each month

Vertical *in situ* water quality profiles, completed at the time of biological sampling in August, were plotted to determine if thermal stratification or gradients in dissolved oxygen (DO), pH, specific conductance, and/or turbidity occurred at the sampling areas under representative full pool reservoir conditions. The profile data were compared between downstream (RG_T4) and upstream (RG_TN) transects, and to profile data collected in previous years.

[5] The examination of nitrogen to phosphorus ratios among Koocanusa Reservoir study areas/stations was initially included in the analysis of the 2018 data based on recommendation by the EMC (Minnow 2019).

Table 2.5: Criteria for Trophic Status Classification

Variable [a]	Ultra-Oligotrophic	Oligotrophic	Mesotrophic	Meso-Eutrophic	Eutrophic	Hyper-Eutrophic
Total Phosphorus (µg/L)	-	1 - 10	10 - 30	-	>30	-
Chlorophyll-a (µg/L)	-	0 - 2	2 - 7	-	>7	-
Secchi Depth (m)	-	>6	3 - 6	-	<3	-
Total Nitrogen (µg/L)	-	<100	100 - 500	-	500 - 1,000	-

Note: "-" indicates no data available.

[a] Nordin 1985, Criteria used in British Columbia.

2.2.3 Field Parameters and Mixing Assessment

2.2.3.1 Sampling

In situ water quality data were collected from a central location at each of the five zooplankton and benthic invertebrate sampling stations located upstream (Transect Stations RG_TN-1 through RG_TN-5) and downstream of the Elk River (Transect Stations RG_T4-1 through RG_T4-5), as well as at fish sampling areas (Sand Creek, Elk River, and Gold Creek; Figure 2.1). *In situ* measurements of water temperature, DO, pH, specific conductance (i.e., temperature-standardized measurement of conductivity), and turbidity[6] were collected as vertical profiles conducted at 0.5 to 1 m intervals (0.5 m intervals for stations less than 5 m depth, and 1 m intervals for stations greater than 5 m) during biological monitoring conducted in the Canadian portion of the reservoir in April (low-pool), June (mid-pool), and August (full-pool) 2018 and 2019 (Figure 2.2; Table 2.2). The *in situ* water quality measurements were taken using a calibrated handheld multi-parameter meter equipped with four DSS sensors. Additional water quality information collected to support interpretation of biological data at each station/area included Secchi depth and observations of water colour and clarity.

To address the concern that the Elk River may be influencing water quality at the upstream permitted station RG_KERRRD and to determine whether the Elk River is fully mixed within the reservoir at the downstream Order station RG_DSELK, a mixing assessment was conducted in Canadian portion of the reservoir under three pool conditions (low [April], intermediate [June], and full [August]) in 2018 and 2019. Specific conductance of the Elk River (RG_ELKMOUTH) has consistently been greater than that of the Kootenay River (RG_WARDB), and therefore specific conductance measurements served as the primary means to evaluate Elk River mixing. Because temperature-driven differences in water density can also influence mixing features, water temperature data were also considered for the mixing assessment.

An In-Situ Aquatroll meter was used to collect profile data across transects under low (late April), intermediate (early June), and full (late August) reservoir levels in 2018 and 2019. The In-Situ unit was used to continuously measure and log specific conductance, temperature, turbidity, and depth data upon being lowered through the water column. Koocanusa Reservoir water levels were considerably lower in April 2018 than in April 2019, and therefore the location of In-Situ transects between the two April sampling events differed. Transects were grouped closely together (approximately 250 m apart) near the Elk River confluence, and then at interval distances of approximately 1,000 m for four transects upstream of the Elk River confluence, and for

[6] Turbidity was not included as a field parameter in the 2018 to 2020 monitoring study design, however, based on the study design approval letter (ENV 2018), turbidity measurements were collected with *in situ* profiles beginning in 2018.

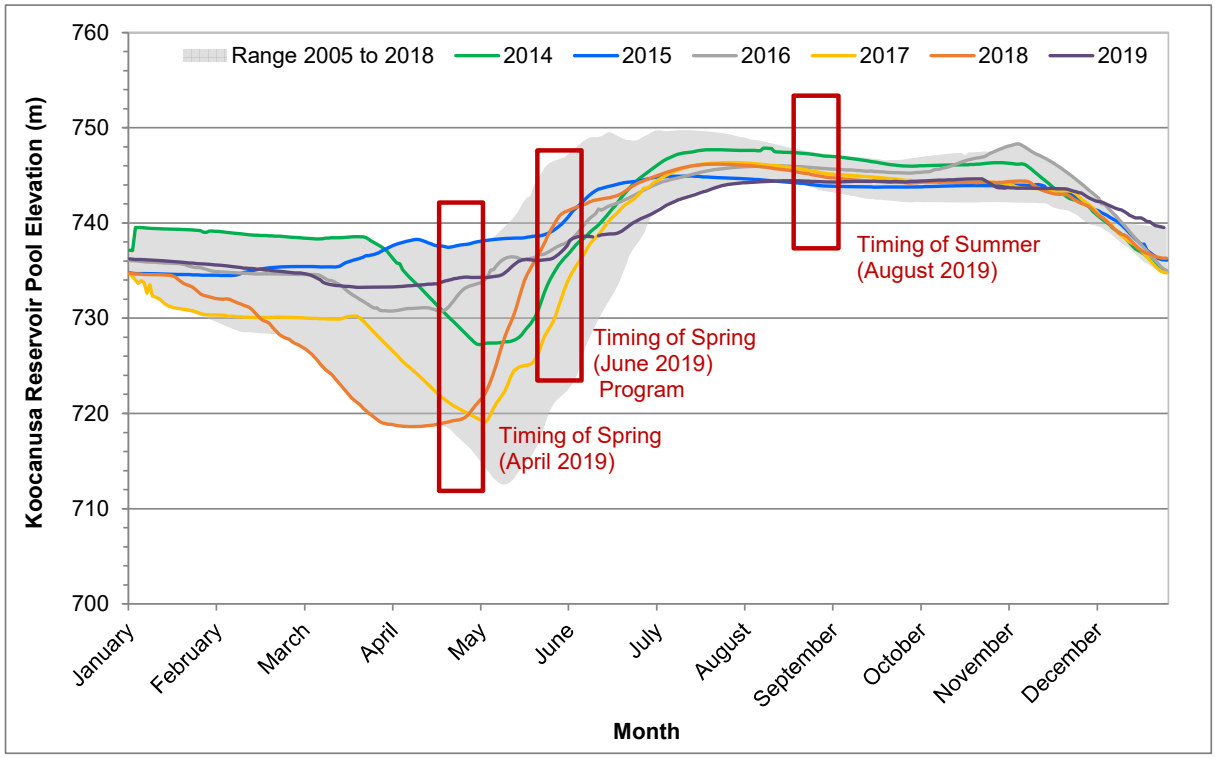


Figure 2.2: Koocanusa Reservoir Water Surface (Pool) Elevation, 2014 to 2019

Notes: Shaded area is the historical daily range of water levels from 2005 to 2018. Data from United States Army Corps of Engineers (USACE 2018).

transects located downstream of the Elk River confluence. In 2019, the mixing assessment was extended to just upstream of RG_KERRRD and downstream to RG_BORDER. Five to six evenly spaced profile stations were established at each transect during each sampling event.

2.2.3.2 Data Analysis

Evaluation of Elk River mixing in the reservoir included the generation of specific conductance, water temperature, and turbidity profile plots for each of the April, June, and August sampling events. Field coordinates (northing ~ easting) were used to create a linear model which projected the data along a straight transect. Coordinates along the shorelines were not collected in the field, and therefore shoreline locations were estimated by extending the trend line by the mean distance between transect stations in both directions. Once the x- and y-axis coordinates were estimated from the linear model, a depth profile was derived for each transect using a minimum convex polygon around the x- and y-axis locations and the maximum depth at each point, and then extrapolating the values for each parameter (specific conductance, temperature, and turbidity) horizontally between each station across the entire polygon. The parameter values were estimated using a spatial kriging model with a polynomial degree function of 1 and a range parameter (θ) set to the mean Euclidean distance between the points. The kriging spatial model takes into account the observed data and the correlation between data points under an assumed covariance function (exponential decline with distance between points) and was fit with generalized cross validation. The model was derived and extrapolated in R using the Krig and interpolate functions in the fields and raster packages. Visualization of the generated profiles was conducted by placing the interpolated values in ten bins equally spaced between the maximum and minimum values for each month, which were then assigned a unique colour ramp for each parameter.

2.3 Sediment Quality

2.3.1 Overview

Sediment quality was assessed as part of the 2018 and 2019 monitoring programs for the Canadian portion of the reservoir to characterize substrate chemistry and support interpretation for the biological component of the study. In 2018 and 2019, sediment quality sampling was conducted in August in two profundal[7] areas (RG_T4 and RG_TN), consistent with the 2014 to 2016 monitoring program (Minnow 2018a). In addition, in response to advice from the EMC, sediment sampling was completed at littoral[8] stations downstream (RG_ER and RG_GC) and

[7] Referring to the sediment collected from a deep basin of a lake/reservoir.

[8] Referring to sediment collected along the shoreline.

upstream (RG_SC) of the Elk River in April 2018 in each of the three fishing areas concurrent and co-located with littoral benthic invertebrate tissue samples (Figure 2.1; Table 2.2). Large-volume suspended sediment samples were also included in 2018 and 2019 to measure total selenium concentrations in suspended particulate at the Order station RG_DSELK. These data were collected in support of the United States Geological Survey (USGS) selenium model development as requested by ENV via the Transboundary Monitoring Task Group and the Lake Koocanusa Monitoring and Research Working Group.

2.3.2 Sample Collection

Sediment samples for physical and chemical characterization were collected in August using a stainless-steel Petite Ponar (0.023 m^2 sampling area). At each of the five stations downstream (RG_T4-1 to 5) and upstream of the Elk River (RG_TN-1 to 5), three grabs were collected to create a composite sediment sample consisting of the top three centimetres (cm) of sediment (i.e., the sediment fraction in which most benthic fauna generally reside [Kirchner 1975]). If the grab was not complete to each edge of the sampler, or lacked an intact sediment-water surface layer, it was discarded, and a new grab was collected. If the grab was acceptable, the top three centimetres were removed and placed into a separate plastic tub. This procedure was repeated until three acceptable grabs were obtained, after which the sample was homogenized using a stainless-steel spoon. The homogenized sediment was then transferred to a glass jar (for analysis of PAHs) and a labelled polyethylene sealable bag (for analyses of other parameters, as described below). Sampling locations were recorded for each station using a handheld global positioning system (GPS) unit in Universal Transverse Mercator (UTM) coordinates. Following collection of each sediment sample, the sample was placed in a cooler containing ice and later transferred to a refrigerator for storage prior to shipment to an accredited analytical laboratory at the completion of the field study.

Littoral sediment samples were collected in April using a stainless-steel spoon. Sampling occurred (concurrent with benthic and fish sampling) at five stations throughout the three sampling areas (RG_SC, RG_ER, and RG_GC; Figure 2.1), for a total of 15 samples. Samples were collected from shore, directly below the water surface, and consisted of only the top 3 cm of sediment. A minimum of five full spoon scoops were composited together in a clean white tub and the sample was homogenized before transferring to a glass jar and polyethylene bag for laboratory analysis. Sampling locations were recorded for each station using a GPS unit in UTM coordinates. Following collection for all sediment samples, they were placed in a cooler containing ice and later transferred to a refrigerator for storage prior to shipment to an accredited analytical laboratory at the completion of the field study.

Large-volume suspended sediment samples were collected and analyzed from the Canadian portion of the reservoir concurrent with samples collected in Montana. Samples for the large-volume suspended sediment analysis were collected from Order station RG_DSELK in June, July, and September 2018 and 2019 according to methods outlined in the Montana Department of Environmental Quality (MT DEQ) Quality Assurance Project Plan (QAPP; MT DEQ 2018). Briefly, samples were collected from a depth of 3 m below the surface using a pre-acid rinsed beta bottle sampler. A sufficient number of grabs were used to retrieve enough sample to fill two 20 L carboys. In addition, water quality samples for the analysis of total and dissolved selenium were collected at a depth of 3 m from the surface, and 3 m from the bottom, at each station. Accompanying *in situ* and Secchi depth measurements were collected concurrently with the large-volume suspended sediment samples. All samples were stored on ice until shipment to the designated laboratory later that day.

2.3.3 Laboratory Analysis

Sediment samples (whole sample not field-sieved) were sent to ALS (Calgary, AB) for analysis of moisture content, particle size, total organic carbon (TOC), metals/metalloids (hereafter collectively referred to as metals), and PAHs using analytical methods consistent with ENV laboratory guidance manual (Province of BC 2013, 2020) as specified in Permit 107517. Sediment sampling QA/QC included the collection and analysis of field duplicate samples (on a minimum of 10% of the total number of samples collected), as well as an assessment of the accuracy and precision of laboratory data (Province of BC 2020). Data quality was judged based on the ability to achieve minimum LRLs (Table 2.4), and review of the results from laboratory duplicate, spike recovery sample, blank sample, and CRM analyses (see Appendix A).

Large-volume suspended sediment samples were submitted to Georgia State University (Georgia, USA) for de-watering prior to being submitted to Brooks Applied Labs (BAL; Washington, USA) for analysis of total selenium. Water samples collected concurrently with the large-volume samples were sent directly to BAL for the analysis of total and dissolved selenium. Due to laboratory error, September 2019 samples from RG_DSELK were misplaced and were not located until April 2020. Although the samples were processed by Georgia State University, the analysis was further delayed due to lyophilizer malfunction. As a result, the September 2019 samples were well beyond their hold time specified in the QAPP (MT DEQ 2018), and they were not analyzed until September 2020. Results are included in this report, but should be interpreted with caution.

2.3.4 Data Analysis

Data from the 2018 and 2019 Koocanusa Reservoir Monitoring Programs were used to address the following question with regard to sediment quality:

- Are concentrations of mine-related constituents in sediment that benthic invertebrates are exposed to different downstream of the Elk River compared to upstream and are concentrations changing over time?

The assessment of sediment data included comparison to respective guidelines, spatial comparisons between downstream and upstream areas, and quantitative comparisons to data from the previous 2014 to 2016 monitoring period. Sediment particle size distribution were presented for each sampling event (August and April) using a stacked bar graph with concentrations of TOC plotted on the secondary axis. Sediment chemistry data were compared to applicable BC Working Sediment Quality Guidelines (WSQGs). The lower WSQGs (i.e., lowest effect level/threshold effect level – LEL/TEL) represent concentrations below which adverse biological effects would not be expected to occur (BCMOE 2017b). In contrast, the highest sediment quality guidelines (i.e., probable effect level/severe effect level – PEL/SEL) represent concentrations above which effects may be observed (BCMOE 2017b). Parameters with mean concentrations that exceeded the lowest WSQG were plotted. Selenium was plotted for all stations, even if concentrations were below sediment quality guidelines.

Differences among upstream (RG_TN) and downstream (RG_T4) profundal areas over time (2015 to 2019[9]) in physical and chemical sediment characteristics were quantified using an Analysis of Variance (ANOVA) with factors *Area, Year* and *Area x Year*. Data were $\log_{10}$ transformed as necessary to meet assumptions of normality and homoscedasticity or rank transformed when these assumptions could not be met. When *Station* and *Year* terms (or their interaction) were significant (P-value <0.1)[10], post-hoc contrasts were conducted to quantify significant changes in upstream and downstream stations overtime. If *Station* and/or *Year* terms were not significant, post-hoc contrasts were adjusted accordingly (e.g., if *Station* was not significant, differences grouped over station were compared among years). When the *Year* term was significant, the temporal magnitude of difference (MOD) was calculated as a magnitude of difference from the base year of sampling (2015):

[9] 2014 was not included in the analysis because this corresponded to the year which RG_T2 was sampled, which was subsequently determined to be influenced by the Elk River.

[10] A conservative p-value of 0.1 was used to accommodate small sample sizes (n = 5), and better balances the trade-offs between Type I and Type II error rates.

$$\text{MOD} = \frac{(MCT_{yeari} - MCT_{2015})}{MCT_{2015}} \times 100\%$$

where MCTs are the measures of central tendency for each year and in 2015. Measures of central tendency were means, geometric means or medians for untransformed, log10-transformed and rank-transformed analyses, respectively. When the *Area* term was significant a MOD between upstream and downstream areas was calculated as:

$$\text{MOD} = \frac{(MCT_{RG\_T4} - MCT_{RG\_TN})}{MCT_{RG\_TN}} \times 100\%$$

where MCT_{RG_T4} and MCT_{RG_TN} were the measures of central tendency for the downstream and upstream areas for each year when *Year* was significant, or overall years when not significant.

All post-hoc contrasts were corrected for the number of tests using an α = 0.1 and Tukey's (HSD) correction. The statistical analyses were conducted using R statistical software (R Core Team 2019).

2.4 Plankton

2.4.1 Overview

In 2018, phytoplankton community data were collected in August, and zooplankton community data were collected in August and September 2018 both upstream (RG_TN) and downstream (RG_T4) of the Elk River (Figure 2.1, Table 2.2). Zooplankton tissue was collected in August and September in 2018 from the same stations as community samples. Zooplankton samples collected a few days apart between August (30th and 31st) and September (4th) were used for comparison between different sampling methods (discussed below), as well as to assess potential differences between downstream and upstream areas. In addition, following the study design acceptance (ENV 2018a), new requirements for 2018 and 2019 specified that zooplankton community and tissue sampling be added in June to assess seasonal changes between spring and late-summer. In 2019, zooplankton community and tissue samples were collected in June and August. Zooplankton community and tissue samples were collected in June 2019 downstream (RG_T4) of the Elk River, and August 2019 at both upstream (RG_TN) and downstream of the Elk River (Figure 2.1, Table 2.2). Despite increased sampling effort over two days (June 12th and June 15th) beyond what is outlined in the study design, and utilization of different sampling methods (i.e., vertical hauls and horizontal tows[11]), zooplankton tissue samples could not be collected upstream of the Elk River (RG_TN) in June due to very low zooplankton

[11] Horizontal tows were conducted near the surface of the water where the highest densities of zooplankton were anticipated. Horizontal tows consisted of maneuvering the boat in large sweeping circles and towing the net behind for 5 to 10 minutes. Horizontal tows were completed at RG_TN-1, RG_TN-3, and RG_TN-5 in addition to 10 vertical hauls.

densities. Zooplankton community and tissue samples were also collected in Montana in 2019 by US ACE at International Boundary, Tenmile, and Forebay, but were not available at the time of reporting.

2.4.2 Sample Collection

2.4.2.1 Community Composition

Phytoplankton community samples were collected as depth-integrated samples through the top 10 m of the water column from five stations located upstream and five stations located downstream of the Elk River (RG_TN-1 to RG_TN-5 and RG_T4-1 to RG_T4-5; Figure 2.1) in August 2018. Water samples were collected by lowering a 1 cm inside-diameter plastic tube, equipped with a weight, to a depth of 10 m (approximate photic zone) and, after crimping the tube to prevent water loss upon retrieval, the tube was pulled to the surface and water inside the tube emptied directly into a clean pail and mixed. A total of three grabs were composited to form a sample. From this composite, a 100 millilitre (mL) sample was collected into a collection bottle to which Lugol's solution was added to preserve the sample (Lugol's solution was added at 1% concentration of the sample volume). Samples were maintained at ambient temperature until shipment to the laboratory.

Zooplankton community samples were collected in June and September 2018, and June and August 2019, using a 19 cm diameter, fine mesh (i.e., 60 micrometre [µm]) plankton net, vertically hauled through the entire water column at each sampling station based on methods described by Province of BC (2013). The plankton net was lowered to a depth of 1.5 m from the sediment-water interface (to avoid disturbing the sediment, potentially resulting in addition of benthic organisms to the sample). In August 2018, additional samples were also collected to a depth of 10 m to compare sampling methods, and for consistency with sampling methods used during the 2014 to 2016 study period[12]. Samples consisted of three vertical hauls for each of the sampling stations at RG_TN (RG_TN-1 to RG_TN-5) and RG_T4 (RG_T4-1 to RG_T4-5). Upon retrieval of each vertical haul, the sample material was transferred into a pre-labelled plastic sampling jar, and, following retrieval of the third vertical haul, preserved to a level of 10% buffered formalin in ambient water. Samples were collected along with supporting measures, including *in situ* water quality profile and Secchi depth. The zooplankton community samples were stored at ambient temperature until shipment to the laboratory.

[12] Study design requirements to collect samples from 10 m below the surface during the period monitoring cycle (2014 to 2016) was removed based on recommendations form the EMC to collect samples throughout the entire water column depth. Samples from 10 m were collected in 2018 in order to compare the two sampling methods, and to be able to compare the data to the previous monitoring cycle (2014 to 2016).

2.4.2.2 Tissue Chemistry

Zooplankton tissue samples were collected using an 80 µm mesh net (30 cm diameter) so that the sample targeted zooplankton and was not confounded by the presence of phytoplankton (i.e., the mesh size excluded phytoplankton from zooplankton tissue samples). One sample representing a composite of ten vertical hauls through the entire water column (beginning 1.5 m above the sediment-water interface, or beginning 10 m below the surface for additional samples collected in August 2018), was collected at each RG_TN and RG_T4 transect station. Upon retrieval of each haul, as much water as possible was removed from the collected material before transferring the sample to a labelled, sterile cryovial. Following the tenth haul, the sample was placed in a cooler on ice and, at the completion of daily field sampling, frozen.

2.4.3 Laboratory Analysis

2.4.3.1 Community Composition

Phytoplankton community samples were sent to Plankton R Us in Winnipeg, Manitoba, where 10 mL aliquots of preserved sample were first gravity settled for 24 hours. Cell counts were performed using a modification of the Ütermohl technique (Nauwerck 1963), using an inverted microscope at magnifications of 125×, 400×, and 1200× with phase contrast illumination. Specimens were identified to the lowest taxonomic level possible. Cell counts were converted to wet weight biomass by approximating cell volume. Estimates of cell volume for each species were obtained by measuring up to 50 cells of an individual species and applying the geometric formula best fitted to the shape of the cell (Rott 1981). A specific gravity of 1 was assumed for cellular mass.

Zooplankton community samples were sent to Salki Consultant Inc. in Winnipeg, Manitoba, where after standing for 72 hours, were decanted (60 µm filter on vacuum hose, back flushed) to 45 mL glass vials to standardize volume (40 mL) for analyses and long-term storage. Samples were analyzed for species composition, abundance, and biomass of crustaceans and rotifers. Each sample underwent the following three levels of analysis:

- 1/10, 1/20, 1/40, or 1/80 (depending on zooplankton abundance in sample) of each sample was examined under a compound microscope at 63× to 160× magnification, and a minimum of 200 organisms were identified to species (crustaceans) or lowest practical level (rotifers), and assigned to instar size categories. Additionally, lengths (± 15 µm) of female and male adult specimens (n=20) of dominant species were measured in representative samples for biomass determinations;
- a sub-sample, representing 10 to 20% of the sample volume, was examined under a stereoscope at 12× magnification to identify and enumerate mature and gravid individuals

of larger-sized species and rare (i.e., less abundant) species, and to assign these individuals to size classes; and

- the entire sample was examined under a stereoscope at 1/10 magnification to improve abundance/biomass estimates for any large-sized, less abundant species in the sample.

Under a compound microscope, *Cyclopoida* and *Calanoida* specimens (mature and immature) were identified to the species level, with the exception of nauplii (N1-N6) which were classified as either *Calanoida* (small or large) or *Cyclopoida* (small or large). Cladocera were identified to the species level, while rotifers were identified to genus. Taxonomic identifications were conducted primarily using Brooks (1957), Wilson (1959), and Yeatman (1959) taxonomic keys. Digital microscopic images of selected specimens were provided with the analytical data.

Zooplankton abundance was reported as individuals per litre (ind/L) based on volumes calculated from net mouth area, sample haul depth, and replication. Biomass estimates for each species were determined from:

- abundances of adults multiplied by mean adult wet weights developed from measured lengths (n=20 per adults of dominant species in representative samples), and length-weight relationships presented in Malley et al. (1989); and,
- abundances of various immature instar categories multiplied by weights of respective size categories determined from length-weight regressions (per Malley et al. 1989).

Additional size measurements made on less common specimens were factored into the biomass calculations. Zooplankton biomass was reported in micrograms (wet weight) per litre (µg/L) of filtered water.

For both phytoplankton and zooplankton community samples, sub-sampling accuracy was assessed by performing replicate counts on 10% of samples. Replicate samples were chosen at random and processed at different times from the original sample to reduce bias (see Appendix A.).

2.4.3.2 Tissue Chemistry

Zooplankton tissue samples were shipped to Saskatchewan Research Council (SRC) in Saskatoon, Saskatchewan, for analysis of metals (including mercury) and selenium using high-resolution inductively coupled plasma mass spectrometry (HR-ICP-MS) consistent with ENV laboratory guidance as specified in Permit 107517 (Province of BC 2020). At the laboratory, the samples were freeze-dried prior to analysis, and thus concentrations were reported on a dry weight basis. Accuracy and precision of data was judged based on ability to achieve minimum

LRLs (Table 2.6), review of the results from laboratory duplicate analysis, as well as a comparison to CRMs (see Appendix A).

2.4.4 Data Analysis

2.4.4.1 Community Composition

Data from the plankton community and tissue chemistry sampling were used to address the following questions:

- Do phytoplankton and/or zooplankton community structure differ downstream of the Elk River compared to upstream, and were the differences changing over time?

Phytoplankton data were collected in 2014 to 2016 and in 2018. Zooplankton were sampled in the same years, but also in 2019. However, from 2014 to 2016 zooplankton was collected to a depth of 10 m whereas in 2019 zooplankton were collected from the entire column. Based on a comparison of sampling methods (10 m vs entire column) completed in the 2018 summary report (Minnow 2019), the methods were not found to be comparable and therefore 2019 could not be directly compared to data collected in the previous monitoring cycle (2014 to 2016). In 2018, both the entire column and 10 m sampling methods were used, therefore zooplankton comparisons from 2014 to 2018 and between 2018 and 2019 were possible, however 2019 could not be directly compared to the historical data. Both phytoplankton and zooplankton community data were compared between downstream and upstream study areas and temporally among years for which valid comparisons could be made for primary metrics of mean taxonomic richness [as identified to lowest practical level (LPL)], mean organism density (average number of cells or organisms per litre), and mean biomass (mass of cells or organisms per litre). Comparisons were made based on density as well as biomass. Relative density and relative biomass of key and/or dominant taxonomic groups were calculated as the density or biomass of each respective group relative to the total number of cells or organisms in the sample. Community endpoints were summarized by reporting the minimum, maximum, mean, median, standard deviation (SD), and sample size for each sampling area. Zooplankton community data was compared between downstream (RG_T4) and upstream areas (RG_TN), and between spring and late-summer to determine if there were community differences when the reservoir was at half pool compared to full pool (June and September; ENV 2018a).

Phytoplankton and zooplankton community data sampled to a depth of 10 m were compared statistically between downstream and upstream study areas and across time (2014 to 2018) using an ANOVA with factors *Area* and *Year* and their interaction with α=0.1. Data were $\log_{10}$ transformed (or $\log_{10}$[x +1] for counts that contain 0) as necessary to meet assumptions of normality and homoscedasticity or rank transformed when these assumptions could not be met.

Table 2.6: Minimum Laboratory Reporting Limits (LRLs) for Tissue Samples

Analyte	Units	Plankton, Benthic Invertebrate, and Fish Tissue LRL [a]
Moisture	%	-
Aluminum (Al)	µg/g dw	2
Antimony (Sb)	µg/g dw	0.1
Arsenic (As)	µg/g dw	0.05
Barium (Ba)	µg/g dw	0.05
Beryllium (Be)	µg/g dw	0.01
Boron (B)	µg/g dw	1
Cadmium (Cd)	µg/g dw	0.01
Chromium (Cr)	µg/g dw	0.5
Cobalt (Co)	µg/g dw	0.01
Copper (Cu)	µg/g dw	0.05
Iron (Fe)	µg/g dw	2
Lead (Pb)	µg/g dw	0.01
Manganese (Mn)	µg/g dw	0.1
Mercury (Hg)	µg/g dw	0.005
Molybdenum (Mo)	µg/g dw	0.1
Nickel (Ni)	µg/g dw	0.05
Selenium (Se)	µg/g dw	0.05
Silver (Ag)	µg/g dw	0.01
Strontium (Sr)	µg/g dw	0.1
Thallium (Tl)	µg/g dw	0.05
Tin (Sn)	µg/g dw	0.05
Titanium (Ti)	µg/g dw	0.05
Uranium (U)	µg/g dw	0.005
Vanadium (V)	µg/g dw	0.1
Zinc (Zn)	µg/g dw	0.5

Note: "-" indicates no data available.

[a] Laboratory reporting limits provided by SRC in Saskatoon, Saskatchewan.

When the *Area* and *Year* terms (or their interaction) were significant, post-hoc contrasts were conducted to quantify significant changes in upstream and downstream stations overtime. If the *Area* and/or *Year* terms were not significant, post-hoc contrasts were adjusted accordingly (e.g., if *Station* was not significant, differences grouped over station were compared among years). When the *Year* term was significant, the temporal magnitude of difference (MOD) was calculated as a magnitude of difference from the base year of sampling (2015[13]):

$$\text{MOD} = \frac{(MCT_{yeari} - MCT_{2015})}{PooledSD} \times 100\%$$

where MCTs are measures of central tendency for each year and in 2015. Measures of central tendency are means, geometric means or medians for untransformed, log10-transformed and rank-transformed analyses, respectively. When the rank transformation was used, the observed effect size was estimated using the Pooled Median Absolute Deviations (MAD) instead of pooled SD. When the *Area* term was significant a MOD between upstream and downstream areas was calculated as:

$$\text{MOD} = \frac{(MCT_{RG\_T4} - MCT_{RG\_TN})}{PooledSD}$$

where MCT_{RG_T4} and MCT_{RG_TN} were the measures of central tendency for the downstream and upstream areas for each year when *Year* was significant, or over all years when not significant. When the interaction between *Area* and *Year* was significant post-hoc contrast were also conducted to determine if differences between upstream and downstream differed overtime. All post-hoc contrasts were corrected for the number of tests using an α = 0.1 and Tukey's (HSD) correction. The statistical analyses were conducted using R statistical software (R Core Team 2019).

An ANOVA with factors *Method*, *Area*, and their interaction with α=0.05 was conducted on zooplankton in 2018 to test for an effect of method (10 m or Entire Column) for community endpoints. This analysis demonstrated differences between the methods for many of the endpoints and, thus a separate zooplankton ANOVA was conducted using the data from 2018 and 2019 from the Entire Column with factors *Area* and *Season* (spring or summer) with *Year* nested within season, and all possible interactions using the same selection of transformation described above. In all cases the interaction between *Area* and *Season(Year)* was significant and, thus post-hoc contrasts for all pairwise comparisons were conducted (with Tukey's HSD correction) and the MOD between areas calculated as described above.

[13] RG_T2 was considered the upstream station in 2014, however, due to influence from the Elk River, this station was relocated further upstream in 2015 to RG_TN. Among-year comparisons were thus based on using 2015 as the base year.

Non-metric multi-dimensional scaling (NMDS) was used to reduce the respective phytoplankton and zooplankton taxonomic data matrices to fewer dimensions. NMDS was conducted on data collected using the same method from 2014 to 2018. Zooplankton data collected in 2019 was also analyzed separately. NMDS is used to visualize the level of similarity of samples based on the rank (e.g. sample A is more similar to Sample B than to Sample C) of the similarities (Clarke 1993). The NMDS takes the N-dimensional (here N = number of taxa) coordinates of each sample (i.e. area) and defines a set of new N-dimensional coordinates that reflect the locations (rank distances) among samples. NMDS results of non-transformed data often leads "to shallow interpretation in which only the pattern of a few, very common species is represented" (Clarke 1993). A $\log_{10}$ transformation was applied and the resultant data matrix was assessed for normality based on the average skewness and kurtosis. The NMDS was conducted on the lowest practical level taxonomic data matrix using relative abundances. The analysis used the Bray-Curtis distance as the measure of relative community similarity or dissimilarity. A two-dimensional ordination solution was used when stress was < 0.2. Additional dimensions were used only when required to reduce the stress to <0.2. The analysis was conducted using the vegan package (version 2.5-1; Oksanen et al. 2018) in R (R Core Team 2019).

2.4.4.2 Tissue Chemistry

Data from the zooplankton tissue chemistry sampling were used to address the following question:

- Are selenium concentrations in zooplankton different downstream of the Elk River compared to upstream, and were the differences changing over time?

The assessment of zooplankton tissue data included comparison to the closest representative guidelines and benchmarks, spatial comparisons between downstream and upstream areas of the reservoir, and temporal comparison between 2018 and 2019, as well as to data from the previous monitoring period (2015 to 2016). Temporal and area comparisons were conducted using an ANOVA as described in Section 2.4.4.1, but MODs were expressed in percentage of reference instead of standard deviations. Concentrations of selenium in zooplankton tissues were compared to the interim chronic dietary BC guideline for invertebrate tissue (4 µg/g dry weight [dw]) and EVWQP Level 1 benchmarks for effects to benthic invertebrates (13 µg/g dw) and dietary effects to juvenile fish (11 µg/g dw).

Data from Montana were available from 2016 to 2018, however, the data from 2016 was reported on a wet weight basis and did not have moisture content available to do the proper conversion to dry weight. Therefore, only Montana data from 2017 and 2018 were incorporated in the data plots and compared to the guideline and benchmarks.

2.5 Benthic Invertebrates

2.5.1 Overview

In 2018, benthic invertebrate community samples were collected in August at the profundal areas downstream (RG_T4) and upstream (RG_TN) of the Elk River (Table 2.2; Figure 2.1). Benthic invertebrate tissue samples were collected from RG_T4 and RG_TN in both April and August 2018 and 2019, however, due to laboratory error, the August tissue sample from RG_T4 had to be recollected in October. In addition, benthic invertebrate tissue samples were also collected concurrent with sediment quality samples from littoral areas downstream (RG_ER and RG_GC) and the upstream (RG_SC; Figure 2.1) of the Elk River in April 2018. In 2019, benthic invertebrate tissue samples were collected at RG_T4 and RG_TN in both April and August. In Montana, benthic invertebrate tissue samples were collected from eight stations within both the Rexford and Tenmile areas in the Montana portion of the reservoir in May 2019 (Figure 2.1), as well as from the Rexford area in September 2019. In addition, surface invertebrate sampling was conducted in May and September 2019 at Tenmile, and in May, June, and September 2019 at Rexford, resulting in one successful sampling attempt in September at Rexford.

2.5.2 Sample Collection

2.5.2.1 Community

Consistent with the 2014 to 2016 study, benthic invertebrate community sampling in 2018 was completed at each of the five stations downstream and upstream of the Elk River (i.e., RG_T4-1 to RG_T4-5 and RG_TN-1 to RG_TN-5, respectively; Figure 2.1) in August when water levels were most stable, and benthic invertebrate communities were anticipated to be at peak biomass and diversity (BCMOE 2006). No community samples were collected in 2019 as per study design (Table 2.2). Benthic invertebrate community samples were collected using a stainless-steel Petite Ponar sampler. A single sample, consisting of a composite of five Petite Ponar grabs, were collected at each station with care taken so that each grab captured the surface material and was full to each edge. Incomplete grabs were discarded, while each acceptable grab was field-sieved using 500 µm mesh bag. The retained material was carefully transferred into a plastic sampling jar containing both external and internal station identification labels. Benthic invertebrate samples were preserved to a level of 10% buffered formalin in ambient water and kept at ambient temperatures. Supporting measures collected along with each sample included *in situ* water measurements and Secchi depth.

2.5.2.2 Tissue Chemistry

A single composite benthic invertebrate tissue sample (each consisting of 20 petite Ponar grabs [0.023 m^2 sampling area each grab]; four from each of the five sampling stations [RG_T4-1 to RG_T4-5 and RG_TN-1 to RG_TN-5] in each study area), was collected in April and August of 2018 and 2019. Sampling conducted by Montana in 2019 employed slightly different methods whereby samples consisted of a minimum of 4 composited grabs (however, sampling continued until the target tissue volume was achieved). For sampling completed at both the Canadian and Montana portions of the reservoir, each grab was placed into a 500 µm mesh sieve bag and sieved free of material less than the mesh size. The remaining material was transferred to a white enamel tray for removal of benthic organisms using tweezers. Visible organisms were removed from the debris/sediment and rinsed clean using ambient water. Similar to sampling conducted in 2014 to 2016, chironomids were targeted for tissue collection in 2018 and 2019, but if chironomids were not present in sufficient numbers, other benthic invertebrates were added to the sample (and noted on field sheets) to achieve sufficient sample weight for analysis (approximately 0.5 grams [g]). Benthic invertebrate tissue samples were transferred to sterile cryovials and frozen. Supporting measures for each sample included *in situ* water quality measurements and Secchi depth measurements.

Benthic invertebrates were also collected in April 2018 along the shoreline margins (littoral areas), at the downstream Elk River, and Gold Creek sampling areas, and the upstream Sand Creek sampling area (n = 5 samples per area) concurrent with littoral sediment samples. Samples were collected with a kick net having a triangular aperture measuring 36 cm per side and 400 µm mesh (net recommended for the Canadian Aquatic Biomonitoring Network [CABIN] protocol). The net was swept back and forth along the shoreline to collect benthic invertebrates. The kick-net was rinsed with water to move debris and invertebrates into the collection cup at the bottom of the net. The sample was transferred to a white enamel tray and organisms were removed from the debris using tweezers until a minimum of 0.5 g of tissue was obtained for analysis. All benthic tissue samples collected in both April and August were transferred to sterile cryovials and frozen. Supporting measures for each sample included *in situ* water quality measurements, Secchi depth measurements for deeper stations, and GPS coordinates for samples collected in littoral areas in April.

Surface invertebrate tows were also completed at Tenmile in May and September 2019, and in Rexford in May, June, and September 2019 using methods and gear consistent with that which is outlined in the QAPP (MT DEQ and FWP 2018a). In brief, samples were collected from each area using a tow net (1.0 m wide by 0.3 m high opening tapered to a 100 mm diameter collar to which a plastic receptacle [cod piece] outfitted with 80 µm mesh was placed), which was pulled

for a distance of 600 m. A total of 8 tows were completed per area, which were composited into a single sample. Sampled contents were removed from the plastic receptacle and placed in 125 mL sample bottles on ice. Samples were taken back to the Montana Fish, Wildlife, and Parks (MFWP) laboratory where they were sorted on a white tray to remove invertebrates until a 5 to 10 g sample was achieved, which was placed in a labelled vial, frozen, and shipped to Brooks Applied Laboratory. A single sample was successfully collected in September at Rexford.

2.5.3 Laboratory Analysis

2.5.3.1 Community

Benthic invertebrate community samples were submitted to Zeas Inc. in Nobleton, Ontario, a certified benthic taxonomist, for analysis following standard sorting methods which incorporate recommended QA/QC procedures for assessing sub-sampling error and sorting recovery checks (Environment Canada 2012). Upon arrival at the laboratory, a biological stain was added to each sample to facilitate greater sorting accuracy. Samples were washed free of formalin in a 500 µm sieve and examined under a stereomicroscope at a magnification of at least ten times. Benthic invertebrates were removed from the sample debris and placed into vials containing a 70% ethanol solution according to major taxonomic groups (e.g., phyla, orders). A senior taxonomist enumerated and identified benthic organisms to LPL (typically to genus or species) using the most recent taxonomic keys (see Appendix A for Data Quality Review). Following identification, representative specimens of new taxa were preserved in a 75% ethanol, 3% glycerol solution in separately labelled vials and added to the voucher collection for the project.

2.5.3.2 Tissue Chemistry

Benthic invertebrate tissue samples were shipped to SRC in Saskatoon, Saskatchewan, for analysis of metals (including mercury) and selenium using HR-ICP-MS consistent with ENV laboratory guidance (Province of BC 2020). Samples were freeze dried prior to analysis, and concentrations reported on a dw basis, along with moisture content to allow for conversion to wet weight (ww) values if required. Accuracy and precision of laboratory data were judged based on ability to achieve minimum LRLs (Table 2.6), review of results from laboratory duplicate analysis, as well as a comparison to CRMs (see Appendix A). Samples from Montana were analyzed by Brooks Applied Laboratory and results were provided in wet weights due to insufficient samples size. As a result, selenium concentrations were converted to a dry weight based on an average moisture content from samples collected from the Canadian portion of the reservoir.

2.5.4 Data Analysis

2.5.4.1 Community

Data from the benthic invertebrate community sampling were used to address the following question:

- Does benthic invertebrate community structure differ downstream of the Elk River compared to upstream, and are the differences changing over time?

Benthic invertebrate community data were compared between downstream and upstream study areas, and between 2014 to 2018, using primary metrics of mean taxonomic richness [as identified to lowest practical level (LPL)], mean organism density, and mean biomass. Benthic invertebrate communities were evaluated similar to phytoplankton communities (Section 2.4.4.1). Primary metrics of mean taxonomic richness (as identified to LPL) and mean organism density (average number of organisms per m^2) were calculated, and the absolute and relative densities (calculated as the density of each respective taxa and group relative to the total number of organisms in the sample) of dominant groups were also calculated. Community endpoints were summarized by reporting the mean, median, minimum, maximum, SD, and sample size for each sampling area.

Changes in benthic invertebrate community over time were compared using an ANOVA with factors *Year*, *Area*, and their interaction as described in Section 2.4.4.1. Benthic invertebrate communities were also assessed using NMDS as described in Section 2.4.4.1.

2.5.4.2 Tissue Chemistry

Data from the benthic invertebrate tissue chemistry sampling were used to address the following questions:

- Are selenium concentrations in benthic invertebrates greater than guidelines or effect thresholds, do they differ downstream of the Elk River compared to upstream, and are the differences changing over time?

Selenium concentrations in benthic invertebrates composite samples were plotted and compared to the BCMOE (2017a) interim guideline of 4 µg/g dw and the Level 1 benchmarks (Teck 2014) as per the EVWQP (i.e., 15, 13, and 11 µg/g dw for dietary effects on juvenile birds, effects on benthic invertebrate reproduction, and for dietary effects to juvenile fish, respectively), and were qualitatively compared across years, as well as, between upstream and downstream stations. A lack of replication precluded statistical analysis.

2.6 Fish

2.6.1 Overview

Collection of fish was an integral component of the Canadian Koocanusa Reservoir monitoring program (Table 2.2). Peamouth chub (PCC; *Mylochelius caurinus*) and redside shiner (RSC; *Richardsonius balteatus*) were collected near the mouths of Sand Creek, Elk River, and Gold Creek (RG_SC, RG_ER, and RG_GC respectively; Figure 2.1) in spring (April), prior to spawning in 2018 to evaluate fish health. These species represent a food source for piscivorous fish (Lotic 2017) and were also collected along with northern pikeminnow (NSC; *Ptychocheilus oregonensis*) for muscle and ovary tissue chemistry in 2018 and 2019. In 2019, NSC were collected as part of a supporting northern pikeminnow selenium toxicity study (Brix et al. 2020). Sport fish represent the highest trophic level in the reservoir and are an important resource for human consumption (Lotic 2017, Ramboll Environ 2016). Sport fish (e.g., bull trout [BT; *Salvelinus confluentus*]) muscle using non-lethal methods (i.e., muscle plug) were also evaluated. Fish tissue data were supplemented with fish tissue samples collected in the Montana portion of the reservoir from 2018 and 2019 (Figure 2.1).

Redside shiner, which had the highest ovary mean selenium concentrations in the 2014 to 2016 monitoring program (Minnow 2018a) were also the sentinel species for assessment of recruitment (requested and supported by the EMC). Recruitment was assessed in August 2018 and 2019 at each of the three fishing areas to confirm the presence of young-of-the-year (YOY) RSC, among other endpoints[14] (Table 2.2).

2.6.2 Fish Population Health

An *a priori* power analysis was completed to determine sample sizes required to detect a difference of 20 to 30% in relative gonad size (standard Environmental Effects Monitoring [EEM] protocol; Environment Canada 2012). For the fish health assessment, 20 sexually mature female and 35 male PCC were targeted in each of the three study areas (downstream areas of Elk River and Gold Creek, and the upstream area of Sand Creek; Figure 2.1) in April 2018 (i.e., immediately prior to spawning). The *a priori* power analysis indicated that more RSC (35 female and 45 males) would be required to detect a difference of 20 to 30% in relative gonad size in each of the three study areas. Redside shiners were sampled at the same time as PCC. Fish were collected using very short-set gill nets (starting with a maximum set time of 15 minutes). Representatives from the Elk Valley Fish and Fish Habitat Committee (EVFFHC) attended the EMC meeting on

[14] Additional work was conducted for the Redside Shiner Toxicity Study in 2018 to target spawning at monitoring areas within the valley.

January 23rd, 2018, where members indicated that if gill nets are requested, only small-mesh, short-set gill nets would be approved to avoid incidental mortalities of sport fish.

This advice was followed in the application for the scientific fish collection permit submitted to the Ministry of Forests, Lands, Natural Resource Operations, and Rural Development (FLNRO).

Gill nets with mesh size specific for targeting PCC (2") and RSC (1") were set on the bottom and deployed in each fishing area for each species. The location of each net set (UTM coordinates), as well as the time of deployment and the time of retrieval, was recorded on field sheets. Captured PCC and RSC were sacrificed by a decisive blow to the head and transported to a dedicated field laboratory for processing as soon as possible following capture (i.e., within hours).

Peamouth chub and redside shiner fork and total lengths were measured to the nearest millimeter using a standard measuring board. Fish weights were measured using appropriately-sized spring scales (e.g., 50 g, 100 g, and 300 g) or a digital balance (± 0.001 g). Each fish was opened, and the sex and/or sexual maturity recorded. Whole gonads and livers were removed from each fish and weighed to the nearest milligram using an analytical balance with a surrounding draft shield. Whole ovaries and a skinless, boneless muscle fillet sample were collected from each sexually mature female being retained for tissue analysis and placed in separately labelled, polyethylene (Whirl-Pak®) bags. Following these measures, age structures (i.e., otoliths) were removed from each fish. Each age structure was wrapped separately in waxed paper and placed inside a labelled envelope. Internal or external deformities, erosions (fin and gill), lesions, or tumors (DELT) observed during processing (Sanders et al. 1999) and parasites were recorded on laboratory bench sheets. Samples (i.e., ovaries, muscle, and age structures) were stored frozen pending shipment to the respective laboratory for analysis.

2.6.3 Fish Tissue

The targeted species, the number of samples collected, and the timing of collection for the fish tissue chemistry assessment were as follows:

- peamouth chub PCC and RSC ovary and muscle collection from up to 10 females per species per study area in April 2018 and 2019. These species were targeted in the 2014 to 2016 monitoring cycle and at this time, both had mean selenium concentrations in ovaries above the BC guideline. In the study design for 2021 to 2023, the timing of collection of these samples will be revisited to focus on collection of ripe ovaries;
- northern pikeminnow ovary and muscle collection from up to 10 females per fishing area in early June 2018. Northern pikeminnow were collected in June rather than April (as per the 2014 to 2016 program) to determine if average ovary selenium concentrations above the EVWQP Level 1 benchmark for effects to fish reproduction observed in 2014 were

potentially a result of pikeminnow having undeveloped ovaries (i.e., gonadosomatic index [GSI] <1 %). In 2019, NSC were collected as part of a supporting selenium toxicity study that took place in June and July. These samples were used to supplement the 2019 tissue data set; and,

- sport fish muscle (non-lethal muscle plugs) collection from up to eight individuals per species in each of the three fishing areas in 2018 and 2019. Fishing took place in April, June, and/or August of each year.

The sport fish collection targeted species previously collected in Koocanusa Reservoir (i.e., bull trout, Kokanee [KO; *Oncorhynchus nerka*], mountain whitefish [MW; *Prosopium williamsoni*], rainbow trout [RB; *Oncorhynchus mykiss*], westslope cutthroat trout [WCT; *Oncorhynchus clarki lewisi*], and yellow perch [YP; *Perca flavescens*]; Minnow 2018h). Burbot (*Lota lota*) were not a target species for muscle tissue sampling based on concerns regarding low abundance[15] and the cultural importance of this fish species to the KNC. If burbot were caught, they were immediately released. In addition, previous analysis of burbot tissue confirmed that selenium concentrations were below the BC guideline and EVWQP Level 1 benchmarks, and not expected to cause effects (Minnow 2015c).

Fish were collected using multiple methods. Very short-set gill nets (starting with a maximum set time of 15 minutes) were used to minimize effects to fish. Three foot-diameter hoop nets were also deployed (effective for catching YP; Minnow 2018h) and were left to fish overnight (i.e., approximately 24 hours). Leads were attached to the opening of each net and typically set perpendicular to shore. Yellow perch were sacrificed as they were inadvertently introduced into Koocanusa Reservoir (Huston et al. 1984; Hamilton et al. 1990), and the FLNRO requested that perch collected during sampling be sacrificed (FLNRO 2018). Angling, although not effective in April due to water flow and turbidity, was used to target sport fish and supplement catches of other species, such as NSC. Angling was conducted from a boat using a single hook baited with salted salmon roe or earthworms, and using fishing lures. In August 2018, some fish sampled were caught from anglers. The location (UTMs) of each net set or angling location, as well as the time of deployment and the time of retrieval, were recorded on field sheets.

For collection of tissues from fish that were sacrificed (i.e., PCC, NSC, RSC, and YP), methods were consistent with those described in Section 2.6.2. For fish being sampled non-lethally (i.e., most sport fish), fish were lightly anaesthetized in a dilute clove oil solution prior to processing. Each fish was then weighed using appropriately-sized spring scales, near the top

15 In recent years, lower Kootenay burbot populations were designated as critically imperiled and red-listed, meaning potentially extirpated, endangered, or threatened (BCMOE 2015)

of the scale's range to so that measurements achieved a resolution of approximately one percent or less. Total length and fork length was determined using a standard measuring board (± 1 mm). External deformities, erosions (fin and gill), lesions, or tumors observed (i.e., DELT survey; Sanders et al. 1999) were recorded on field sheets. A muscle sample was collected using a biopsy punch (4 mm acu-punch). Following extraction of the biopsy sample, skin was removed from the sample using a scalpel and the remaining muscle placed into a sterile cryovial. Once each fish recovered from the anesthetic in a recovery bin, it was released back into the reservoir near its capture location.

Fish collected as part of the Montana program was conducted by MFWP in alignment with the 2018 Fish Tissue QAPP (Montana DEQ and FWP 2018b). Unlike BC permit requirements, gillnets were set for approximately 24 hours at Rexford in the spring and fall (mid-May and mid-September 2019) and at Kikomun in the fall (mid-September 2019; Figure 2.1). Fish collected by MFWP were provided to Minnow for onshore processing and tissue sample collection. A total of eight individuals per species were targeted from each study area (except for NSC where 15 individuals were targeted in May) with a preference for sampling mature females. Fish tissue sample preparation was completed using similar processing methods described above, with the exception that sport fish were sampled lethally. Samples were stored frozen until shipment to an accredited laboratory.

2.6.3.1 Laboratory Analysis

Fish tissues collected for age analysis were submitted to AAE Technical Services in Winnipeg, Manitoba. Otoliths were prepared and read under a compound microscope using transmitted light. For each structure, the age and edge condition were recorded along with a confidence rating for the age determination. For the purpose of QA/QC, greater than 40% of samples were reassessed by a second individual at the laboratory (see Appendix A).

Canadian fish tissue samples for chemical analysis were submitted to SRC in Saskatoon, Saskatchewan, Montana fish tissue samples were submitted to Brooks Applied Laboratories.

Samples were initially freeze-dried for determination of moisture content and then analyzed for metals (including mercury) using HR-ICP-MS. Results were reported on a dry weight basis, along with moisture content (based on the difference between wet and freeze-dried sample weights) to allow conversion to wet-weight values. Accuracy and precision of data was judged based on ability to achieve minimum LRLs (Table 2.6), replicate analysis of a minimum of 10% of samples, as well as a comparison to CRMs (see Appendix A).

Fish tissue samples collected from the Montana portion of the reservoir were submitted to BAL (Washington), consistent with the 2018 studies (MT DEQ and FWP 2018b), for analyses that

conformed to EPA820-F-16-007. Analyses were conducted for moisture content (ASTM D2974A modified dry 60-65 ºC) and, following digestion (US EPA method 3050), for metals (including arsenic, cadmium, copper, lead, and selenium) by ICP-MS (method WS6020) with results reported in dry weight. The target detection limit for determination of selenium concentrations was 0.5 µg/g dry weight or lower.

2.6.4 Fish Recruitment

A non-lethal sampling design was used to investigate whether RSC recruitment was occurring, and to evaluate condition (among other non-lethal Environment Effects Monitoring [EEM] endpoints) of YOY RSC at areas downstream of the Elk River (Elk River and Gold Creek) relative to upstream (Sand Creek) in August 2019. Seining was used in littoral areas to collect YOY RSC in each of the three study areas (Figure 2.1). Upon retrieval of the net, captured fish were identified, enumerated, and inspected for external anomalies (i.e., DELT survey). Non-target fish were released alive at the capture location. Captured RSC were placed in buckets containing aerated water and retained for processing (described below). Fish sampling targeted a minimum of 100 YOY RSC from each fishing area. The recruitment assessment focused on YOY versus non-YOY (mostly expected to be 1+ age category based on previous sampling; Minnow 2018a). Sufficient numbers of the non-YOY age class were not captured (e.g., greater than 100 RSC), so endpoints were not examined separately for non-YOY. Recorded supporting information for the sampling included duration of sampling effort, sampling depth, area/distance sampled, UTM coordinates, and habitat descriptions.

Fish were lightly anaesthetized in a dilute clove oil solution prior to processing. Lengths (fork and total) were measured to the nearest hundredth of a millimetre using digital calipers, fresh body weight was measured to the nearest milligram using an analytical balance with a repeatability (standard deviation) of ± 0.003 g, and external DELT were recorded on field sheets for each individual. Ten RSC of varying sizes were sacrificed at each study area for collection of otoliths according to methods described in Section 2.6.2. With the exception of fish sacrificed for aging, fish were placed into a recovery bucket following processing and released near the point of capture following completion of sampling.

2.6.5 Data Analysis

Data from the health assessment, tissue sampling, and recruitment survey were used to address the following questions:

- Is fish health different downstream of the Elk River compared to upstream, and are differences in fish health endpoints changing over time?

- Are selenium concentrations in fish tissue greater than guidelines or effect thresholds, do they differ downstream of the Elk River compared to upstream, and are the differences changing over time?
- Are there differences in redside shiner recruitment downstream of the Elk River compared to upstream?

Statistical comparisons of fish health endpoints were conducted using a two-way ANOVA (Age, Length, Adjusted body weight; as described in as described in 2.4.4.1) or a two-way ANCOVA with factors Area and Year. The ANCOVA model varied depending on the comparisons of regression slopes between areas and among years. The ANCOVA analyses were conducted as described below.

A full interaction model was fit:

$$Y = \beta0 + \beta1Cov + \beta2Area + \beta3Year + \beta4\ Area\times Year + \beta5Cov\times Area + \beta6Cov\times Year + \beta7Cov\times Area\times Year + \varepsilon$$

where Y is the response variable, Cov is the covariate, Area is a categorical variable for area, Year is a categorical variable for year, ε is the error term, and βi are the regression coefficients. The first hypothesis to test was whether the regression slopes were dependent on area and year:

H01: $\beta7=0$ (regression slopes were not dependent on area and year)

If the hypothesis H01 was rejected (i.e. $\beta7\neq0$) with an $\alpha = 0.05$, then the regression slopes were dependent on area and year. When the interaction term was significant then the coefficients of determination (R2) of the interaction model and parallel slope model were compared to assess whether the slopes were practically significant. If the R2 was > 0.8 and within 0.02 between the two models then the conclusion was that the interaction model and parallel slope models were practically the same (Environment Canada, 2012) and the ANCOVA proceeded with testing the additional interactions. When the interaction could not be removed, post-hoc trend analyses were conducted for each area and year to determine which pairwise regression slopes were significantly different among areas and between reference and exposed stations. For pairwise comparisons with different regression slopes, post-hoc tests were conducted and magnitude of difference (MOD) calculations (percentage difference of reference) were conducted at the minimum and maximum values of the overlap in covariate values between areas or year. When the regression slopes term was not significant (i.e., parallel slopes) then post-hoc comparisons and MODs were conducted at the mean value of the covariate.

All post-hoc contrasts were corrected for the number of tests using an $\alpha = 0.1$ and Tukey's (HSD) correction. The statistical analyses were conducted using R statistical software (R Core Team 2019).

Selenium concentrations in fish tissues collected in 2019 from downstream areas (RG_ER and RG_GC) were compared statistically to those from the upstream area (RG_SC) for PCC and RSC. Selenium concentrations in all fish tissues (for both the Canadian and Montana portions of the reservoir) were also plotted and compared to the BCMOE (2017a) guidelines (for muscle [4 µg/g dw] and ovary [11 µg/g dw] tissues), and US EPA (2016) criterion (for muscle [11.3 µg/g dw] and ovary [15.1 µg/g dw] tissues). Westslope cutthroat trout were also compared to a species specific EVWQP Level 1 benchmark for reproduction (25 µg/g dw), and a Level 1 muscle equivalent benchmark to the ovary benchmark (15.5 µg/g dw), based on the relationship observed between selenium in muscle and ovary. Temporal and spatial differences in selenium tissue concentrations were assessed using an ANOVA with factors *Year*, *Area*, and their interaction as described in Section 2.3.4.4.1. Sampling events with less than 5 fish [16]were excluded from the analysis. Magnitude of difference were expressed as a percentage of the base year (first year of sampling) for significant temporal post-hoc comparisons or from the upstream location for the significant spatial post-hoc comparisons.

Data analysis for the redside shiner recruitment survey included comparing fish health endpoints of fork length, fresh body weight, and Fulton's condition factor (body weight / fork length^3 x 10^5), which were summarized by separately reporting mean, median, minimum, maximum, standard deviation, standard error and sample size for each fishing area. These endpoints were used as the basis for evaluating four response categories (survival, growth, reproduction, and energy storage; Table 2.1) according to the procedures outlined for a non-lethal, small-bodied fish assessment in EEM (Gray et al. 2002; Environment Canada 2012). The proportion of YOY fish captured at each area were compared qualitatively.

[16] A minimum of eight fish are required for comparison against BC guidelines, however, for the purposes of comparison between areas, a minimum sample size of five was chosen for sport fish because of the difficulty of obtaining eight individuals of each species per study area.

3 WATER QUALITY, PRODUCTIVITY, AND MIXING

3.1 Overview

Water quality data collected within Koocanusa Reservoir from 2017 to 2019 were compared to applicable guidelines, EVWQP benchmarks, and SPOs, among downstream and upstream stations/areas, and to data collected historically. In accordance with Permit 107517, water quality was monitored monthly under ice-free conditions (excluding sampling periods that posed safety concerns), as well as weekly from March 15th to July 15th (per the Koocanusa Reservoir Monitoring Plan; Teck 2018b), in each year by Teck at five stations within Koocanusa Reservoir: one situated upstream from the Elk River (RG_KERRRD) and four located downstream from the Elk River (RG_DSELK, RG_GRASMERE, RG_USGOLD, RG_BORDER; Figure 2.1). This water quality monitoring included water chemistry analyses and *in situ* measurements at each station. These data were provided in annual reports (Teck 2018, 2019, and 2020) and are summarized in this report along with water quality information collected concurrently with biological sampling conducted in 2018 and 2019 at downstream (RG_T4) and upstream (RG_TN) transects (Figure 2.1). Water quality data collected by Montana DEQ in 2017 to 2019 from International Boundary, Tenmile, and Forebay stations in the Montana portion of the reservoir were incorporated into the data analyses as applicable. As per requirement from ENV, analysis of data from 2018 and 2019 also included summarization of average monthly nitrate and selenium loadings to Koocanusa Reservoir from the Elk and Kootenay rivers. Water quality monitoring conducted in the Canadian portion of the reservoir in 2018 and 2019 also included specific conductance, temperature, and turbidity profiling to evaluate Elk River mixing characteristics in the reservoir under low (late April), intermediate (early June), and full (late August) pool conditions.

3.2 Water Quality

3.2.1 Water Chemistry

Mean monthly concentrations of Order constituents (nitrate, selenium, sulphate, and dissolved cadmium) were consistently below SPOs at RG_DSELK from 2017 to 2019, with the exception of selenium concentrations in April 2018 (Appendix Tables B.15 to B.17; Appendix Figures B.4, B.10, B.12, and B.13). Due to unsafe conditions for accessing the Order station RG_DSELK in April 2018, water sampling was not completed at the permitted sampling location but instead was conducted at alternate locations from the east shoreline of the reservoir. As a result, water chemistry data taken near station RG_DSELK in April were not representative of the Order station. Selenium concentrations were consistently elevated above the BC guideline at RG_ELKMOUTH in all samples collected from 2017 to 2019 (Appendix Tables B.15 to B.17).

Of constituents with EWTs (i.e., total antimony, total barium, total boron, dissolved cobalt, total lithium, total manganese, total molybdenum, total nickel, nitrite, total dissolved solids, total uranium, and total zinc in addition to the Order constituents), only nickel (11% of samples at RG_DSELK were elevated relative to EVWQP Level 1 interim screening value in 2017) and zinc (9% and 8% of samples at RG_WARDB were elevated relative to the long-term BC guideline in 2017 and 2018, respectively) occurred at concentrations above respective guidelines in 2017 and/or 2018 (Appendix Tables B.15 and B.17; Appendix Figures B.1 to B.16). All constituents with EWTs consistently occurred at concentrations below applicable BC water quality guidelines at all permitted water quality stations in 2019 (Appendix Table B.17; Appendix Figures B.1 to B.16).

Temporal comparisons of mean monthly concentrations of Order constituents at stations downstream of the Elk River relative to concentrations occurring upstream at station RG_KERRRD indicated significantly[17] higher concentrations of dissolved cadmium, nitrate, and total selenium, and significantly lower concentrations of sulphate, downstream of the Elk River consistently from 2014 to 2019 (where sufficient data were available; Appendix Table B.18). Dissolved cadmium and nitrate concentrations did not show any significant trends at any of the permitted stations since 2014, but significant increasing trends in sulphate concentrations were indicated downstream of the Elk River at stations RG_DSELK, RG_GRASMERE, RG_BORDER, International Boundary, Tenmile, and Forebay, as well as at both inputs to the reservoir (RG_WARDB and RG_ELKMOUTH). In addition, significant increasing trends in total selenium concentrations at station RG_DSELK, and significant decreasing trends at International Boundary from 2014 to 2019 were also observed (Appendix Table B.19).

For constituents with EWTs, significantly higher monthly mean concentrations of antimony, barium, lithium, nitrite, and TDS were observed at all stations downstream of the Elk River, as did concentrations of molybdenum at downstream stations RG_DSELK and RG_GRASMERE compared to upstream station RG_KERRRD consistently from 2014, or 2015 to 2019 (Appendix Table B.18). Significantly lower monthly mean concentrations of manganese and zinc were also observed at all downstream stations compared to RG_KERRRD consistently from 2014, or 2015 to 2019 (Appendix Table B.18). None of the constituents with EWTs showed a significant increasing trend at any stations downstream or upstream of the Elk River over the period from 2014 to 2019 (Appendix Table B.19). Rather, significant decreasing trends in concentrations of total manganese (RG_GRASMERE and RG_BORDER), total molybdenum

[17] Significance implies statistical significance here and throughout the report, unless otherwise specified (i.e., biologically meaningful significance).

(RG_DSELK and RG_GRASMERE), total nickel (RG_DSELK and RG_BORDER), and dissolved cobalt (RG_DSELK) were indicated at one or two stations downstream of the Elk River from 2014 to 2019 (Appendix Table B.19). At the inputs to the reservoir, significant increasing trends were observed for TDS and boron at RG_WARDB, and for lithium at RG_ELKMOUTH, whereas significant decreasing trends were observed for lithium, molybdenum, nickel, zinc, and dissolved cadmium (Appendix Table B.19).

3.2.2 Productivity

Productivity comparisons among the permitted stations (RG_KERRRD, RG_DSELK, RG_GRASMERE, RG_USGOLD, and RG_BORDER), Kootenay River (RG_WARDB) and Elk River (RG_ELKMOUTH), and Montana (International Boundary, Tenmile, and Forebay) were based on evaluation of total nitrogen to total phosphorus concentration (N:P) ratios. Ratios of N:P greater than 15 indicate phosphorus limitation, whereas ratios less than 7 indicate nitrogen limitation, based on categories defined by McDowell et al. (2009) using mass concentrations. At all permitted water quality stations, annual median N:P ratios were consistently 15 or more throughout the water column both downstream and upstream of the Elk River from 2017 to 2019 indicating phosphorus limitation, except at upstream station RG_KERRRD near the water column surface where the N:P ratio fell between 7 and 15 in both 2017 and 2018 (Figure 3.1). These results were consistent with those observed at all Koocanusa Reservoir stations from 2014 to 2016. Water quality N:P ratios at the Kootenay River inflow (station RG_WARDB) indicated a co-limited system in both 2017 and 2018, but a phosphorus limited system in 2019 (Figure 3.1). Near the mouth of the Elk River (station RG_ELKMOUTH), phosphorus limitation was consistently indicated, with highest N:P ratios at this location when compared to other stations located downstream and upstream in the reservoir, from 2017 to 2019 (Figure 3.1).

The trophic status classification of Koocanusa Reservoir using Nordin (1985) categories for BC freshwaters suggested a brief period of eutrophic conditions in the spring when the reservoir is riverine (April through June) based on total nitrogen, total phosphorus, and Secchi depth data, transitioning to mesotrophic or oligotrophic when the reservoir is at full-pool based on whether total nitrogen and Secchi depth data were used, or total phosphorus and chlorophyll-a data were used, respectively, in each of 2017 and 2018 (Tables 3.1 and 3.2). In 2019, Koocanusa Reservoir was classified primarily as oligotrophic for most of the year using total phosphorous and chlorophyll-a data, but as eutrophic in spring and early summer and otherwise mesotrophic using

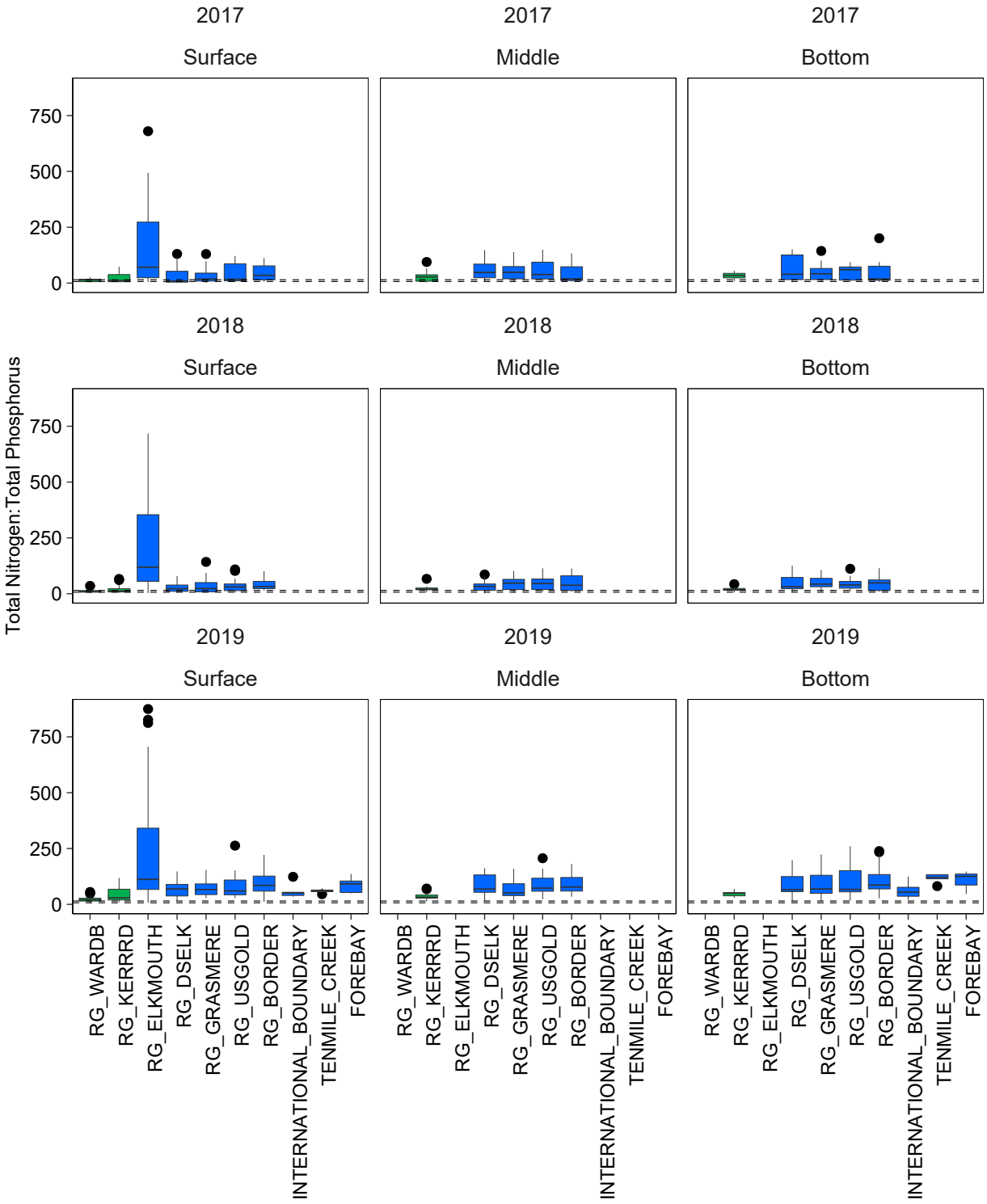


Figure 3.1: Ratio of Total Nitrogen to Total Phosphorus at Upstream (Green) and Downstream (Blue) Stations, Koocanusa Reservoir Monitoring Program, 2017 to 2019

Notes: Total N:P ratios > 15 (hatched line) are indicative of phosphorus limited systems. Total N:P ratios < 7 (hatched line) are indicative of nitrogen limited systems. Total N:P ratios in between 7 and 15 indicate co-limitation.

Table 3.1: Trophic Level Classification (Nordin 1985) Using Monthly Means for Productivity Parameters Collected at Stations in the Koocanusa Reservoir Study Area, 2017

Parameter		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total Phosphorus (mg/L)	RG_WARDB	-	0.015	0.014	0.012	0.064	0.070	0.026	0.006	0.009	0.007	0.010	0.006
	RG_KERRRD	-	-	-	0.057	0.080	0.027	0.005	0.003	0.002	0.003	0.004	0.006
	RG_ELKMOUTH	0.006	0.006	0.027	0.017	0.093	0.064	0.006	0.005	0.003	<0.002	0.004	0.003
	RG_DSELK	-	-	-	0.392	0.155	0.031	0.005	0.005	0.002	0.005	0.005	0.007
	RG_GRASMERE	-	-	-	0.057	0.169	0.028	0.009	0.002	0.004	0.002	0.005	0.006
	RG_USGOLD	-	-	-	0.085	0.073	0.028	0.006	0.003	0.003	0.003	0.003	0.004
	RG_BORDER	-	-	-	0.038	0.048	0.024	0.011	0.003	0.002	0.002	0.004	0.003
Chlorophyll-a (mg/L)	RG_WARDB	-	-	-	-	-	-	-	-	-	-	-	-
	RG_KERRRD	-	-	-	0.003	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001
	RG_ELKMOUTH	-	-	-	-	-	-	-	-	-	-	-	-
	RG_DSELK	-	-	-	0.002	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001
	RG_GRASMERE	-	-	-	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.002
	RG_USGOLD	-	-	-	0.001	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.002
	RG_BORDER	-	-	-	0.001	0.000	0.001	0.001	0.001	0.001	0.002	0.002	0.002
Secchi Depth (m)	RG_WARDB	-	-	-	-	-	-	-	-	-	-	-	-
	RG_KERRRD	-	-	-	0.2	0.1	0.3	3.6	6.0	3.8	7.5	4.3	1.7
	RG_ELKMOUTH	-	-	-	-	-	-	-	-	-	-	-	-
	RG_DSELK	-	-	-	0.2	0.1	1.2	4.0	6.0	3.2	6.9	5.0	3.5
	RG_GRASMERE	-	-	-	0.2	0.1	1.7	4.4	6.0	5.0	6.2	5.0	3.5
	RG_USGOLD	-	-	-	0.3	0.1	2.6	3.9	4.7	6.3	7.2	5.0	3.2
	RG_BORDER	-	-	-	0.3	0.5	2.0	4.1	4.3	5.0	4.2	4.5	3.5
Total Nitrogen (mg/L)	RG_WARDB	-	0.29	0.25	0.22	0.36	0.27	0.14	0.09	0.11	0.11	0.13	0.16
	RG_KERRRD	-	-	-	0.29	0.37	0.20	0.16	0.15	0.13	0.17	0.13	0.17
	RG_ELKMOUTH	1.70	1.58	1.19	1.00	1.05	0.92	0.92	1.17	1.31	1.36	1.32	1.28
	RG_DSELK	-	-	-	1.15	0.65	0.35	0.33	0.35	0.28	0.34	0.31	0.48
	RG_GRASMERE	-	-	-	0.61	0.53	0.34	0.27	0.29	0.24	0.21	0.25	0.31
	RG_USGOLD	-	-	-	0.61	0.55	0.37	0.30	0.36	0.27	0.20	0.25	0.31
	RG_BORDER	-	-	-	0.52	0.50	0.34	0.31	0.29	0.27	0.20	0.25	0.32

Indicates oligotrophic status based on Nordin (1985) classification for the indicated parameter value.

Indicates mesotrophic status based on Nordin (1985) classification for the indicated parameter value.

Indicates eutrophic status based on Nordin (1985) classification for the indicated parameter value.

Notes: Nordin 1985 criteria used in British Columbia for trophic level classification. "-" indicates no data available.

Table 3.2. Trophic Level Classification Using Monthly Means of Productivity Measures, Koocanusa Reservoir Monitoring Program, 2018

Parameter		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total Phosphorous (mg/L)	RG_WARDB	0.016	0.014	0.021	0.018	0.090	0.024	0.016	0.008	0.010	0.011	0.010	0.009
	RG_KERRRD	-	-	-	0.029	0.050	0.008	0.010	0.004	0.005	0.010	0.004	0.007
	RG_ELKMOUTH	0.005	0.003	0.007	0.018	0.192	0.013	0.013	0.004	0.004	<0.002	0.006	<0.002
	RG_DSELK	-	-	-	0.097	0.130	0.010	0.008	0.006	0.005	0.004	0.004	0.021
	RG_GRASMERE	-	-	-	0.089	0.080	0.009	0.018	0.003	0.005	0.004	0.004	0.003
	RG_USGOLD	-	-	-	0.074	0.056	0.009	0.009	0.005	0.004	0.003	0.004	0.004
	RG_BORDER	-	-	-	0.024	0.037	0.009	0.008	0.004	0.005	0.004	0.003	0.003
Chlorophyll-a (mg/L)	RG_WARDB	-	-	-	-	-	-	-	-	-	-	-	-
	RG_KERRRD	-	-	-	0.002	0.001	0.000	0.002	0.001	0.002	0.002	0.002	0.002
	RG_ELKMOUTH	-	-	-	-	-	-	-	-	-	-	-	-
	RG_DSELK	-	-	-	0.003	0.001	0.003	0.003	0.001	0.002	0.001	0.002	0.003
	RG_GRASMERE	-	-	-	0.002	0.001	0.003	0.003	0.001	0.002	0.001	0.002	0.002
	RG_USGOLD	-	-	-	0.002	0.001	0.002	0.003	0.001	0.002	0.002	0.002	0.003
	RG_BORDER	-	-	-	0.001	0.001	0.002	0.002	0.001	0.001	0.002	0.002	0.002
Secchi Depth (m)	RG_WARDB	-	-	-	-	-	-	-	-	-	-	-	-
	RG_KERRRD	-	-	-	-	0.2	1.1	2.6	5.5	2.8	3.9	7.1	-
	RG_ELKMOUTH	-	-	-	-	-	-	-	-	-	-	-	-
	RG_DSELK	-	-	-	1.0	0.2	2.2	3.0	6.3	4.0	3.0	5.1	5.6
	RG_GRASMERE	-	-	-	-	0.2	2.3	2.9	5.4	4.0	3.5	5.3	4.5
	RG_USGOLD	-	-	-	-	0.4	2.3	3.2	6.0	3.7	3.1	5.1	4.3
	RG_BORDER	-	-	-	-	0.7	1.8	3.0	5.3	4.1	3.5	4.1	4.1
Total Nitrogen (mg/L)	RG_WARDB	0.22	0.23	0.24	0.20	0.33	0.14	0.13	0.13	0.11	0.13	0.15	0.17
	RG_KERRRD	-	-	-	0.20	0.41	0.14	0.17	0.16	0.15	0.10	0.23	0.18
	RG_ELKMOUTH	1.78	1.57	1.69	1.43	1.07	1.02	1.16	1.42	1.55	1.40	1.04	1.43
	RG_DSELK	-	-	-	0.78	0.71	0.32	0.27	0.28	0.30	0.33	0.33	0.33
	RG_GRASMERE	-	-	-	0.73	0.57	0.33	0.29	0.29	0.25	0.33	0.31	0.28
	RG_USGOLD	-	-	-	0.68	0.54	0.34	0.26	0.33	0.25	0.30	0.25	0.33
	RG_BORDER	-	-	-	0.63	0.51	0.33	0.31	0.31	0.36	0.30	0.29	0.29

Indicates oligotrophic status based on Nordin (1985) classification for the indicated parameter value.

Indicates mesotrophic status based on Nordin (1985) classification for the indicated parameter value.

Indicates eutrophic status based on Nordin (1985) classification for the indicated parameter value.

Notes: Nordin 1985 criteria used in British Columbia for trophic level classification. "-" indicates no data available.

classification based on Secchi depth data, and as mesotrophic for the entire year except at RG_ELKMOUTH using classification based on total nitrogen data (Table 3.3). Changes in the trophic status of the reservoir throughout the year (primarily in the spring season) were observed from 2017 to 2019, and may be reflective of the rapid changes in water levels that take place from April to June during freshet. Total phosphorus and Secchi depth data both suggested lower productivity beginning in early summer compared to the spring, but a similar change in trophic status at this time of year was not evident based on indicators of chlorophyll-a and total nitrogen (Tables 3.1 to 3.3).

3.2.3 Loadings

Monthly nitrate and selenium loadings were estimated based on total monthly flow and monthly average nitrate and selenium concentrations at stations RG_ELKMOUTH (Elk River) and RG_WARDB (Kootenay River). In 2018, highest nitrate and selenium loadings occurred in May and June, whereas in 2019 highest loadings occurred in June and July, at both stations. Loadings of both nitrate and selenium were also high from January to April in 2018 at RG_ELKMOUTH compared to loadings from the same time frame in 2019. Overall loadings of both nitrate and selenium to Koocanusa Reservoir were higher from the Elk River than from the Kootenay River on monthly and annual timescales, and generally higher in 2018 than in 2019 (Table 3.4). Overall, both nitrate and selenium loadings appear to be consistent for both stations from 2014 to 2019, with consistently observed seasonal peaks during freshet (Figures 3.2 and 3.3).

3.3 *In Situ* Water Quality Profiles

In situ profiles conducted in August 2018 and 2019 (i.e., annual full pool levels) indicated similar temperatures in the epilimnion downstream and upstream of the Elk River, but a deeper established epilimnion downstream of the Elk River (17 to 19 m in 2018, and 16 to 17 m in 2019) compared to upstream (10 to 12 m in 2018, and 8 to 10 m in 2019; Figure 3.4). Dissolved oxygen concentrations were high (>8.0 mg/L) within the surficial 15 m to 18 m of the water column at each transect, decreasing to about 6.0 mg/L near at the bottom only at the downstream (RG_T4) transect in 2018[18] (Figure 3.4). Measurements of pH indicated similar readings throughout the top 10 m of the water column both downstream and upstream of the Elk River in 2018 and 2019 with the exception of slightly higher pH within the surficial 5 m during the August 2019 sampling event (Figure 3.4). The pH at both transects showed similarly decreasing pH with increasing

[18] DO was not measured in 2019 due to device malfunction.

Table 3.3: Trophic Level Classification (Nordin 1985) Using Monthly Means for Productivity Parameters Collected at Stations in the Koocanusa Reservoir Study Area, 2019

	Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total Phosphorous (mg/L)	RG_WARDB	0.011	-	0.018	0.012	0.017	0.037	0.010	0.004	0.010	0.003	0.005	0.007
	RG_KERRRD	-	-	-	0.012	0.013	0.010	0.004	0.003	0.002	0.003	0.009	-
	RG_ELKMOUTH	0.003	-	0.016	0.011	0.043	0.037	0.008	<0.002	<0.002	<0.002	<0.002	0.004
	RG_DSELK	-	-	0.006	0.011	0.011	0.010	0.003	0.003	0.002	0.003	0.003	0.003
	RG_GRASMERE	0.005	-	-	0.010	0.010	0.009	0.003	0.002	0.002	0.003	0.003	0.006
	RG_USGOLD	0.006	-	-	0.007	0.011	0.009	0.003	<0.002	0.002	0.002	0.002	<0.002
	RG_BORDER	0.004	-	-	0.006	0.007	0.007	0.005	<0.002	<0.002	0.003	0.002	<0.002
	FOREBAY	-	-	-	0.005	0.004	0.005	0.003	0.003	0.004	0.005	-	-
	INTERNATIONAL_BOUNDARY	-	-	-	0.006	0.010	0.012	0.007	0.004	0.009	0.006	-	-
	TENMILE_CREEK	-	-	-	0.003	-	0.004	0.005	0.003	0.003	0.005	-	-
Chlorophyll-a (mg/L)	RG_WARDB	-	-	-	-	-	-	-	-	-	-	-	-
	RG_KERRRD	-	-	-	0.001	0.001	0.000	0.001	0.002	0.002	0.002	0.002	-
	RG_ELKMOUTH	-	-	-	-	-	-	-	-	-	-	-	-
	RG_DSELK	-	-	0.001	0.002	0.001	0.001	0.001	0.002	0.002	0.002	0.003	0.002
	RG_GRASMERE	0.001	-	-	0.004	0.001	0.001	0.001	0.002	0.001	0.002	0.003	0.003
	RG_USGOLD	0.001	-	-	0.004	0.001	0.002	0.001	0.002	0.002	0.002	0.003	0.003
	RG_BORDER	0.001	-	-	0.004	0.001	0.002	0.001	0.001	0.001	0.002	0.003	0.004
	FOREBAY	-	-	-	0.002	0.004	0.003	0.001	0.002	0.002	0.002	-	-
	INTERNATIONAL_BOUNDARY	-	-	-	0.002	0.002	0.003	0.002	0.002	0.001	0.002	-	-
	TENMILE_CREEK	-	-	-	0.002	-	0.004	0.002	0.002	0.002	0.002	-	-
Secchi Depth (m)	RG_WARDB	-	-	-	-	-	-	-	-	-	-	-	-
	RG_KERRRD	-	-	-	0.5	0.6	0.7	2.3	4.7	5.8	5.3	5.0	-
	RG_ELKMOUTH	-	-	-	-	-	-	-	-	-	-	-	-
	RG_DSELK	-	-	-	0.7	0.6	1.0	2.5	4.3	5.9	4.4	4.1	4.8
	RG_GRASMERE	3.5	-	-	0.8	0.8	1.2	2.8	4.5	6.3	4.1	4.4	3.2
	RG_USGOLD	3.5	-	-	1.0	0.8	1.3	3.2	4.8	4.1	4.1	3.8	3.3
	RG_BORDER	4.4	-	-	1.4	1.2	1.5	2.5	4.5	4.1	4.1	3.8	3.3
	FOREBAY	-	-	-	-	-	-	-	-	-	-	-	-
	INTERNATIONAL_BOUNDARY	-	-	-	-	-	-	-	-	-	-	-	-
	TENMILE_CREEK	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen (mg/L)	RG_WARDB	0.27	0.25	0.36	0.28	0.30	0.24	0.20	0.17	0.14	0.13	0.22	0.26
	RG_KERRRD	-	-	-	0.22	0.28	0.19	0.20	0.17	0.18	0.14	0.21	-
	RG_ELKMOUTH	1.26	1.43	1.66	1.08	0.89	1.04	1.13	1.41	1.65	1.75	1.62	1.49
	RG_DSELK	-	-	0.47	0.44	0.41	0.36	0.31	0.35	0.31	0.25	0.40	0.35
	RG_GRASMERE	0.43	-	-	0.43	0.39	0.31	0.33	0.27	0.33	0.38	0.30	0.31
	RG_USGOLD	0.39	-	-	0.45	0.42	0.36	0.35	0.38	0.36	0.25	0.30	0.47
	RG_BORDER	0.41	-	-	0.38	0.41	0.36	0.34	0.34	0.37	0.28	0.30	0.40
	FOREBAY	-	-	-	0.34	0.41	0.38	0.48	0.35	0.29	0.33	-	-
	INTERNATIONAL_BOUNDARY	-	-	-	0.27	0.50	0.35	0.42	0.44	0.30	0.27	-	-
	TENMILE_CREEK	-	-	-	0.35	-	0.32	0.37	0.28	0.26	0.35	-	-

Indicates oligotrophic status based on Nordin (1985) classification for the indicated parameter value.

Indicates mesotrophic status based on Nordin (1985) classification for the indicated parameter value.

Indicates eutrophic status based on Nordin (1985) classification for the indicated parameter value.

Notes: Nordin 1985 criteria used in British Columbia for trophic level classification. "-" indicates no data available.

Table 3.4: Average Monthly Nitrate and Selenium Loadings to the Koocanusa Reservoir, 2014 to 2019

Source	Month	Average Nitrate (mg/L)						Average Selenium (mg/L)						Total Volume (m^3)						Nitrate Loadings (kg/day)						Selenium Loadings (kg/day)					
		2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Elk River (RG_ELKMOUTH)	January	1.74	1.12	1.54	1.59	1.50	1.19	0.0076	0.0057	0.0068	0.0062	0.0079	0.0067	52,982,554	70,088,198	54,542,419	61,363,526	126,672,984	41,006,976	2,714	3,017	1,745	3,090	10,410	1,256	12	14	8	12	55	7.0
	February	1.72	1.14	1.28	1.47	1.38	1.29	0.0080	0.0060	0.0055	0.0063	0.0073	0.0074	47,536,243	105,872,573	57,040,848	40,875,088	145,411,200	25,089,073	2,115	4,828	2,250	1,817	11,164	1,073	10	22	10	8	59	6.2
	March	1.64	0.77	1.08	1.04	1.47	1.29	0.0074	0.0041	0.0050	0.0048	0.0077	0.0072	70,458,336	135,880,157	76,420,195	82,534,075	112,878,749	46,239,045	3,274	3,250	2,598	2,530	4,138	2,048	15	17	12	12	22	11
	April	1.29	0.99	0.85	0.82	1.21	0.91	0.0061	0.0054	0.0036	0.0043	0.0068	0.0056	146,323,325	185,359,622	276,823,267	151,703,539	119,951,021	106,686,508	6,164	5,969	7,794	3,988	3,271	2,949	29	33	33	21	18	18
	May	0.86	0.85	0.76	0.78	0.74	0.68	0.0041	0.0043	0.0033	0.0037	0.0037	0.0038	667,662,134	389,781,331	443,279,434	660,193,286	823,437,187	276,188,619	19,592	10,189	10,211	15,710	18,175	5,821	89	50	44	73	90	32
	June	0.77	0.96	0.82	0.75	0.86	0.74	0.0033	0.0043	0.0036	0.0034	0.0047	0.0036	805,842,432	431,368,934	322,085,808	718,635,370	381,043,440	421,070,214	20,975	12,671	8,009	16,016	10,749	10,700	91	55	35	72	58	51
	July	0.76	1.26	1.15	0.82	0.98	0.96	0.0034	0.0061	0.0048	0.0041	0.0056	0.0046	311,721,955	178,327,008	196,265,462	233,781,552	187,606,886	297,267,032	12,810	6,894	7,526	8,265	7,932	9,590	58	33	32	41	45	46
	August	1.03	1.38	1.24	1.08	1.19	1.18	0.0052	0.0067	0.0056	0.0053	0.0066	0.0059	148,663,123	113,804,093	129,296,995	115,588,685	105,238,051	149,747,763	5,542	5,436	6,704	4,883	4,452	6,009	28	26	30	24	25	30
	September	1.33	1.60	1.49	1.23	1.35	1.22	0.0065	0.0073	0.0062	0.0060	0.0070	0.0061	123,850,685	100,994,688	91,423,987	81,139,450	66,122,438	98,566,165	5,485	5,393	4,648	3,349	3,230	4,029	27	24	19	16	17	20
	October	1.41	1.72	0.92	1.16	1.25	1.29	0.0068	0.0076	0.0041	0.0064	0.0070	0.0066	92,997,072	90,604,397	142,939,210	75,098,275	65,646,547	82,005,592	4,380	5,230	4,568	2,760	3,024	3,613	21	23	20	15	17	19
	November	1.31	1.38	0.60	1.24	0.90	1.22	0.0064	0.0057	0.0027	0.0071	0.0049	0.0065	91,212,480	87,365,693	141,630,509	80,306,640	64,250,315	54,291,842	4,000	3,959	3,359	2,426	2,312	2,559	20	16	15	14	12	14
	December	0.86	1.44	1.04	1.14	1.28	1.14	0.0040	0.0062	0.0047	0.0061	0.0070	0.0066	82,368,835	73,274,026	71,502,653	66,080,137	40,946,811	60,114,499	1,944	2,817	3,286	2,984	2,009	2,073	9	12	15	16	11	12
Kootenay River (RG_WARDB)	January	0.14	0.16	0.16	-	0.15	0.15	0.0001	0.0001	0.0002	-	0.0001	0.0001	135,932,602	143,242,560	121,139,366	152,703,706	119,501,915	112,819,052	448	567	550	-	591	470	0.43	0.50	0.48	-	0.48	0.46
	February	0.13	0.14	0.15	0.18	0.14	0.15	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	94,631,846	158,973,754	108,466,733	119,640,672	87,149,011	77,486,057	469	839	541	696	480	284	0.39	0.73	0.41	0.86	0.41	0.27
	March	0.15	0.10	0.10	0.13	0.13	0.15	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	139,613,069	220,817,837	129,010,061	171,575,021	113,763,778	116,675,008	467	448	411	753	460	612	0.35	0.44	0.50	0.62	0.50	0.47
	April	0.08	0.11	0.15	0.08	0.08	0.14	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	198,989,914	370,646,496	783,959,904	310,474,426	222,596,408	267,887,635	543	1,252	4,636	821	415	1,191	0.7	1.2	2.4	1.2	0.62	0.97
	May	0.18	0.14	0.13	0.16	0.17	0.18	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	1,488,223,930	1,132,992,576	1,445,373,504	1,661,205,888	2,455,996,906	947,360,464	8,788	4,999	5,434	8,868	11,602	6,262	5.6	2.8	3.5	5.2	8.2	2.7
	June	0.10	0.09	0.08	0.09	0.08	0.11	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	2,093,788,224	1,458,933,120	1,239,430,464	2,436,346,944	1,617,820,982	1,370,615,445	7,247	4,406	3,208	6,616	4,215	5,448	7.2	4.5	3.0	6.5	4.9	4.0
	July	0.07	0.08	0.06	0.06	0.07	0.13	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	1,340,260,992	581,942,016	764,538,048	1,045,415,808	816,991,948	941,856,710	4,544	1,582	1,580	2,925	2,417	4,223	6.6	1.6	2.2	3.9	3.3	3.4
	August	0.06	0.03	0.07	0.04	0.04	0.06	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	452,157,120	347,992,762	399,723,206	387,580,723	369,305,817	482,055,684	1,013	351	1,152	681	587	1,093	1.7	1.3	1.8	1.2	1.3	2.0
	September	0.06	0.06	0.05	0.05	0.03	0.08	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	312,085,267	356,944,147	286,056,922	229,738,637	255,272,089	359,498,669	618	658	470	343	199	991	1.21	1.01	0.84	0.74	0.71	1.1
	October	0.04	0.06	0.10	0.05	0.06	0.07	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	264,351,341	260,456,774	448,282,944	178,589,318	229,202,945	267,152,361	310	574	1,964	279	523	751	0.81	0.91	1.9	0.53	0.81	1.1
	November	0.09	0.10	0.11	0.08	0.06	0.11	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	276,055,430	185,165,222	424,833,984	171,034,675	194,764,183	171,424,041	868	752	1,788	295	508	765	0.95	0.82	1.12	0.43	0.60	0.78
	December	0.14	0.16	0.12	0.11	0.12	0.16	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	196,879,507	146,688,538	205,147,814	127,042,387	132,603,520	147,008,197	685	582	1,077	560	576	638	0.48	0.52	1.17	0.70	0.59	0.60

Note: "-" indicates no available data. Values below LRL were subbed in at the detection limit.

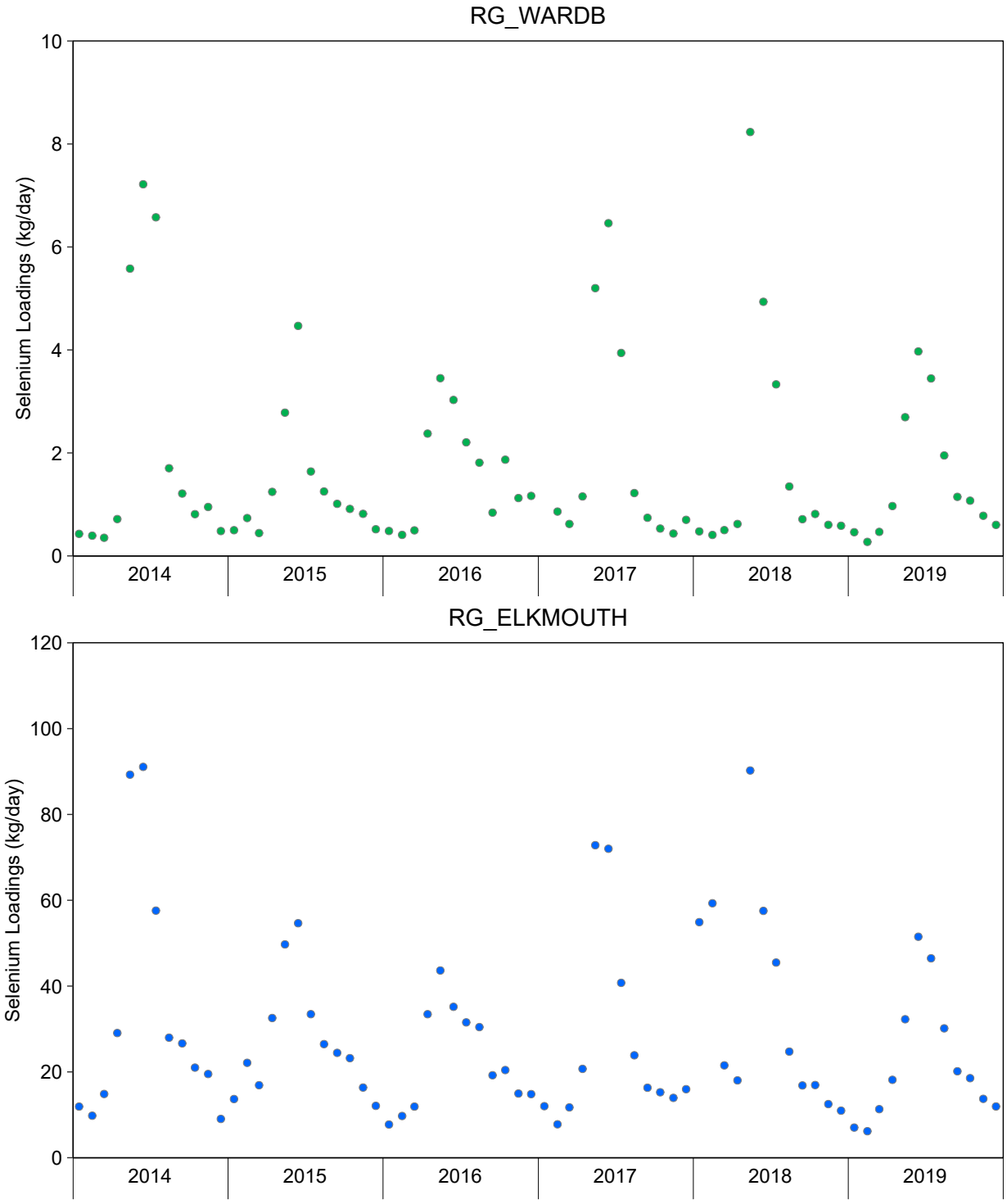


Figure 3.2: Average Monthly Selenium Loadings to the Koocanusa Reservoir, 2014 to 2019

Notes: Values below the LRL were replaced with the LRL for average calculations. Upstream station plotted in green and downstream in blue.

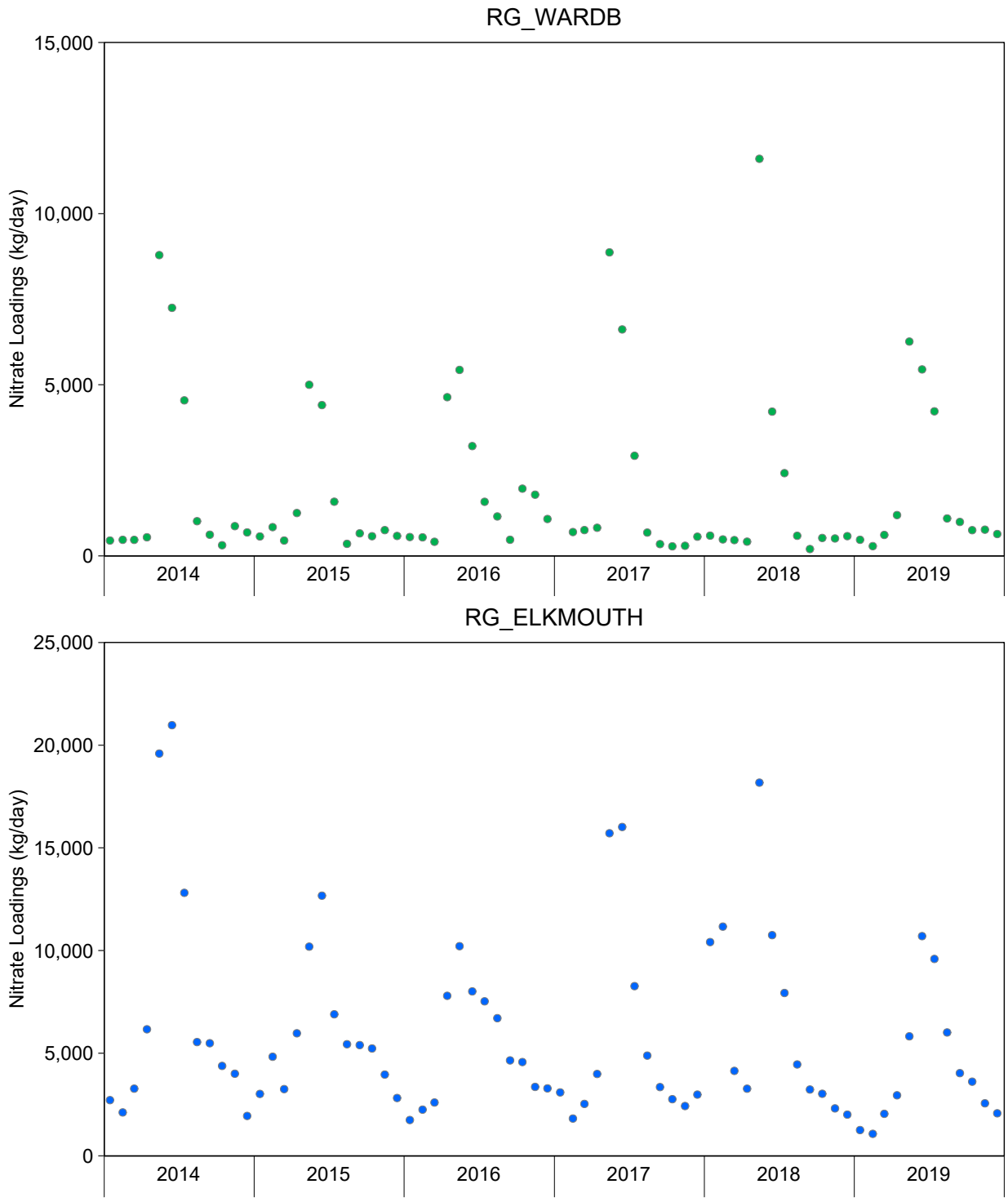


Figure 3.3: Average Monthly Nitrate Loadings to the Koocanusa Reservoir, 2014 to 2019

Notes: Values below the LRL were replaced with the LRL for average calculations. Upstream station plotted in green and downstream in blue.

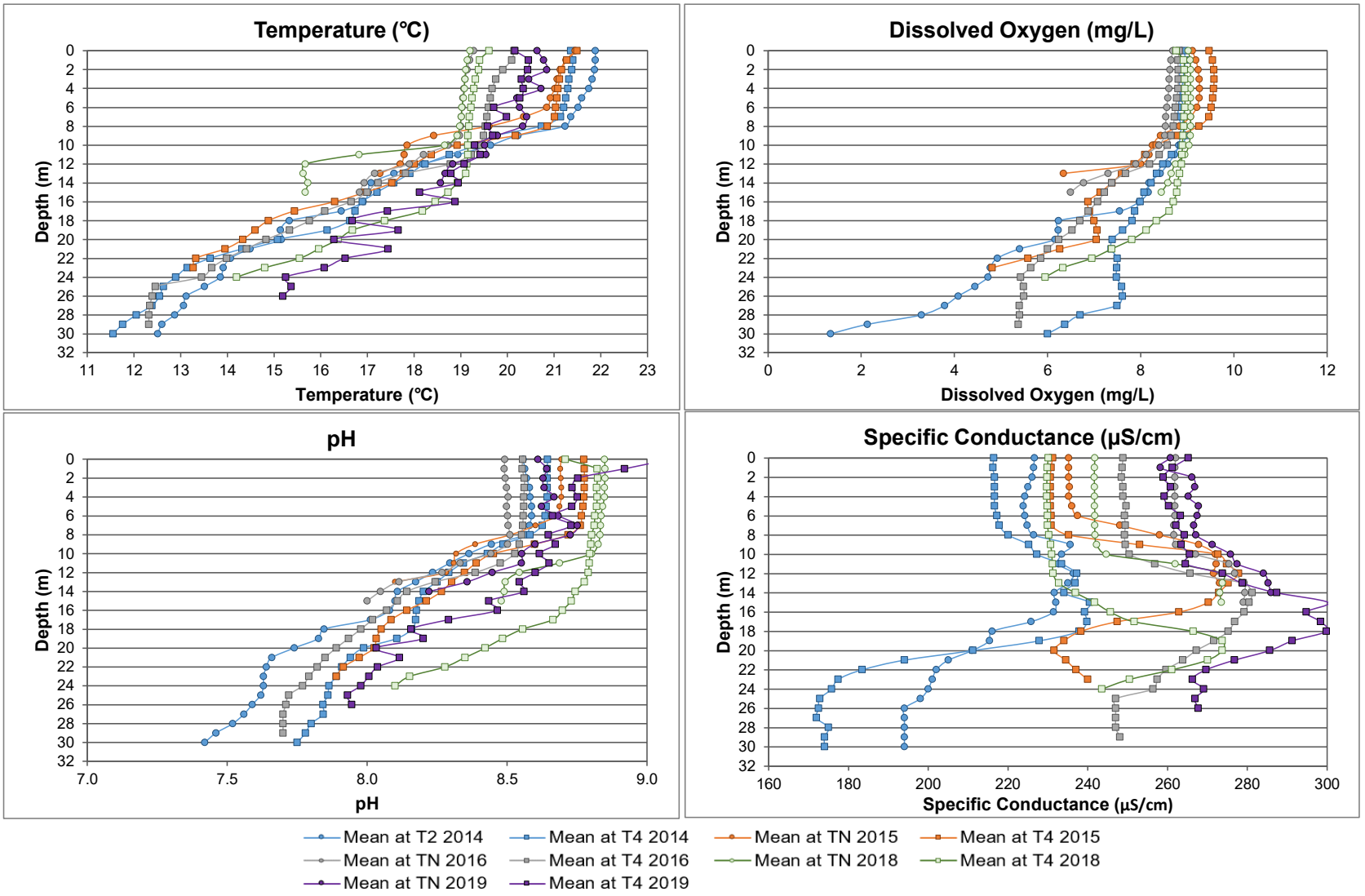


Figure 3.4: Mean Across-Transect (n=5 Stations per Transect) *In Situ* Water Quality Profiles Downstream (RG_T4) and Upstream (T2/RG_TN) of the Elk River in Koocanusa Reservoir Measured Annually in August from 2014 to 2019 (except 2017)

Note: Dissolved oxygen data for 2019 unavailable. Data in 2017 was not collected for these stations. In 2017, only routine water chemistry was measured at Teck's permitted water quality stations.

depth below the epilimnion (Figure 3.4). Specific conductance was noticeably lower downstream of the Elk River compared to upstream at all depths throughout the water column in both 2018 and 2019 (Figure 3.4). In addition, specific conductance was higher in approximately the lower third of the water column compared to waters found above (both transects) and below (downstream transect only) at each respective transect location in both years (Figure 3.4).

Temporal comparison of *in situ* profile data collected in August indicated close similarity in values and generally similar changes with depth in water temperature and pH between the downstream and upstream transects in 2018 and 2019 compared to previous years (i.e., 2014 to 2016; Figure 3.4). Similarly, specific conductance was lower at the downstream transect compared to upstream transect and showed distinct elevation in the lower third of the water column at both transects in 2018 and 2019 as in previous years (Figure 3.4). Because specific conductance of Elk River water at station RG_ELKMOUTH has consistently been higher than that at the Kootenay River (station RG_WARDB), the occurrence of lower specific conductance downstream of the Elk River relative to upstream suggests an influencing source located between the Kootenay and Elk rivers in Koocanusa Reservoir (Figure 3.4).

3.4 Mixing Assessment

Reservoir levels in April 2019 were approximately 15 m higher than those observed in April 2018, whereas similar levels were observed in June and August in both years (Figure 2.2). In April 2018 and 2019, specific conductance profiles indicated the Elk River influence in the reservoir (near RG_ER) downstream to RG_BORDER (Appendix Figure B.17 and B.25). The Elk River entered the reservoir with a specific conductance ranging from 299 to 362 µS/cm in the initial mixing zone, approximately 13 to 39 µS/cm higher than that observed upstream at RG_KERRRD, and higher than previously observed in 2018 (Appendix Figure B.17 and B.25). The patterns in specific conductance indicated that Elk River flow was mainly confined to the eastern half of the reservoir until RG_GRASMERE and areas downstream, where mixing across the entire width of the basin was observed for both years (Appendix Figure B.17 and B.25). Temperature profiles showed a similar pattern to that shown for specific conductance, with the colder waters of the Elk River confined to the east bank before sinking to the bottom of the reservoir near RG_GRASMERE in both 2018 and 2019 (Appendix Figure B.18 and B.26). No differentiation of the Elk River influence in the Koocanusa Reservoir was indicated by the turbidity profiles conducted in April 2019[19] (Appendix Figure B.27). Turbidity measurements consistently indicated higher water clarity near the surface with increasing turbidity near the bottom of the water column regardless of whether profiles were conducted downstream or upstream of the Elk River.

[19] Turbidity measurements were not conducted until June 2018.

In June, the difference in specific conductance between the mouth of the Elk River and upstream (RG_KERRRD) was higher than in April, ranging from 83 to 100 µS/cm (2018) and 85 to 95 µS/cm (2019) higher at the Elk River than upstream at RG_KERRRD (Appendix Figure B.19 and B.28). The specific conductance and temperature profiles also indicated that Elk River mixing in Koocanusa Reservoir was primarily confined along the east bank of the reservoir before sinking and completely mixing across the reservoir width just downstream of RG_GC (Appendix Figure B.20 and B.29). Mixing patterns were similar to, but less pronounced, in August, which had the lowest specific conductance of the three sampling periods (Appendix Figure B.22 and B.31). In August, higher specific conductance was occasionally observed at the lower third of the water column at downstream stations compared to shallower and deeper depths. This inversion layer appeared to be the result of the Elk River initially following the bottom contours of the reservoir before rising to mid-column as warmer water from the upper reservoir flows over cooler water situated along the bottom of the lower portion of the reservoir (Appendix Figure B.23 and B.32). Similar to April, higher water clarity was observed near the surface both downstream and upstream of the Elk River in June and August (Appendix Figures B.21, B.24, B.30, and B.33). In general, aside from differences between April 2018 and April 2019 due to differences in reservoir levels, conditions and mixing patterns were similar between 2018 and 2019.

4 SEDIMENT

4.1 Overview

Sediment samples were collected from profundal habitat at transects located downstream (RG_T4) and upstream (RG_TN) of the Elk River confluence with Koocanusa Reservoir in August 2018 and 2019 and analyzed for particle size, and metal and PAH concentrations. In April 2018, sediment samples were also collected from littoral habitat at two downstream areas (RG_ER and RG_GC) and one upstream area (RG_SC) to provide supporting information for the assessment of fish health and tissue chemistry (Figure 2.1). Large-volume suspended sediment samples were also collected from the epilimnion at RG_DSELK in June, July, and September 2018 and 2019[20] for the analysis of particulate selenium concentrations.

4.2 Sediment Particle Size and Chemistry

Sediment at profundal stations was primarily composed of silt-sized material, the proportion of which did not differ significantly between the downstream and upstream transects in either of the 2018 and 2019 studies (Figure 4.1). Statistical analysis of the grain size data indicated a significantly higher proportion of clay-sized material downstream in both years compared to upstream of the Elk River, but also a significantly lower proportion of sand-sized material downstream in 2019, but the incremental differences between downstream and upstream areas was small (i.e., less than 10%; Appendix Tables C.7 and C.9). Sediment particle size distributions at each of the profundal transects in 2018 and 2019 were similar to those observed in previous monitoring conducted from 2014 to 2016 (Figure 4.1). Sediment TOC content at profundal stations was not significantly different downstream of the Elk River than upstream in 2018 or 2019 (Appendix Tables C.7 and C.9). Average sediment TOC content in 2019 was lower compared to 2018 at both transects, and similar to data collected from 2015 or 2016. In 2018, the mean incremental difference in TOC content at each transect between 2018 and all other years was small (i.e., ≤1%; Appendix Table C.7).

Sediment at littoral stations was predominantly composed of silt-sized material at most of the Elk River mouth and Gold Creek downstream area stations with no significant differences in dominant particle sizes were indicated among the three areas (Figure 4.2; Appendix Table C.8).

[20] Sample preparation and particulate selenium analyses for the RG_DSELK sample collected in September 2019 were not able to be conducted at Georgia State University and Brooks Analytical Laboratories, respectively, prior to preparation of this report.

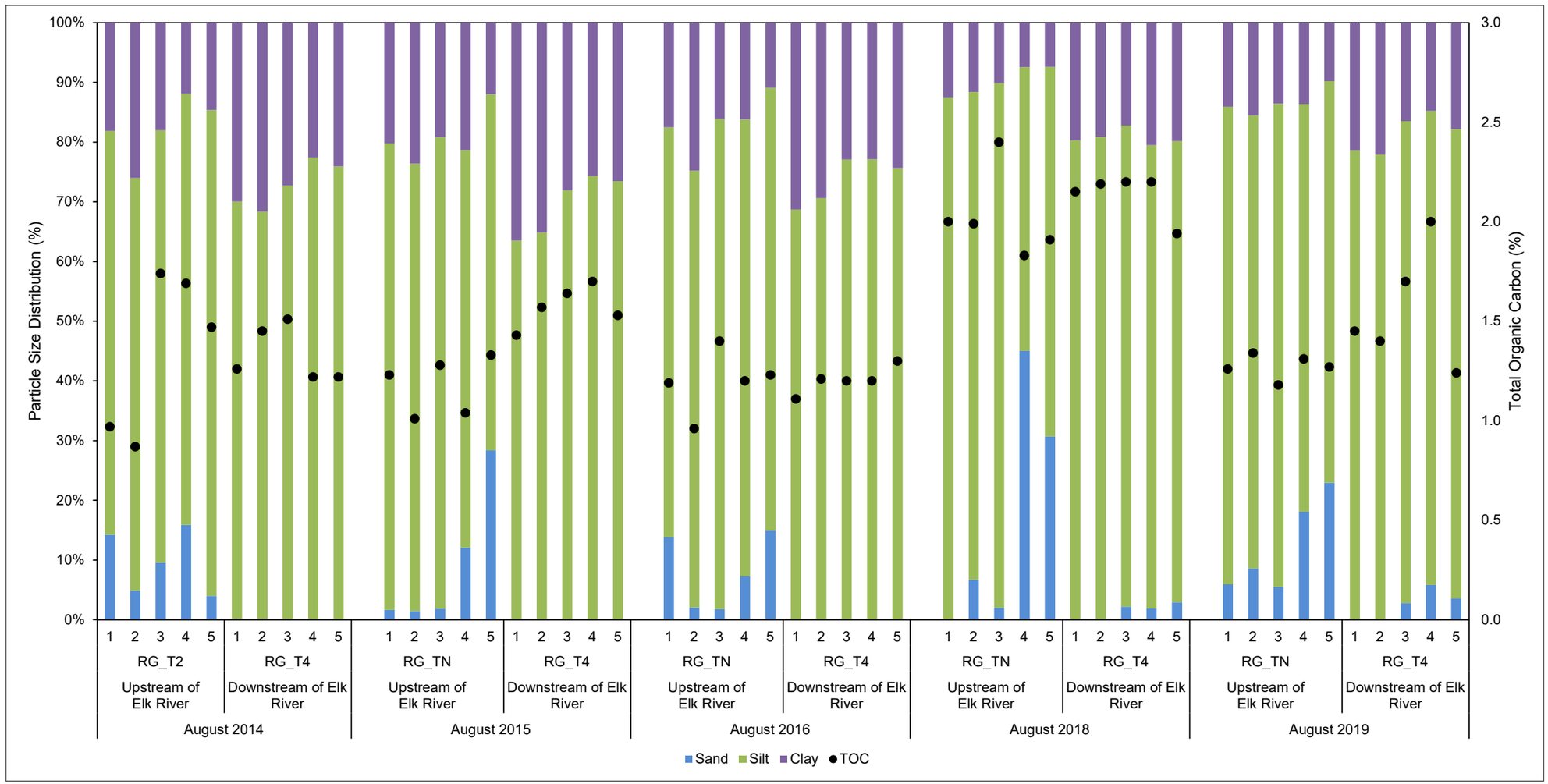


Figure 4.1: Relative Sediment Particle Size and Total Organic Carbon (TOC) Content at Profundal Transect Stations, Koocanusa Reservoir, 2014 to 2019

Note: The upstream location was relocated further upstream from the mouth of the Elk River in August 2015 and 2016. Gravel contents were all under detection limits and are not shown in the figure.

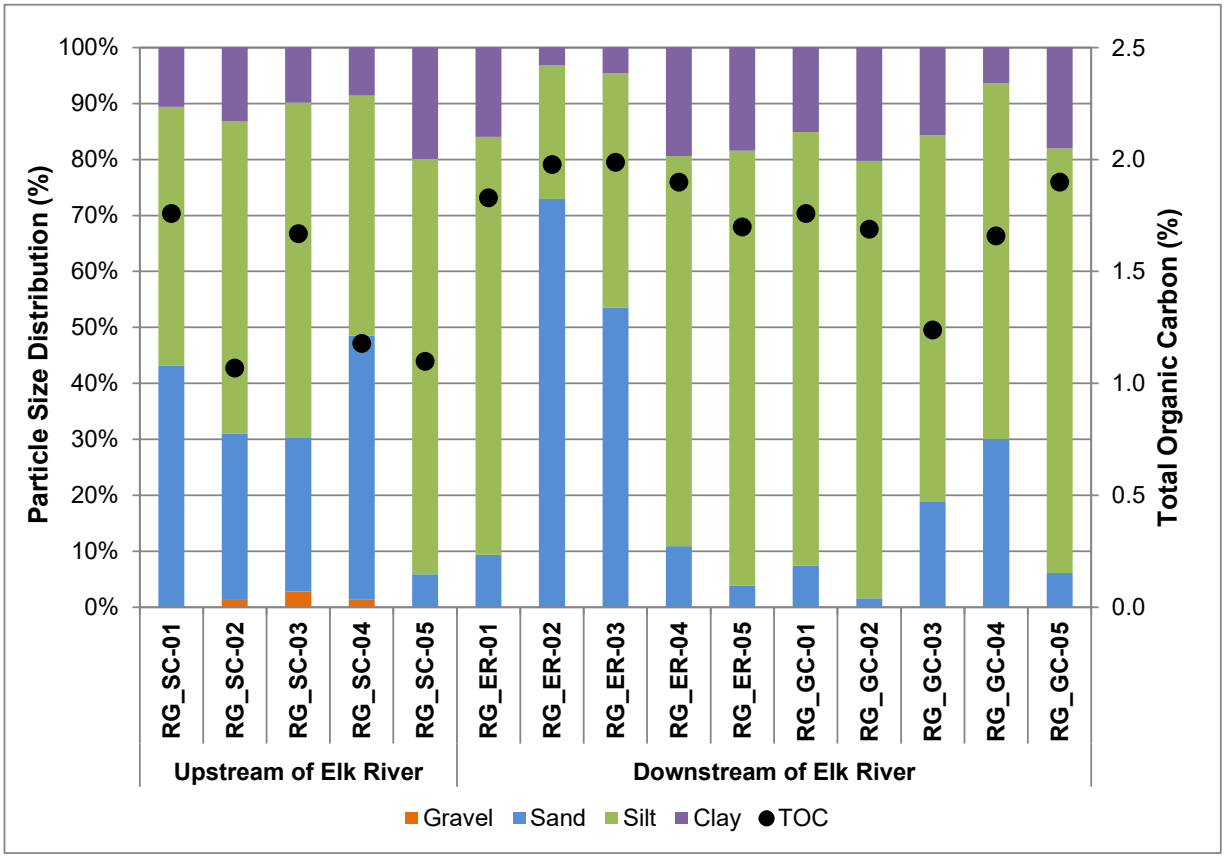


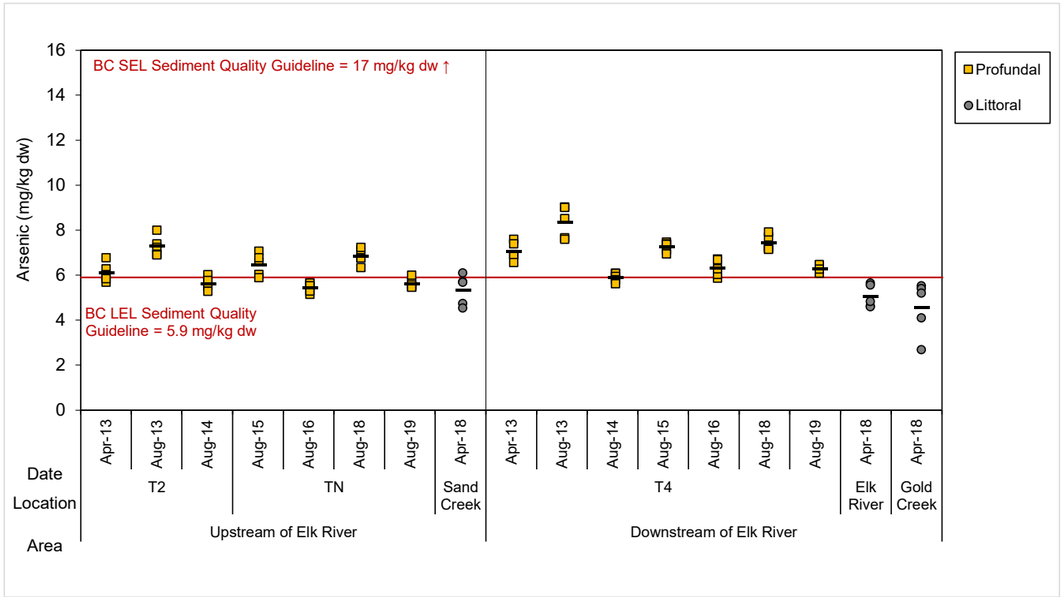
Figure 4.2: Sediment Particle Size and Total Organic Carbon (TOC) Content at Koocanusa Reservoir Littoral (April) and Profundal (August) Stations, 2018

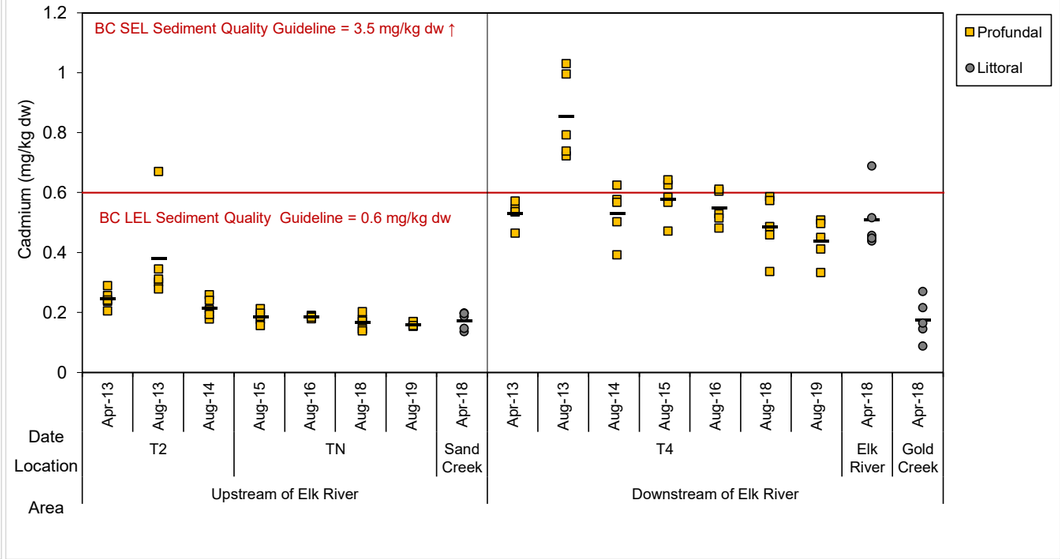
Sediment TOC content at littoral habitat was significantly higher at the Elk River mouth compared to the Sand Creek upstream area; however, the mean incremental differences between and among all three littoral areas was small (i.e., maximum of 0.52%). A statistical difference in %TOC was not calculated between the Gold Creek area and Sand Creek upstream area, nor between the Elk River mouth and Gold Creek downstream areas (Appendix Tables C.5 and C.8).

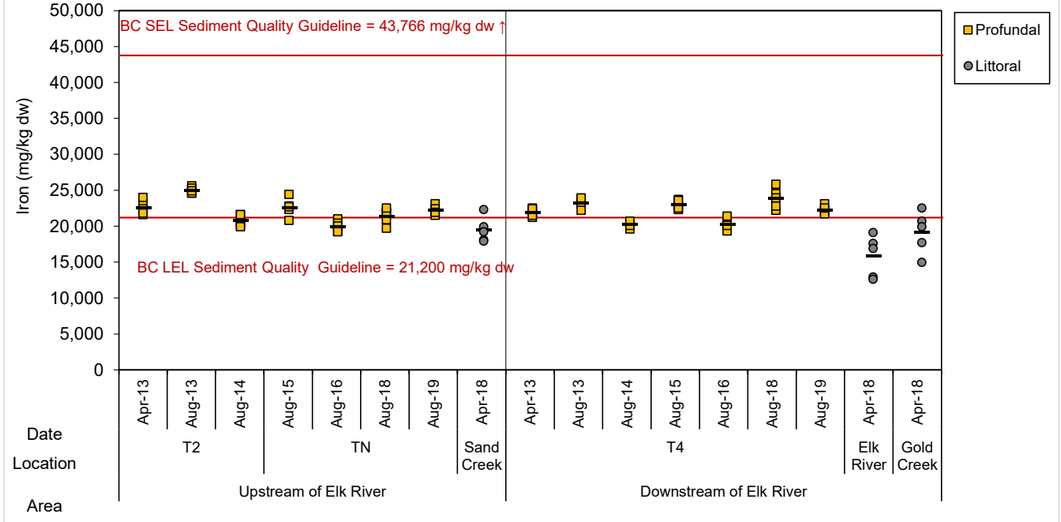
Several metals (including selenium) and PAHs occurred at significantly higher concentrations in profundal sediment collected at the downstream transect than at the upstream transect in each of the 2018 and 2019 studies, as well as in littoral sediment at the Elk River mouth compared to upstream at the Sand Creek area in 2018 (Figure 4.3; Appendix Tables C.7 to C.9). Sediment at littoral habitat of Gold Creek showed significantly higher concentrations of barium, mercury, potassium, and selenium, but no significant differences in PAH concentrations, compared to littoral habitat at the Sand Creek upstream area in 2018 (Appendix Table C.8). Among the metals, arsenic, iron, manganese, and nickel concentrations in sediment were above LEL of the BC sediment quality guidelines at one or more of the downstream profundal transect stations in both 2018 and 2019, as were concentrations of cadmium, iron, manganese, and nickel at the Elk River mouth and/or Gold Creek area littoral stations in 2018 (Figure 4.3). With the exception of cadmium, these metals also occurred at concentrations above LEL sediment quality guidelines at one or more of the upstream profundal transect stations in 2018 and 2019, and at one or more littoral habitat stations located upstream at the Sand Creek area in 2018 (Figure 4.3; Appendix Tables C.4 to C.6). Among the PAHs, 2-methylnaphthalene and phenanthrene concentrations in sediment were above LEL sediment quality guidelines at one or more of the downstream profundal transect stations in 2018 and 2019, and at more than two littoral stations at the Elk River mouth in 2018. Concentrations of benz(a)anthracene, benzo(b&j)fluoranthene, chrysene, and dibenz(a,h)anthracene were also above LEL sediment quality guidelines at one of the littoral stations (Station ER-2) at the Elk River mouth in 2018. Notably, concentrations of all metals and PAHs in sediment at all profundal transect stations and all littoral stations located downstream and upstream of the Elk River were below established Severe Effect Level (SEL) provincial sediment quality guidelines in 2018 and 2019, as applicable.

Concentrations of several metals (including arsenic, cadmium, manganese, and nickel which were observed at concentrations above LEL, and selenium) and PAHs were consistently shown to be significantly higher at profundal stations located downstream of the Elk River compared to upstream in 2015, 2016, 2018, and 2019 (Appendix Table C.10)[21]. For all metals that occurred at significantly higher concentrations at the downstream transect compared to the upstream

[21] 2014 was not included in the analyses because the upstream station (RG_T2) was relocated to RG_TN in 2015.







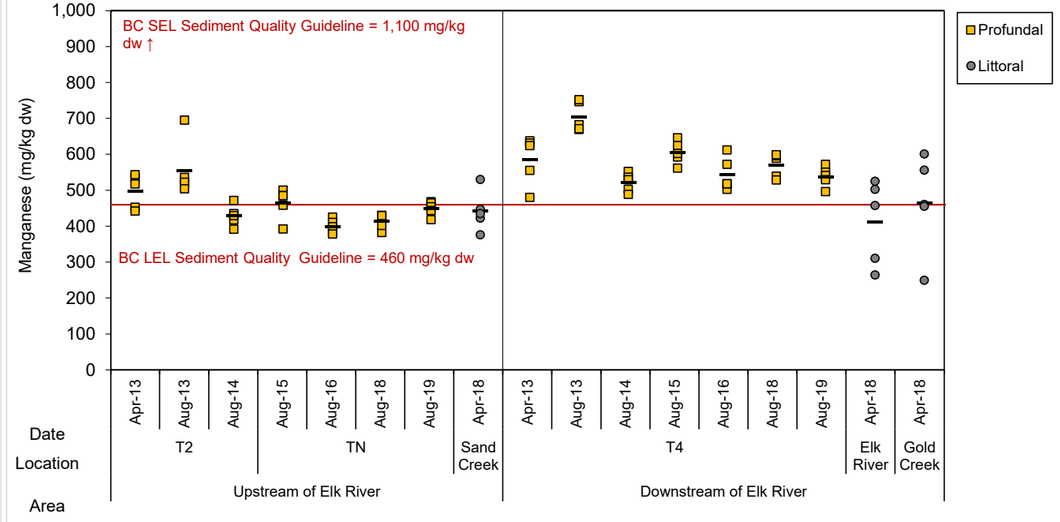
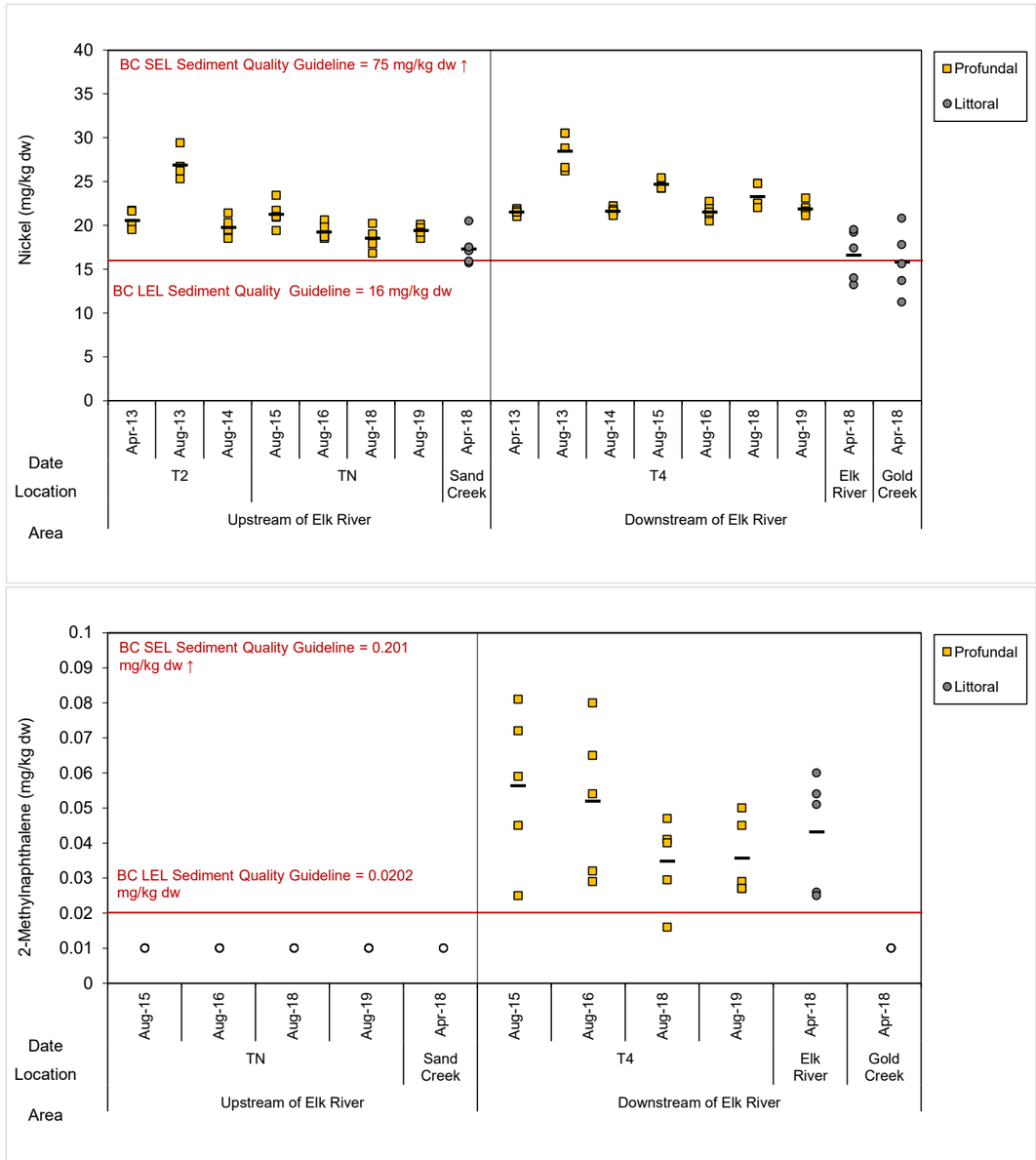


Figure 4.3: Parameter Concentrations in Sediment for Parameters Occurring at Concentrations Above Lowest Effects Level (LEL) Sediment Quality Guidelines and Selenium, Koocanusa Reservoir, 2013 to 2019

Notes: Individual values are plotted. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Means are plotted as horizontal lines when n > 1.
The upstream area was sampled at T2 until April 2015 and this area was relocated further upstream from the mouth of the Elk River (TN) beginning in August 2015.



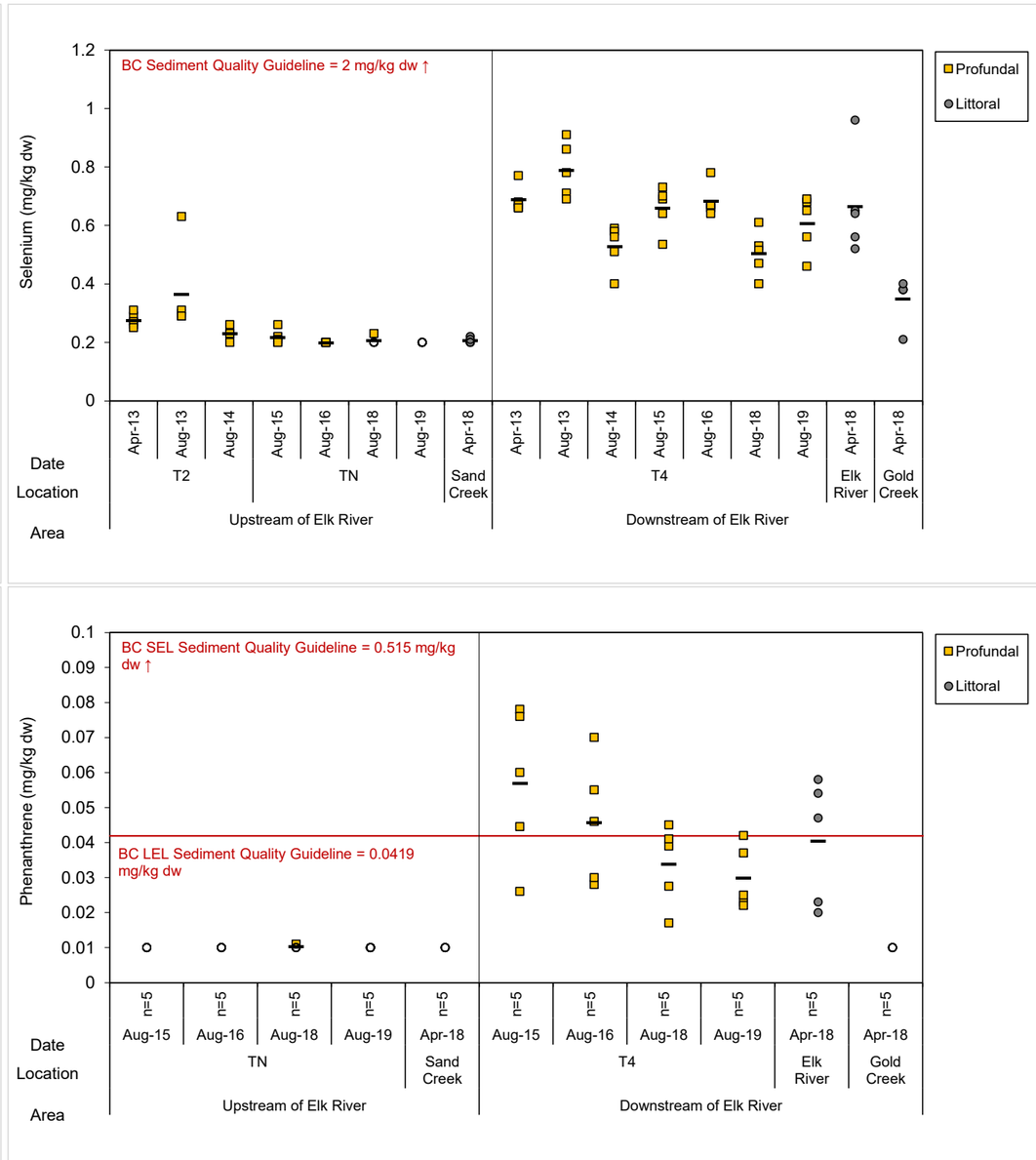


Figure 4.3: Parameter Concentrations in Sediment for Parameters Occurring at Concentrations Above Lowest Effects Level (LEL) Sediment Quality Guidelines and Selenium, Koocanusa Reservoir, 2013 to 2019

Notes: Individual values are plotted. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Means are plotted as horizontal lines when n > 1.
The upstream area was sampled at T2 until April 2015 and this area was relocated further upstream from the mouth of the Elk River (TN) beginning in August 2015.

transect, with the exception of phosphorus, all were present at significantly lower concentrations in 2018 and/or 2019 compared to 2015 at transects located both downstream and upstream of the Elk River (Appendix Table C.10). In addition, a number of PAHs, including benzo(b&j)fluoranthene, benzo(b+j+k)fluoranthene, chrysene, fluoranthene, perylene, and phenanthrene, occurred in significantly lower concentrations in 2019 relative to 2015 for sediment sampled downstream of the Elk River (Appendix Table C.10). Magnesium and strontium concentrations in sediment at both the downstream and upstream profundal transects, and zirconium concentrations in sediment at the downstream profundal transect, were the only metals that showed significantly higher concentrations in 2018 and 2019 compared to 2015 and/or 2016 (Appendix Table C.10).

4.3 Suspended Sediment Selenium Concentrations

Large-volume suspended sediment samples collected from RG_DSELK in June, July, and September 2018, and June, July, and September 2019 were compared to samples collected from both the epilimnion (and hypolimnion in 2019) from stations within the Montana portion of the reservoir (International Boundary, Tenmile [Tenmile], and Forebay in May, July, and September 2018, and International Boundary [LIBBOR] and Forebay [LIBFB] in May, July, and September 2019; Figure 4.4). Suspended sediment selenium concentrations at RG_DSELK in July and September 2018 were higher than in those collected from Montana during the same time frame, but less in 2019 (Figure 4.4; Table 4.1)[22]. Water samples collected concurrently with the suspended sediment samples had higher concentrations of total and dissolved selenium in samples collected 3 m from the bottom of the water column in July and September 2019 (Table 4.1). Concentrations of total and dissolved selenium in water samples appeared to be higher in July and September compared to June in both 2018 and 2019.

[22] September 2019 samples from Montana were analyzed well beyond their hold times due to laboratory equipment malfunction; however, this does not appear to have had any effects on the results. September 2019 samples from RG_DSELK were lost, but eventually found and analyzed in September 2020, however, these results should be interpreted with caution.

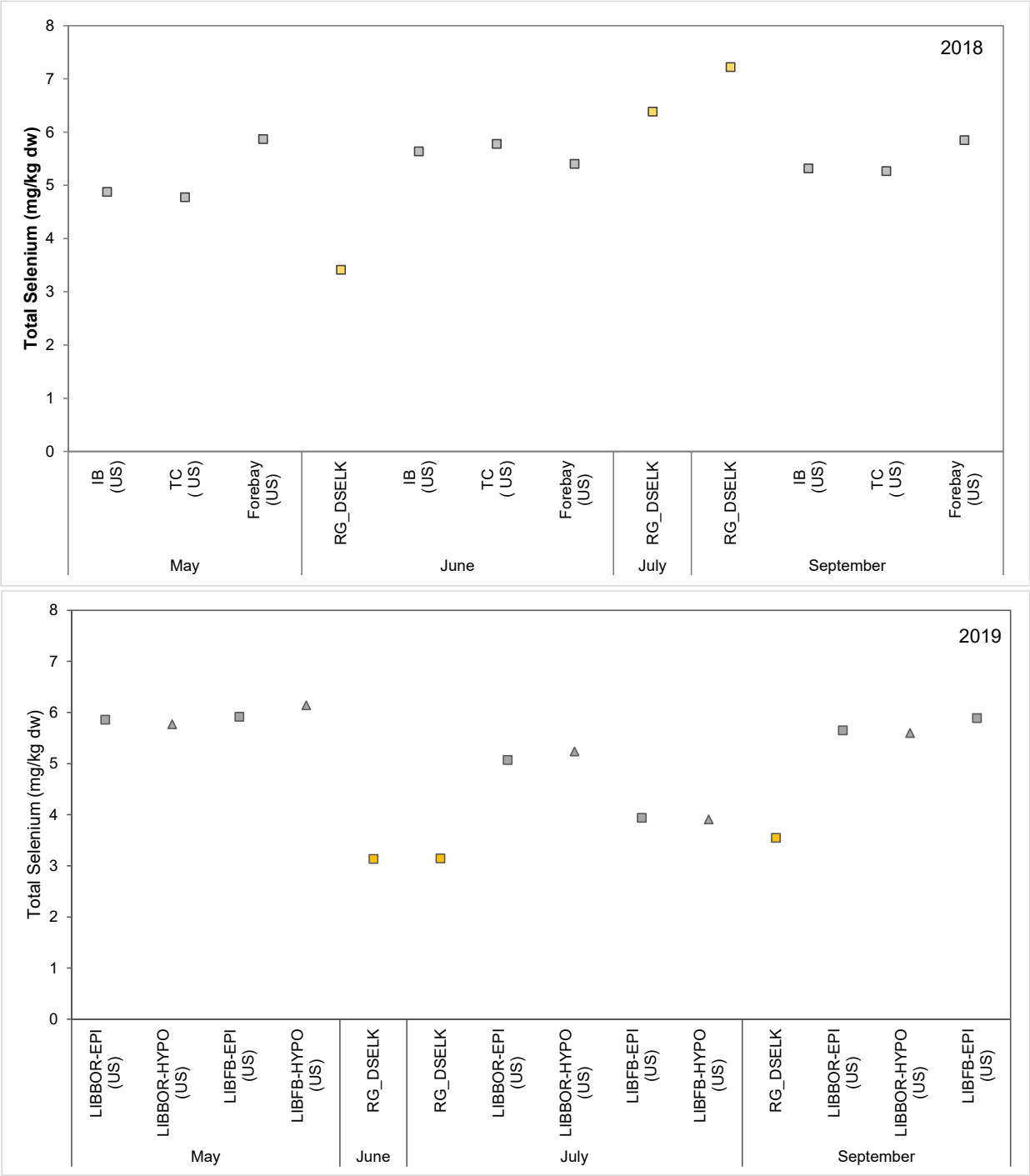


Figure 4.4: Particulate Selenium Concentrations of Large-Volume Suspended Sediment Samples Collected from the Epilimnion of Canadian (RG_DSELK) and Montana (International Boundary [LIBBOR] and Forebay [LIBFB]) Portions of Koocanusa Reservoir, 2019

Notes: Concentrations presented as averages where applicable duplicates were collected. Koocanusa Reservoir station in Canada (RG_DSELK) is represented by a yellow symbol, and those for Montana stations are represented by grey symbols. Epilimnion samples represented by a square symbol, hypolimnion samples represented by a triangle symbol. September 2019 sample for RG_DSELK was misplaced by the laboratory, and although later found, was not processed until September 2020 (i.e., beyond retention time). No hypolimnion sample was collected for LIBFB in September 2019. Large volume particulate sampling program was not initiated until 2018.

Table 4.1: Large-Volume Suspended Sediment and Water Samples Collected at RG_DSELK, Koocanusa Reservoir, 2018 and 2019

Matrix	Analyte		BC Sediment Quality Guideline[a]	BC Long-term Guideline[b]	2018			2019		
					June [c]	July [d]	September [e]	June[f]	July[g]	September
Sediment	Selenium (mg/kg dw)		2.0	-	3.42	6.39	7.23	3.14	3.15	ND
Water [h]	3 m from Surface	Selenium (µg/L)	-	2.0	-	-	-	0.61	0.80	0.91
		Dissolved Selenium (µg/L)	-	-	0.41	0.81	1.04	0.64	0.59	0.89
	3 m from Bottom	Selenium (µg/L)	-	2.0	-	-	-	0.54	2.02	1.97
		Dissolved Selenium (µg/L)	-	-	0.74	0.86	1.06	0.59	2.00	1.90

Note: Shaded values were above the respective guideline. ND = No data, September samples still outstanding. "-" indicates no available guidelines.

[a] Working sediment quality guideline (BC MOE 2015).

[b] British Columbia Accepted (BCMOE 2017) Water Quality Guidelines for the Protection of Aquatic Life.

[c] Average concentration presented, values for sample and duplicate were 3.50 and 3.33 mg/kg dw respectively.

[d] Average concentration presented, values for sample and duplicate were 6.31 and 6.46 mg/kg dw respectively.

[e] Average concentration presented, values for sample and duplicate were 6.96 and 7.49 mg/kg dw respectively.

[f] Average concentration presented, values for sample and duplicate were 3.58 and 2.69 mg/kg dw respectively.

[g] Average concentration presented, values for sample and duplicate were 3.47 and 2.82 mg/kd dw respectively.

[h] Total fraction of selenium not measured in 2018. Dissolved selenium measured in 2018 is presented as an average of two samples.

5 PLANKTON

5.1 Overview

Phytoplankton and zooplankton community structure, and zooplankton tissue selenium concentrations, were assessed downstream (RG_T4) and upstream (RG_TN) of the Elk River in August/September 2018 (Figure 2.1). Additional zooplankton community and tissue samples were also collected in June 2018 to explore potential differences between spring and summer seasons based on an ENV (2018) requirement. In addition, zooplankton tissue chemistry data from the Montana portion of the reservoir were incorporated into the 2018 dataset. The 2018 zooplankton community and tissue chemistry samples were collected as a composite sample through the entire water column depth at five stations along each of a downstream and upstream transect in June and September, and as a composite sample through the top 10 m of the water column at these same transects and stations in August. The additional samples retrieved in August were used to explore potential methodological influences on zooplankton community and/or tissue chemistry features. Zooplankton tissue chemistry data from the Montana portion of the reservoir in 2018 were collected from the top 10 m of the water column.

In June and August 2019, zooplankton community structure and zooplankton tissue selenium concentrations were assessed downstream and upstream of the Elk River at RG_T4 and RG_TN, respectively. Zooplankton community and tissue chemistry samples were collected as a composite sample through the entire water column depth at five stations along each transect. Despite increased sampling effort that included horizontal tows and additional vertical hauls, sufficient sample mass for zooplankton tissue analysis was not achieved at RG_TN in June 2019, but adequate material was acquired to conduct a community analysis.

5.2 Phytoplankton Community Structure

Individual phytoplankton community metrics (i.e., total density, biomass, and richness) differed among years; however, these differences generally occurred in the same direction at both the downstream and upstream transects, indicating a temporal influence (or influences) associated with natural, large-scale factors within the reservoir that were unrelated to influences from the Elk River discharge (Figure 5.1; Appendix Table D.9). When temporal changes in each metric at the upstream transect was considered (i.e., two-way ANOVA conducted), no significant differences in phytoplankton total density, biomass, and richness, and dominant taxonomic group density and biomass were indicated at the downstream transect s from 2014 to 2018 with the exception of golden algae and cryptophyte dominant groups (Figure 5.2; Appendix Table D.9). Although golden algae density and cryptophyte biomass differed significantly between the downstream and upstream transects among the four years of studies, no consistent among year

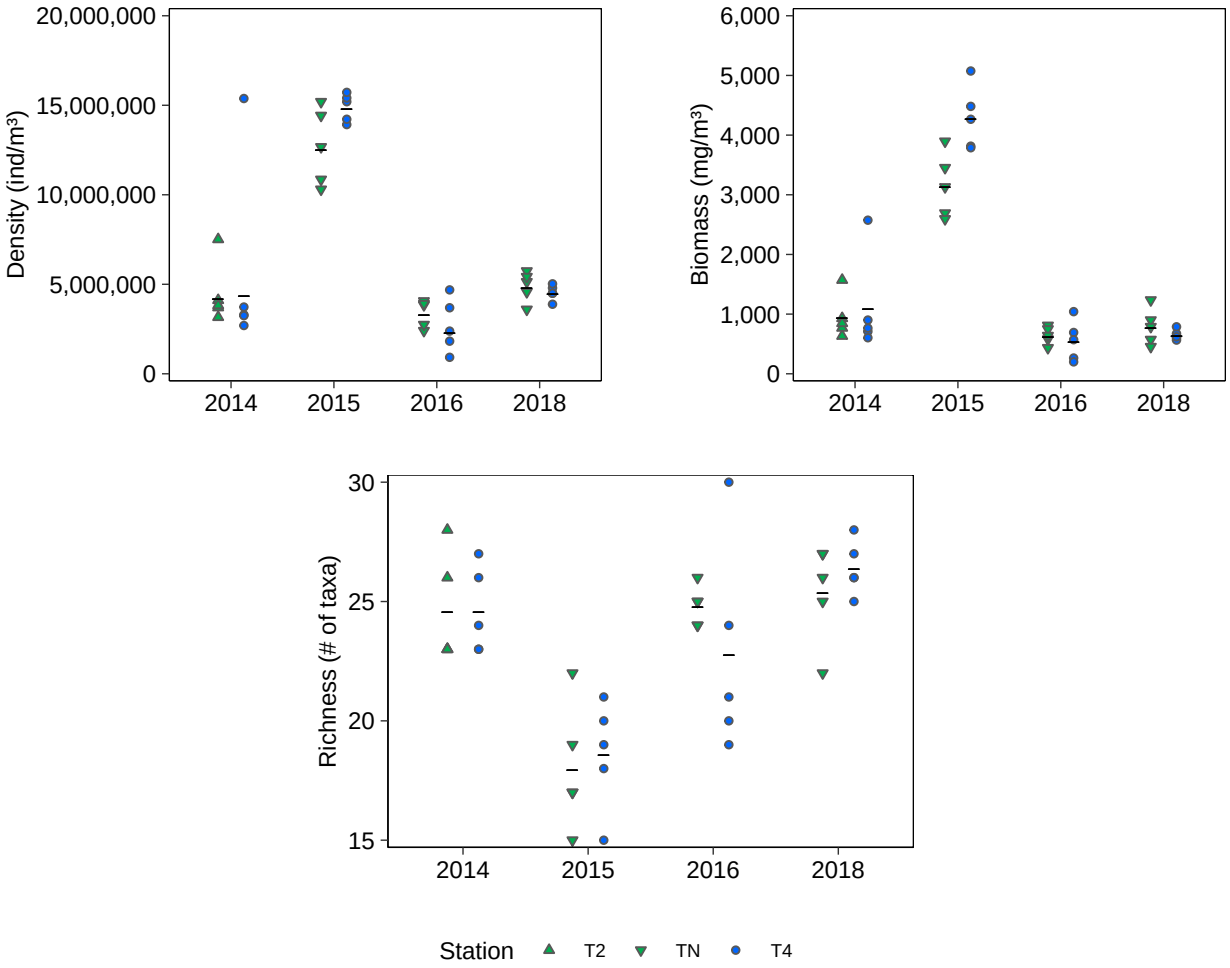


Figure 5.1: Phytoplankton Community Endpoints from Upstream (RG_T2 and RG_TN) and Downstream (RG_T4) of the Elk River, Koocanusa Reservoir Monitoring Program, 2014 to 2018

Notes: The upstream location RG_T2 was relocated further upstream of the mouth of the Elk River to RG_TN in 2015. Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines

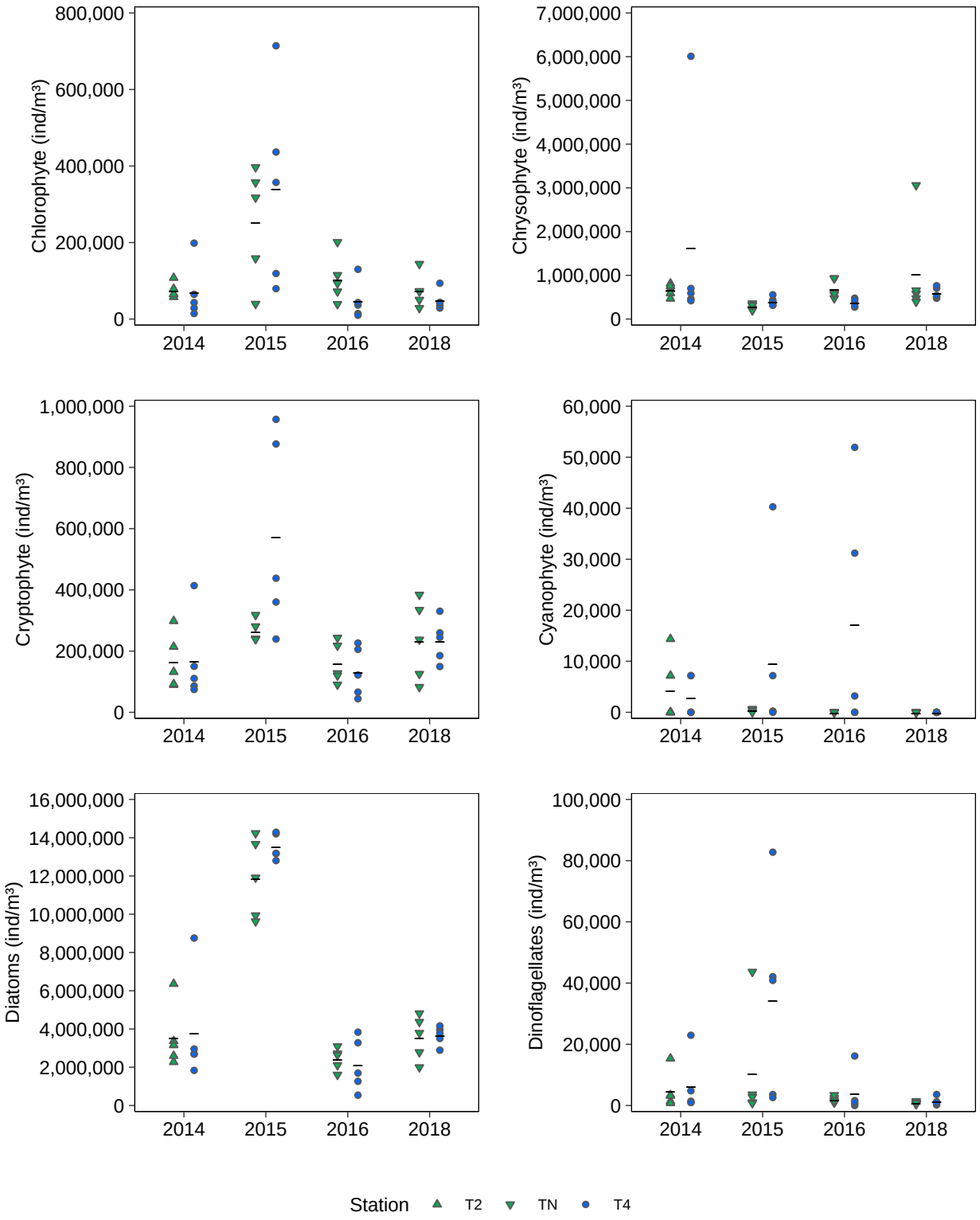


Figure 5.1: Phytoplankton Community Endpoints from Upstream (RG_T2 and RG_TN) and Downstream (RG_T4) of the Elk River, Koocanusa Reservoir Monitoring Program, 2014 to 2018

Notes: The upstream location RG_T2 was relocated further upstream of the mouth of the Elk River to RG_TN in 2015. Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines. Note the differing y-axis values among density/biomass and relative abundance/biomass plots.

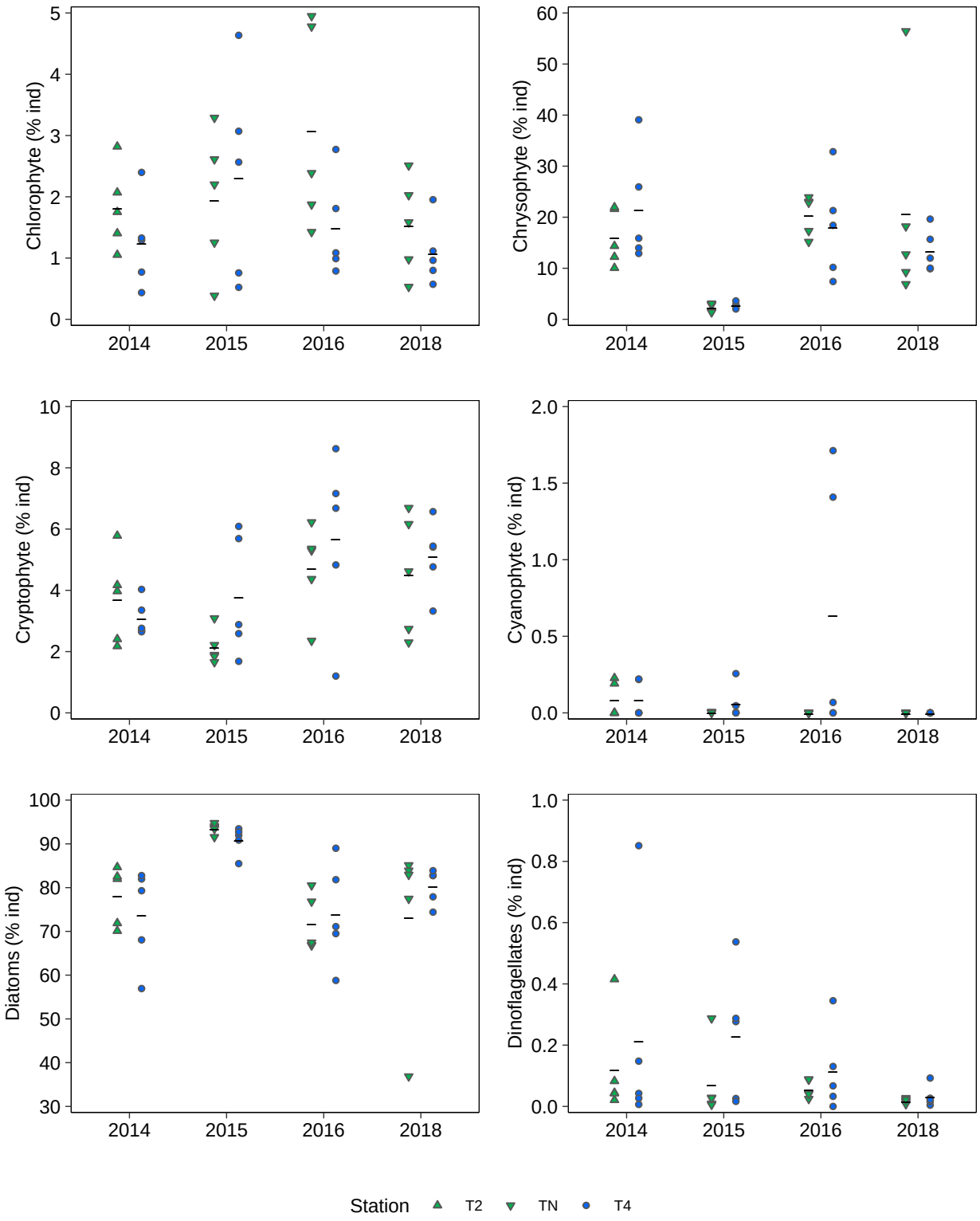


Figure 5.1: Phytoplankton Community Endpoints from Upstream (RG_T2 and RG_TN) and Downstream (RG_T4) of the Elk River, Koocanusa Reservoir Monitoring Program, 2014 to 2018

Notes: The upstream location RG_T2 was relocated further upstream of the mouth of the Elk River to RG_TN in 2015. Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines. Note the differing y-axis values among density/biomass and relative abundance/biomass plots.

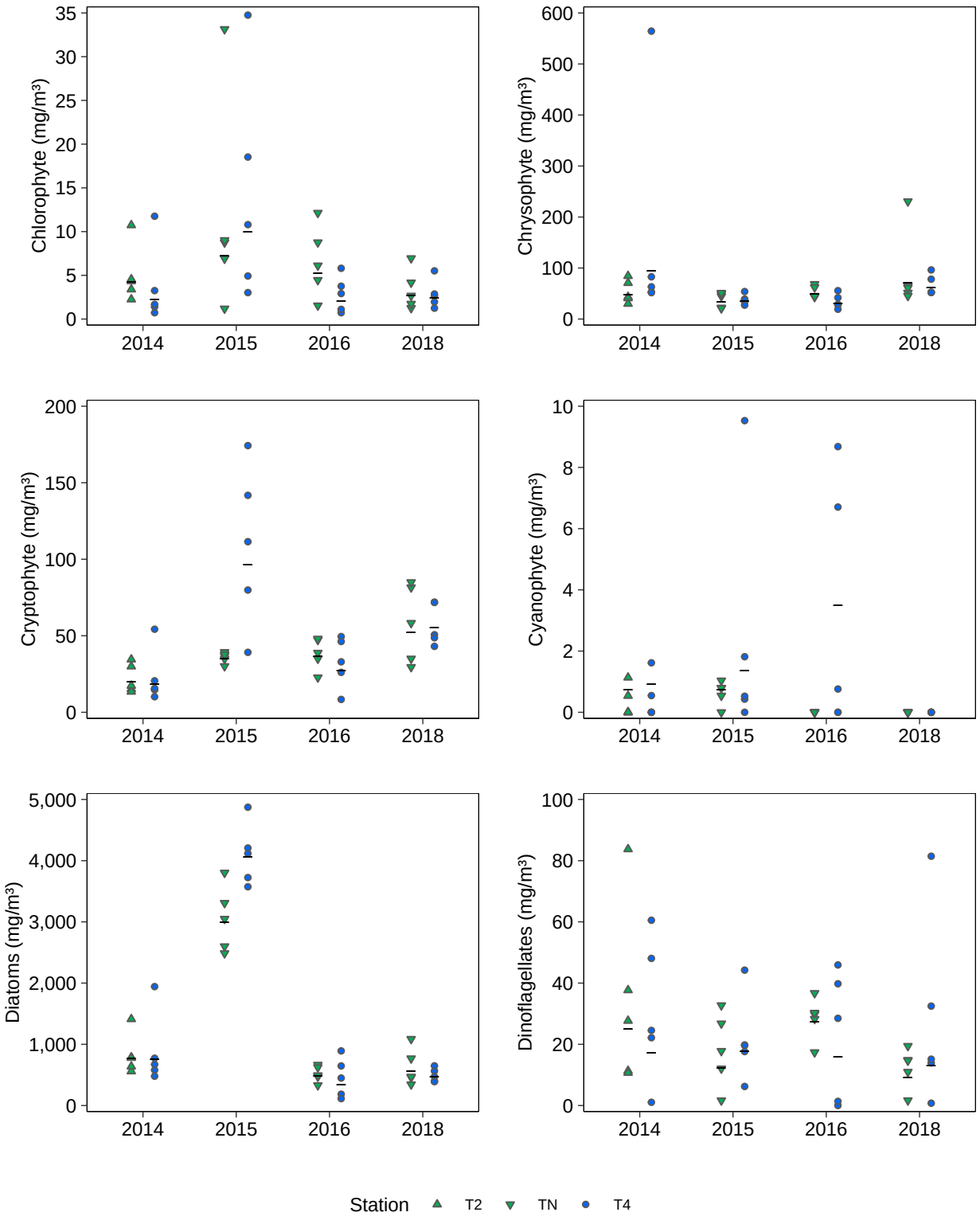


Figure 5.1: Phytoplankton Community Endpoints from Upstream (RG_T2 and RG_TN) and Downstream (RG_T4) of the Elk River, Koocanusa Reservoir Monitoring Program, 2014 to 2018

Notes: The upstream location RG_T2 was relocated further upstream of the mouth of the Elk River to RG_TN in 2015. Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines. Note the differing y-axis values among density/biomass and relative abundance/biomass plots.

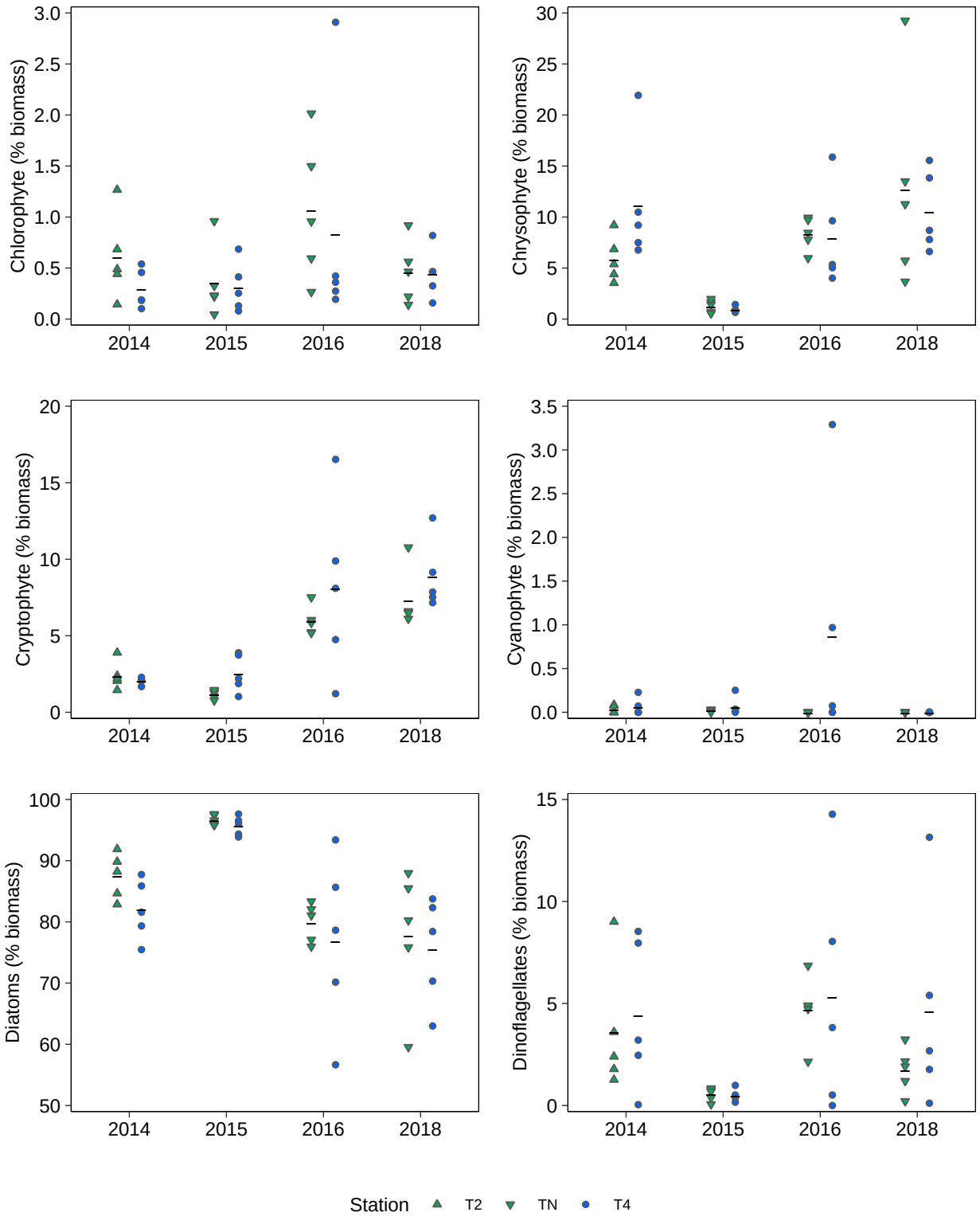


Figure 5.1: Phytoplankton Community Endpoints from Upstream (RG_T2 and RG_TN) and Downstream (RG_T4) of the Elk River, Koocanusa Reservoir Monitoring Program, 2014 to 2018

Notes: The upstream location RG_T2 was relocated further upstream of the mouth of the Elk River to RG_TN in 2015. Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines. Note the differing y-axis values among density/biomass and relative abundance/biomass plots.

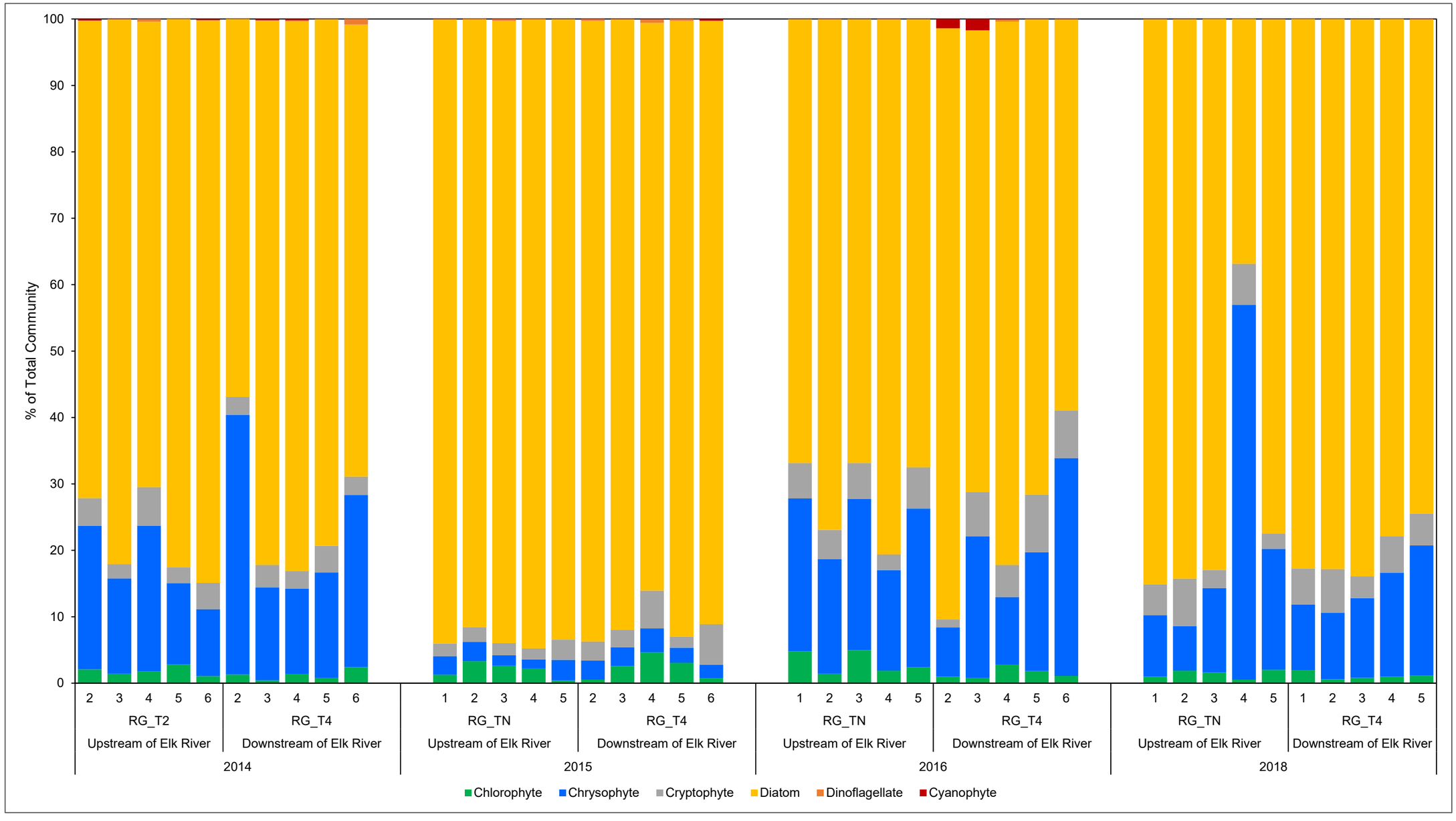


Figure 5.2: Relative Density of Major Phytoplankton Groups in Koocanusa Reservoir, August 2014 to 2018

Note: The upstream location was relocated further upstream from the mouth of the Elk River in August 2015 and 2016.

differences, including between 2018 and 2015 baseline conditions (i.e., the first year RG_TN was sampled), were indicated between transects for these endpoints (Figure 5.2; Appendix Table D.9) suggesting that these temporal differences likely reflected natural annual variability. The year-to-year differences in phytoplankton community features were supported by NMDS analyses, which showed high within-year overlap in taxonomic groupings between the downstream and upstream areas, but often considerable separation of taxonomic groupings among individual years, for each of the study areas based primarily on MDS1 and MDS2 weightings (Figure 5.3). Overall, the phytoplankton community indicated substantially lower density, biomass, and richness within the reservoir in 2016 and 2018, indicating lower primary productivity, compared to 2015, but the differences in community features among these years was not related to the Elk River discharge given similar among year differences both downstream and upstream of the mouth of the river.

Phytoplankton communities in Koocanusa Reservoir both upstream (RG_TN) and downstream (RG_T4) of the Elk River were primarily dominated by diatoms together with moderate relative densities of chrysophytes (golden algae) in August 2018 (Figure 5.2; Appendix Table D.8). The centric diatom *Cyclotella pseudostelligera* was the dominant species of phytoplankton at both areas, both in terms of density and biomass (Appendix Tables D.3 and D.6). The predominance of *C. pseudostelligera* at both areas in August was believed to reflect flow from the tributaries near each sampling area providing the upwelling necessary to prevent individual organisms from settling out of the photic zone, while at the same time supplying the silica/silicon/silicates materials required for frustule formation (H. Larratt, pers. comm. 2016). Relatively low nutrient concentrations within Koocanusa Reservoir were also hypothesized to prevent *C. pseudostelligera* from being outcompeted by other organisms such as blue-green algae, which prefer higher concentrations of nitrogen and phosphorus (i.e., more eutrophic conditions), leading to the dominance of the phytoplankton community by this diatom (H. Larratt, pers. comm. 2016). The densities and biomass of other major phytoplankton groups, including chlorophytes, cryptophytes, cyanophytes, and dinoflagellates, were variable but generally low, each typically composing less than 5% of the community at each station (Figure 5.2). Phytoplankton total density, biomass, and richness did not differ significantly between the downstream and upstream areas in 2018 (Figure 5.1; Appendix Table D.7). In addition, there were no downstream-to-upstream differences in density or biomass for any of the major phytoplankton groups in 2018 (Figure 5.1; Appendix Table D.7).

5.3 Zooplankton Community Structure

Total zooplankton density, biomass, and LPL richness, as well as the density and biomass of cladocerans, copepods, and rotifers taxonomic groups, were all higher downstream of the Elk

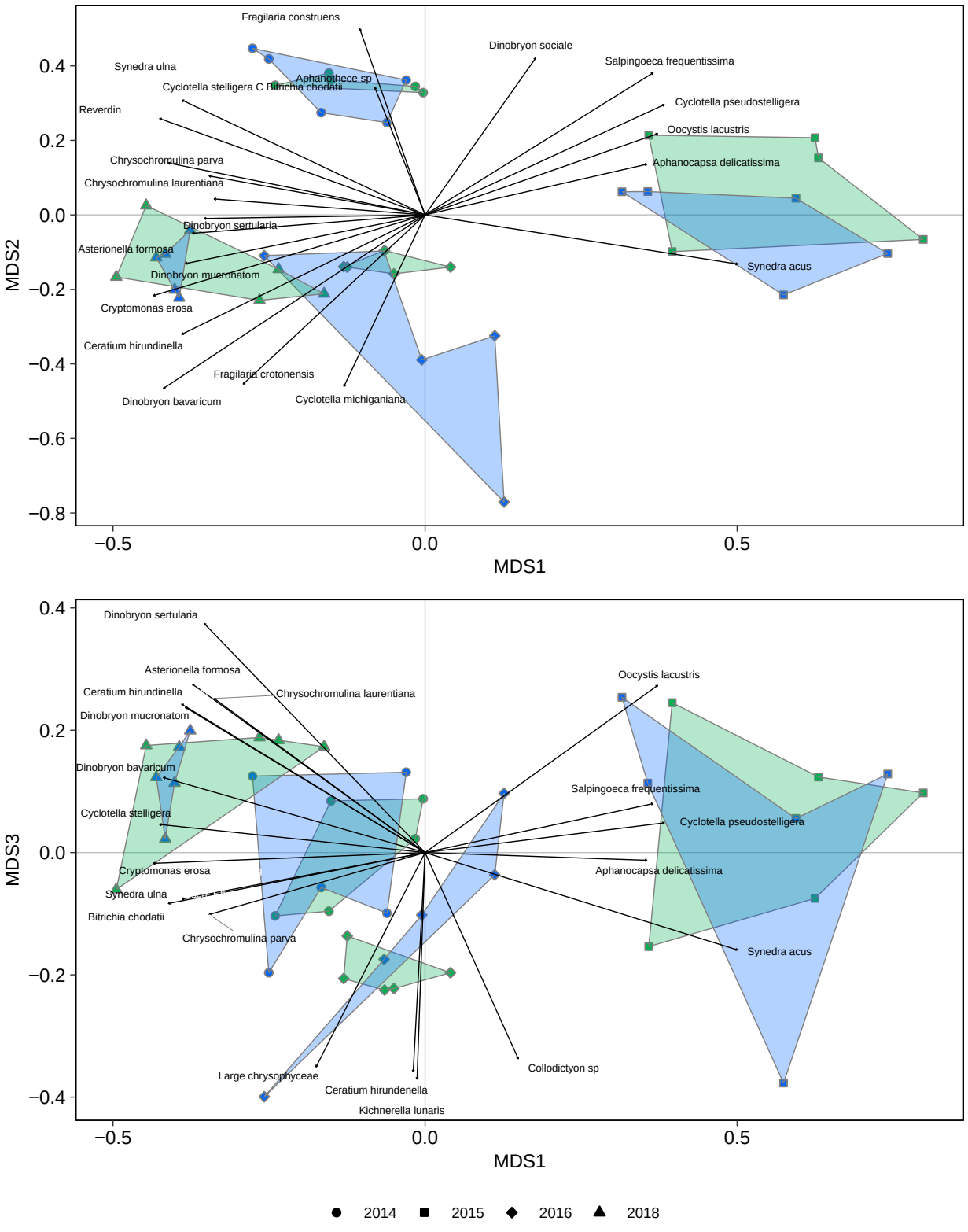


Figure 5.3: NMDS Scores for Phytoplankton Communities, Koocanusa Reservoir Monitoring Program, 2014 to 2018

Notes: Upstream areas (RG_T2 and RG_TN) plotted in green and downstream areas (RG_T4) plotted in blue. Arrows drawn for taxa with correlation p−value ≤ 0.001.

River than upstream in June 2018 and 2019 (Figure 5.4). In June 2018, the zooplankton community was dominated by rotifers downstream of the Elk River, and by cladocerans and copepods upstream of the Elk River. In June 2019, the community was co-dominated by cladocerans and rotifers downstream of the Elk River, and dominated solely by copepods at the upstream transect (Figure 5.5). The differences in density, biomass, richness, and relative abundances of dominant groups between years were likely in response to substantially lower reservoir levels in June 2018 compared to June 2019 (Figure 2.2) and influences associated with differing freshet timing. These differences suggested a more well-established zooplankton community downstream (RG_T4) compared to upstream (RG_TN) of the Elk River in the spring (June). Comparison of 2018 and 2019[23] indicated that in the spring (June) density LPL richness, and the density and biomass of copepods and rotifers, and the density of cladoceran were all significantly higher downstream compared to upstream in both 2018 and 2019. Biomass and cladoceran biomass was also significantly higher downstream in June 2019, but not significantly different in 2018 (Figure 5.4; Appendix Table E.36).

In mid- to late summer, following a prolonged period in which near full-pool reservoir levels have been maintained at both the downstream and upstream transects, the zooplankton community was well established both downstream and upstream of the Elk River, with both areas being dominated by Copepods based on relative abundance (Figure 5.5). No significant differences in density, biomass, LPL richness, or density and biomass of major groups was observed in either 2018 or 2019, with the exception of significantly lower cladoceran biomass downstream in 2018, and significantly higher rotifer density downstream in 2019 (Figure 5.4; Appendix Table E.36). Overall, results for both the spring and summer are not indicative of mine-related influences. Differences that were observed in the spring community are attributed to fluctuations in water levels in the reservoir and annual differences in the timing of freshet.

Temporal comparison between 2015, 2016, and 2018 for samples collected from the top 10 m of the water column, indicated that there were greater difference in total density between downstream and upstream areas was observed in 2018 compared to 2015 and 2016, with consecutively higher density shown at the downstream area contrasting with no significant differences in density shown at the upstream area since 2015 (Appendix Table E.37). No significant difference in total biomass, nor consistent differences in total richness, were observed at the downstream area compared to the upstream area among the 2015, 2016, and 2018 surveys. Total biomass and biomass of all three zooplankton groups were significantly

[23] These comparisons were made using community samples collected from the entire water column in 2018 and 2019, and could not be combined with data from the surficial 10m samples collected prior to 2018 because the methods were found to yield significant differences in zooplankton endpoints (Appendix Table E.35).

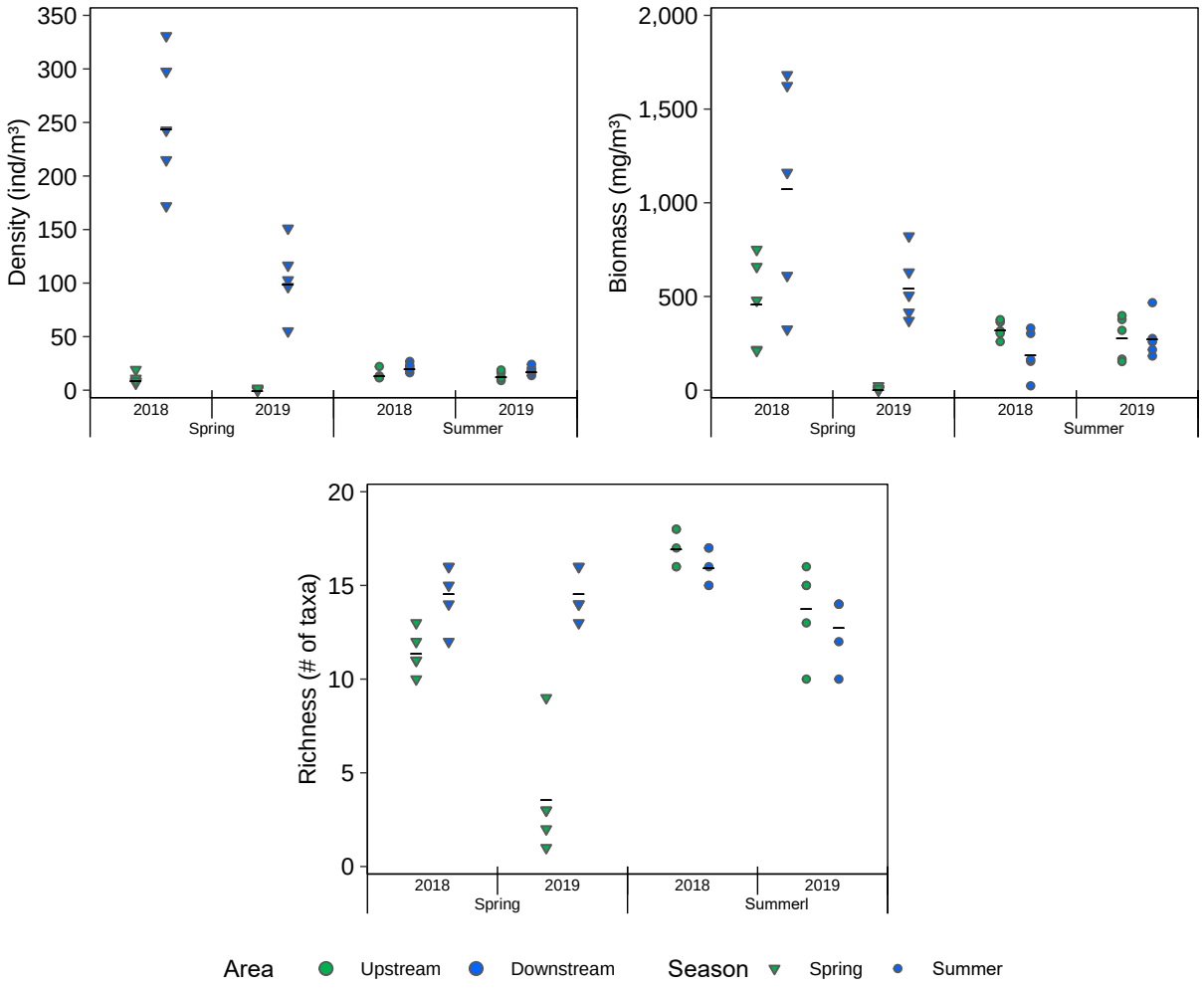


Figure 5.4: Zooplankton Community Endpoints Upstream (RG_TN) and Downstream (RG_T4) of the Elk River on Koocanusa Reservoir in Spring and Summer, 2018 and 2019

Notes: Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines.

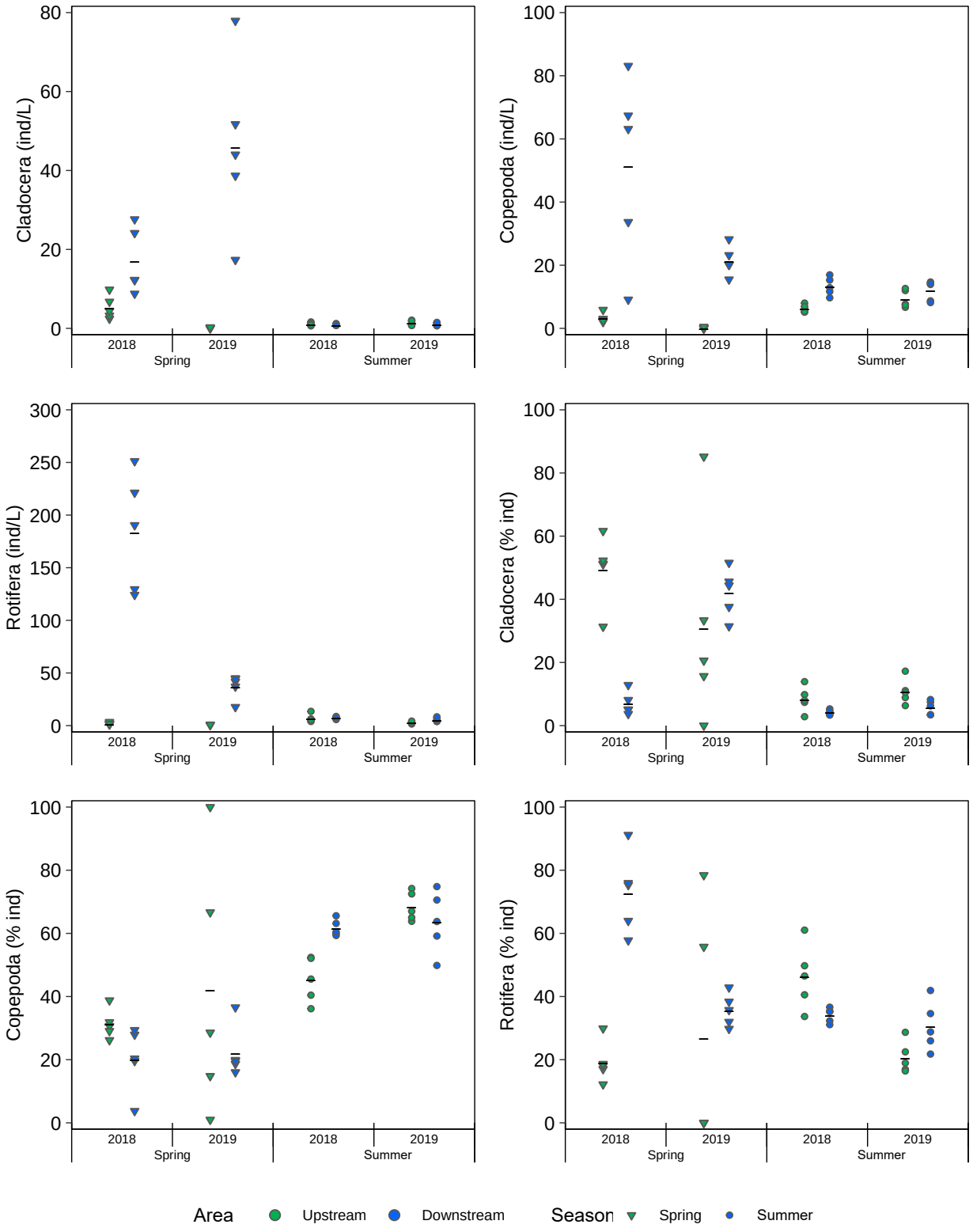


Figure 5.4: Zooplankton Community Endpoints Upstream (RG_TN) and Downstream (RG_T4) of the Elk River on Koocanusa Reservoir in Spring and Summer, 2018 and 2019

Notes: Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines. Note the differing Y-axis values among like density/biomass and relative abundance/biomass plots.

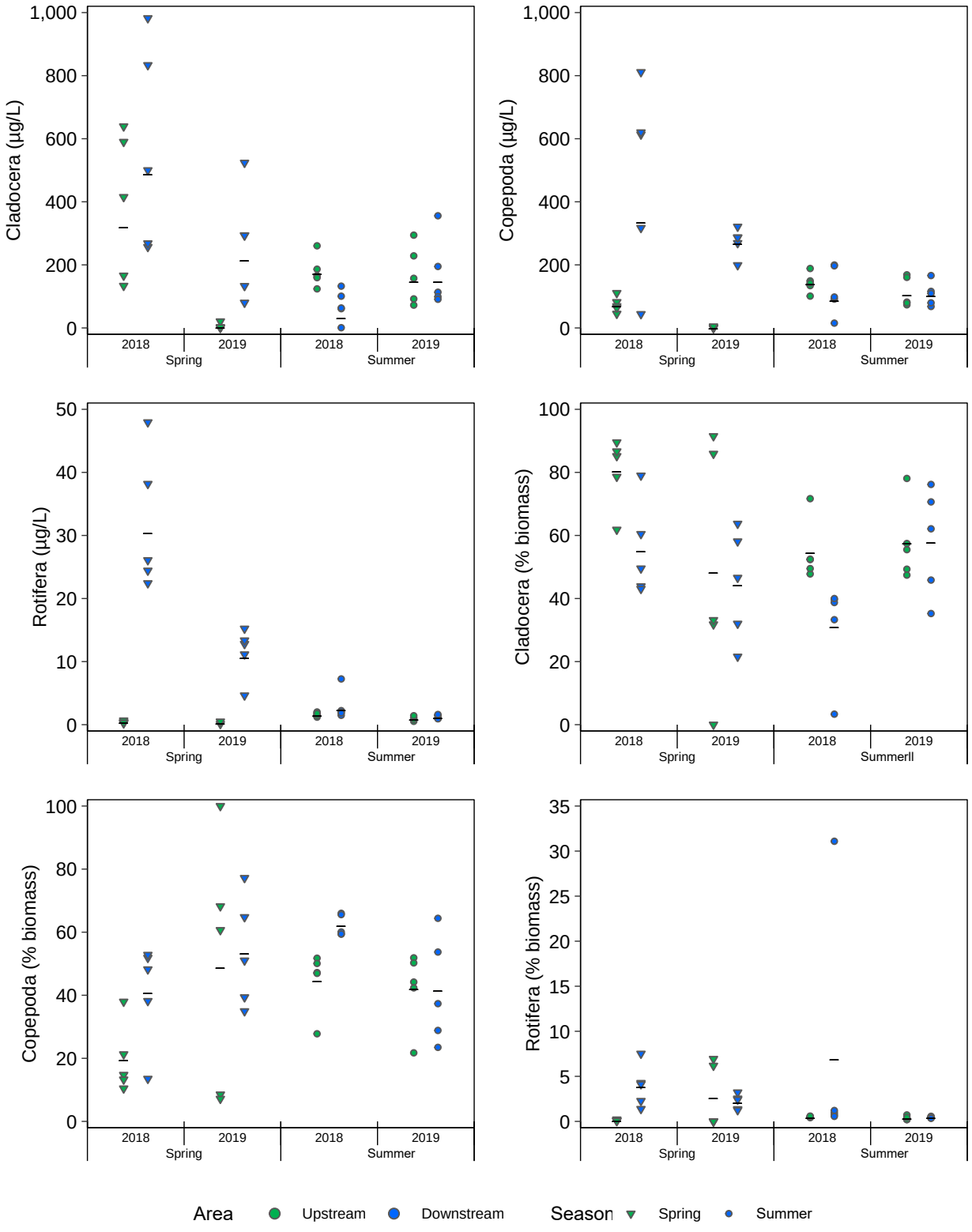


Figure 5.4: Zooplankton Community Endpoints Upstream (RG_TN) and Downstream (RG_T4) of the Elk River on Koocanusa Reservoir in Spring and Summer, 2018 and 2019

Notes: Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines. Note the differing Y-axis values among like density/biomass and relative abundance/biomass plots.

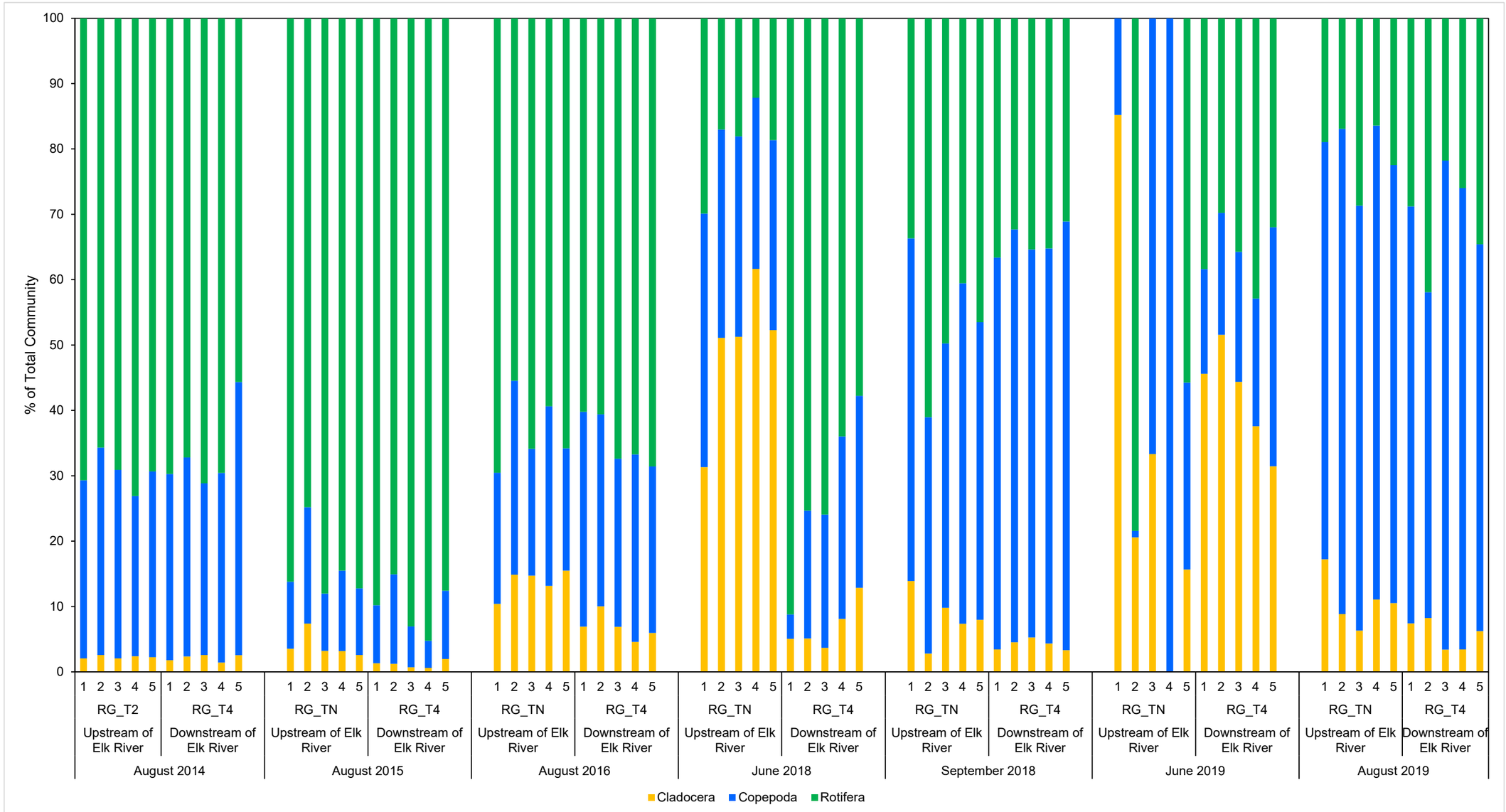


Figure 5.5: Relative Density of Major Zooplankton Groups in Koocanusa Reservoir, 2014 to 2019

Notes: The upstream location RG_T2 was relocated further upstream from the mouth of the Elk River in August 2015 to RG_TN. Samples collected prior to 2018 were from the surficial 10m of the water column, whereas samples from 2018 and 2019 were collected from the entire water column.

higher at both downstream and upstream areas since 2015, suggesting an overall change in the zooplankton community within the reservoir, rather than an influence associated with the Elk River discharge. Among the dominant taxonomic groups, only the biomass of cladocerans were consistently significantly lower at the downstream area compared to upstream of the Elk River since 2015, but this difference was not associated with correspondingly lower densities of cladocerans suggesting simply smaller sized individuals at the downstream area (Appendix Table E.37). In addition, significantly larger differences in cladoceran, copepod, and rotifer densities between the downstream and upstream area in 2018 compared to 2015 (Appendix Table E.37). Overall, despite differences in sampling methods, changes are occurring between years and appear to be variable, but are consistently observed both upstream and downstream. Because changes are consistently observed both downstream and upstream of the Elk River, they are not expected to be mine-related, but rather a result in the seasonal fluctuations of the reservoir levels.

5.4 Zooplankton Tissue Selenium

Mean selenium concentrations in zooplankton tissue from downstream of the Elk River were below the interim BC selenium guideline for dietary effects to benthic invertebrates (4 µg/g dw) in June 2018 and 2019, and in August 2019, but not in August and September of 2018 (Figure 5.6). However, mean concentrations of selenium in zooplankton tissue at the downstream area were consistently below the EVWQP Level 1 benchmarks for dietary effects to fish (11 µg/g dw) and for potential effects to invertebrate reproduction (13 µg/g dw; Teck 2014). Mean selenium concentrations in zooplankton tissue collected upstream of the Elk River were consistently below the BC guideline and EVWQP Level 1 benchmarks in 2018 and 2019. In the Montana portion of the reservoir, mean tissue selenium concentrations were below the BC guideline in both 2017 and 2018 (Figure 5.6).

Zooplankton tissues collected in summer (i.e., August and/or September) consistently showed significantly higher selenium concentrations downstream compared to upstream of the Elk River since 2016 (Table 5.1). However, the magnitude of difference in concentrations between the downstream and upstream areas was similar to the 2016 sampling event, and selenium concentrations in zooplankton tissue were significantly lower at both the downstream and upstream study areas from 2016 to 2019 compared to 2015 (Figure 5.6; Table 5.1).

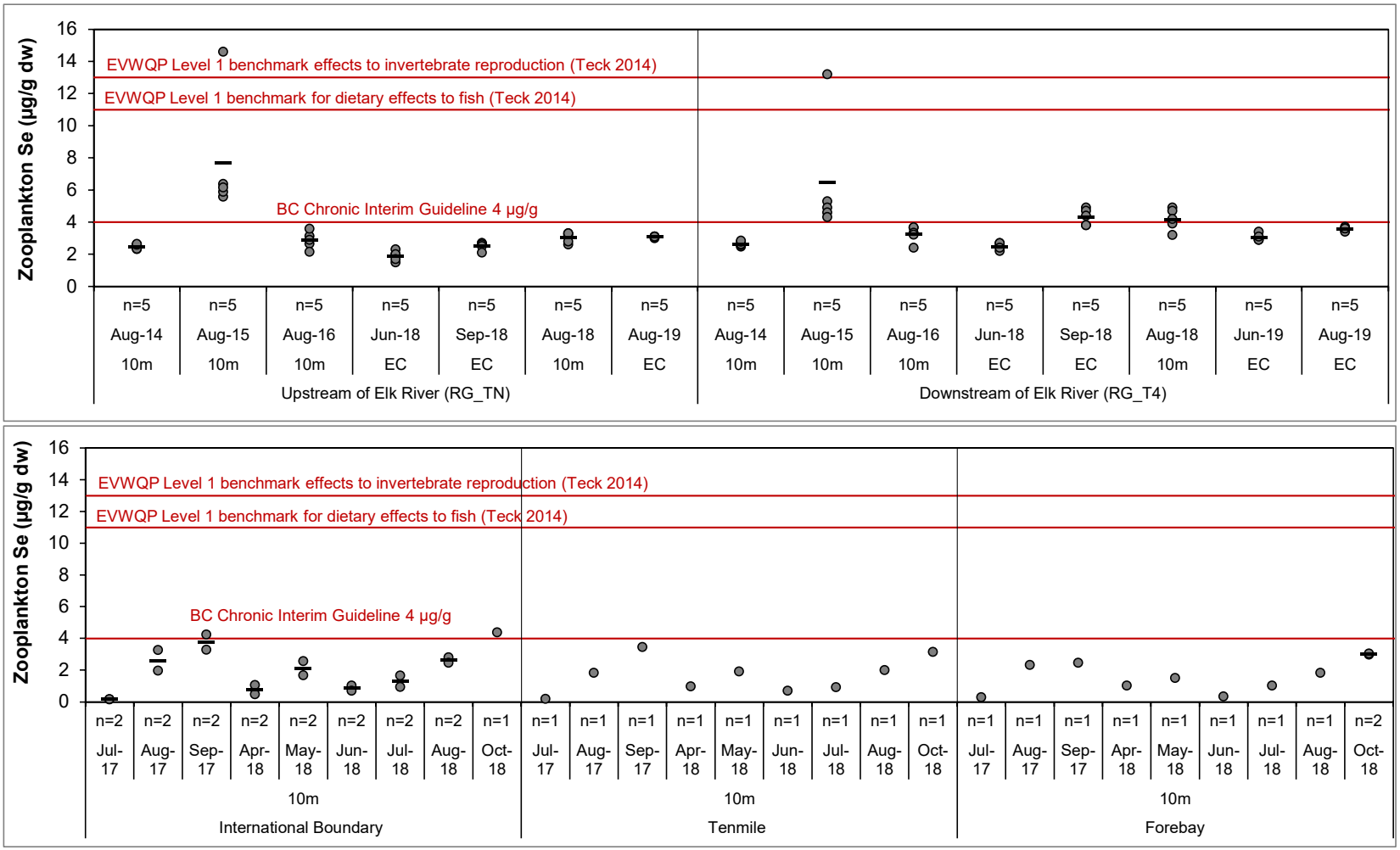


Figure 5.6: Concentration of Selenium (µg/g dw) in Zooplankton Tissue Collected at the Canadian (RG_TN and RG_T4) and Montana (International Boundary, Tenmile, and Forebay) Portions of Koocanusa Reservoir, 2014 to 2019

Notes: Individual values are plotted. Means are plotted as horizontal lines. "EC" refers to sampling the entire water column, 10 m refers to the top 10 meters of the water column. Data from Montana stations for 2016 were reported on a wet weight basis (moisture content not available to convert to dry weight), and therefore excluded from this plot. Montana stations include International Boundary, Tenmile, and Forebay. Sufficient sample sizes could not be collected from upstream of Elk River in June 2019.

Table 5.1: Temporal Comparison of Zooplankton Tissue Selenium Concentrations Collected in Summer from 2015 to 2019 at Koocanusa Reservoir Downstream (RG_T4) and Upstream (RG_TN) Transects

Endpoint	Transformation	ANOVA P-Values			Year	MCT		US vs. DS MOD[a]	US vs. DS Contrast[b]	Temporal Differences		Temporal MOD vs Baseline[c]	
		Int.	Area	Year		RG_TN (US)	RG_T4 (DS)			US	DS	US	DS
Selenium (mg/kg dw)	rank	<0.01	-	-	2015	6.16	4.90	-25.7	A	B	B	b	b
					2016	2.89	3.33	13.2	AB	AC	C	-53.1	-32.0
					2018	2.70	4.30	37.2	C	AC	BD	-56.2	-12.2
					2019	3.10	3.60	13.9	BC	C	CD	-49.7	-26.53

P-Value < 0.1 and MOD < 0
P-Value < 0.1 and MOD > 0
P-Value <0.1

[a] MOD = Magnitude of difference between Upstream (US) and Downstream (DS) calculated for each year as MOD = $MCT_{Downstream}$ - $MCT_{Upstream}/MCT_{Upstream}$ x 100%

[b] Letters indicate pairwise contrasts between Upstream and Downstream differences over time (i.e., years that share a letter have similar MODs)

[c] MOD = (MCT_{year} - $MCT_{baseline}$)/$MCT_{baseline}$, where MCT_{year} is the Measure of Central Tendency for the year of interest, $MCT_{baseline}$ is the Measure of Central Tendency for 2015.

Note: Analyses based on samples sizes of n = 5. MCT = Measure of Central Tendency (mean when untransformed, geometric mean when log10-transformed, and median when rank transformed). "ns" = non-significant. "-" = not applicable. All pairwise contrasts done using Tukey's Honest Significant Differences (α=0.1), b = baseline year. Baseline was considered to be 2015 to correspond with the year that RG_T2 was relocated to RG_TN. Pairwise contrasts of upstream vs downstream differences conducted on the same scale as analysis (i.e., as ratios on log10 transformed endpoints, otherwise additive).

6 BENTHIC INVERTEBRATES

6.1 Overview

Benthic invertebrate community samples were collected at profundal areas located downstream (RG_T4) and upstream (RG_TN) from the confluence with Elk River in August 2018. Composite-taxa benthic invertebrate tissue samples were collected at the same downstream and upstream areas in April and August[24] of 2018 and 2019, as well as at littoral areas including Elk River mouth (RG_ER) and Gold Creek (RG_GC) downstream areas and the Sand Creek (RG_SC) upstream area in April 2018, for analysis of selenium concentrations and other metals.

6.2 Benthic Invertebrate Community

In 2018, the total density of benthic invertebrates ranged from 502 to 3,670 organisms/m^2 downstream of, and 1,835 to 2,614 organisms/m^2 upstream of the Elk River, with no significant difference in density indicated between areas (Figure 6.1; Appendix Tables F.6 and F.7). Richness downstream of the Elk River ranged from 7 to 12 taxa per station, and although significantly lower than the 9 to 13 taxa per station observed upstream of the Elk River, the magnitude of the difference between areas was within the natural effect size (i.e., ±2 SD; Figure 6.1; Appendix Tables F.6 and F.7). The benthic invertebrate community was primarily composed of oligochaetes (mostly tubificinae) and insects (various species of chironomids, but mainly *Chironomus*, *Procladius*, and *Tanytarsus*) both downstream (RG_T4) and upstream (RG_TN) of the Elk River (Figure 6.2; Appendix Table F.3). Key differences in benthic invertebrate community structure between study areas in 2018 included significantly lower total density of nematodes, and total and relative density of Ostracoda downstream compared to upstream of the Elk River. Only the Ostracoda endpoints had a magnitude of difference outside of an effect size of ±2 (Appendix Table F.6 and F.7).

Temporal analyses of benthic invertebrate community data indicated no significant difference in richness, and no consistent direction of difference in total density, at the downstream area relative to the upstream area since 2015. Although densities of Ostracoda differed significantly at the downstream area relative to the upstream area, no consistent direction of difference was indicated between areas among years from 2015 to 2018 (Figure 6.1; Appendix Table F.11). Shannon's Diversity and the density of Nematoda were consistently significantly lower downstream than upstream of the Elk River, but no significant change in the magnitude of these differences occurred among years since 2015. Chemically, although many metals had

[24] The August 2018 sample from RG_T4 was inadvertently ruined in the analytical testing process, and was resampled October 9, 2018.

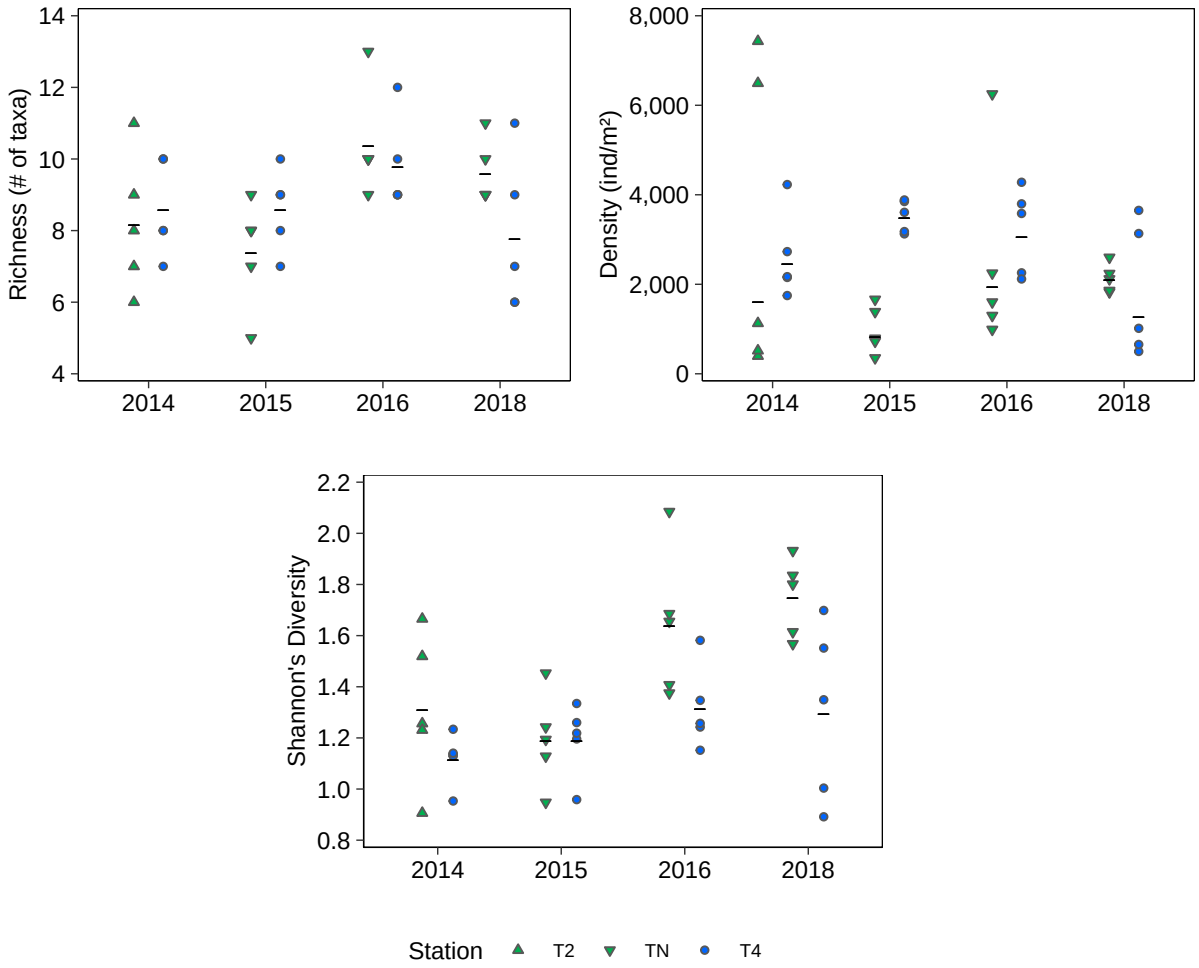


Figure 6.1: Benthic Invertebrate Community Endpoints from Upstream (RG_T2 and RG_TN) and Downstream (RG_T4) of the Elk River on Koocanusa Reservoir, 2014 to 2018

Notes: The upstream location RG_T2 was relocated further upstream of the mouth of the Elk River in 2015 to RG_TN. Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines.

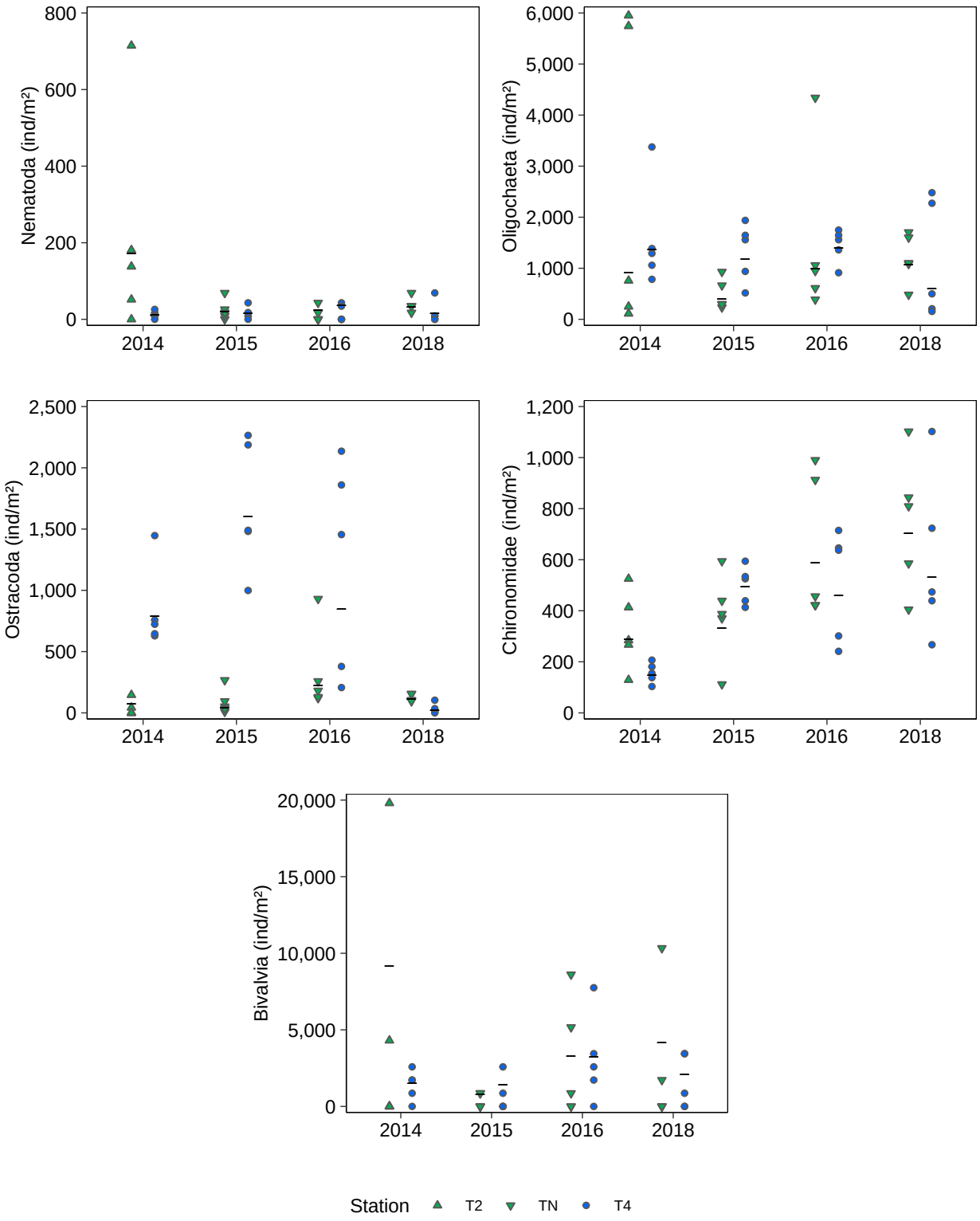


Figure 6.1: Benthic Invertebrate Community Endpoints from Upstream (RG_T2 and RG_TN) and Downstream (RG_T4) of the Elk River on Koocanusa Reservoir, 2014 to 2018

Notes: The upstream location RG_T2 was relocated further upstream of the mouth of the Elk River in 2015 to RG_TN. Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines.

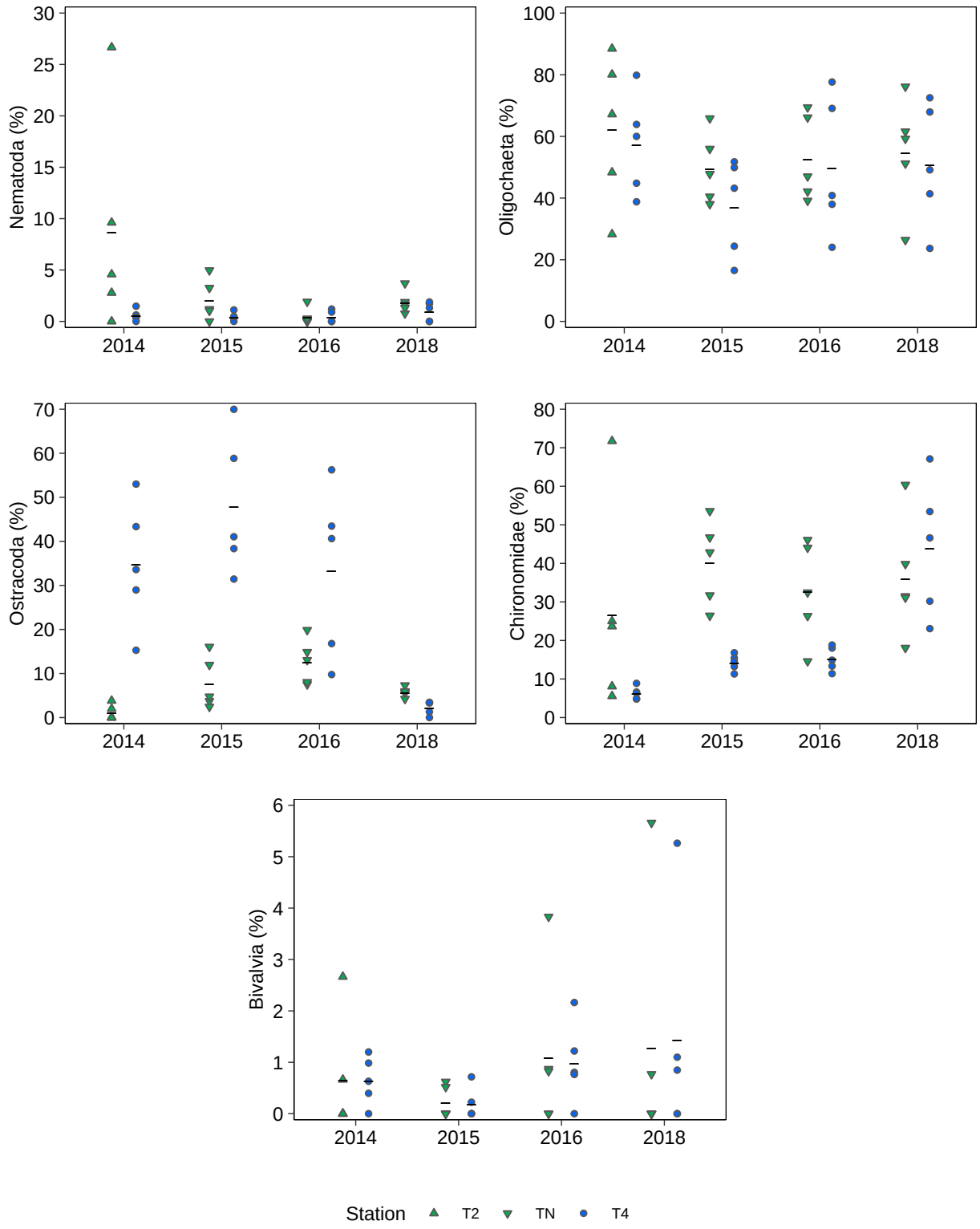


Figure 6.1: Benthic Invertebrate Community Endpoints from Upstream (RG_T2 and RG_TN) and Downstream (RG_T4) of the Elk River on Koocanusa Reservoir, 2014 to 2018

Notes: The upstream location RG_T2 was relocated further upstream of the mouth of the Elk River in 2015 to RG_TN. Measures of Central Tendency (geometric mean for biomass and density, otherwise mean) are plotted as horizontal lines.

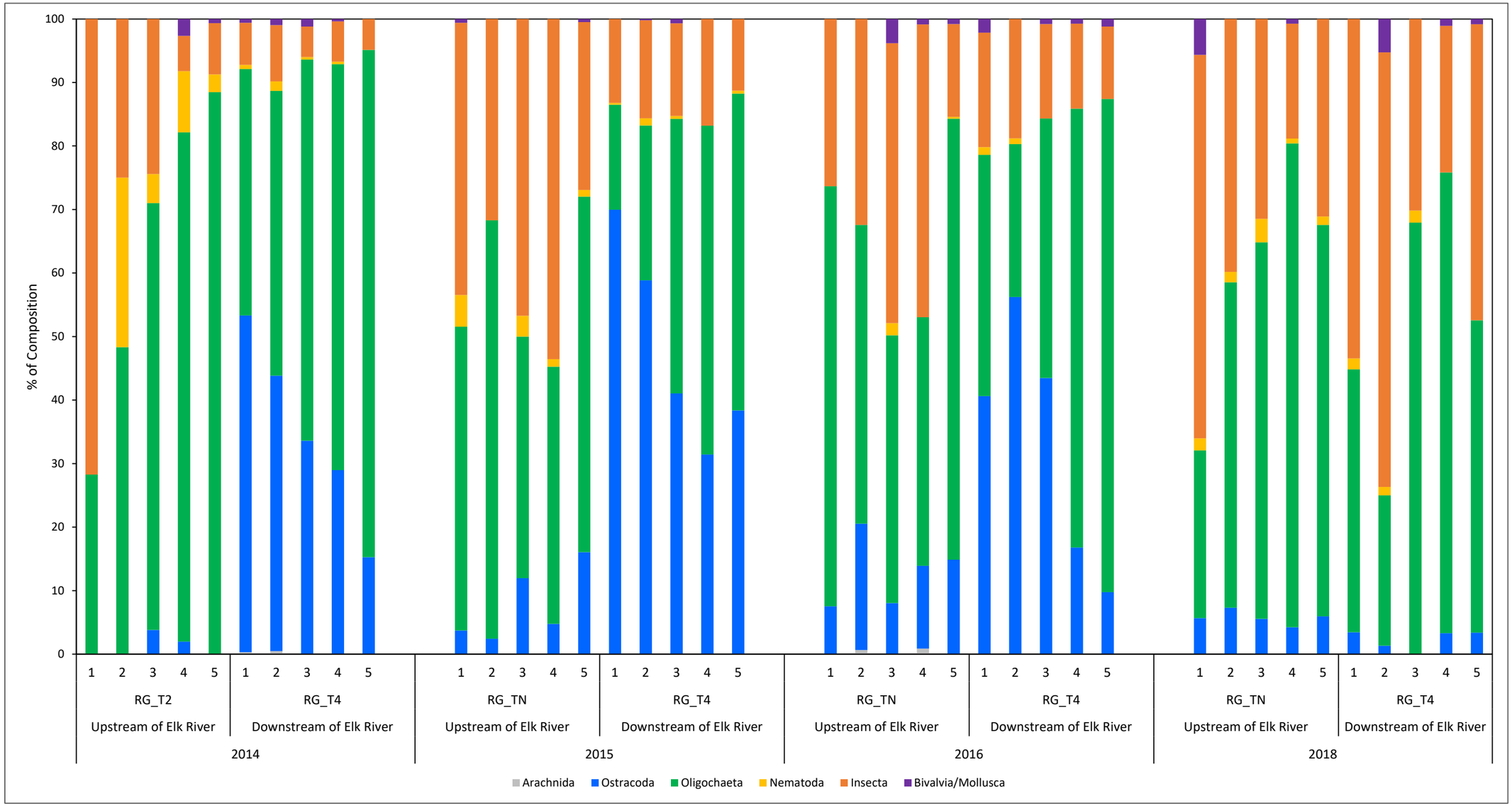


Figure 6.2: Relative Density of Major Benthic Invertebrate Community Groups in Koocanusa Reservoir, August 2014 to 2018

Note: The upstream location was relocated further upstream from the mouth of the Elk River in August 2015 and 2016.

significantly higher concentrations in sediment downstream of the Elk River compared to upstream (see Section 4), metals that are elevated relative to guidelines are elevated both downstream and upstream of the Elk River (Appendix Tables C.4 and C.6), therefore differences in Shannon's Diversity are not mine-related. In addition, mean incremental difference in Shannon's Diversity between downstream and upstream areas was small, further supporting that the difference between areas was not ecologically meaningful. The habitat at both the downstream and upstream transects differs with regard to physical characteristics (i.e., higher clay and lower sand and silt content downstream relative to upstream), which may influence Shannon's Diversity, and differences may also be influenced by the abundance of Nematodes, which have historically been consistently significantly lower downstream of the Elk River since 2015. Nematodes are relatively metal tolerant (Ekschmitt at Korthals 2006), and therefore the lower density of this group in the downstream area is not consistent with the influences typically associated with metal exposure, and therefore their density is unrelated to Elk River discharge. Analyses conducted using NMDS indicated significant differences in benthic invertebrate community composition between downstream and upstream areas and among years at both areas based on the first two axes, which were primarily driven by weightings of various species of oligochaete worms and chironomid midges (Figure 6.3). Investigation into changes over time indicated that Shannon's Diversity and Chironomid density were both significantly higher in 2016 and 2018 downstream and upstream of the Elk River compared to 2015, LPL richness was significantly higher both downstream and upstream in 2016, and Ostracod density was significantly lower downstream in 2018 compared to 2015 (Figure 6.1; Appendix Table F.11). Overall, downstream and upstream areas remained fairly similar over time, with the exception of consistently lower Shannon's Diversity and Nematode density downstream of the Elk River, and some variability in Ostracod density.

6.3 Benthic Invertebrate Tissue Selenium

Similar selenium concentrations in benthic invertebrate tissues were observed between the downstream and upstream profundal (transects) samples collected in August/October 2018 in the Canadian portion of the reservoir, but were higher downstream in April 2018 (Figure 6.4). With the exception of April upstream sample, selenium concentrations in profundal benthic invertebrate tissues collected in 2018 were above the interim BC guideline of 4 µg/g dw, but below the EVWQP Level 1 benchmarks for potential effects to invertebrates (13 µg/g dw), and for dietary effects to fish (11 µg/g dw) at the downstream area as well as upstream area (Figure 6.4). In April 2019, selenium concentrations in benthic invertebrate tissue samples collected downstream and upstream of the Elk River were both greater than the interim BC guideline for selenium in invertebrate tissue, and were higher downstream (Figure 6.4). Benthic invertebrate tissues collected in August 2019 showed concentrations of selenium below the BC guideline for

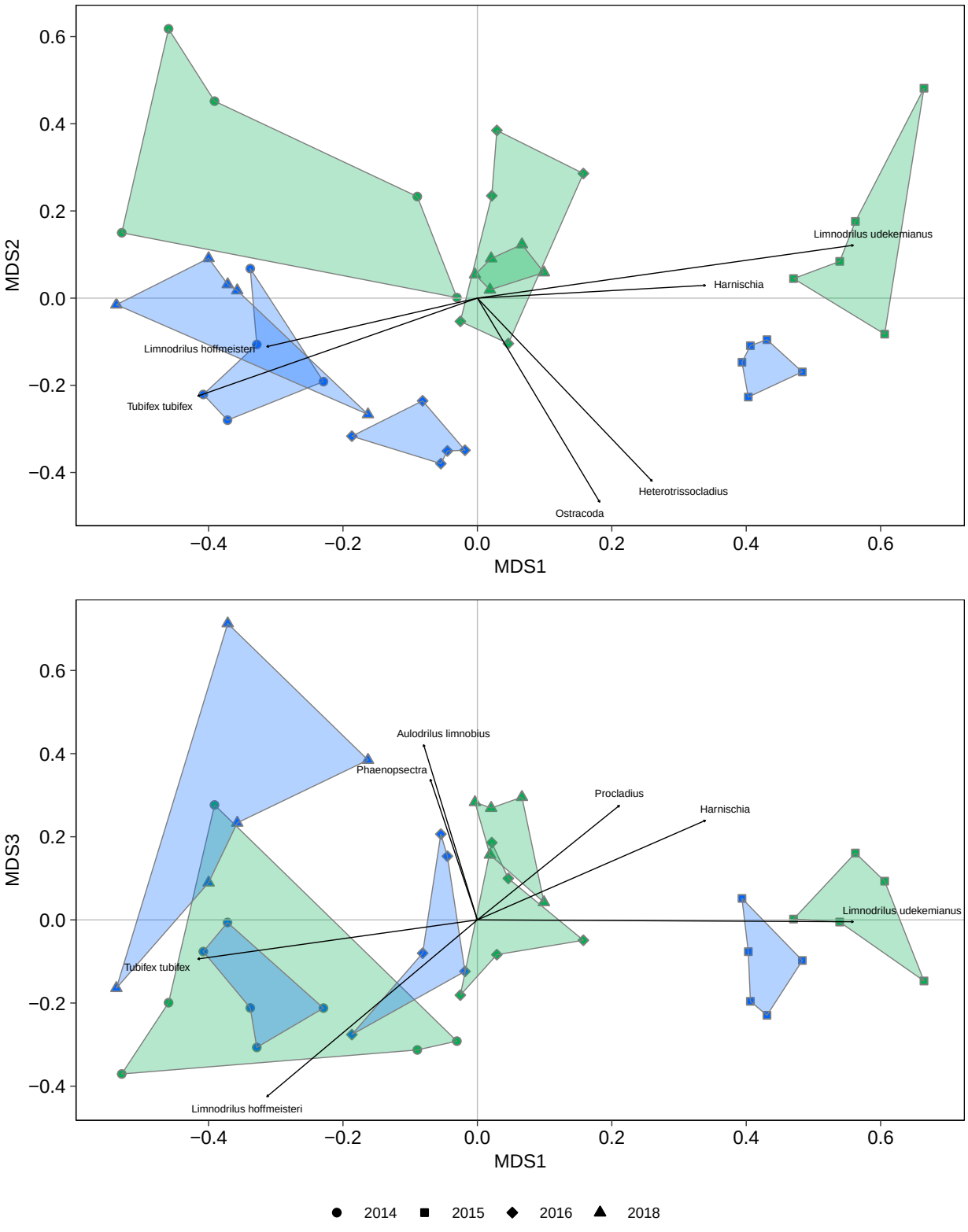


Figure 6.3: NMDS Scores for Benthic Invertebrate Communities, Koocanusa Reservoir Monitoring Program, 2014 to 2018

Notes: Upstream areas (RG_T2 and RG_TN) plotted in green and downstream areas (RG_T4) plotted in blue. Arrows drawn for taxa with correlation p−value ≤ 0.01.

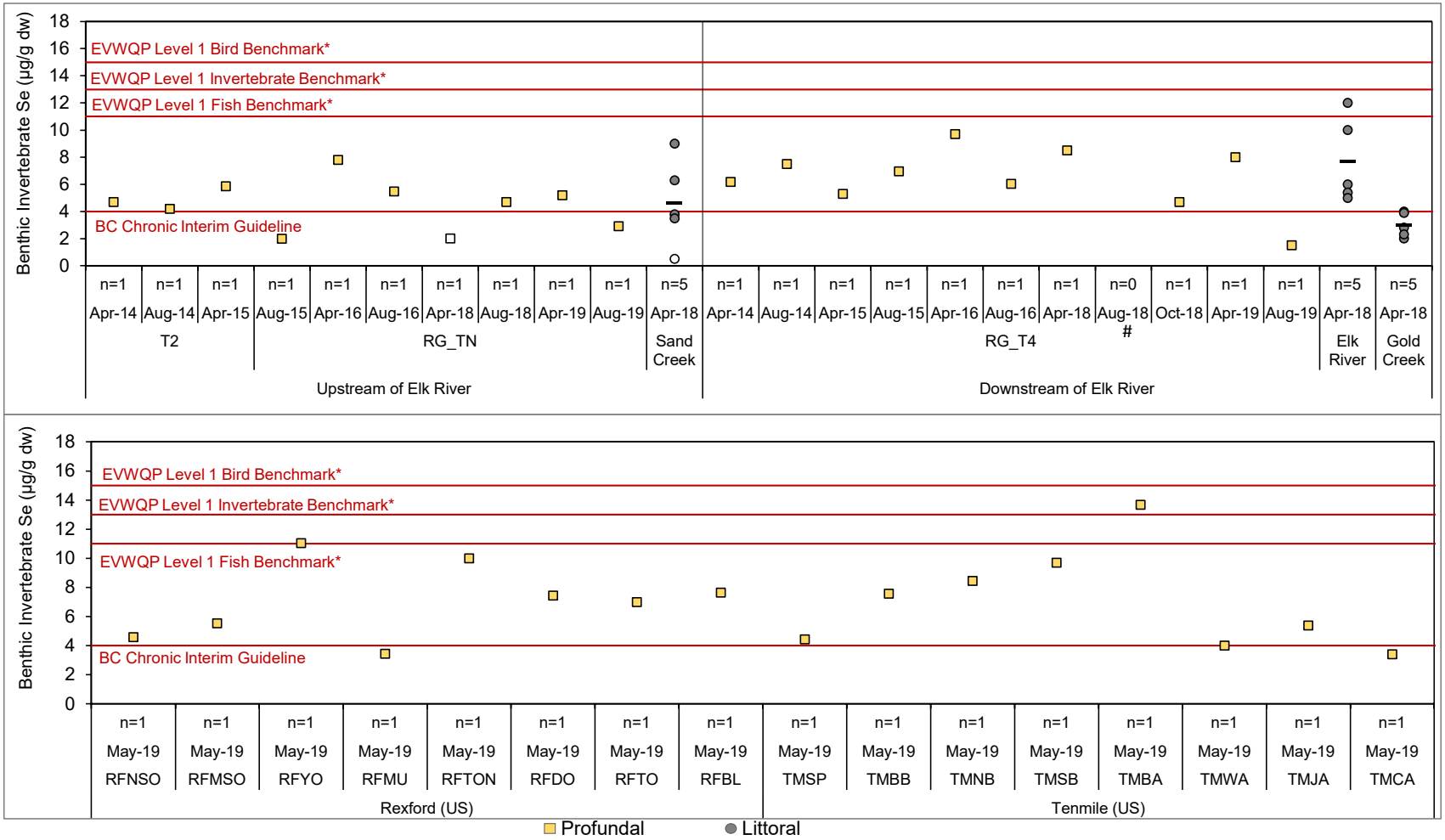


Figure 6.4: Selenium Concentration in Composite Benthic Invertebrate Tissue Samples in Koocanusa Reservoir, 2014 to 2019

Notes: Means of individual values are plotted as horizontal lines when n > 1. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. The upstream area was sampled at T2 until April 2015, and subsequently relocated further upstream from the mouth of the Elk River (RG_TN) beginning in August 2015. # Sample was inadvertently ruined in the analytical testing process (resampled October 9, 2018). * 15 µg/g Level 1 Benchmark for dietary effects to juvenile birds; 13 µg/g Level 1 Benchmark for growth, reproduction, and survival of benthic invertebrates; 11 µg/g Level 1 Benchmark for dietary effects to juvenile fish (Elk Valley Water Quality Plan [EVWQP]; Golder, 2014); 4 µg/g BC Chronic Interim Guideline for dietary effects to benthic invertebrates (BCMOE 2006). Caution should be applied with comparing benthic invertebrate tissue concentrations between the Canadian and US portions of the reservoir as US data converted to dw using a moisture of 73.8% (average from 2018 Canadian samples).

invertebrate tissue both downstream and upstream of the Elk River, and unlike in April, were lower downstream (Figure 6.4).

Selenium concentrations in benthic invertebrate tissues were higher at the mouth of the Elk River (RG_ER) compared to upstream at Sand Creek (RG_SC) and downstream at Gold Creek (RG_GC) for samples collected from littoral habitat in April 2018 (Figure 6.4). The mean selenium concentrations in benthic invertebrate tissues collected at littoral habitat of the Elk River and Sand Creek areas exceeded the interim BC selenium guideline of 4 µg/g dw, but were less than the EVWQP Level 1 benchmarks (Figure 6.4).

Selenium concentrations in benthic invertebrate tissues collected at areas from the Montana portion of the reservoir in May 2019 were all above the BC guideline with the exceptions of at stations RFMU and TMCA in the Rexford and Tenmile areas, respectively (Figure 6.4). Selenium concentration in benthic invertebrate tissue at TMBA was greater than the EVWQP Level 1 benchmark for potential effects to invertebrates (13 µg/g dw; Figure 6.4).

In general, selenium concentrations in benthic invertebrate tissues collected at areas from the Canadian portion of the reservoir in 2018 and 2019 were within the range of concentrations observed in previous years (2014 to 2016) for each respective study area, and benthic invertebrate tissue samples from Montana had similar selenium concentrations as observed in samples from downstream of the Elk River in the Canadian portion of the reservoir (Figure 6.4).

7 FISH

7.1 Overview

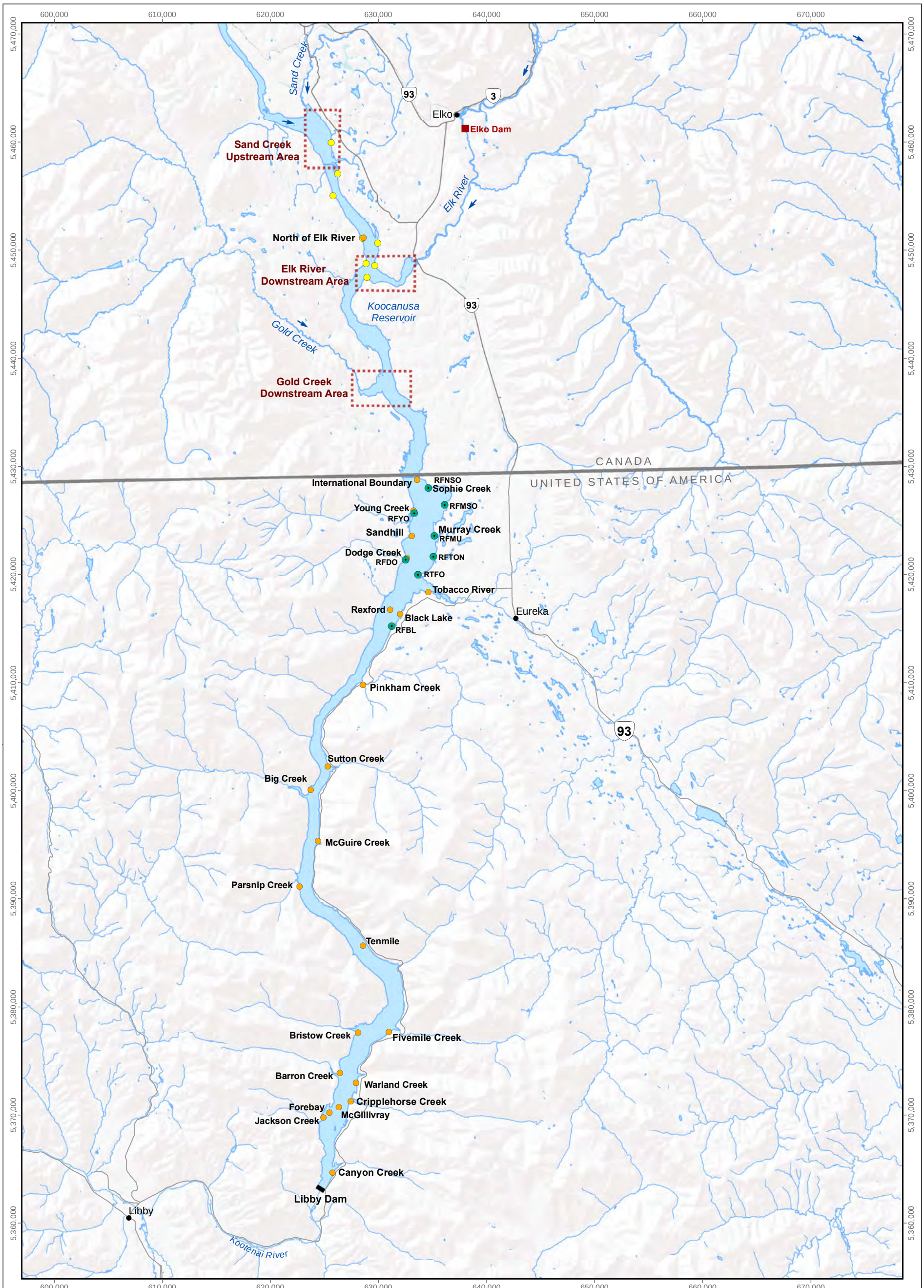
Fish were sampled in the Canadian portion of the Koocanusa Reservoir to evaluate endpoints indicative of individual and population health in April 2018. Three areas were sampled in the reservoir for the assessment of fish health, including two located downstream from the Elk River (Elk River Mouth [RG_ER] and Gold Creek [RG_GC]), and one located upstream from the Elk River (Sand Creek [RG_SC]; Figure 7.1). The fish health survey targeted the collection of peamouth chub (PCC) and reside shiner (RSC) prior to the spawning period for each species. Recruitment of redside shiners was also assessed in August 2018 and 2019 at each of the three fishing areas by confirming the presence of young-of-the-year (YOY) and, as applicable, evaluating YOY endpoints of body size and condition.

Fish tissue samples were collected in both the Canadian and Montana portions of the reservoir for selenium chemistry analyses. Within the Canadian portion of the reservoir, the tissue survey targeted 10 female PCC and 10 female RSC in April of 2018 and 2019, and sport fish were sampled non-lethally in April, June, and August of 2018 and 2019, from each of the three fishing areas indicated above. Tissue chemistry data from a northern pikeminnow (NSC) study conducted in Canada as part of a selenium toxicity study in 2019, and from a variety of fish species collected by MFWP at the Kikomun area of the Canadian portion of the reservoir in September 2019, were integrated into the analyses. Tissue chemistry data associated with MFWP sampling in the Montana portion of the reservoir in 2018, and from the Rexford (Montana) area (Figure 7.1) in May and September of 2019, were also included into the fish tissue evaluation.

7.1.1 Fish Health Assessment

7.1.1.1 Peamouth Chub (PCC)

Female PCC were collected from Sand Creek (RG_SC, 22 individuals), Elk River (RG_ER, 18 individuals), and Gold Creek (RG_GC, 20 individuals) study areas for fish health assessment. The mean age of female PCC captured at each of the downstream areas did not differ significantly from females collected from the upstream area (Table 7.1; Figure 7.2). Near the Elk River mouth, female PCC showed significantly lower condition than at the Sand Creek upstream area, but no other significant differences in health endpoints were indicated between areas (Table 7.1; Figure 7.2). Female PCC captured at the Gold Creek area showed significantly lower body weight and significantly greater relative liver weight compared to female PCC sampled at the upstream area (Table 7.1; Figure 7.2). In all cases, the magnitude of these



LEGEND

- Montana Fish Sampling Station 2018
- Montana Kikoman Fish Sampling Location 2019
- Montana Fish Sampling Location 2019
- British Columbia Fish Sampling Area

Fishing Locations in Koocanusa Reservoir, 2018 and 2019

0 5 10 20
km

N
W E
S

Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure 7.1

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\extra map\19-08 Figure 8.16 Fishing Locations.mxd

Table 7.1: Statistical Comparisons of Peamouth Chub Health Endpoints between Sand Creek (Upstream), and Elk River and Gold Creek (Downstream) Areas, Koocanusa Reservoir Monitoring Program, 2018

Sex	Indicator	Endpoint	Variables		Sample Size			Test	ANCOVA Model Statistics			Summary Statistics[b]				Overall Test P-value (Area)	Pairwise Comparisons[c]			
									Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]						Elk River vs. Sand Creek		Gold Creek vs. Sand Creek	
			Response	Covariate	Sand Creek	Elk River	Gold Creek		Interaction P-value	Covariate P-value		Statistic	Sand Creek	Elk River	Gold Creek		P-value	Magnitude of Difference (%)[d]	P-value	Magnitude of Difference (%)[d]
Female	Survival	Age	log_{10}[Age]	-	22	18	20	ANOVA	-	-	-	Geometric Mean	7.97	8.88	6.86	0.124	-	-	-	-
	Body Size	Fork Length	Fork Length (cm)	-	22	18	20	ANOVA	-	-	-	Mean	23.0	23.0	22.2	0.283	-	-	-	-
		Body Weight	Adjusted Body Weight (g)	-	22	18	20	ANOVA	-	-	-	Mean	127	119	107	0.077	0.678	-	0.064	-15
	Energy Usage	Length-at-age	log_{10}[Fork Length (cm)]	log_{10}[Age]	22	18	20	ANCOVA	0.661	<0.001	7.83	Adjusted Mean	22.9	22.4	22.6	0.598	-	-	-	-
		Weight-at-age	log_{10}[Adjusted Body Weight (g)]	log_{10}[Age]	22	18	20	ANCOVA	0.602	<0.001	7.83	Adjusted Mean	124	109	109	0.090	0.155	-	0.143	-
		Relative Gonad Weight	log_{10}[Gonad Weight (g)]	log_{10}[Adjusted Body Weight (g)]	22	18	20	ANCOVA	0.147	<0.001	114	Adjusted Mean	7.29	6.37	8.48	0.047	0.442	-	0.366	-
	Energy Storage	Relative Liver Weight	log_{10}[Liver Weight (g)]	log_{10}[Adjusted Body Weight (g)]	22	18	20	ANCOVA	0.769	<0.001	114	Adjusted Mean	1.99	1.90	2.39	0.008	0.798	-	0.041	20
		Condition	log_{10}[Adjusted Body Weight (g)]	log_{10}[Fork Length (cm)]	22	18	20	ANCOVA	0.184	<0.001	22.6	Adjusted Mean	120	111	111	0.005	0.013	-7.7	0.014	-7.5
Male	Survival	Age	Age	-	32	35	36	K-W	-	-	-	Median	5.5	5	5.5	0.041	0.069	-9.1	1.000	-
	Energy Usage	Length-at-age	log_{10}[Fork Length (cm)]	log_{10}[Age]	32	35	36	ANCOVA	0.077	<0.001	5.52	Adjusted Mean	20.5	20.3	20.5	0.711	-	-	-	-
		Weight-at-age	log_{10}[Adjusted Body Weight (g)]	log_{10}[Age]	32	34	36	ANCOVA	0.118	<0.001	5.52	Adjusted Mean	89.5	85.2	93.0	0.340	-	-	-	-
		Relative Gonad Weight	log_{10}[Gonad Weight (g)]	log_{10}[Adjusted Body Weight (g)]	33	34	36	ANOVA	0.935	0.476	-	Geometric Mean	0.467	0.410	0.467	0.132	-	-	-	-
	Energy Storage	Relative Liver Weight	log_{10}[Liver Weight (g)]	log_{10}[Adjusted Body Weight (g)]	33	34	36	ANCOVA	0.391	<0.001	88.8	Adjusted Mean	1.18	1.05	1.24	0.030[f]	0.169	-	0.687	-
		Condition	log_{10}[Adjusted Body Weight (g)]	log_{10}[Fork Length (cm)]	33	34	36	ANCOVA	0.022[e]	<0.001	20.4	Adjusted Mean	87.5	88.2	90.6	0.254	-	-	-	-

Area P-value < 0.1 or Interaction P-value < 0.05

Magnitude of Difference > 25% for Age, Weight-at-age, Relative Gonad Weight, and Relative Liver Weight or > 10% for Condition (EEM effect endpoint)

Covariate P-value > 0.05

Note: "-" indicates no data available

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for log_{10}-transformed variables), and adjusted mean are reported for Kruskal-Wallis, ANOVA and ANCOVA, respectively. The predicted means of the regression line equations are reported for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVA when a significant interaction is observed.

[c] Pairwise comparisons conducted using Tukey's honestly significant differences method (ANOVA and ANCOVA) or Dunn's test with Bonferroni adjustment (Kruskal-Wallis test).

[d] Calculated as the difference in measure of central tendency (MCT) between areas (downstream area minus upstream area), expressed as a percentage of the upstream area MCT.

[e] ANCOVA proceeded under the assumption that the slopes are practically parallel (R^2 of interaction model = 0.8942 and R^2 of parallel slope model = 0.8856; a difference < 0.02) following Environment Canada (2012).

[f] A significant difference was detected between the average rank values between RG_ER and RG_GC (not shown).

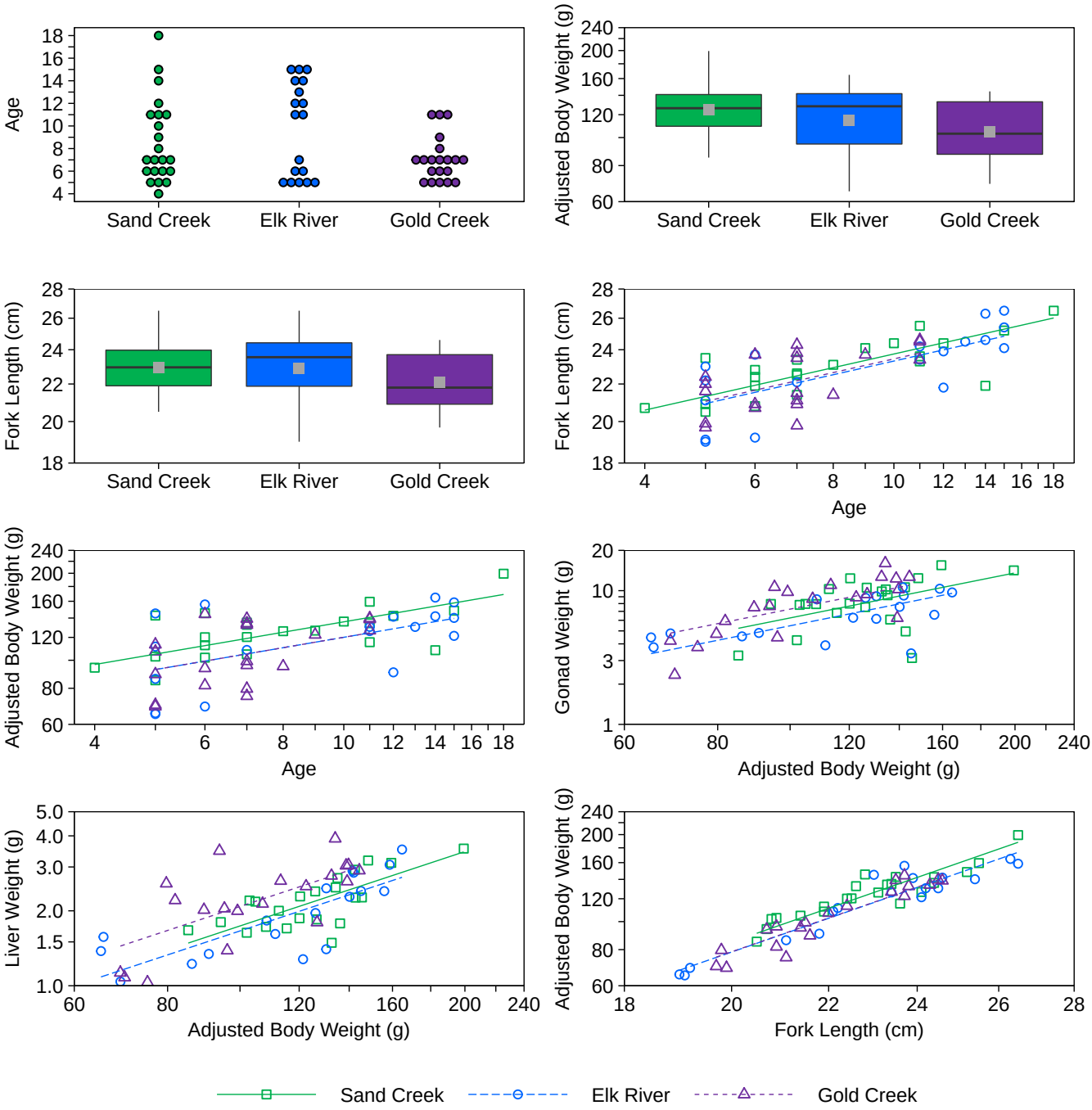


Figure 7.2: Plots to Support the Statistical Comparisons for Female Peamouth Chub Health Endpoints, Koocanusa Reservoir, 2018

Notes: Scatterplot x- and y-axes are $\log_{10}$-scaled. Outliers removed from the analysis are plotted as open symbols with an X through them.
Boxplot: box represents Q1, the median, and Q3. Whiskers extend to the minimum and maximum values; however, values above Q3 + 1.5IQR or below Q1 − 1.5IQR are plotted as individual points (IQR = Q3 − Q1) and the whiskers are truncated to the next value in the dataset. The mean is plotted as a square.

differences were within the applicable critical effect sizes (Table 7.1). Male PCC were collected at the Sand Creek (33 individuals), Elk River (35 individuals), and Gold Creek (36 individuals) areas for fish health assessment. The mean age of male PCC ranged from 5 to 6 years among these three study areas, with only those captured at the Elk River area shown to be significantly younger compared to males captured at the Sand Creek area (Table 7.1; Figure 7.3). No other significant differences in male PCC health endpoints were indicated at each individual downstream area compared to the upstream area (Table 7.1; Figure 7.3). Both sexes of PCC showed a relatively high incidence of tapeworms at all three study areas, ranging from 41.4% to 55.7% of individuals at each area, with the highest incidence occurring at the Gold Creek area (Table 7.2).

Temporally, no consistent differences and/or no consistent direction of differences were shown for any of the PCC fish health endpoints for either of the sexes over the period from 2014 to 2018 between the Elk River mouth and upstream areas, nor between the Gold Creek and upstream areas (Appendix Tables G.34 and G.35). In general, the incidence of tapeworms appeared higher in 2018 compared to that shown in previous years (2014 to 2016; Table 7.2).

7.1.1.2 Redside Shiner (RSC)

Female RSC were collected from the Sand Creek (33 individuals), Elk River (33 individuals), and Gold Creek (35 individuals) areas, for fish health assessment. The median age of the female RSC captured at each of the downstream areas did not differ significantly from that at the upstream area, and ranged from 3 to 4 years among all areas (Table 7.3; Figure 7.4). Relative liver weight of Elk River area female RSC was significantly greater than that of females collected upstream at the Sand Creek area, the magnitude of which was outside of the applicable effect size (±25%; Table 7.3; Figure 7.4). Growth endpoints of length- and weight-at-age were both significantly higher in female RSC from the Gold Creek area compared to the Sand Creek area, but the magnitude of this difference was within the applicable critical effect size.

Male RSC were collected from the Sand Creek (48 individuals), Elk River (45 individuals), and Gold Creek (46 individuals) areas, for fish health assessment. The median age of the male RSC at the downstream areas did not differ significantly from that at the upstream area (Table 7.3; Figure 7.5). Male RSC sampled at the Gold Creek area showed significantly greater relative liver weight compared to those captured at the Sand Creek upstream area, the magnitude of which was slightly outside of the applicable critical effect size (Table 7.3; Figure 7.5). However, no other significant differences in male RSC health endpoints were indicated between the Elk River area and upstream area, nor between the Gold Creek area and the upstream area, in 2018 (Table 7.3). Tapeworms were prevalent in both sexes of RSC, and similar to PCC, the highest incidences of tapeworms occurred at the Gold Creek area compared to the Elk River

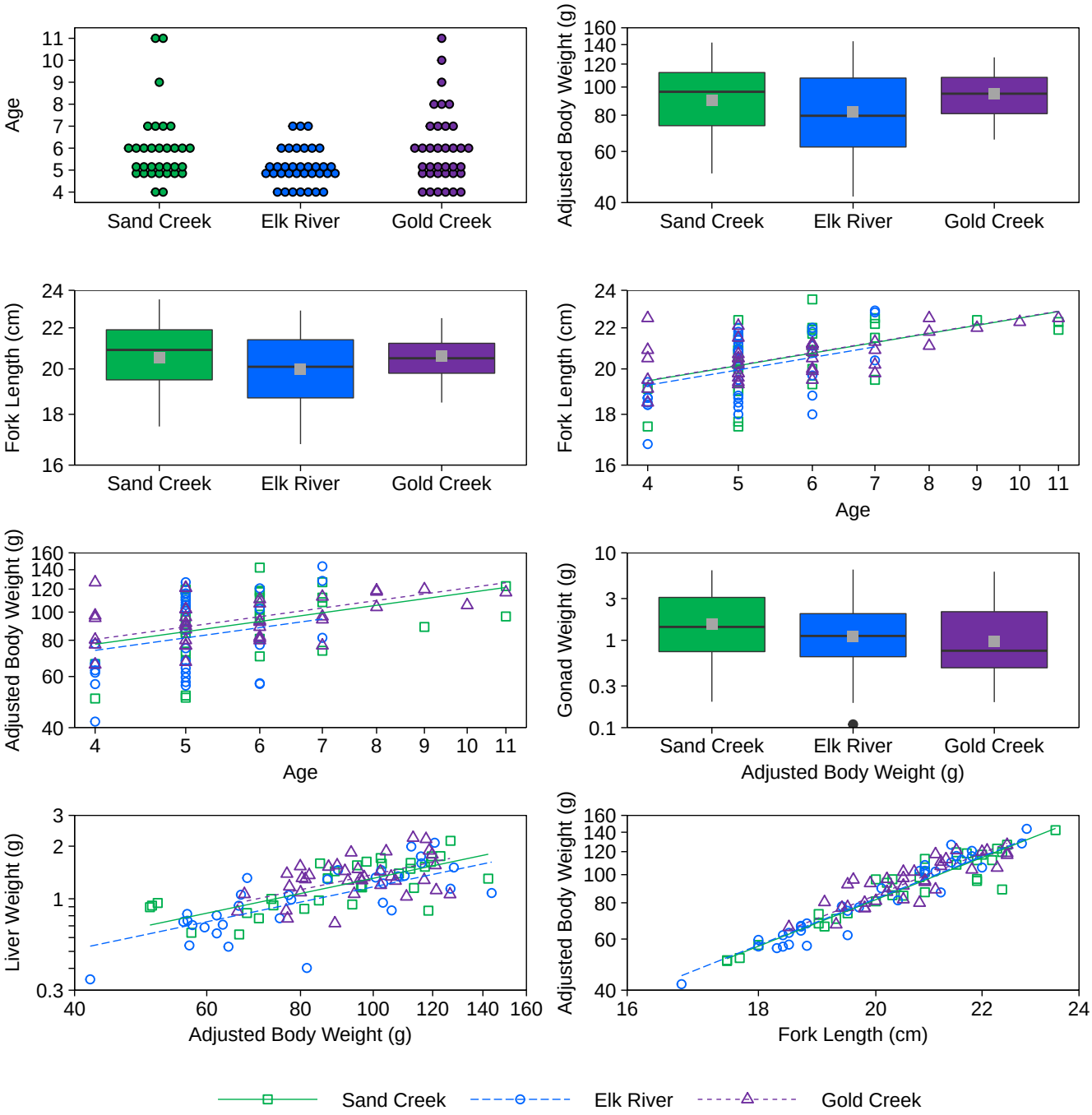


Figure 7.3: Plots to Support the Statistical Comparisons for Male Peamouth Chub Health Endpoints, Koocanusa Reservoir, 2018

Notes: Scatterplot x- and y-axes are log_{10}-scaled. Outliers removed from the analysis are plotted as open symbols with an X through them.
Boxplot: box represents Q1, the median, and Q3. Whiskers extend to the minimum and maximum values; however, values above Q3 + 1.5IQR or below Q1 − 1.5IQR are plotted as individual points (IQR = Q3 − Q1) and the whiskers are truncated to the next value in the dataset. The mean is plotted as a square.

Table 7.2: Summary of Body Cavity Tapeworms at Sand Creek, Elk River, and Gold Creek Study Areas in Koocanusa Reservoir, 2014 to 2016, 2018, and 2019

Fish Species (Collection Month)	Study Area	Parasites (body cavity tapeworm)				
		2014	2015	2016	2018	2019
Peamouth Chub (April)	Sand Creek	19%	10%	38%	42%	40%
	Elk River	9.1%	1.9%	23%	41%	10%
	Gold Creek	35%	5.3%	23%	56%	80%
Redside Shiner (April)	Sand Creek	-	11%	30%	14%	10%
	Elk River	-	46%	38%	24%	20%
	Gold Creek	-	83%	37%	35%	10%
Yellow Perch (April)	Sand Creek	-	0.038%	2.9%	0.0%	-
	Elk River	-	3.0%	20%	-	-
	Gold Creek	-	2.9%	7.1%	0.0%	-
Northern Pikeminnow (June)	Sand Creek	-	0%	7.7%	0.0%	-
	Elk River	-	0%	2.4%	17.0%	-
	Gold Creek	-	0%	3.1%	0.0%	-

Note: "-" indicates no data available

Table 7.3: Statistical Comparisons of Redside Shiner Health Endpoints between Sand Creek (Upstream) and Elk River and Gold Creek (Downstream) Areas, Koocanusa Reservoir Monitoring Program, 2018

Sex	Indicator	Endpoint	Variables		Sample Size			Test	ANCOVA Model Statistics			Summary Statistics[b]				Overall Test P-value (Area)	Pairwise Comparisons[c]			
									Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]						Elk River vs. Sand Creek		Gold Creek vs. Sand Creek	
			Response	Covariate	Sand Creek	Elk River	Gold Creek		Interaction P-value	Covariate P-value		Statistic	Sand Creek	Elk River	Gold Creek		P-value	Magnitude of Difference (%)[d]	P-value	Magnitude of Difference (%)[d]
Female	Survival	Age	Age	-	33	35	35	K-W	-	-	-	Median	4	4	3	0.296	-	-	-	-
	Body Size	Fork Length	Fork Length (cm)	-	33	35	35	ANOVA	-	-	-	Mean	9.72	9.83	9.93	0.676	-	-	-	-
		Body Weight	Adjusted Body Weight (g)	-	33	35	35	ANOVA	-	-	-	Mean	10.6	10.8	11.2	0.743	-	-	-	-
	Energy Usage	Length-at-age	log_{10}[Fork Length (cm)]	Age	33	35	35	ANCOVA	0.459	<0.001	3.51	Adjusted Mean	9.54	9.61	9.99	0.016	0.906	-	0.021	4.7
		Weight-at-age	log_{10}[Adjusted Body Weight (g)]	Age	33	35	35	ANCOVA	0.526	<0.001	3.51	Adjusted Mean	10.1	10.2	11.5	0.042	0.972	-	0.059	14
		Relative Gonad Weight	log_{10}[Gonad Weight (g)]	log_{10}[Adjusted Body Weight (g)]	33	35	35	ANCOVA	0.056	<0.001	10.8	Adjusted Mean	0.442	0.412	0.429	0.750	-	-	-	-
	Energy Storage	Relative Liver Weight	log_{10}[Liver Weight (g)]	log_{10}[Adjusted Body Weight (g)]	33	35	35	ANCOVA	0.333	<0.001	10.8	Adjusted Mean	0.158	0.198	0.175	0.053	0.042	25	0.514	-
		Condition	log_{10}[Adjusted Body Weight (g)]	log_{10}[Fork Length (cm)]	33	35	35	ANCOVA	0.668	<0.001	9.78	Adjusted Mean	10.9	10.8	10.8	0.750	-	-	-	-
					33	35	34[e]	ANCOVA	0.640	<0.001	9.78	Adjusted Mean	10.9	10.8	10.9	0.859	-	-	-	-
Male	Survival	Age	Age	-	47	45	46	K-W	-	-	-	Median	3	3	3	0.008[f]	0.303	-	0.393	-
	Energy Usage	Length-at-age	log_{10}[Fork Length (cm)]	log_{10}[Age]	47	45	46	ANCOVA	0.882	<0.001	3.24	Adjusted Mean	9.37	9.51	9.27	0.151	-	-	-	-
		Weight-at-age	log_{10}[Adjusted Body Weight (g)]	log_{10}[Age]	47	44	46	ANCOVA	0.861	<0.001	3.24	Adjusted Mean	9.84	10.2	9.38	0.096[g]	0.551	-	0.439	-
		Relative Gonad Weight	log_{10}[Gonad Weight (g)]	log_{10}[Adjusted Body Weight (g)]	48	45	46	ANCOVA	0.885	<0.001	9.80	Adjusted Mean	0.102	0.0818	0.0949	0.113	-	-	-	-
	Energy Storage	Relative Liver Weight	log_{10}[Liver Weight (g)]	log_{10}[Adjusted Body Weight (g)]	48	45	46	ANCOVA	0.474	<0.001	9.80	Adjusted Mean	0.114	0.137	0.144	0.058	0.188	-	0.063	26
		Condition	log_{10}[Adjusted Body Weight (g)]	log_{10}[Fork Length (cm)]	48	45	46	ANCOVA	0.158	<0.001	9.38	Adjusted Mean	9.87	9.85	9.67	0.354	-	-	-	-
					48	45	45[f]	ANCOVA	0.568	<0.001	9.37	Adjusted Mean	9.84	9.81	9.73	0.706	-	-	-	-

Area P-value < 0.1 or Interaction P-value < 0.05

Magnitude of Difference > 25% for Age, Weight-at-age, Relative Gonad Weight, and Relative Liver Weight or > 10% for Condition (EEM effect endpoint)

Covariate P-value > 0.05

Note: "-" indicates no data available

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for log_{10}-transformed variables), and adjusted mean are reported for Kruskal-Wallis, ANOVA and ANCOVA, respectively. The predicted means of the regression line equations are reported for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVA when a significant interaction is observed.

[c] Pairwise comparisons conducted using Tukey's honestly significant differences method (ANOVA and ANCOVA) or Dunn's test with Bonferroni adjustment (Kruskal-Wallis test).

[d] Calculated as the difference in measure of central tendency (MCT) between areas (downstream area minus upstream area), expressed as a percentage of the upstream area MCT.

[e] One outlier (Fish ID: RG_GC_RSC_85_20180428; Studentized residual = -4.6) was removed from the analysis.

[f] A significant difference was detected between the average rank values between RG_ER and RG_GC (not shown); however, the median values for the areas are the same.

[g] A significant difference was detected between the average rank values between RG_ER and RG_GC (not shown).

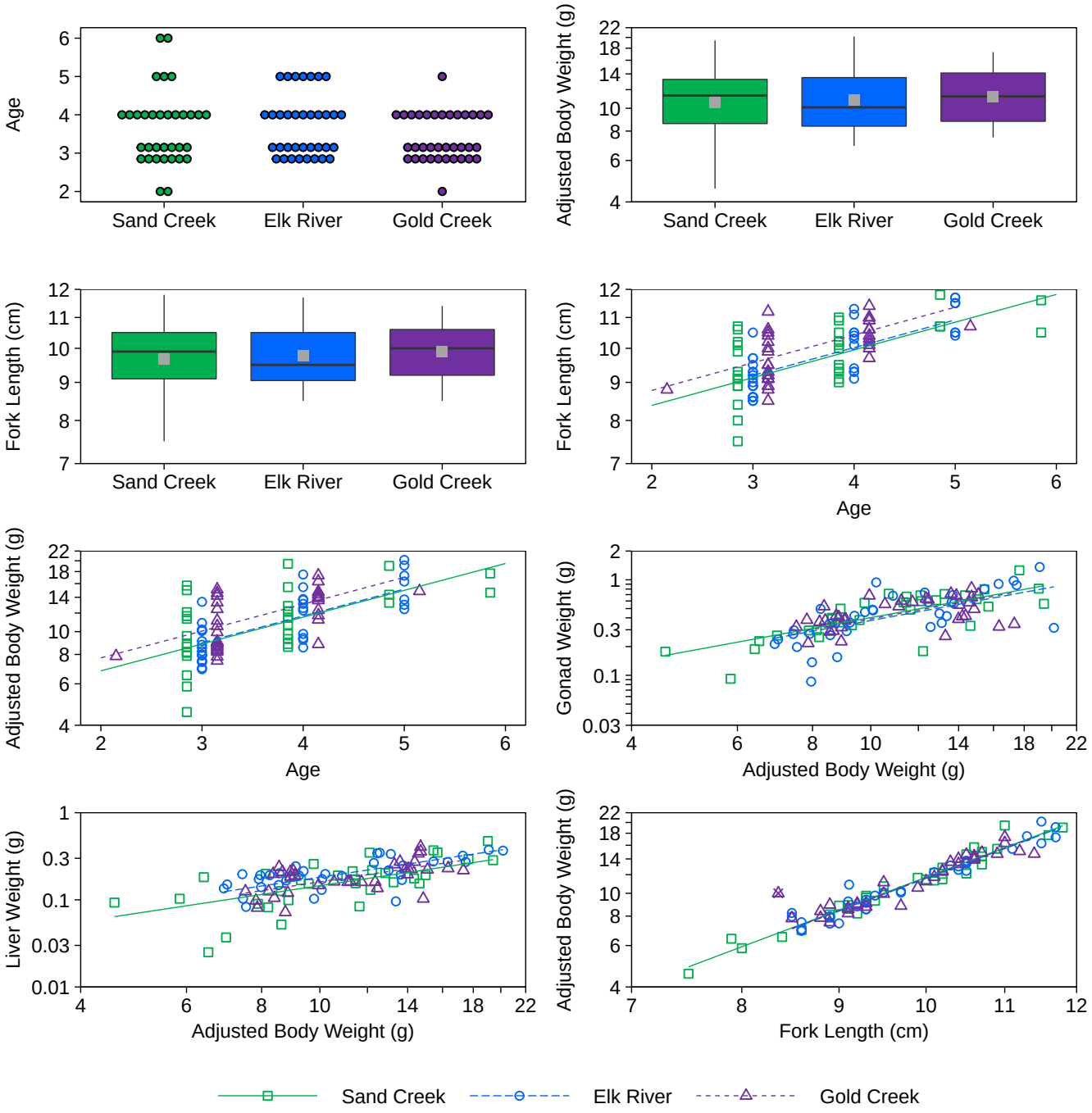


Figure 7.4: Plots to Support the Statistical Comparisons for Female Redside Shiner Health Endpoints, Koocanusa Reservoir, 2018

Notes: Scatterplot x- and y-axes are $\log_{10}$-scaled. Outliers removed from the analysis are plotted as open symbols with an X through them.
Boxplot: box represents Q1, the median, and Q3. Whiskers extend to the minimum and maximum values; however, values above Q3 + 1.5IQR or below Q1 − 1.5IQR are plotted as individual points (IQR = Q3 − Q1) and the whiskers are truncated to the next value in the dataset. The mean is plotted as a square.

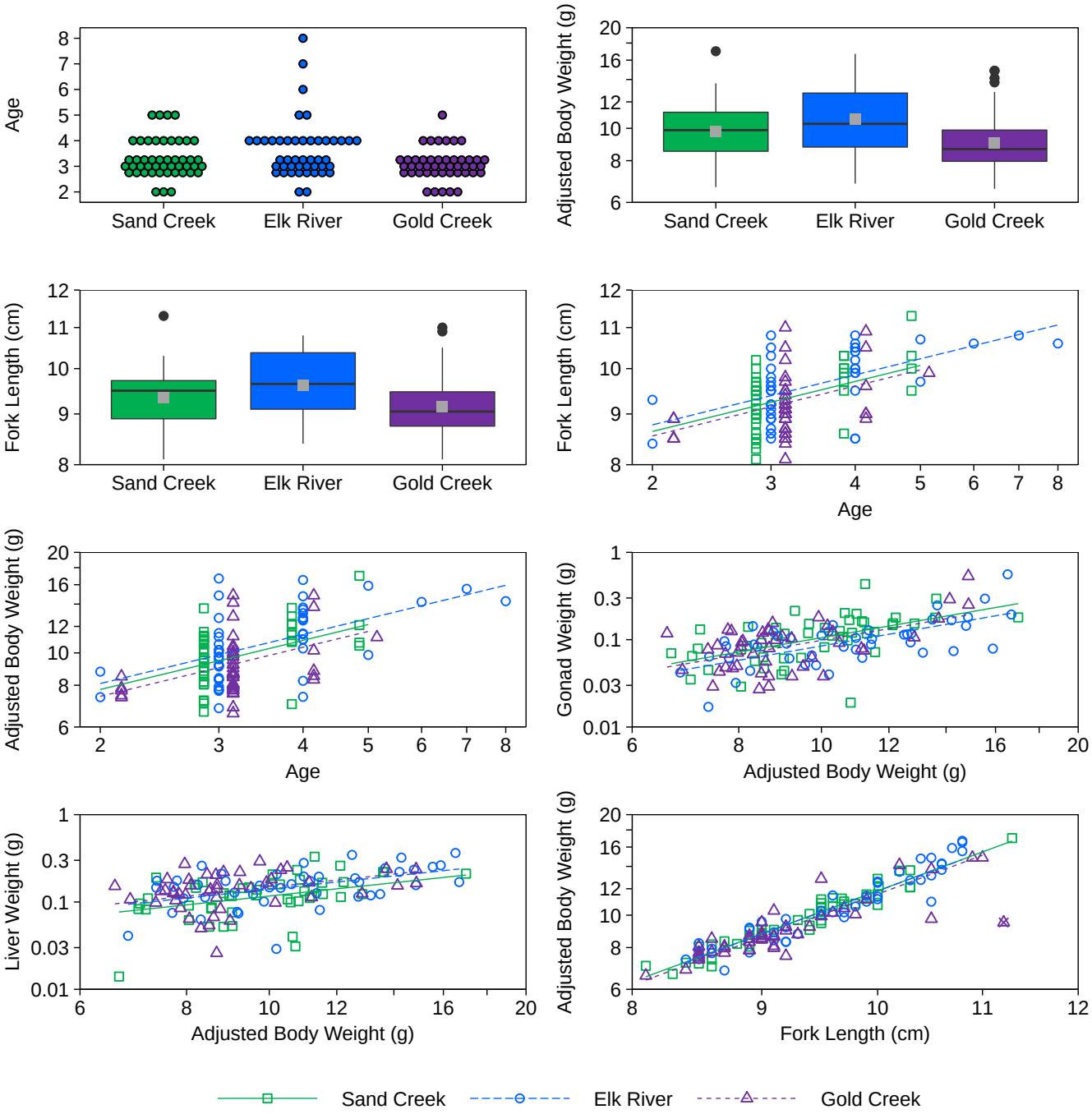


Figure 7.5: Plots to Support the Statistical Comparisons for Male Redside Shiner Health Endpoints, Koocanusa Reservoir, 2018

Notes: Scatterplot x- and y-axes are $\log_{10}$-scaled. Outliers removed from the analysis are plotted as open symbols with an X through them.
Boxplot: box represents Q1, the median, and Q3. Whiskers extend to the minimum and maximum values; however, values above Q3 + 1.5IQR or below Q1 − 1.5IQR are plotted as individual points (IQR = Q3 − Q1) and the whiskers are truncated to the next value in the dataset. The mean is plotted as a square.

downstream and Sand Creek upstream areas (Table 7.2). In general, the incidence of tapeworms in RSC was lower in 2018 than during previous years (2014 to 2016; Table 7.2).

Temporal comparisons indicated no consistent differences and/or no consistent direction of differences for any of the RSC fish health endpoints for either of the sexes over the period from 2015 to 2018 between the Elk River mouth and upstream areas, nor between the Gold Creek and upstream areas (Appendix Tables G.36 and G.37). The only exceptions were significantly greater weight-at-age and length-at-age in female RSC from the Gold Creek area compared to the upstream area, but overall this difference was within the critical effect size of ±25% (Appendix Table G.36).

7.1.2 Redside Shiner Recruitment

In 2018, RSC were captured from the Sand Creek (380 individuals), Elk River (311 individuals), and Gold Creek (293 individuals) areas, and in 2019, a total of 130 individuals in Sand Creek, 200 in Elk River, and 279 in Gold Creek (Appendix Table G.6 and G.24). Although the CPUE of RSC was lower at Elk River and Gold Creek downstream areas compared to the Sand Creek upstream area in 2018 and 2019, YOY required for completion of the recruitment survey were all captured in one or two seine hauls at each area, indicating that RSC were plentiful at each of the three study areas (Appendix Table G.6 and G.24). Of the RSC captured in each area, 112, 117, and 145 were categorized as YOY from the Sand Creek, Elk River, and Gold Creek areas, respectively (Table 7.4). The corresponding proportion of YOY in these sampled populations was 29%, 38%, and 49%, respectively in 2018, and 100% at all areas in 2019. Therefore, a higher proportion of YOY was observed at the downstream areas compared to the upstream area in 2018, and no difference in 2019, suggesting no adverse influences on RSC recruitment at the downstream areas.

Indicators of body size, including both fork length and body weight, were significantly greater in RSC YOY captured downstream at the Elk River area compared to those captured at the Sand Creek area in 2018 (Table 7.4; Figure 7.6). The 2019 results for Elk River differed from those observed in 2018, which indicated that both fork length and body weight were significantly greater in RSC YOY captured downstream at Elk River compared to upstream at Sand Creek. In addition, Elk River RSC YOY had a significantly lower condition than observed upstream at Sand Creek, which is opposite to the results observed in 2019 (Tables 7.4 and 7.5; Figures 7.6 and 7.7). Despite being larger, RSC YOY at the Elk River area showed significantly lower condition compared to those captured at the Sand Creek area in 2018 (Table 7.4; Figure 7.6), whereas in 2019, Elk River Mouth RSC YOY were significantly shorter than those sampled upstream at Sand Creek but had significantly higher condition compared to those captured at the Sand Creek area outside of the effect size of ±10% for condition (Table 7.5; Figure 7.7). Indicators of body size,

Table 7.4: Statistical Comparisons of Juvenile Redside Shiner Health Endpoints at Elk River and Gold Creek (Downstream) Areas Compared to the Sand Creek (Upstream) Area, Koocanusa Reservoir Monitoring Program, 2018

Indicator	Endpoint	Variables		Sample Size			Test	ANCOVA Model Statistics			Summary Statistics[b]				Pairwise Comparisons[c]			
								Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]					Elk River vs. Sand Creek		Gold Creek vs. Sand Creek	
		Response	Covariate	Sand Creek	Elk River	Gold Creek		Interaction P-value	Covariate P-value		Statistic	Sand Creek	Elk River	Gold Creek	P-value	Magnitude of Difference (%)[d]	P-value	Magnitude of Difference (%)[d]
Body Size	Fork Length	log_{10}[Fork Length (mm)]	-	112	117	145	ANOVA	-	-	-	Geometric Mean	26.2	28.6	30.1	<0.001	8.8	<0.001	15
	Body Weight	log_{10}[Body Weight (g)]	-	112	117	145	ANOVA	-	-	-	Geometric Mean	0.183	0.228	0.254	<0.001	25	0.001	39
Energy Storage	Condition	log_{10}[Body Weight (g)]	log_{10}[Fork Length (mm)]	112	117	145	ANCOVA	0.005[g]	<0.001	28.4	Adjusted Mean	0.230	0.224	0.215	0.173	-	<0.001	-6.5
				111[f]	117	145	ANCOVA	0.005[h]	<0.001	28.4	Adjusted Mean	0.231	0.224	0.215	0.065	-3.0	<0.001	-7.0

Area P-value < 0.1 or Interaction P-value < 0.05

Magnitude of Difference > 10% for Condition (EEM effect endpoint)

Covariate P-value > 0.05

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for log_{10}-transformed variables), and adjusted mean are reported for Kruskal-Wallis, ANOVA and ANCOVA, respectively. The predicted means of the regression line equations are reported for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVA when a significant interaction is observed.

[c] Pairwise comparisons conducted using Tukey's honestly significant differences method (ANOVA and ANCOVA) or Dunn's test with Bonferroni adjustment (Kruskal-Wallis test).

[d] Calculated as the difference in measure of central tendency (MCT) between areas (downstream area minus upstream area), expressed as a percentage of the upstream area MCT (except for the K-S test; see footnote e).

[e] Calculated as the maximum difference in the cumulative relative frequency distributions (CRFD) between areas. A negative difference implies that the downstream area has a greater number of fish with length measures that are less than where the maximum difference in CRFDs was observed. A positive difference implies that the downstream area has fewer fish with length measures that are less than where the maximum difference in CRFDs was observed.

[f] One outlier (Fish ID: RG_SC_RSC_50_20180829; Studentized residual = -5.5) was removed from the analysis.

[g] ANCOVA proceeded under the assumption that the slopes are practically parallel (R^2 of interaction model = 0.9513 and R^2 of parallel slope model = 0.9499; a difference < 0.02) following Environment Canada (2012).

[h] ANCOVA proceeded under the assumption that the slopes are practically parallel (R^2 of interaction model = 0.9547 and R^2 of parallel slope model = 0.9534; a difference < 0.02) following Environment Canada (2012).

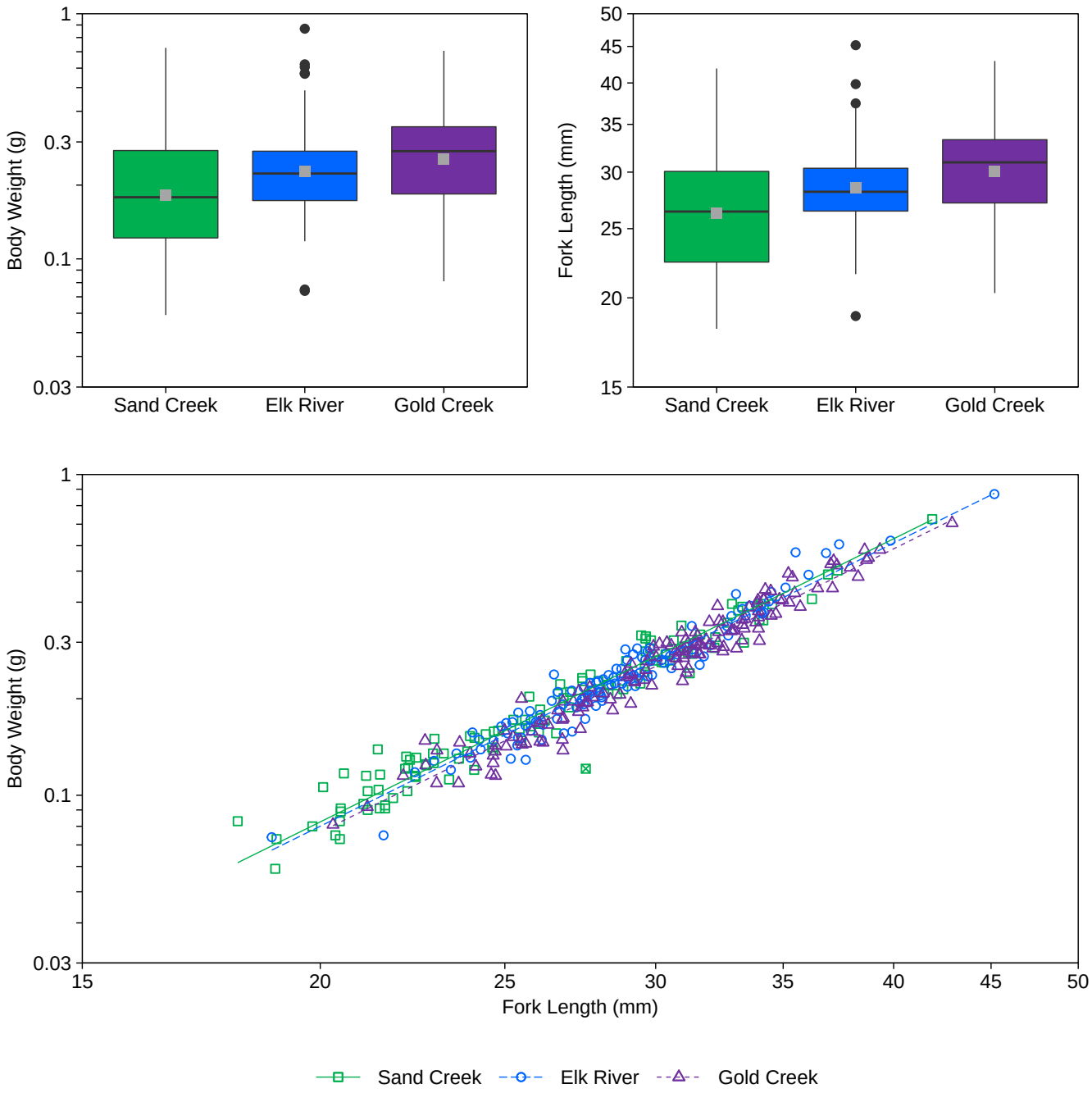


Figure 7.6: Plots to Support the Statistical Comparisons for Non−Lethal Redside Shiner Health Endpoints

Notes: Scatterplot x- and y-axes are $\log_{10}$-scaled. Outliers removed from the analysis are plotted as open symbols with an X through them.
Boxplot: box represents Q1, the median, and Q3. Whiskers extend to the minimum and maximum values; however, values above Q3 + 1.5IQR or below Q1 − 1.5IQR are plotted as individual points (IQR = Q3 − Q1) and the whiskers are truncated to the next value in the dataset. The mean is plotted as a square.

Table 7.5: Statistical Comparisons of Juvenile Redside Shiner Health Endpoints at Elk River and Gold Creek (Downstream) Areas Compared to the Sand Creek (Upstream) Area, Koocanusa Reservoir Monitoring Program, 2019

Indicator	Endpoint	Variables		Sample Size			Test	ANCOVA Model Statistics			Summary Statistics[b]				Overall Test P-value (Area)	Pairwise Comparisons[c]			
								Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[a]						Elk River vs. Sand Creek		Gold Creek vs. Sand Creek	
		Response	Covariate	Sand Creek	Elk River	Gold Creek		Interaction P-value	Covariate P-value		Statistic	Sand Creek	Elk River	Gold Creek		P-value	Magnitude of Difference (%)[d]	P-value	Magnitude of Difference (%)[d]
Body Size	Fork Length	log_{10}[Fork Length (mm)]	-	100	100	100	K-W	-	-	-	Median	2.50	2.40	2.80	<0.001	0.050	-4.0	<0.001	12
	Body Weight	log_{10}[Body Weight (g)]	-	100	100	100	K-W	-	-	-	Median	0.142	0.126	0.220	<0.001	0.115	-12	<0.001	55
Energy Storage	Condition	log_{10}[Body Weight (g)]	log_{10}[Fork Length (mm)]	100	100	100	ANCOVA	<0.001[e]	<0.001	2.53	Adjusted Mean	0.153	0.166	0.155	0.086	0.088	8.1	0.936	1.3
				99[f]	98[g]	100	ANCOVA	<0.001[h]	<0.001	2.53	Adjusted Mean	0.150	0.170	0.155	<0.001	<0.001	13	0.578	3.1
	Condition[i]	log_{10}[Body Weight (g)]	log_{10}[Fork Length (mm)]	88	100	86	ANCOVA	<0.001[j]	<0.001	2.42	Adjusted Mean	0.133	0.144	0.136	0.088	0.089	8.7	0.888	2.1
				87[k]	98[l]	86	ANCOVA	<0.001[m]	<0.001	2.42	Adjusted Mean	0.130	0.148	0.135	<0.001	<0.001	14	0.517	3.9

Indicates area P-value < 0.1 or Interaction P-value < 0.05.

Indicates Magnitude of Difference > 10% for Condition (EEM effect endpoint).

Indicates covariate P-value > 0.05.

Note: "-" indicates no data available.

[a] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[b] The median, mean (geometric mean for log_{10}-transformed variables), and adjusted mean are reported for Kruskal-Wallis, ANOVA and ANCOVA, respectively. The predicted means of the regression line equations are reported for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVA when a significant interaction is observed.

[c] Pairwise comparisons conducted using Tukey's honestly significant differences method (ANOVA and ANCOVA) or Dunn's test with Bonferroni adjustment (Kruskal-Wallis test).

[d] Magnitude of Difference (MOD) calculated as the difference in measure of central tendency (MCT) between areas (downstream area minus upstream area), expressed as a percentage of the upstream area MCT (except for the K-S test).

[e] ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.8979 and R2 of parallel slope model = 0.8921; a difference < 0.02) following Environment Canada (2012).

[f] One outlier (Fish ID: RG.SC.RSC.56 Stdnt resid: 10.983) was removed from the analysis.

[g] Two outliers (RG.ER.RSC.22 Stdnt resid: -4.631; RG.ER.RSC.23 Stdnt resid: -4.279) were removed from the analysis.

[h] ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9355 and R2 of parallel slope model = 0.9312; a difference < 0.02) following Environment Canada (2012).

[i] Only fish where fork length (Fork Length < 3.5 cm) overlapped between all three areas included.

[j] ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.8484 and R2 of parallel slope model = 0.8397; a difference < 0.02) following Environment Canada (2012).

[k] One outlier (Fish ID: RG.SC.RSC.56 Stdnt resid: 10.574) was removed from the analysis.

[l] Two outliers (RG.ER.RSC.22 Stdnt resid: -4.467; RG.ER.RSC.23 Stdnt resid: -4.127) were removed from the analysis.

[m] ANCOVA proceeded under the assumption that the slopes are practically parallel (R2 of interaction model = 0.9037 and R2 of parallel slope model = 0.8972; a difference < 0.02) following Environment Canada (2012).

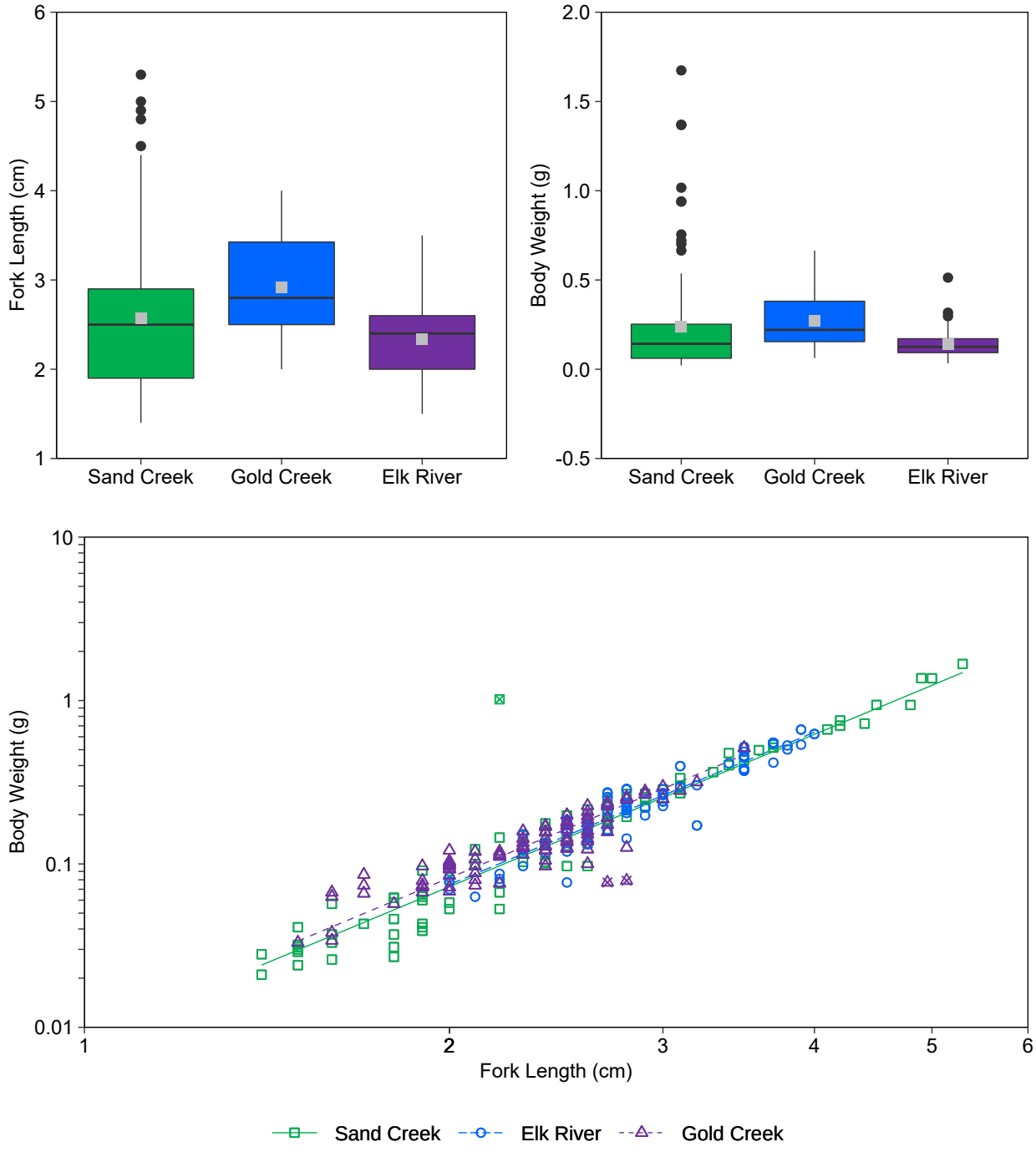


Figure 7.7: Fish Meristics Supporting Statistical Comparisons for Juvenile Redside Shiner Health Endpoints, Koocanusa Reservoir, 2019

Notes: Scatterplot x- and y-axes are log10-scaled. Outliers removed from the analysis are plotted as open symbols with an X through them.
Boxplot: box represents Q1, the median, and Q3. Whiskers extend to the minimum and maximum values; however, values above Q3 + 1.5IQR or below Q1 - 1.5IQR are plotted as individual points (IQR= Q3 - Q1) and the whiskers are truncated to the next value in the dataset. The mean is plotted as a square.

including both fork length and body weight, were also significantly greater in RSC YOY captured downstream at Gold Creek compared to those captured at the Sand Creek area in 2018 (Table 7.4; Figure 7.6). Despite being larger, RSC YOY at the Gold Creek area showed significantly lower condition compared to those captured at the Sand Creek area (Table 7.4). In 2019, Gold Creek YOY were significantly longer and heavier than those captured at Sand Creek, but no difference in YOY condition was indicated between areas (Table 7.5; Figure 7.7). Similar to 2018, Gold Creek YOY were significantly larger than upstream at Sand Creek; however, no difference in condition was observed in 2019 whereas in 2018 it was significantly lower than Sand Creek. In general, the magnitude of the indicated differences between the downstream and upstream areas were within applicable natural effect sizes for each of the endpoints evaluated (Table 7.4).

7.2 Fish Tissue Selenium

7.2.1 Muscle

Muscle tissue from PCC collected at all areas within the Canadian portion of the reservoir had selenium concentrations below the BC fish muscle tissue guideline (4 µg/g dw) and the US EPA criterion (11.3 µg/g dw) in 2018 and 2019 (Figure 7.8). Temporal comparisons indicated significantly higher selenium concentrations in PCC muscle tissue at the Elk River and Gold Creek areas compared to the Sand Creek area from 2014 to 2019 (Appendix Table H.13). Concentrations of selenium in muscle tissue did not change appreciably relative to base year (2014) for PCC, with the exception of increases muscle tissue at Sand Creek in 2015 and 2016, and Gold Creek in 2016, and a significant decrease in muscle tissue at Elk River in 2019 (Appendix Table H.13).

Selenium concentrations in RSC muscle tissue were less than the BC guideline and the US EPA criterion throughout the reservoir in 2018 and 2019 with the exception of the Tenmile area of Montana where the mean concentration (n = 10) was above the BC guideline in May 2018 (Figure 7.8). Muscle selenium concentrations in RSC from the Elk River area were significantly higher than at the Sand Creek area in 2016, as were those from the Gold Creek area relative to the Sand Creek area in all years from 2016 to 2019 (Appendix Table H.13). Fish captured in Montana from Rexford in 2019 and Tenmile in 2018 had significantly higher muscle selenium concentrations than Sand Creek. Changes over time indicated no consistent differences from 2015 to 2019, with the exception of a significant decrease in selenium concentration in Elk River in 2019, and a significant increase in Gold Creek in 2018 relative to 2014 (Appendix Table H.13).

Mean selenium concentrations in NSC muscle tissues were below the BC guideline and US EPA criterion throughout the Canadian and Montana portions of the reservoir in 2018 and 2019

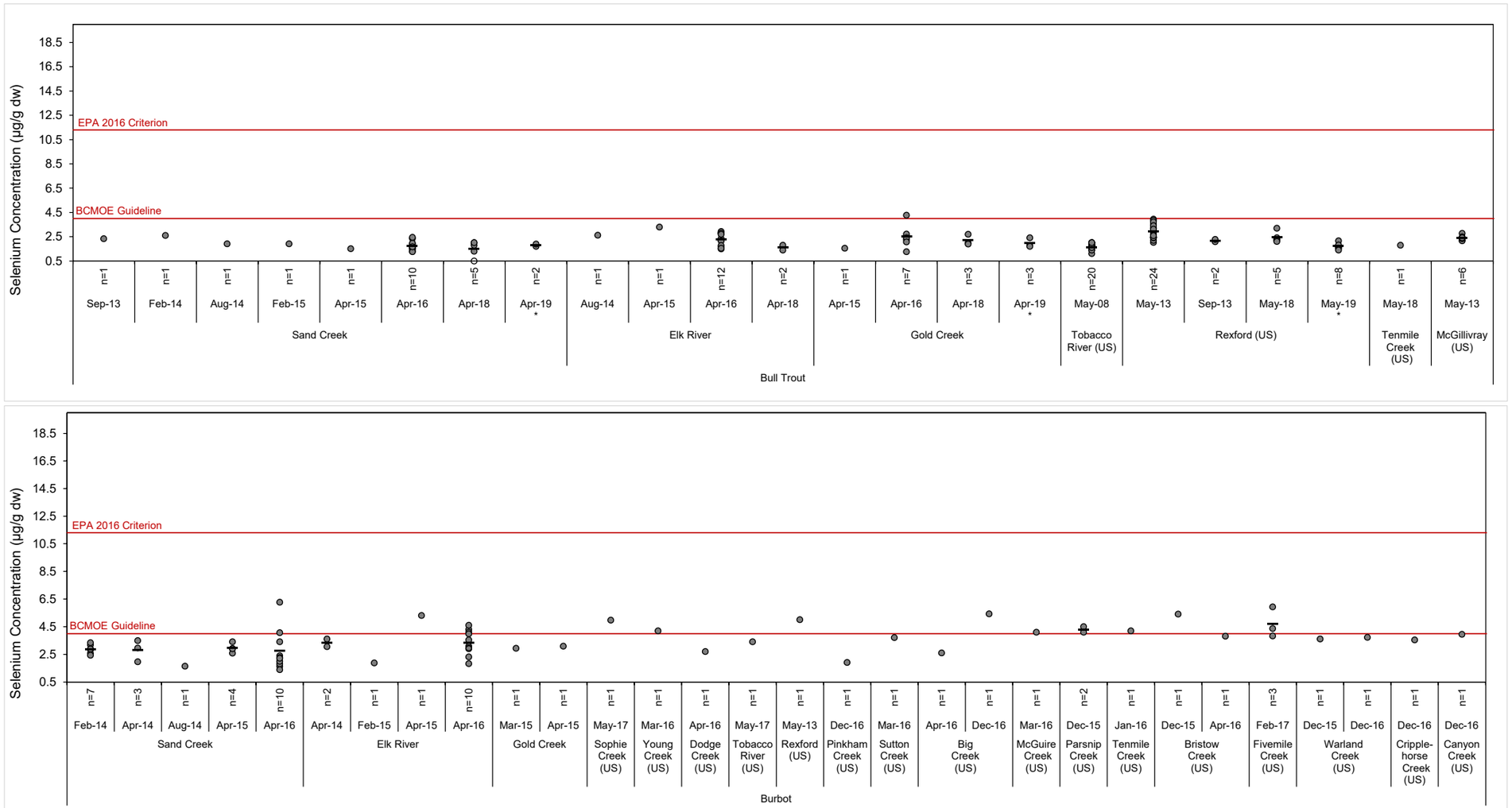


Figure 7.8: Concentrations of Selenium (µg/g dw) in Fish Muscle in Koocanusa Reservoir, 2008 to 2019

Notes: Individual values from muscle or filet are plotted. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Means are plotted as horizontal lines when n > 1. Sand Creek study area is upstream of the Elk River confluence, while the Elk River and Gold Creek study areas are downstream of the Elk River. Sand Creek, Elk River, and Gold Creek samples were collected by Teck, with the exception of some samples for Sand Creek that were collected by MT DEQ. All other sampling areas in the Koocanusa Reservoir are in the United States and samples were collected by MT DEQ. Data from 2019 are indicated by *.

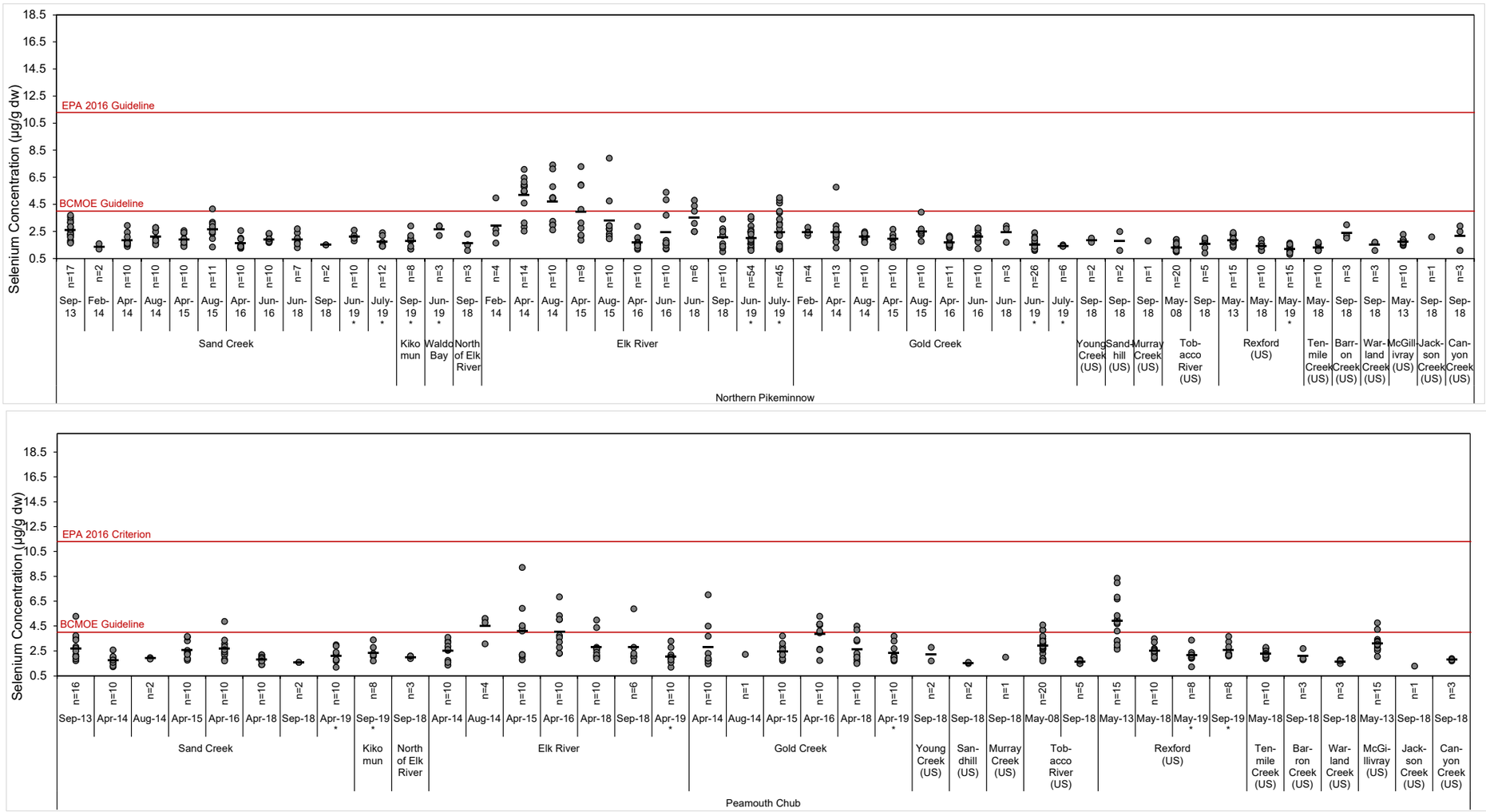


Figure 7.8: Concentrations of Selenium (µg/g dw) in Fish Muscle in Koocanusa Reservoir, 2008 to 2019

Notes: Individual values from muscle or filet are plotted. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Means are plotted as horizontal lines when n > 1. Sand Creek study area is upstream of the Elk River confluence, while the Elk River and Gold Creek study areas are downstream of the Elk River. Sand Creek, Elk River, and Gold Creek samples were collected by Teck, with the exception of some samples for Sand Creek that were collected by MT DEQ. All other sampling areas in the Koocanusa Reservoir are in the United States and samples were collected by MT DEQ. Data from 2019 are indicated by *. The June and July data for Northern Pikeminnow were from the toxicity study

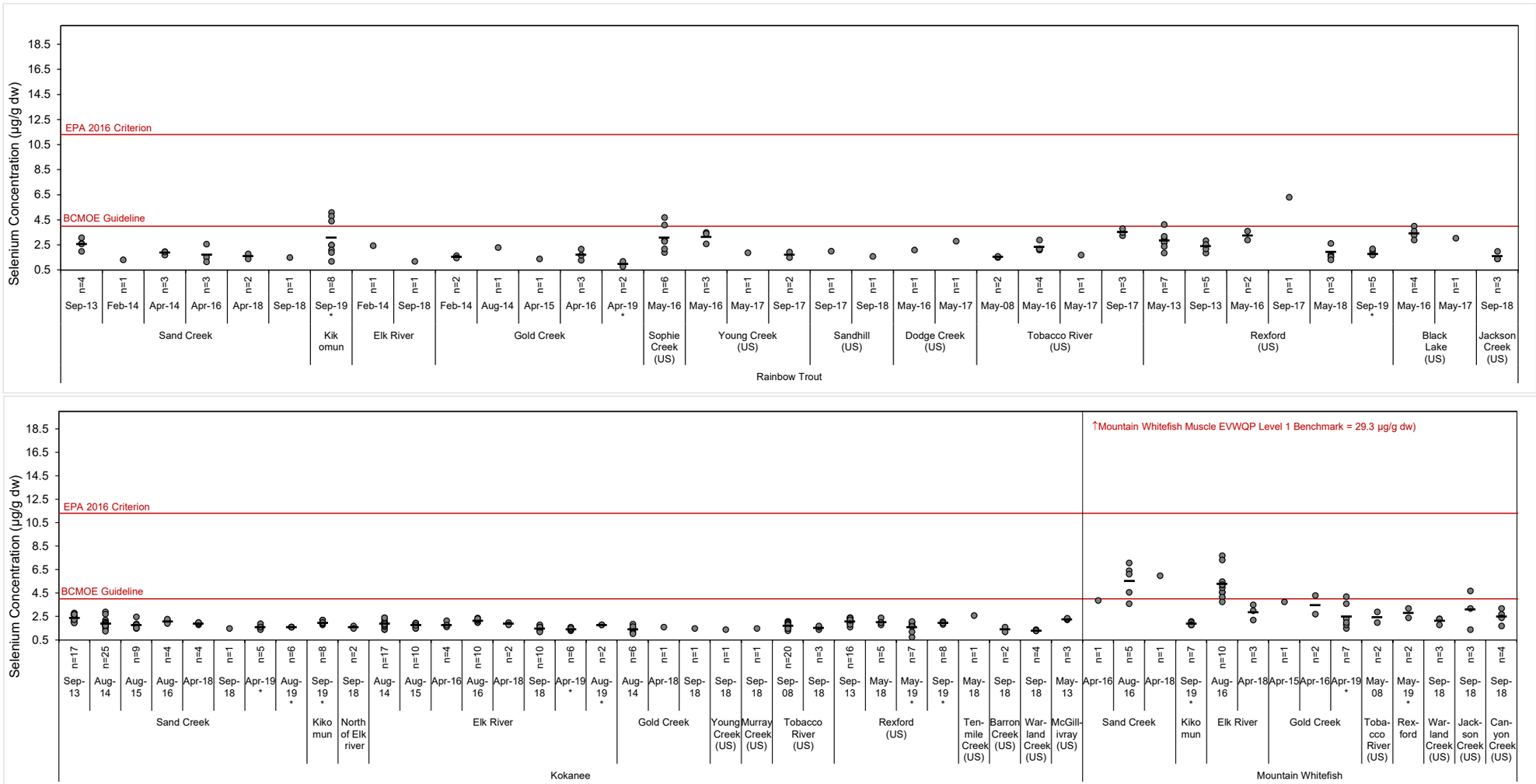


Figure 7.8: Concentrations of Selenium (µg/g dw) in Fish Muscle in Koocanusa Reservoir, 2008 to 2019

Notes: Individual values from muscle or filet are plotted. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Means are plotted as horizontal lines when n > 1. Sand Creek study area is upstream of the Elk River confluence, while the Elk River and Gold Creek study areas are downstream of the Elk Rive Sand Creek, Elk River, and Gold Creek samples were collected by Teck, with the exception of some samples for Sand Creek that were collected by MT DEQ. All other sampling areas in the Koocanusa Reservoir are in the United States and samples were collected by MT DEQ. Data from 2019 are indicated by *.

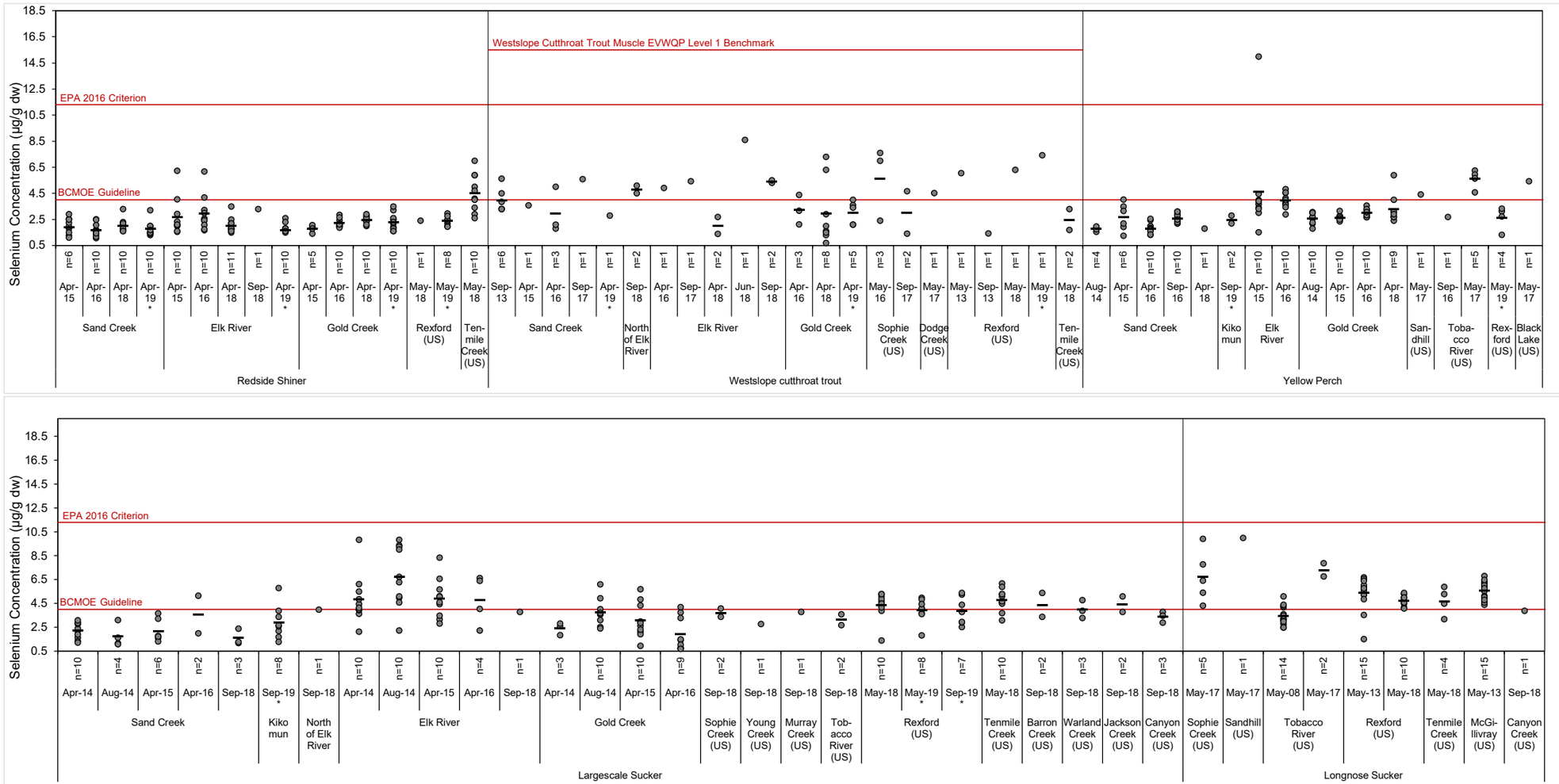


Figure 7.8: Concentrations of Selenium (µg/g dw) in Fish Muscle in Koocanusa Reservoir, 2008 to 2019

Notes: Individual values from muscle or filet are plotted. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Means are plotted as horizontal lines when n > 1. Sand Creek study area is upstream of the Elk River confluence, while the Elk River and Gold Creek study areas are downstream of the Elk River. Sand Creek, Elk River, and Gold Creek samples were collected by Teck, with the exception of some samples for Sand Creek that were collected by MT DEQ. All other sampling areas in the Koocanusa Reservoir are in the United States and samples were collected by MT DEQ. Data from 2019 are indicated by *.

(Figure 7.8). Comparisons between downstream and upstream indicated that NSC muscle selenium concentrations were significantly higher in the Elk River area than Sand Creek in 2014, 2015, and 2018, and significantly lower in Rexford in 2019 (Appendix Table H.13). At Elk River, no consistent differences were observed over time, but significantly lower selenium concentrations were observed from 2016 to 2019 relative to base year (2014), and also at Gold Creek in 2019 (Appendix Table H.13).

Among sport fish, mean selenium concentrations[25] in muscle tissue were above the BC guideline only in westslope cutthroat trout (WCT) captured at the Elk River and Rexford areas, and in mountain whitefish (MW) captured at the Sand Creek area (n = 1), in 2018 and/or 2019, but below their respective species specific benchmarks of 15.5 µg/g dw (WCT) and 29.3 µg/g dw (MW; Figure 7.8). However, mean selenium concentrations in all sport fish muscle tissue samples were below the US EPA criterion in 2018 and 2019 (Figure 7.8). Sufficient samples sizes for statistical comparison of selenium concentrations in muscle tissue between areas located downstream and upstream of the Elk River were not available for sport fish species in 2018 or 2019 with the exception of Kokanee (KO). Selenium concentrations in KO muscle tissue did not differ significantly between the Elk River and Sand Creek areas, but was significantly lower and higher at the Gold Creek and Rexford areas, respectively, than at the Sand Creek area in 2014 and 2018/2019 respectively (Appendix Table H.13). These findings were consistent with those of previous surveys, suggesting no changes in these differences between areas downstream and upstream of the Elk River since 2014/2015 (Appendix Table H.13).

7.2.2 Ovary

Mean selenium concentrations in ovaries of PCC collected at the Gold Creek downstream and Sand Creek upstream areas were greater than the BC ovary tissue guideline (11 µg/g dw), but below the US EPA criterion (15.1 µg/g dw), and the EVWQP Level 1 benchmark for reproductive effects to fish (18 µg/g dw; Figure 7.9) in 2018 and 2019. Mean selenium concentrations in PCC ovaries collected at the Elk River and Rexford (MT) areas were significantly lower than concentrations measured in PCC ovaries at the Sand Creek area in 2019, but not in 2018 (Appendix Table H.13). Investigation into changes over time relative to base year (2014) indicated significantly higher ovary selenium concentrations in Sand Creek from 2015 to 2019, Elk River from 2015 to 2018, and in Gold Creek in 2019 relative to 2014 (Appendix Table H.13). However, no differences in selenium concentrations have generally been indicated at Elk River and Gold Creek areas compared to Sand Creek since 2014.

[25] Or in some cases, only a single sample was collected.

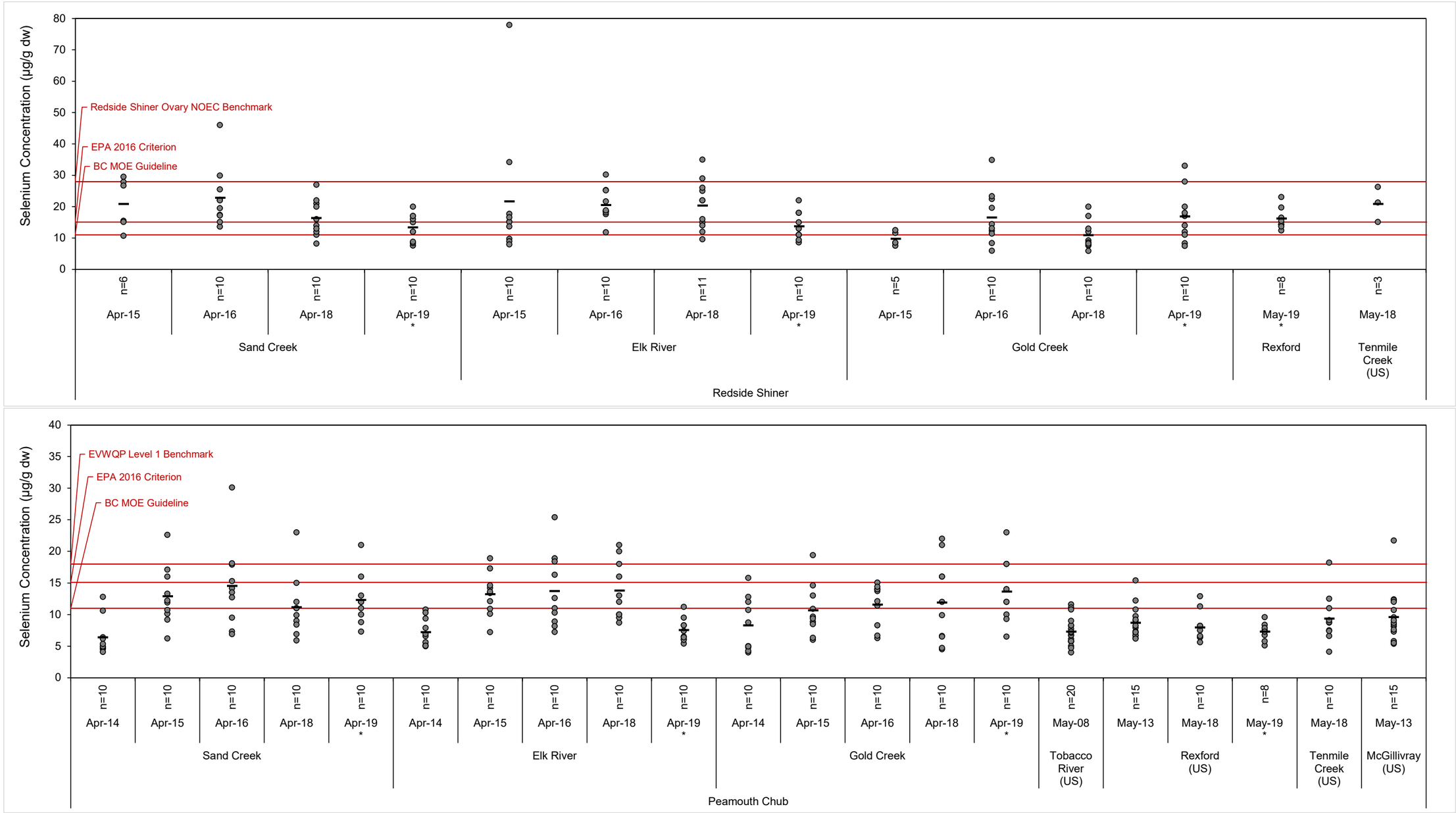


Figure 7.9: Concentrations of Selenium (µg/g dw) in Fish Gonads or Ovary, Koocanusa Reservoir, 2008 to 2019

Notes: Individual values are plotted. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Means are plotted as horizontal lines when n > 1. Sand Creek study area is upstream of the Elk River confluence, while the Elk River and Gold Creek study areas are downstream of the Elk River. Sand Creek, Elk River, and Gold Creek samples were collected by Teck. All other sampling areas in the Koocanusa Reservoir are in the United States and samples were collected by MT DEQ. MT DEQ also collected some samples in Sand Creek (2013 samples). All samples collected by Teck were ovary samples. All samples collected by MT DEQ were labelled as gonads or ovary samples. The new data are indicated by *. Ovaries for peamouth chub and redside shiner were not fully developed at the time of collection, therefore selenium concentrations are not representative of ripe ovaries and should be interpreted with caution.

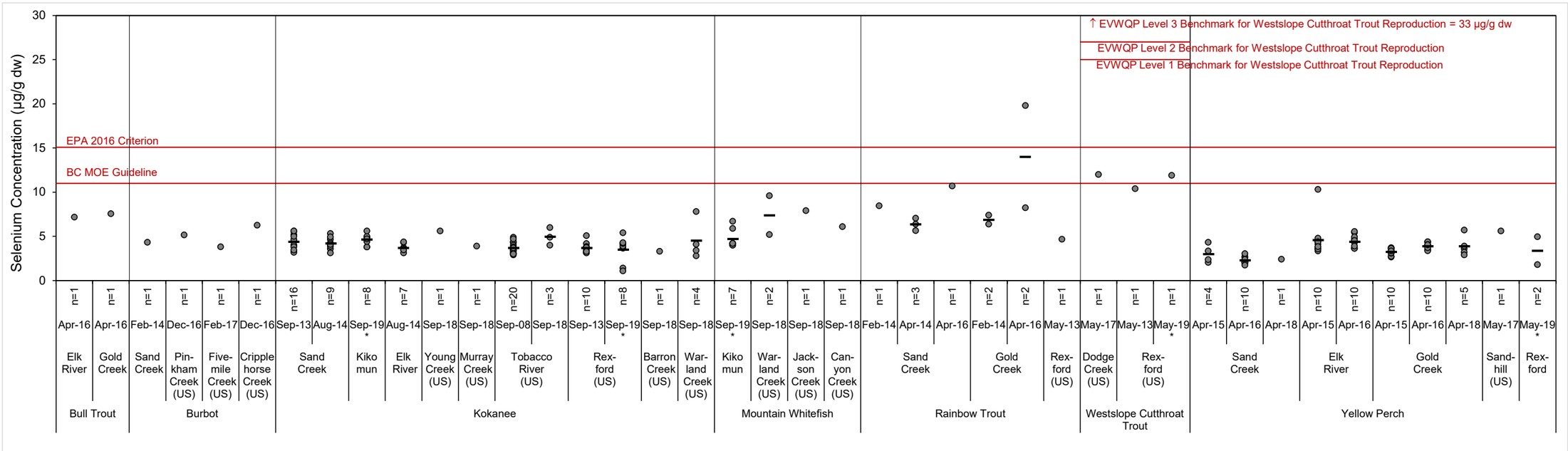


Figure 7.9: Concentrations of Selenium (µg/g dw) in Fish Gonads or Ovary, Koocanusa Reservoir, 2008 to 2019

Notes: Individual values are plotted. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Means are plotted as horizontal lines when n > 1. Sand Creek study area is upstream of the Elk River confluence, while the Elk River and Gold Creek study areas are downstream of the Elk River. Sand Creek, Elk River, and Gold Creek samples were collected by Teck. All other sampling areas in the Koocanusa Reservoir are in the United States and samples were collected by MT DEQ. MT DEQ also collected some samples in Sand Creek (2013 samples). All samples collected by Teck were ovary samples. All samples collected by MT DEQ were labelled as gonads or ovary samples. The new data are indicated by *.

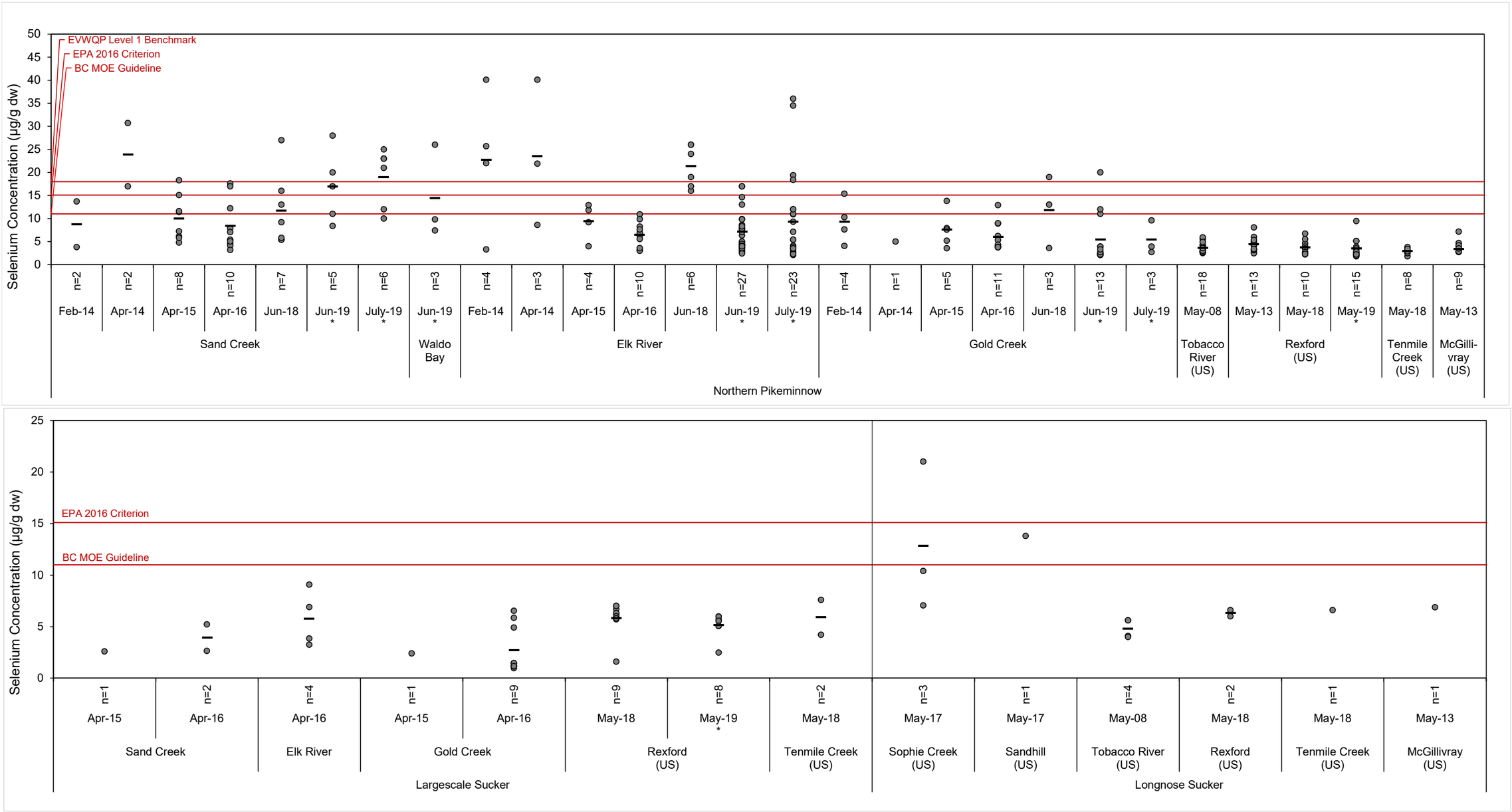


Figure 7.9: Concentrations of Selenium (µg/g dw) in Fish Gonads or Ovary, Koocanusa Reservoir, 2008 to 2019

Notes: Individual values are plotted. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Means are plotted as horizontal lines when n > 1. Sand Creek study area is upstream of the Elk River confluence, while the Elk River and Gold Creek study areas are downstream of the Elk River. Sand Creek, Elk River, and Gold Creek samples were collected by Teck. All other sampling areas in the Koocanusa Reservoir are in the United States and samples were collected by MT DEQ. MT DEQ also collected some samples in Sand Creek (2013 samples). All samples collected by Teck were ovary samples. All samples collected by MT DEQ were labelled as gonads or ovary samples. The new data are indicated by *. The June and July data for the Northern Pike Minnow were from the toxicity study and are representative of ripe ovaries, however, previously collected ovaries were not fully developed and not representative of selenium concentrations observed in ripe ovaries.

Mean selenium concentrations in RSC ovaries were above the BC ovary tissue guideline at all areas within the Canadian and Montana portions of the reservoir in 2018 and 2019, and also above the US EPA criterion upstream of the Elk River at the Sand Creek area in 2018, and downstream of the Elk River at the Elk River, Gold Creek, and Montana Rexford and Tenmile areas in either 2018 or 2019 (Figure 7.9). Aside from significantly lower ovary selenium concentrations in ovary tissues at Gold Creek in 2015 relative to Sand Creek, ovary selenium concentrations have not been significantly different between areas, nor have they significantly changed over time relative to 2014 (Appendix Table H.13).

Mean selenium concentrations in ovary tissues of NSC captured at the Elk River and Gold Creek downstream areas were above the EVWQP Level 1 benchmark and BC guideline, respectively, in 2018, but were below the BC guideline at both areas in 2019 (Figure 7.9). This contrasted with the Sand Creek upstream area, which showed mean selenium concentrations in NSC ovaries above the BC guideline, US EPA criterion, and the EVWQP Level 1 benchmark, in 2018 and/or 2019 (Figure 7.9). Mean selenium concentrations in ovary tissues of NSC captured at the Rexford and Tenmile areas of Montana were below the BC guideline in 2018 and/or 2018 (Figure 7.9). Selenium concentrations in NSC ovaries at the Elk River, Gold Creek, Rexford, and Tenmile areas were all significantly lower than at the Sand Creek area in 2018 and/or 2019 (Appendix Table H.13). With the exception of significantly lower concentrations of selenium in NSC ovaries collected at Rexford in 2018 and 2019, no consistent differences in ovary selenium concentrations of NSC were indicated downstream compared to upstream of the Elk River since 2015 (Appendix Table H.13). Subsequent to sampling conducted in 2019, Brix et al. (2020) conducted a study to evaluate reproductive effects of selenium on NSC and identified that lower selenium concentrations in ovary occurred with more advanced gonadal development stage. Based on these findings, future assessment of ovary selenium concentrations in NSC (and possibly other fish species) as part of the Koocanusa Reservoir Monitoring Program will include the collection of additional information regarding gonadal development stage to support the assessment of potential influences from the Elk River discharge. In addition, data collected from 2014 to 2019 should be interpreted with caution, as the necessary means to distinguish gonad development and its implications on selenium concentrations cannot be taken into consideration.

Non-lethal sampling of sport fish was conducted at Elk River, Gold Creek, and Sand Creek areas precluding analyses of selenium concentration analyses of ovary tissue. However, MFWP employed lethal collection methods within the Montana portion of the reservoir in 2018, and at the Rexford (May and September) and Kikomun (September) study areas in 2019, in which ovaries from Kokanee, mountain whitefish, westslope cutthroat trout, and yellow perch sport fish were assessed for selenium concentrations. From the MFWP sampling, only a single westslope

cutthroat trout captured at the Rexford area in Montana showed selenium concentrations in ovary tissue greater than the BC ovary tissue guideline, but below the US EPA criterion (Figure 7.9).

7.3 Fish Tissue Mercury

Relative mercury concentrations (i.e., mercury concentrations at length relationship) in muscle tissue of bull trout, Kokanee, mountain whitefish, NSC, PCC, rainbow trout, RSC, and yellow perch were greater than the BC guideline for protection of wildlife (0.165 µg/g dw[26]) at each of the downstream (Elk River and Gold Creek) and upstream (Sand Creek) areas in 2018 (Appendix Figures H.1 to H.11). With the exception of one RSC from RG_ER, mercury concentrations in muscle of all PCC, RSC, and NSC from all areas downstream and upstream of the Elk River were also above the BC guideline in 2019 (Appendix Figures H.1 to H.3). Results from both 2018 and 2019 mirror similar findings from previous monitoring (2014 to 2016; Appendix Figures H.1 to H.11). In general, mercury concentrations in muscle of most sport fish species were above the BC guideline at areas both downstream and upstream of the Elk River in 2019 as well, consistent with previously collected data (2014 to 2016; Appendix Figure H.4 and H.11). Investigations by Teck regarding human health and water quality identified that mercury is not a mine-related constituent (Teck 2018c).

[26] The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to a dry weight basis using the average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

8 SUMMARY

Characterization of chemical and biological conditions in Koocanusa Reservoir has been ongoing since existing conditions were established as part of the 2014 to 2016 monitoring program. Results of the most recent three-year monitoring period (i.e., 2017 to 2019) are summarized below. Consistent with the study design, only water quality was assessed in the Canadian portion of the reservoir in 2017, with monitoring of sediment and biota resuming in 2018 and 2019.

Mean monthly concentrations of Order constituents in water were consistently below SPOs at RG_DSELK from 2017 to 2019, with the exception of selenium in April 2018; however, this sample was collected from the shoreline and not from the permitted sampling location due to safety concerns. Of the other water quality constituents that were assessed, only nickel and zinc had one or more samples with concentrations above respective guidelines and benchmarks in 2017 and/or 2018. Except for sulphate and selenium downstream of the Elk River, none of the Order constituents or other constituents increased in concentration from 2014 to 2019. Monthly nitrate and selenium loadings to Koocanusa Reservoir were estimated to be higher from the Elk River than the Kootenay River, and generally higher in 2018 than in 2019; however, the loadings appear to be consistent with those observed previously from 2014 to 2017.

Consistent with results from 2014 to 2016, annual median N:P ratios indicated phosphorus limitation throughout the reservoir from 2017 to 2019. Changes in the trophic status of the reservoir throughout the year (primarily in the spring) were observed from 2017 to 2019 and were reflective of the rapid changes in water levels that take place that take place from April to June during freshet and in response to seasonal reservoir operation adjustments.

Reservoir levels in April 2019 were much higher than those observed in April 2017 and 2018, but similar in June and August in both years. In April and June of both years, the Elk River appeared to be confined to the eastern half of the reservoir basin, but more mixed under full-pool conditions in August. August was also defined by the appearance of a specific conductance “inversion layer”, which was occasionally observed at the lower third of the water column at downstream stations.

Concentrations of several metals and PAHs were consistently higher downstream of the Elk River compared to upstream in 2015, 2016, 2018, and 2019. However, concentrations of all metals and PAHs in sediment remained below provincial SEL guidelines in all monitoring years (2013 to 2019) throughout the reservoir. Except for phosphorus, metals that had higher concentrations downstream of the Elk River decreased in concentration in 2018 and/or 2019 compared to 2015. In addition, concentrations of several PAHs were lower in 2019 relative to 2015 for sediment sampled downstream of the Elk River.

Phytoplankton density, biomass, and richness did not differ between the downstream and upstream areas in 2018, nor were there differences in phytoplankton density, biomass, and richness, or dominant taxonomic group density and biomass from 2014 to 2018 (except for inconsistent differences in the density and biomass of chrysophytes and cryptophytes in some monitoring years). Overall, the phytoplankton community had substantially lower density, biomass, and richness within the reservoir in 2016 and 2018, indicating lower primary productivity, compared to 2015, but the differences in community structure among these years were not related to the Elk River discharge based on similar differences observed both downstream and upstream of the mouth of the river.

Zooplankton density, biomass, and LPL richness, as well as the density and biomass of the major taxonomic groups, were all higher downstream of the Elk River than upstream in June 2018 and 2019; however, differences in community were observed between years. In mid- to late summer, following a prolonged period in which near full-pool reservoir levels were maintained, the zooplankton community was well established both downstream and upstream of the Elk River with both areas dominated by copepods. Total density and biomass of Rotifera, Cladocera, and Copepoda were higher throughout the reservoir since 2015. Overall, changes that occurred between years appeared to be due to seasonal fluctuations in reservoir water levels rather than related to mine-influence.

With few exceptions, mean selenium concentrations in zooplankton tissue throughout the reservoir (both Canadian and Montana portions) were below the interim BC selenium guideline for dietary effects to benthic invertebrates in 2018 and 2019, and were consistently below the EVWQP Level 1 benchmark. Since 2016, concentrations of selenium in zooplankton were higher downstream of the Elk River compared to upstream in summer, but concentrations were lower at both areas from 2016 to 2019 compared to 2015.

The key differences in benthic invertebrate community structure between study areas in 2018 included lower density of nematodes and Ostracoda, and lower Shannon's Diversity downstream compared to upstream of the Elk River. Temporally, no changes in richness nor consistent changes in density were apparent between 2015 to 2018, but Shannon's Diversity and the density of Nematoda were consistently lower downstream than upstream of the Elk River. These differences appear to be based on differences in habitat (i.e., particle size) and not mine related.

With few exceptions, selenium concentrations in benthic invertebrate tissues were above the interim BC guideline of 4 µg/g dw both downstream and upstream of the Elk River, in both the Canadian and Montana portions of the reservoir in 2018 and 2019, but remained below the EVWQP Level 1 benchmark for fish (11 µg/g dw), the Level 1 benchmark for invertebrates

(13 µg/g dw; except for one sample in Tenmile in 2019), and the Level 1 benchmark for birds (15 µg/g dw). In general, selenium concentrations in benthic invertebrate tissues collected at areas from the Canadian portion of the reservoir in 2018 and 2019 were within the range of concentrations observed in previous years (2014 to 2016), and selenium concentrations were higher downstream relative to upstream.

Temporally, there was no evidence of a mine-related effect on health endpoints for peamouth chub from 2014 to 2018. Redside shiner downstream versus upstream of the Elk River also showed limited differences in health endpoints from 2015 to 2018, except for greater growth (i.e., weight-at-age and length-at-age) in females from the Gold Creek area compared to the upstream (i.e., Sand Creek) area.

Although the CPUE of redside shiner was lower at the areas downstream of the Elk River compared to the Sand Creek upstream area in 2018 and 2019, young-of-the-year were all captured in one or two seine hauls at each area, indicating that redside shiner were plentiful at all three study areas. A higher proportion of young-of-the-year was observed downstream compared to upstream in 2018, but no differences were observed in 2019.

Redside shiner in Tenmile in May 2018, westslope cutthroat trout from Elk River and Rexford in 2018, and mountain whitefish from Sand Creek in 2018 had selenium muscle concentrations above the BC Guideline (4 µg/g dw) but below the US EPA criterion (11.3 µg/g dw), but neither westslope cutthroat trout or mountain whitefish selenium muscle concentrations were above their species specific EVWQP Level 1 benchmarks (15.5 µg/g dw and 29.3 µg/g dw respectively). Selenium concentration in fish muscle in 2018 and 2019 from the remaining fish muscle samples were below both the BC guideline and the US EPA criterion. Mean selenium concentrations in ovary tissues of peamouth chub, redside shiner, and northern pikeminnow collected downstream and upstream of the Elk River in 2018 and 2019 were frequently greater than the BC chronic guideline (11 µg/g dw). Redside shiner and NSC were also frequently above the US EPA criterion (15.1 µg/g dw) both downstream and upstream of the Elk River in 2018 and 2019, and NSC even exceeded and the EVWQP Level 1 benchmark for reproductive effects to fish (18 µg/g dw) upstream of the Elk River in 2019.. Generally, selenium concentrations in fish muscle showed no consistent difference between downstream and upstream of the Elk River, and selenium concentrations in ovaries are subject to uncertainty regarding ovary development. A recent study on the reproductive effects of selenium on northern pikeminnow identified that elevated selenium concentrations were often associated with immature ovaries, and further work is being done to understand species specific selenium toxicity for northern pikeminnow.

Results from the 2017 to 2019 monitoring in Koocanusa Reservoir suggest that changes are variable between seasons and years, with changes often observed throughout the reservoir.

For example, although metal concentrations were generally higher in sediment downstream relative to upstream of the Elk River, metals that were elevated relative to guidelines were elevated both downstream and upstream of the Elk River. Similarly, although higher zooplankton and benthic invertebrate tissue selenium concentrations have been observed downstream of the Elk River, concentrations above the BC guideline were noted at various times in both downstream and upstream areas. In addition, ovary selenium concentrations in northern pikeminnow in 2018 and 2019 were higher upstream of the Elk River compared to all other areas. Some study components, such as plankton community and trophic status, also appear to be primarily driven by the dynamic changes in reservoir levels, and dependent on whether the reservoir is in riverine or lentic condition. Overall, the results suggest that mine-related influences associated with the Elk River are having limited effects on the biota within Koocanusa Reservoir. Instead, the results appear to indicate that changes in reservoir levels, which change drastically between seasons, and also vary between years, may play a more integral role in the observed effects in the measured endpoints. Moving forward, changing reservoir levels should be factored into the overall analyses in addition to the comparisons between upstream and downstream of the Elk River.

9 REFERENCES

BCMOE (British Columbia Ministry of Environment). 2017a. Approved Water Quality Guidelines for British Columbia. Available from http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines [Accessed May 2017].

BCMOE. 2017b. British Columbia Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture. Water Protection & Sustainability Branch. Available from http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/bc_env_working_water_quality_guidelines.pdf [Accessed June 2017].

Bailey, R.C., R.H. Norris, and T.B. Reynoldson. 2004. Bioassessment of Freshwater Ecosystems: Using the Reference Condition Approach. Kluwer Academic Publishers, Massachusetts, USA.

Brix, K.V., M. Hecker, M. Carr. 2020. Evaluation of Selenium Reproductive Effects on Northern Pikeminnow (*Ptychocheilus oregonesis*), Draft Report. Submitted to Teck Coal Limited. Dated February 2020.

Brooks, J. L. 1957. The systematics of North American Daphnia. Mem. Conn. Acad. Arts Sci. 13: 1-80.

Clarke, SE. 1993. Non-parametric multivariate analyses of changes in community structure. Aus. J. Ecol. 18: 117:143.

Ekschmitt, K. and G.W. Korthals. 2006. Nematodes as Sentinels of Heavy Metals and Organic Toxicants in the Soil. J. of Nematology. 38: 13-19

ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2018. Re: Final Koocanusa Reservoir Study Design, 2018 – 2020. Received June 8, 2018.

Environment Canada. 2004. National Guidelines and Standards Office. Water Policy and Coordination Directorate. Canadian Guidance Framework for the Management of Phosphorous in Freshwater system. Report No. 1-18.

Environment Canada. 2012. Metal Mining Technical Guidance for Environmental Effects Monitoring. ISBN 978-1-100-20496-3.

FLNRO (Ministry of Forests, Lands, Natural Resource Operations, and Rural Development). 2018. Personal Communication with Albert Chirico. Fish and Wildlife Information Specialist, Kootenay Region. March 15, 2018.

Galvez-Cloutier R. and M. Sanchez. 2007. Trophic status evaluation for 154 lakes in Quebec, Canada: Monitoring and recommendations. Water Quality Research Journal of Canada. 42(4). 252-268.

Gray, M.A., A.R. Curry and K. Munkittrick. 2002. Non-Lethal Sampling Methods for Assessing Environmental Impacts Using a Small-Bodied Sentinel Fish Species. Water Qual. Res. J. Canada. 37(1): 195-211.

Hamilton, H.R., L.R. Linton, P. Chow-Fraser, B. Taylor, and D. Fernet. 1990. Koocanusa Reservoir State of the Aquatic Environment 1972-1988. Prepared by HydroQual Canada Limited, Calgary, for Waste Management Branch, B.C. Ministry of Environment, Cranbrook. March.

Helsel, D.R. and Hirsch, R.M. 2002. Statistical Methods in Water Resources Techniques of Water Resources Investigations, Book 4, chapter A3. U.S. Geological Survey. 522 pages.

Hirsch, R.M., Slack, J.R., and Smith, R.A. 1982. Techniques of trend analysis for monthly water quality data. Water Resources Research 18: 107-121.

Kirchner W.B. 1975. The effect of oxidized material on the vertical distribution of freshwater benthic fauna. Freshwat. Biol. 5:423-429.

Lotic (Lotic Environmental Ltd). 2017. Lake Koocanusa Food Web. Prepared for the B.C. Ministry of Environment by Lotic Environmental Ltd. Cranbrook, B.C. 19 pp.

Malley, D.F., S.G. Lawrence, M.A. MacIver, and W.J. Findlay. 1989. Range of variation in estimates of dry weight for planktonic Crustacea and Rotifera from temperate North American lakes. Can. Tech. Rep. Fish. Aquat. Sci. 1666: iv+49p.

McDowell, R.W., S.T. Larned, and D.J. Houlbrooke. 2009. Nitrogen and phosphorous in New Zealand streams and rivers: Control and impact of eutrophication and the influence of land management. New Zeal. J Mar. Fresh. 43: 985-995.

Minnow (Minnow Environmental Inc.). 2014. Lake Koocanusa Sediment Quality Characterization – 2013. Prepared for Teck Coal Limited, Sparwood BC. February. Project #2490.

Minnow. 2015a. Lake Koocanusa 2014 Biological Monitoring Program Report. Prepared for Teck. March. Project #2509.

Minnow. 2015b. Burbot Monitoring in Lake Koocanusa 2014 and 2015. Prepared for Teck Coal Limited, Sparwood, British Columbia. July. Project #2557.

Minnow. 2016. Lake Koocanusa 2015 Biological Monitoring Program Report. Prepared for Teck. March. Project #2564.

Minnow. 2018a. Koocanusa Reservoir Monitoring Report, 2014 to 2016. Prepared for Teck Coal Limited, Sparwood, British Columbia. January. Project #167202.0049

Minnow. 2018b. Koocanusa Reservoir Monitoring Program Study Design, 2018 to 2020. Prepared for Teck Coal Limited, Sparwood, British Columbia. April. Project #177202.0048.

Minnow. 2019. Koocanusa Reservoir Monitoring Program Annual Report, 2018. Prepared for Teck Coal Limited, Sparwood, British Columbia. June 2019. Project #187202.0007

MT DEQ (Montana Department of Environmental Quality). 2018. Quality Assurance Project Plan for the Collection of Data to Support the Development of Partition Coefficients (Kd). May 2018.

Montana DEQ and FWP. 2018a. Montana Fish and Wildlife and Parks and Montana Department of Environmental Quality. Benthic and Surface Macroinvertebrate Selenium Concentrations in Lake Koocanusa (Quality Assurance Project Plan) (WQSMQAP-01) April 2018

Montana DEQ and FWP. 2018b. Montana Fish Wildlife and Parks and Montana Department of Environmental Quality. Fish Tissue Quality Assurance Project Plan for Lake Koocanusa (WQSMQAP-02) April, 2018

Nauwerck A. 1963. Die Beziehungen zwischen Zooplankton und Phytoplankton in See Erken. Symbolae Botanicae Upsaliensis. 17:1-163.

Nordin R. N. 1985. Water quality criteria for nutrients and algae (technical appendix). Water Quality Unit, Resource Quality Section, Water Management Branch, B. C. Ministry of Environment, Victoria.

Nürnberg G. 2001. Eutrophication and Trophic State. LAKELINE. pp 29-33.

Oksanen, J., Blanchet, F.G., Friendly, M., Kindt, R., Legendre, P., McGlinn, D., Minchin, P.R., O'Hara, R.B., Simpson, G.L., Solymos, P., Henry, M., Stevens, H., Szoecs, E., and Wagner, H. 2018. Package "vegan". Community Ecology Package Version 2.4-6. URL https://cran.r-project.org/web/packages/vegan/vegan.pdf

Pohlert, T. 2016. Trend: non-parametric trend tests and change-point detection. R package version 0.2.0. https://CRAN.R-project.org/package=trend Province of British Columbia. 2013. British Columbia Field Sampling Manual (complete). Available from https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual?keyword=field&keyword=sampling&keyword=manual. Accessed December 15, 2017.

Province of British Columbia. 2020. British Columbia Environmental Laboratory Manual (complete). Available from https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/sampling-methods-quality-assurance/bc-environmental-laboratory-manual. Accessed November 2020.

R Core Team. 2019. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

Ramboll Environ (Ramboll Environ US Corporation). 2016. Elk Valley Permit 107517. Section 9.9 Human health risk assessment (revision). September 14, 2016 (updates)

Rott, E. 1981. Some results from phytoplankton counting intercalibrations. Schweiz. Z. Hydrobiologia. 43:43-62.

Ruxton, Graeme D. 2006. The unequal variance t-test is an underused alternative to Student's t-test and the Mann–Whitney U test. Behavioral Ecology 17.4: 688-690.

Sanders, R.E., R.J. Miltner, C.O. Yoder, and E.T. Rankin. 1999. The use of external deformities, erosion, lesions, and tumors (DELT anomalies) in fish assemblages for characterizing aquatic resources: A case study of seven Ohio streams. In: T.P. Simon (Ed.), pp: 225-246, Assessing the sustainability, and biological integrity of water resources using fish communities. CRC Press, Boca Raton, FL.

Teck (Teck Coal Limited). 2014. Elk Valley Water Quality Plan. Submitted to the British Columbia Minister of Environment for approval on July 22, 2014.

Teck (Teck Resources Limited). 2018a. Water Quality Adaptive Management Plan for Teck Coal Operations in the Elk Valley. December

Teck (Teck Resources Ltd.). 2018b. Koocanusa Reservoir Water Quality Monitoring Plan.

Teck (Teck Resources Ltd.). 2018c. Permit 107517 2017 Summary Report of Monitoring Results in the Koocanusa Reservoir. June 28, 2018.

Teck (Teck Coal Limited). 2019. Permit 107517 Annual Water Quality Monitoring Report. Submitted to BCMOE on March 29, 2019.

Teck (Teck Coal Limited). 2020. Permit 107517 Annual Water Quality Monitoring Report. Submitted to BCMOE on March 31, 2020.

Therneau, T.M. 2017. Survival analysis. Package “survival” for R. April 4, 2017. URL https://cran.r-project.org/web/packages/survival/survival.pdf

US EPA (United States Environmental Protection Agency). 2016. Aquatic Life Ambient Water Quality Criterion for Selenium - Freshwater. EPA 822-R-16-006

Vollenweider RA, Kerekes JJ. 1980. Background and summary results of the OECD cooperative program on eutrophication. In: Proceedings of an International Symposium on Inland Waters and Lake Restoration, pp. 26-36. U.S. Environmental Protection Agency. EPA 440/5-81-010.

Wilson, M.S. 1959. Calanoida, p. 738-794. In W.T. Edmondson [ed.] Freshwater Biology. 2nd ed. John Wiley & Sons, New York, NY.

Woods, P.F. 1982. Annual nutrient loadings, primary productivity, and trophic state of Lake Koocanusa, Montana and British Columbia, 1972-80. Geological Survey Professional Paper 1283. Prepared for the U.S. Army Corps of Engineers. Seattle District.

Yeatman, H. C. 1959. Cyclopoida, p. 795-815. In W.T. Edmondson [ed.] Freshwater Biology. 2nd ed. John Wiley & Sons, New York, NY.

APPENDIX A
DATA QUALITY REVIEW

APPENDIX A DATA QUALITY ASSESSMENT

A1 INTRODUCTION

A1.1 Background

A variety of factors can influence the chemical and biological measurements made in an environmental study and thus affect the accuracy and/or precision of the data. Inconsistencies in sampling or laboratory methods, use of instruments that are inadequately calibrated or which cannot measure to the desired level of accuracy or precision, and contamination of samples in the field or laboratory are just some of the potential factors that can lead to the reporting of data that do not accurately reflect actual environmental conditions. Depending on their magnitude, inaccuracy or imprecision have the potential to affect the reliability of conclusions made from the data. Therefore, it is important to ensure that monitoring programs incorporate appropriate steps to control the non-natural sources of data variability (i.e., minimize the variability that does not reflect natural spatial and/or temporal variability in the environment).

Data quality, as a concept, is meaningful only when it relates to the intended use of the data. That is, one must know the context in which the data will be interpreted in order to establish a relevant basis for judging whether or not the data set is adequate. A Data Quality Review (DQR) involves comparison of field and laboratory measurement performance to Data Quality Objectives (DQOs) established for a particular study, such as evaluation of Laboratory Reporting Limits (LRLs), blank sample data, data precision (based on field and laboratory duplicate samples), and data accuracy (based on matrix spike recoveries and/or analysis of standards or certified reference materials).

As specified in the Koocanusa Reservoir Monitoring Program study design (Minnow 2018), chemistry analyses were completed by laboratories accredited by the Canadian Association for Laboratory Accreditation (CALA), and DQOs were established at the outset of the field program to reflect reasonable and achievable performance expectations (Appendix Table A.1).[1] Programs involving many samples and analytes usually have some results that exceed the DQOs. This is particularly so for multi-element scans (e.g., ICP scans for metals) because the analytical conditions are not necessarily optimal for every element included in the scan.

[1] Data Quality Objectives (DQOs) set by the analytical laboratories were applied to samples collected in support of the 2019 Koocanusa Reservoir Monitoring Program.

A DQR was conducted on all laboratory data reported in 2018 and 2019 in support of the 2019 Koocanusa Reservoir Monitoring Program Report. The objective of the DQR is to define the overall quality of the data presented in the report, and, by extension, the confidence with which the data can be used to derive conclusions. The intent of the DQR is not to reject measurements that did not meet a DQO, but to ensure that questionable data received more scrutiny to determine what effect, if any, were had on interpretation of results within the context of the project.

A1.2 Laboratory Reporting Limits

An LRL is the lowest concentration of an analyte that can be reported with a reasonable degree of accuracy and precision and is ideally synonymous with the lower limit of quantitation (LLOQ). The LLOQ is the lowest concentration of an analyte that can be reliably measured within specific limits of precision and accuracy during routine operating conditions, as opposed to being detected which, in most cases, is the lowest concentration on the calibration curve. The LRL is typically three to ten times the method detection limit (MDL); however, some guidelines are so low the LRL is equal to the MDL to report the guideline. Achieving satisfactory LRLs is important when comparing concentrations to guidelines for that medium. If the LRL is above the guideline, the data cannot be accurately interpreted. Consistency is also important for LRLs when taking consecutive samples. Changes in LRLs between laboratory reports can affect summary calculations and also introduce confounding factors when assessing trends. For the 2019 Koocanusa Reservoir Monitoring Program Interpretive Report, LRLs were screened against guidelines, Elk Valley Water Quality Plan (EVWQP) benchmarks, and site-specific screening values, as appropriate.

A1.3 Quality Control Samples

Typically, a DQR involves the examination of analytical results associated with several types of Quality Control (QC) samples were assessed based on samples collected (or prepared) in the field and laboratory. These samples, and a description of each, include the following:

- **Blanks** are samples of de-ionized water and/or appropriate reagent(s) that are handled and analyzed the same way as regular samples. These samples will reflect contamination of samples occurring in the field (in the case of field or trip blanks) or the laboratory (in the case of laboratory or method blanks). Concentrations of analytes should not be below the LRL.
- **Field Duplicates** are samples collected from a randomly selected field station that are homogenized to the extent possible, split, and analyzed separately in the laboratory. The duplicate samples are handled and analyzed in an identical manner in the

laboratory. These samples reflect variability introduced during the handling of field samples (e.g., during homogenization), both in the field and laboratory, and therefore provide a measure of field sampling and laboratory precision.

- **Laboratory Duplicates** are replicate sub-samples created in the laboratory from randomly selected field samples which are sub-sampled and then analyzed independently using identical analytical methods. The laboratory duplicate sample results reflect variability introduced during laboratory sample handling and analysis and thus provide a measure of laboratory precision.
- **Spike Recovery Samples** are created in the laboratory by adding a known amount/concentration of a given analyte (or mixture of analytes) to a randomly selected test sample previously divided to create two sub-samples. The spiked and regular sub-samples are then analyzed in an identical manner. The spike recovery represents the difference between the measured spike amount (total amount in spiked sample minus amount in original sample) relative to the known spike amount (as a percentage). Two types of spike recovery samples are commonly analyzed. Spiked blanks are created using laboratory control materials, whereas matrix spikes are created using field-collected samples. The analysis of spiked samples provides an indication of the accuracy of analytical results.
- **Certified Reference Materials** are commercially prepared (or commercially-homogenized) samples containing known chemical concentrations that are processed and analyzed along with batches of environmental samples. The sample results are then compared to target results to provide a measure of analytical accuracy. The results are reported as the percent of the known amount that was recovered in the analysis.

Two additional types of QC, specific to benthic invertebrate and zooplankton community samples, included:

- **Organism Recovery Checks** for benthic invertebrate and zooplankton community samples involve the re-processing of previously sorted material from a randomly selected sample to determine the number of invertebrates and plankton that were not recovered during the original sample processing. The reprocessing is conducted by an analyst not involved during the original processing to reduce any bias. This check allows the determination of accuracy through assessment of recovery efficiency.
- **Sub-Sampling Error** is assessed for studies in which benthic invertebrate and plankton community samples require sub-sampling (due to excessive sample volume and/or invertebrate density). By comparing the numbers of benthic invertebrates or

plankton recovered between at least two sub-samples, this measure provides an evaluation of how effective the sub-sampling method was in evenly dividing the original sample. Therefore, sub-sampling error provides a measure of analytical accuracy and precision. The processing of entire benthic invertebrate community samples in representative sample fractions also allows an evaluation of sub-sampling accuracy.

One additional QC type, specific to fish aging samples, included:

- **Fish aging checks** involve the re-processing of randomly-selected fish aging structures (e.g., otoliths, fin rays, or scales) by a second analyst to determine the precision of fish age estimates. The re-processing is completed by an analyst not involved during the original processing to reduce bias. The original analyst and second analyst both assign a confidence index (e.g., G = good; pattern is clear and age is easily identified) to each age estimate and check.

A2 WATER SAMPLES

A2.1 Laboratory Reporting Limits

The analytical reports from ALS Environmental (ALS) for 2018 and 2019 (Appendix A) were examined to provide an inventory of analytes for which the sample results were equal to or below the target LRL. The LRLs for these analytes were also assessed relative to the working (BCMOE 2017) and approved (BCMOECCS 2019) British Columbia water quality guidelines (BC WQG) for the protection of freshwater aquatic life, EVWQP Level 1 Benchmarks for water quality (Teck 2014), and relevant site-specific benchmarks (Appendix Table A.2).

Several parameters were consistently (i.e., 100% of samples) reported at concentrations less than the LRL in 2018 and 2019; these included: bromide, and dissolved antimony, beryllium, bismuth, boron, cobalt, mercury, nickel, silver, thallium, titanium, and vanadium (Appendix Table A.2). Additionally, dissolved mercury in 2018, orthophosphate, total bismuth, silver, thallium, and titanium, and dissolved copper in 2019 were also consistently below the LRL.

Selenium concentrations were detectable in all samples in 2018 and 2019. The LRLs achieved for water samples were lower than the BC WQG and EVWQP Level 1 benchmarks for all analytes (Appendix Table A.2). Overall, the achieved LRLs were appropriate for this study.

A2.2 Field and Laboratory Blanks

A total of five field blank samples and five trip blank samples were used to assess field sampling contamination (Appendix Table A.3). The DQO used for laboratory blanks were applied to the trip and field blanks (Appendix Table A.1). Of the 656 results that were reported for trip and field blanks, nine were greater than the LRL:

- total suspended solids (TSS) in one sample;
- turbidity in one sample;
- ammonia in three samples;
- dissolved orthophosphate in one sample; and
- total barium, chromium, and tin (one sample).

However, detectable concentrations measured in blank samples are only considered reliable if they are greater than five-times the LRL (Appendix Table A.1). None of the detectable concentrations were greater than five-times the LRL, therefore, these results are expected to have a negligible impact on data interpretability for this particular study.

A total of 301 method blank samples were analyzed by ALS (179 method blank samples from 2018 and 122 samples from 2019; see Appendix A for applicable laboratory reports). Of the 1,655 reported method blank results, 11 had reportable concentrations greater than the LRL:

- total dissolved solids (TDS) in one sample;
- acidity (as $CaCO_3$) in one sample;
- alkalinity (as $CaCO_3$) in one sample;
- phosphorus in two samples;
- total molybdenum and manganese (two samples each), and total thallium (one sample); and
- dissolved copper in one sample.

None of the detectable concentrations were greater than five-times the LRL, with the exception of a single dissolved copper concentration (0.00149 milligrams per litre [mg/L]; LRL = 0.00020 mg/L) from laboratory report L2291233 (Appendix A). Overall, the number of detectable concentrations was low and detectable concentrations were within five-times the LRL for all but one sample. In addition, there was no detectable concentrations for selenium, sulphate, cadmium, and nitrate in either the field or laboratory blanks, which have long-term water as part of the EVWQP (Teck 2014). Therefore, the results are expected to have a negligible impact on data interpretability.

A2.3 Data Precision

A2.3.1 Field Duplicate Samples

A total of four field duplicate samples were collected to assess field sampling precision (one sample in 2018 and three samples in 2019; Appendix Table A.4). However, sampling techniques varied; samples were collected as split samples or side-by-side duplicates, the latter of which would be expected to result in greater variability among sample results. Additionally, for split samples, the sample aliquots in the larger “general” bottles would not be considered true splits (i.e., the smaller sample bottles would have been filled from these containers, and then these containers would have been filled directly from the sampling area).

Of the analytes with long-term targets under the EVWQP (i.e., selenium, nitrate, sulphate, and total cadmium; Teck 2014), selenium, nitrate and sulphate had the best field sampling precision (Appendix Table A.4). For selenium, RPDs between paired results were ≤4.4%. For sulphate and nitrate, RPDs between paired samples were ≤1.7% and 5.4%, respectively. For cadmium,

RPDs between paired results were ≤11%. The higher RPD was based on a pair with one result that was equal to the LRL, and the other that was within the five-times the LRL.[2]

Field sampling precision was also good for TDS and nickel, both of which have site-specific screening values (Appendix Table A.2). For TDS, RPDs between paired results were consistently less than 7.5% (Appendix Table A.4). For nickel, RPDs between paired concentrations were below the LRL, with the exception of one pair that had an RPD of 6.1% (both results were less than the five-times the LRL; Appendix Table A.4).

For the remaining analytes, the mean and median RPDs for paired concentrations were less than 40%, with the exception of ammonia. For ammonia, the mean RPD was 56%, with one pair of results with an RPD of 98%. The higher RPD was based on both results from each pair concentration being less than the five-times the LRL (Appendix Table A.4).

Field precision and reproducibility are considered good for the analytes with long-term targets under the EVQWP (i.e., selenium, nitrate, sulphate, total cadmium, nickel and TDS; Teck 2014), and fair to good for the remaining analytes. Overall, the field sampling precision is considered acceptable for the purpose of this study.

A2.3.2 Laboratory Duplicate Samples

A total of 53 laboratory duplicate samples were used to evaluate analytical precision (n = 30 duplicate samples in 2018 and n = 23 samples in 2019; Appendix A). For all paired samples, comparisons were within the laboratory DQO set by the analytical laboratory (Appendix Table A.1). The laboratory analytical precision can therefore be considered excellent.

A2.4 Data Accuracy

Data accuracy was evaluated based on results for Certified Reference Materials (CRM), Laboratory Control Samples (LCS), and Matrix Spike (MS) samples. Specifically, 52 CRM samples, 283 LCS samples, and 30 MS samples were analyzed to produce 52, 1,381, and 433 individual results, respectively (see Appendix A). All CRM and LCS results met the laboratory DQO, except one total bismuth and one dissolved chromium in an LCS (see laboratory report L2333505 and L2112645 in Appendix A). The laboratory DQO was marginally exceeded by less than 10% and therefore are still considered acceptable as per Canadian Council of

[2] Greater RPDs between paired results for water chemistry are considered more acceptable when concentrations are close to the LRL (e.g., within five-times the LRL; BCMOE 2013).

Ministers of the Environment (CCME). For 58 MS results (i.e., 13% of the total MS results), analyte concentrations were high in the background samples (i.e., the field sample used as the base for the MS sample) and the analytical laboratory was unable to accurately calculate the recovery of the spiked material. Affected analytes in MS samples include the following:

- total aluminum in two samples;
- total manganese in one sample;
- total barium, calcium, magnesium, sodium, and strontium in five samples; and
- dissolved barium, calcium, magnesium, sodium, and strontium in six samples.

None of the long-term water quality targets under the EVWQP (Teck 2014) had DQO exceedances, and few of the remaining analytes exceeded the DQO overall, the accuracy of the laboratory is considered good.

A3 SEDIMENT SAMPLES

A3.1 Laboratory Reporting Limits

The analytical reports from ALS for sediment samples collected in 2018 and 2019 (see Appendix A) were examined to provide an inventory of analytes for which sample results were less than the LRL (Appendix Table A.6). The LRLs for these analytes were assessed relative to existing British Columbia Working Sediment Quality Guidelines (BC WSQG; BCMOE 2017) and the alert concentration for selenium (BCMOECCS 2019).

Few metals were consistently (i.e., 100% of samples) reported at concentrations less than the LRL in 2018 and 2019; these included: boron (2019 only), sulphur, tin, and tungsten (Appendix Table A.5). Several of the polycyclic aromatic hydrocarbons (PAHs) were consistently less than the LRL (i.e., no detectable concentrations), with the greatest number below the LRL in 2019. Acenaphthene, fluorene, and quinoline concentrations were consistently less than the LRL in 2018 and 2019. Additionally, acenaphthylene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, and fluorene were consistently less than the LRL in 2019. For selenium, seven samples in 2018 and five samples in 2019 had concentrations below the LRL (Appendix Table A.5).

The LRLs for metals and PAHs measured in sediment samples from 2018 and 2019 were less than applicable BC WSQG as well as the alert concentration for selenium (Appendix Table A.5). Overall, the achieved LRLs were appropriate for this study.

A3.2 Laboratory Blanks

A total of 23 laboratory method blank samples were analyzed by ALS (17 method blank samples in 2018 and six method blank samples in 2019; see Appendix A). All 291 reported method blank results were below the laboratory DQO (Appendix Table A.1). Thus, the method blank results for this study indicated no inadvertent contamination of samples within the laboratory during analysis.

A3.3 Data Precision

A3.3.1 Field Duplicate Samples

A total of three field duplicate samples were collected to assess the precision of field sampling (Appendix Table A.6). Samples were collected as split samples (i.e., a larger sample was homogenized and split into two duplicate sub-samples); however, some variability is expected, based on the heterogeneity of sediments. For selenium, RPDs between paired results were

≤9.52 (Appendix Table A.6). The mean and median RPDs for paired concentrations were ≤35%, with the exception of mercury which had mean and median RPDs of 52% and 45%, respectively. The greatest variability between paired concentrations (i.e., RPDs greater than 35%) was observed for mercury in two samples, fluoranthene, perylene, and pyrene in one sample each (Appendix Table A.6). Overall, field precision and reproducibility are considered good for selenium and other metals and PAHs; however, results for mercury and the PAHs listed above should be interpreted with caution.

A3.3.2 Laboratory Duplicate Samples

A total of nine laboratory duplicate samples were used to evaluate laboratory precision (see Appendix A). The RPD between all 169 laboratory duplicate measurements were within the laboratory DQO (Appendix Table A.1; Appendix A), indicating that laboratory analytical precision was excellent.

A3.4 Data Accuracy

Data accuracy was evaluated based on the analysis of CRM, LCS, internal reference material (IRM), and MS samples. Specifically, three CRM, 21 LCS, 12 IRM, and two MS were used to produce 69, 201, 76, and 44 results, respectively, for the three laboratory reports (no matrix spike samples were analyzed in 2019; laboratory report L2334973 in Appendix A). All LCS, IRM, and MS results met the laboratory DQO. For CRM, one phosphate marginally exceeded the DQO by less than 10% and therefore are still considered acceptable as per CCME (see laboratory report L2157301 in Appendix A). Since there was only one exceedance of the DQO overall, the accuracy achieved by the laboratory in this study can be considered excellent.

A4 BENTHIC INVERTEBRATE COMMUNITY

The analysis of benthic invertebrate community samples involved concurrent assessment of data quality, including sub-sampling accuracy, precision and percent recovery of organisms. Canadian Aquatic Biomonitoring Network (CABIN) protocols were followed for sub-sampling (i.e., identification of a minimum 300 invertebrates), which often resulted in only 5% of a sample being assessed. The subsampled benthic invertebrate community met the DQO of 20%, having a precision range of 7.8% (Appendix Table A.7). Overall, the subsampling precision was excellent. Sub-sampled fractions range from a whole sample to 1/8 of a sample sorted (Appendix Table A.8).

To measure the effectiveness of the sorters, 10% of samples were selected at random for re-sorting analysis by a different sorter. Sorting efficiency (i.e., percent recovery) of benthic invertebrate samples was average; achieving an average of 88% for the two samples evaluated (Appendix Table A.9). Sorting efficiency was below the DQO of 90% recovery for one of the two re-sorted samples, with a percent recovery of 82% (Appendix Table A.9). Because the average percent recovery was just below the target DQO (i.e., 1.9% below), the benthic invertebrate community sample recovery was considered acceptable.

A detailed report providing discussion related to benthic invertebrate sample processing and QC (prepared by the analytical laboratory, ZEAS Incorporated) is included in Appendix A.

A5 BENTHIC INVERTEBRATES TISSUE CHEMISTRY

A5.1 Laboratory Reporting Limits

The analytical reports from Saskatchewan Research Council Environmental Analytical Laboratory (SRC; Appendix A) were examined to provide an inventory of analytes for which the sample results were less than the LRL. Additionally, LRLs for selenium were assessed relative to the 4 µg/g dw BCMOECCS (2019) guideline and the most conservative (i.e., lowest) EVWQP (i.e., the 11 µg/g dw benchmark for dietary effects to juvenile fish; Golder 2014).

Few metals were consistently (i.e., 100% of samples) reported at concentrations less than the LRL in 2018 including antimony, molybdenum, silver, thallium, and tin (Appendix Table A.10). Selenium concentrations were detectable in all samples, with the exception of two samples in 2018 (see laboratory report 2018-8134 in Appendix A). In addition, achieved LRLs for selenium were below the BCMOECCS guideline and the lowest EVWQP Level 1 Benchmark (Appendix Table A.10). Therefore, the achieved LRLs were considered appropriate for the study.

A5.2 Data Precision

A total of 14 laboratory duplicate samples were analyzed to evaluate laboratory precision within the benthic invertebrate tissue chemistry reports (Appendix A). Of the 360 duplicate pair results, only one titanium sample exceeded the laboratory DQO (Appendix Table A.1; Appendix A). Because only one sample exceeded the laboratory DQO, the laboratory precision and reproducibility were considered acceptable for the study.

A5.3 Data Accuracy

Data accuracy was evaluated based on the Reference Materials and Standards (RMS) within the SRC analytical reports (see Appendix A). A total of 14 RMS samples were used and 168 results were reported. All reported RMS results were within the laboratory DQO (Appendix Table A.1), therefore the accuracy achieved by the laboratory in this study was considered excellent.

A6 PLANKTON COMMUNITY AND TISSUE CHEMISTRY

A6.1 Laboratory Reporting Limits

The analytical reports from SRC (Appendix A) were examined to provide an inventory of analytes for which the sample results were less than the LRL. Selenium concentrations were consistently detectable in all zooplankton tissue chemistry samples (Appendix Table A.11). Additionally, all analytes had one or more detectable concentrations for all 2018 and 2019 samples. Therefore, the achieved LRLs were considered excellent for the study.

A6.2 Data Precision

A total of 14 laboratory duplicate samples were analyzed to evaluate laboratory precision within the zooplankton tissue chemistry reports (Appendix A). Of the 360 duplicate pair results, only one titanium sample exceeded the laboratory DQO (Appendix Table A.1; Appendix A). Because only one duplicate sample exceeded the laboratory DQO, and selenium samples were within the DQO, the laboratory precision and reproducibility were considered acceptable for the study.

A6.3 Data Accuracy

Data accuracy was evaluated based on the results of 12 RMS within all the laboratory reports from SRC (Appendix A). All 142 RMS results were within the laboratory DQO (Appendix Table A.1), and therefore demonstrated excellent analytical accuracy.

A6.4 Abundance and Biomass Accuracy

Zooplankton abundance and biomass were re-measured in a total of five samples (10% of samples) to evaluate sub-sampling accuracy and taxonomic consistency within the zooplankton enumeration and identification laboratory report (Appendix A). There was a high percent of variability between the duplicate pairs for both zooplankton abundance and biomass (Appendix Table A.12). Zooplankton abundance had a mean RPDs of 11% to 46% between the pairs, with DQO exceedances in 0% to 67% of the duplicate pair results (Appendix Table A.12). Zooplankton biomass had average RPDs of 19% to 77% between the pairs, with DQO exceedances in 40% to 100% of the duplicate results (Appendix Table A.13).

Phytoplankton abundance and biomass were re-measured in one sample (10% of samples; Appendix A). There was minimal variability between the duplicate pairs for both abundance and biomass, with mean RPDs of 19% and 12% for abundance and biomass respectively, and DQO exceedances in 25% of the duplicate pair results for both measures (Appendix Table A.13)

Since there is high variability between the duplicate results, and many of the duplicate pairs had RPD exceedances of ≥20%, the zooplankton community results should be interpreted with caution. Phytoplankton community results can be interpreted with more confidence.

A7 FISH TISSUE CHEMISTRY

A7.1 Laboratory Reporting Limits

The analytical laboratory reports from SRC (Appendix A) were examined to provide an inventory of analytes for which the samples were less than the LRL (Appendix Table A.14). The LRLs for these analytes were assessed relative to appropriate guidelines for small-bodied fish (e.g., redside shiner [*Richardsonius balteatus*] and peamouth chub [*Mylocheilus caurinus]*) and large-bodied fish (e.g., bull trout [*Salvelinus confluentus*], west cutthroat trout [*Oncorhynchus clarkia*], mountain whitefish [*Prosopium williamsoni*], etc.). Specifically, the Canadian Food Inspection Agency (CFIA) for chemical contaminants and toxins in fish and fish products (for arsenic, lead, mercury, and selenium; CFIA 2015) and the 4 µg/g dw interim selenium guideline for fish muscle (BCMOECCS 2019).

Several metals were consistently (i.e., 100% of samples) reported at concentrations less than the LRL in 2018 and 2019; these included: beryllium, boron, and tin (Appendix Table A.14). Additionally, antimony, chromium, and vanadium were also consistently below the LRL in 2018. Selenium concentrations were detectable in all samples but one from 2018 and were below the applicable BCMOECCS (2019) guideline for fish tissues. In 2018, arsenic concentrations were not detectable in 66% of the samples, and 22% of the arsenic LRLs exceeded the applicable CFIA (2015) guidelines (Appendix Table A.14). Lead concentrations were not detectable in 63% of the samples, and 22% of the lead LRLs exceeded the applicable CFIA (2015) guidelines (Appendix Table A.14). The 48 (22%) LRLs that exceeded the arsenic and lead guidelines in 2018 were the same samples from the laboratory report 2018-8314 (Appendix A). Lastly, 29% of the mercury concentrations were not detectable in the 2018 samples, and one sample exceeded the applicable CFIA (2015) guideline in 2018 (Appendix Table A.14; laboratory report 2018-8314 in Appendix A). All 2019 LRLs were below the applicable CFIA (2015) and BCMOECCS (2019) guidelines (Appendix Table A.14). The LRLs achieved by SRC were considered good for selenium and other metals, however, results from 2018 for arsenic and lead should be interpreted with caution.

A7.2 Data Precision

A total of 31 laboratory duplicate samples were used to evaluate laboratory precision within the fish tissue chemistry reports from SRC (Appendix A). Seven of the 780 duplicate pair results exceeded the laboratory DQO: one barium, one iron, one titanium, one nickel and one strontium.

Because a low number (i.e., 0.9% of the total results) of duplicate samples exceeded the laboratory DQO (Appendix A) the laboratory precision and reproducibility were considered acceptable for the study.

A7.3 Data Accuracy

Data accuracy was evaluated based on the results of 19 RMS within the analytical reports from SRC (see Appendix A). All 226 RMS results were within the laboratory DQO (Appendix Table A.1), the accuracy achieved by the laboratory in this study was therefore considered excellent.

A8 FISH AGING

A8.1 Data Precision

Otoliths were used for the aging of redside shiner, peamouth chub, yellow perch (*Perca flavescens*), rainbow trout (*Oncorhynchus mykiss*), and northern pikeminnow (*Ptychocheilus oregonensis*) during the 2019 Koocanusa Reservoir Monitoring Program.

To determine the precision of fish age estimates, a total of 255 aging structures that were analyzed by AAE Technical Service were re-processed by a second analyst (n = 195 in 2018 and n = 60 2019; Appendix Table A.15). The original and second analyst assigned a confidence index to each age estimate and check, respectively. A final age estimate for each fish was assigned based on the outcomes of the original analysis and the re-assessment. For the 195 aging structures analyzed in 2018, original age estimates and age estimates based on the re-assessment were in agreement for 165 samples. The remaining samples were within one year of each other, with the exception of one peamouth chub (sample ID SCKR-PCC-29) which differed by two years (Appendix Table A.15). In 2019, the original age estimate and second age estimates were in agreement for 57 of the n = 60 samples that were re-checked. The age estimates for the remaining three samples were within one year of each other (Appendix Table A.15). Overall, the fish age data can be interpreted with a high level of confidence.

A9 DATA QUALITY STATEMENT

Overall the quality of the data collected for this project was considered acceptable for serving the derivation of conclusions associated with the objectives of the 2019 Koocanusa Reservoir Monitoring Program Report.

A10 REFERENCES

BCMOE (British Columbia Ministry of Environment). 2015. B.C. Environmental Laboratory Manual [online]. Available from https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-environmental-laboratory-manual [accessed 22 April 2020].

BCMOE. 2017. Working Water Quality Guidelines for British Columbia [online]. Updated June 2017. Available at: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/bc_env_working_water_quality_guidelines.pdf [accessed 20 April 2020].

BCMOECCS (British Columbia Ministry of Environment and Climate Change Strategy). 2019. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife and Agriculture. Summary Report. Water and Sustainability Branch. August 2019.

CFIA (Canadian Food Inspection Agency). 2015. Canadian Food Inspection Agency Fish Products Standards and Methods Manual: Appendix 3, Canadian Guidelines for Chemical Contaminants and Toxins in Fish and Fish Products. Ottawa, ON.

Golder (Golder Associates Ltd.). 2014. Benchmark Derivation Report for Selenium. Annex E of the Elk Valley Water Quality Plan. Prepared for Teck Coal Limited. July.

Minnow. 2018. Koocanusa Reservoir Monitoring Program Study Design, 2018 to 2020. Prepared for Teck Coal Ltd. Sparwood, BC. Minnow Project 17-48.

Teck (Teck Coal Ltd.). 2014. Elk Valley Water Quality Plan. Submitted to the British Columbia Minister of Environment for approval on July 22, 2014.

Table A.1: Data Quality Objectives for Aquatic Ecological Samples in the Koocanusa Reservoir Monitoring Program, 2017 to 2019

Quality Control Measure	Quality Control Sample Type/Check	Study Component				
		Water Chemistry	Sediment Chemistry	Tissue Chemistry	Benthic Invertebrate Community	Zooplankton Community
		ALS	ALS	SRC	ZEAS	Salki
Analytical Laboratory Reporting Limits (LRL)	Comparison actual LRL versus target LRL	LRL for each parameter should be at least as low as applicable guidelines, ideally ≤1/10th guideline value[a]	LRL for each parameter should be at least as low as applicable guidelines, ideally ≤1/10th guideline value[a]	LRL for each parameter should be at least as low as applicable guidelines, ideally ≤1/10th guideline value[a]	n/a	n/a
Blank Analysis	Field or Laboratory Blank	Concentrations measured in blank samples should be <LRL [b]	Concentrations measured in blank samples should be <LRL [b]	n/a	n/a	n/a
Laboratory Precision	Laboratory Duplicates	10% RPD (conductivity) 15% RPD (turbidity) 20% RPD (all remaining analytes)	5% RPD (sand, silt, clay) 20% RPD (moisture) 25% RPD (gravel) 30% RPD (Sb, As, Be, Bi, B, Cd, Ca, Cr, Co, Cu, Fe, Li, Mg, Mn, Ni, P, Se, S, Tl, W, U, V, Zn, Zr) 40% RPD (Al, Ba, Pb, Hg, Mo, K, Ag, Na, Sr, Sn, Ti) 50% RPD (PAHs) Within 2X LRL (pH)	Dependent on the element and the applicable DL. DQOs include 1-4xDL, 4-10xDL, 10-20xDL, 20-100xDL and >100xDL, and are flagged by the laboratory QC protocols.	n/a	n/a
	Organism Sub-Sampling Precision	n/a	n/a	n/a	≤20% difference between sub-samples; minimum of 5% of each sample must be analyzed	≤20% difference between sub-samples; minimum of 5% of each sample must be analyzed
Accuracy	Recovery of Blank Spike	60 to 140% (total silicon) 75 to 125% (TKN) 80 to 120% (orthophosphate, phosphorus, DOC, TOC, total and dissolved metals) 85 to 115% (TSS, TDS, turbidity, alkalinity, ammonia, Br) 90 to 110% (Cl, F, nitrate, nitrite, sulfate)	50 to 130% (naphthalene) 50 to 150% (acridine, 1-methylnaphthalene, perylene, quinoline) 60 to 130% (all PAHs) 80 to 120% (inorganic carbon, total metals) 90 to 110% (moisture, TOC)	n/a	n/a	n/a
	Recovery Matrix Spike	70 to 130% (TKN, orthophosphate, phosphorus, DOC, TOC, total and dissolved metals) 75 to 125% (ammonia, Br, Cl, F, nitrate, nitrite, sulfate)	50 to 150% (PAHs)	n/a	n/a	n/a
	Recovery of Certified Reference Material, QC Standards	80 to 120% (orthophosphate, phosphorus) 85 to 115% (turbidity, alkalinity)	70 to 130% (total metals)[c]	80 to 120%	n/a	n/a
	Organism Recovery	n/a	n/a	n/a	minimum 90% recovery	n/a
	Organism Sub-Sampling Accuracy	n/a	n/a	n/a	80-120%	n/a
	Instrument Accuracy	n/a	n/a	n/a	n/a	n/a

Notes: ALS = ALS Environmental; SRC = Saskatchewan Research Council Environmental Analytical Laboratory; Zeas = Zaranko Environmental Assessment Services Incorporated; AAE = AAE Tech Services Incorporated; n/a = not applicable; RPD = Relative Percent Difference; PAHs = polycyclic aromatic hydrocarbons; 2X = two times; DL = detection limit; TKN = Total Kjeldahl Nitrogen; TOC = total organic carbon; DOC = dissolved organic carbon; Br = bromide; Cl = chloride; F = fluoride; TSS = total suspended solids; TDS = total dissolved solids; QC = quality control.

[a] If no guideline or benchmark exists for a substance, the LRL should be less than predictions.

[b] Only applies to QC samples at concentrations <LRL or greater than 5X the LRL.

[c] The following metals had specific µg/g dw limits: B (0 to 8.2); Se (0.11 to 0.15); Ag (0.13 to 0.33); Tl (0.077 to 0.18); Sn (0 to 3.1); W (0 to 0.66); Zr (0 to 1.8).

Table A.2: Laboratory Reporting Limit (LRL) Evaluation for Water Chemistry Analyses, 2018 and 2019

	Analyte	Units	BCWQG[a]		EVWQP Level 1 Benchmarks/ Relevant Screening Values [b]	Range of LRLs [c,d]		No. LRLs > Guideline [c,d]		No. Sample Results < LRL [d]	
			30-d Chronic	Maximum		2018	2019	2018	2019	2018	2019
Non-metals	Hardness (as $CaCO_3$)	mg/L	-	-	-	0.50	0.50	-	-	0	0
	Total Suspended Solids	mg/L	-	-	-	1.0	1.0	-	-	1 (2.94%)	10 (25%)
	Total Dissolved Solids	mg/L	-	-	1,000	13 - 20	13 - 20	0	0	0	0
	Turbidity	NTU	-	-	-	0.10	0.10	-	-	0	0
	Alkalinity	mg/L	>20	-	-	1.0	1.0	0	-	0	0
	Ammonia (as N)[e]	mg/L	0.261	1.92	-	0.0050 - 0.020	0.0050	0	0	1 (2.94%)	4 (10%)
	Bromide (Br)	mg/L	-	-	-	0.050	0.050	-	-	34 (100%)	40 (100%)
	Chloride (Cl)	mg/L	150	600	-	0.10 - 0.50	0.10 - 0.50	0	0	1 (2.94%)	0
	Fluoride (F)[f]	mg/L	-	1.32	-	0.020	0.020	0	0	1 (2.94%)	0
	Nitrate (as N)	mg/L	3.0	32.8	3.0	0.0050	0.0050	0	0	1 (2.94%)	0
	Nitrite (as N)[g]	mg/L	0.020	0.060	-	0.0010	0.0010	0	0	9 (26%)	19 (48%)
	Total Kjeldahl Nitrogen	mg/L	-	-	-	0.050 - 0.10	0.050	-	-	11 (32%)	2 (5.00%)
	Orthophosphate	mg/L	-	-	-	0.0010	0.0010	-	-	17 (50%)	40 (100%)
	Phosphorus (P)-Total	mg/L	-	-	-	0.0010 - 0.010	0.0020	-	-	9 (26%)	13 (32%)
	Sulfate (SO_4)[f]	mg/L	309	-	429	0.30	0.30	0	0	1 (2.94%)	0
	Dissolved Organic Carbon	mg/L	-	-	-	0.50	0.50	-	-	0	0
	Total Organic Carbon	mg/L	-	-	-	0.50	0.50	-	-	0	0
Total Metals	Aluminum (Al)	mg/L	-	-	-	0.0030 - 0.0060	0.0030	-	-	0	0
	Antimony (Sb)	mg/L	0.0090	-	-	0.00010 - 0.00020	0.00010	0	0	30 (88%)	38 (95%)
	Arsenic (As)	mg/L	-	0.0050	-	0.00010 - 0.00020	0.00010	0	0	0	0
	Barium (Ba)	mg/L	1.0	-	-	0.00010 - 0.00020	0.00010	0	0	0	0
	Beryllium (Be)	µg/L	0.13	-	-	0.020 - 0.040	0.020	0	0	28 (82%)	39 (98%)
	Bismuth (Bi)	mg/L	-	-	-	0.000050 - 0.00010	0.000050	-	-	33 (97%)	40 (100%)
	Boron (B)	mg/L	1.2	-	-	0.010 - 0.020	0.010	0	0	33 (97%)	36 (90%)
	Cadmium (Cd)	µg/L	-	-	-	0.0050 - 0.010	0.0050	-	-	16 (47%)	18 (45%)
	Calcium (Ca)	mg/L	-	-	-	0.050 - 0.10	0.050	-	-	0	0
	Chromium (Cr)[h]	mg/L	0.0010	-	-	0.00010 - 0.00020	0.00010	0	0	7 (20%)	2 (5.00%)
	Cobalt (Co)	µg/L	4.0	110	-	0.10 - 0.20	0.10	0	0	25 (74%)	27 (68%)
	Copper (Cu)	mg/L	0.0020	0.0032	-	0.00050 - 0.0010	0.00050	0	0	20 (59%)	28 (70%)
	Iron (Fe)	mg/L	-	1.0	-	0.010 - 0.020	0.010	0	0	6 (18%)	8 (20%)
	Lead (Pb)[f]	mg/L	0.00640	0.0792	-	0.000050 - 0.00010	0.000050	0	0	12 (35%)	13 (32%)
	Lithium (Li)	mg/L	-	-	-	0.0010 - 0.0020	0.0010	-	-	1 (2.94%)	4 (10%)
	Magnesium (Mg)	mg/L	-	-	-	0.10	0.10	-	-	0	0
	Manganese (Mn)	mg/L	0.750	0.903	-	0.00010 - 0.00020	0.00010	0	0	0	0
	Mercury (Hg)[i]	µg/L	0.00125	-	-	0.00050	0.00050 - 0.010	0	0	15 (44%)	19 (48%)
	Molybdenum (Mo)	mg/L	1.0	2.0	-	0.000050 - 0.00010	0.000050	0	0	0	0
	Nickel (Ni)[f]	mg/L	0.0938	-	0.123	0.00050 - 0.0010	0.00050	0	0	25 (74%)	37 (92%)
	Potassium (K)	mg/L	-	-	-	0.050 - 0.10	0.050	-	-	0	0
	Selenium (Se)	µg/L	2.0	-	19	0.050 - 0.10	0.050	0	0	0	0
	Silicon (Si)	mg/L	-	-	-	0.10 - 0.20	0.10	-	-	0	0
	Silver (Ag)[f]	mg/L	0.000050	0.00010	-	0.000010 - 0.000020	0.000010	0	0	33 (97%)	40 (100%)
	Sodium (Na)	mg/L	-	-	-	0.050 - 0.10	0.050	-	-	0	0
	Strontium (Sr)	mg/L	-	-	-	0.00020 - 0.00040	0.00020	-	-	0	0
	Thallium (Tl)	mg/L	0.00080	-	-	0.000010 - 0.000020	0.000010	0	0	28 (82%)	40 (100%)
	Tin (Sn)	mg/L	-	-	-	0.00010 - 0.00020	0.00010	-	-	24 (70%)	34 (85%)
	Titanium (Ti)	mg/L	-	-	-	0.010	0.010	-	-	31 (91%)	40 (100%)
	Uranium (U)	mg/L	0.0085	-	-	0.000010 - 0.000020	0.000010	0	0	0	0
	Vanadium (V)	mg/L	-	-	-	0.00050 - 0.0010	0.00050	-	-	24 (70%)	33 (82%)
	Zinc (Zn)[f]	mg/L	0.0132	0.0387	-	0.0030 - 0.0060	0.0030	0	0	23 (68%)	37 (92%)
Dissolved Metals	Aluminum (Al)	mg/L	0.050	0.10	-	0.0030	0.0030	0	0	0	0
	Antimony (Sb)	mg/L	-	-	-	0.00010 - 0.00020	0.00010	-	-	34 (100%)	40 (100%)
	Arsenic (As)	mg/L	-	-	-	0.00010 - 0.00020	0.00010	-	-	0	0
	Barium (Ba)	mg/L	-	-	-	0.00010 - 0.00020	0.00010	-	-	0	0
	Beryllium (Be)	µg/L	-	-	-	0.020 - 0.040	0.020	-	-	34 (100%)	40 (100%)
	Bismuth (Bi)	mg/L	-	-	-	0.000050 - 0.00010	0.000050	-	-	34 (100%)	40 (100%)
	Boron (B)	mg/L	-	-	-	0.010 - 0.020	0.010	-	-	34 (100%)	40 (100%)
	Cadmium (Cd)[f]	µg/L	0.574	0.208	0.0923	0.0050 - 0.010	0.0050	0	0	29 (85%)	35 (88%)
	Calcium (Ca)	mg/L	-	-	-	0.050 - 0.10	0.050	-	-	0	0
	Chromium (Cr)	mg/L	-	-	-	0.00010 - 0.00020	0.00010	-	-	30 (88%)	33 (82%)
	Cobalt (Co)	µg/L	-	-	-	0.10 - 0.20	0.10	-	-	34 (100%)	40 (100%)
	Copper (Cu)	mg/L	-	-	-	0.00050	0.00050	-	-	30 (88%)	40 (100%)
	Iron (Fe)	mg/L	-	0.35	-	0.010 - 0.020	0.010	0	0	28 (82%)	31 (78%)
	Lead (Pb)	mg/L	-	-	-	0.000050 - 0.00010	0.000050	-	-	29 (85%)	36 (90%)
	Lithium (Li)	mg/L	-	-	-	0.0010	0.0010	-	-	4 (12%)	6 (18%)
	Magnesium (Mg)	mg/L	-	-	-	0.10	0.10	-	-	0	0
	Manganese (Mn)	mg/L	-	-	-	0.00010 - 0.00020	0.00010	-	-	13 (38%)	15 (38%)
	Mercury (Hg)	mg/L	-	-	-	0.0000050	0.0000050	-	-	34 (100%)	39 (98%)
	Molybdenum (Mo)	mg/L	-	-	-	0.000050 - 0.00010	0.000050	-	-	0	0
	Nickel (Ni)	mg/L	-	-	-	0.00050 - 0.0010	0.00050	-	-	34 (100%)	40 (100%)
	Potassium (K)	mg/L	-	-	-	0.050 - 0.10	0.050	-	-	0	0
	Selenium (Se)	µg/L	-	-	-	0.050 - 0.10	0.050	-	-	0	0
	Silicon (Si)	mg/L	-	-	-	0.050 - 0.10	0.050	-	-	0	0
	Silver (Ag)	mg/L	-	-	-	0.000010 - 0.000020	0.000010	-	-	34 (100%)	40 (100%)
	Sodium (Na)	mg/L	-	-	-	0.050 - 0.10	0.050	-	-	0	0
	Strontium (Sr)	mg/L	-	-	-	0.00020 - 0.00040	0.00020	-	-	0	0
	Thallium (Tl)	mg/L	-	-	-	0.000010 - 0.000020	0.000010	-	-	34 (100%)	40 (100%)
	Tin (Sn)	mg/L	-	-	-	0.00010 - 0.00020	0.00010	-	-	24 (70%)	37 (92%)
	Titanium (Ti)	mg/L	-	-	-	0.010	0.010	-	-	34 (100%)	40 (100%)
	Uranium (U)	mg/L	-	-	-	0.000010 - 0.000020	0.000010	-	-	0	0
	Vanadium (V)	mg/L	-	-	-	0.00050 - 0.0010	0.00050	-	-	34 (100%)	40 (100%)
	Zinc (Zn)	mg/L	-	-	-	0.0010 - 0.0020	0.0010	-	-	32 (94%)	37 (92%)

Shading indicates an LRL greater than the lowest EVWQP Level 1 Benchmark (Teck 2014) or relevant, site-specific screening value.
Shading indicates an LRL greater than the lowest BC WQG for the protection of freshwater aquatic life (BCMOE 2017; BCMOECCS 2019).

Notes: BC WQG = British Columbia Water Quality Guidelines; EVWQP = Elk Valley Water Quality Plan; LRL = Laboratory Reporting Limit; - = no data/not applicable; $CaCO_3$ = calcium carbonate; mg/L = milligrams per litre; NTU = Nephelometric Turbidity Units; µg/L = micrograms per litre.

[a] Working (BCMOE 2017) or Accepted (BCMOECCS 2019) BC WQG for the Protection of Aquatic Life.

[b] Where more than one EVWQP Level 1 benchmark was applicable, the most conservative (lowest) value was used (Teck 2014).

[c] The LRLs for all analytes were consistently less than the applicable BCWQG (BCMOE 2017; BCMOECCS 2019) and EVWQP Level 1 Benchmarks (Teck 2014).

[d] The total number of samples in 2018 was n = 34 (n = 33 water samples and n = 1 duplicate samples); in 2019, the total number of samples was n = 40 (n = 37 water samples and n = 3 duplicate samples). Data for field and trip blanks are summarized in Table A.3.

[e] Based on most conservative guideline using highest temperature (20) and pH (8.51).

[f] Hardness-based guidelines calculated using the minimum hardness observed for all samples (97.6 mg/L)

[g] Minimum water quality guidelines for Nitrite (as N) reported in BCMOECCS (2019) for chloride concentrations < 2 mg/L

[h] Guideline for Chromium VI (0.001 mg/L) was selected because this is the principal species found in surface waters

[i] The most conservative guideline (0.00125 µg/L) was applied.

Table A.3: Field Blank and Trip Blank Results for Water Chemistry Analyses, 2018 and 2019

	Analyte	Units	BCWQG[a]		EVWQP Level 1 Benchmarks/ Relevant Screening Values[b]	Range of LRLs[c,d]		No. Sample Results < LRL[d]	
			30-d Chronic	Maximum		2018	2019	2018	2019
Non-metals	Hardness (as $CaCO_3$)	mg/L	-	-	-	0.50	0.50	3 (100%)	6 (100%)
	Total Suspended Solids	mg/L	-	-	-	1.0	1.0 - 3.0	3 (75%)	6 (100%)
	Total Dissolved Solids	mg/L	-	-	1,000	10	3.0 - 10	4 (100%)	6 (100%)
	Turbidity	NTU	-	-	-	0.10	0.10	4 (100%)	5 (83%)
	Alkalinity	mg/L	>20	-	-	1.0	1.0	4 (100%)	6 (100%)
	Ammonia (as N)[e]	mg/L	0.261	1.92	-	0.0050	0.0050	2 (50%)	5 (83%)
	Bromide (Br)	mg/L	-	-	-	0.050	0.050	4 (100%)	6 (100%)
	Chloride (Cl)	mg/L	150	600	-	0.10 - 0.50	0.10 - 0.50	4 (100%)	6 (100%)
	Fluoride (F)[f]	mg/L	-	1.32	-	0.020	0.020	4 (100%)	6 (100%)
	Nitrate (as N)	mg/L	3.0	32.8	3.0	0.0050	0.0050	4 (100%)	6 (100%)
	Nitrite (as N)[g]	mg/L	0.020	0.060	-	0.0010	0.0010	4 (100%)	6 (100%)
	Total Kjeldahl Nitrogen	mg/L	-	-	-	0.050	0.050	4 (100%)	6 (100%)
	Orthophosphate	mg/L	-	-	-	0.0010	0.0010	3 (75%)	6 (100%)
	Phosphorus (P)-Total	mg/L	-	-	-	0.0010 - 0.0020	0.0020	4 (100%)	6 (100%)
	Sulfate (SO_4)[f]	mg/L	309	-	429	0.30	0.30	4 (100%)	6 (100%)
	Dissolved Organic Carbon	mg/L	-	-	-	0.50	0.50	2 (100%)	3 (100%)
	Total Organic Carbon	mg/L	-	-	-	0.50	0.50	4 (100%)	6 (100%)
Total Metals	Aluminum (Al)	mg/L	-	-	-	0.0030	0.0030	4 (100%)	6 (100%)
	Antimony (Sb)	mg/L	0.0090	-	-	0.00010	0.00010	4 (100%)	6 (100%)
	Arsenic (As)	mg/L	-	0.0050	-	0.00010	0.00010	4 (100%)	6 (100%)
	Barium (Ba)	mg/L	1.0	-	-	0.00010	0.00010	3 (75%)	6 (100%)
	Beryllium (Be)	µg/L	0.13	-	-	0.020	0.020	4 (100%)	6 (100%)
	Bismuth (Bi)	mg/L	-	-	-	0.000050	0.000050	4 (100%)	6 (100%)
	Boron (B)	mg/L	1.2	-	-	0.010	0.010	4 (100%)	6 (100%)
	Cadmium (Cd)	µg/L	-	-	-	0.0050	0.0050	4 (100%)	6 (100%)
	Calcium (Ca)	mg/L	-	-	-	0.050	0.050	4 (100%)	6 (100%)
	Chromium (Cr)[h]	mg/L	0.0010	-	-	0.00010	0.00010	4 (100%)	5 (83%)
	Cobalt (Co)	µg/L	4.0	110	-	0.10	0.10	4 (100%)	6 (100%)
	Copper (Cu)	mg/L	0.0020	0.0032	-	0.00050	0.00050	4 (100%)	6 (100%)
	Iron (Fe)	mg/L	-	1.0	-	0.010	0.010	4 (100%)	6 (100%)
	Lead (Pb)[f]	mg/L	0.00640	0.0792	-	0.000050	0.000050	4 (100%)	6 (100%)
	Lithium (Li)	mg/L	-	-	-	0.0010	0.0010	4 (100%)	6 (100%)
	Magnesium (Mg)	mg/L	-	-	-	0.10	0.10	4 (100%)	6 (100%)
	Manganese (Mn)	mg/L	0.750	0.903	-	0.00010	0.00010	4 (100%)	6 (100%)
	Mercury (Hg)[i]	µg/L	0.00125	-	-	0.00050	0.00050	4 (100%)	6 (100%)
	Molybdenum (Mo)	mg/L	1.0	2.0	-	0.000050	0.000050	4 (100%)	6 (100%)
	Nickel (Ni)[f]	mg/L	0.0938	-	0.123	0.00050	0.00050	4 (100%)	6 (100%)
	Potassium (K)	mg/L	-	-	-	0.050	0.050	4 (100%)	6 (100%)
	Selenium (Se)	µg/L	2.0	-	19	0.050	0.050	4 (100%)	6 (100%)
	Silicon (Si)	mg/L	-	-	-	0.10	0.10	4 (100%)	6 (100%)
	Silver (Ag)[f]	mg/L	0.000050	0.00010	-	0.000010	0.000010	4 (100%)	6 (100%)
	Sodium (Na)	mg/L	-	-	-	0.050	0.050	4 (100%)	6 (100%)
	Strontium (Sr)	mg/L	-	-	-	0.00020	0.00020	4 (100%)	6 (100%)
	Thallium (Tl)	mg/L	0.00080		-	0.000010	0.000010	4 (100%)	6 (100%)
	Tin (Sn)	mg/L	-	-	-	0.00010	0.00010	4 (100%)	5 (83%)
	Titanium (Ti)	mg/L	-	-	-	0.010	0.010	4 (100%)	6 (100%)
	Uranium (U)	mg/L	0.0085	-	-	0.000010	0.000010	4 (100%)	6 (100%)
	Vanadium (V)	mg/L	-	-	-	0.00050	0.00050	4 (100%)	6 (100%)
	Zinc (Zn)[f]	mg/L	0.0132	0.0387	-	0.0030	0.0030	4 (100%)	6 (100%)
Dissolved Metals	Aluminum (Al)	mg/L	0.050	0.10	-	0.0030	0.0030	2 (100%)	3 (100%)
	Antimony (Sb)	mg/L	-	-	-	0.00010	0.00010	2 (100%)	3 (100%)
	Arsenic (As)	mg/L	-	-	-	0.00010	0.00010	2 (100%)	3 (100%)
	Barium (Ba)	mg/L	-	-	-	0.00010	0.00010	2 (100%)	3 (100%)
	Beryllium (Be)	µg/L	-	-	-	0.020	0.020	2 (100%)	3 (100%)
	Bismuth (Bi)	mg/L	-	-	-	0.000050	0.000050	2 (100%)	3 (100%)
	Boron (B)	mg/L	-	-	-	0.010	0.010	2 (100%)	3 (100%)
	Cadmium (Cd)[f]	µg/L	0.574	0.208	0.0923	0.0050	0.0050	2 (100%)	3 (100%)
	Calcium (Ca)	mg/L	-	-	-	0.050	0.050	3 (100%)	5 (100%)
	Chromium (Cr)	mg/L	-	-	-	0.00010	0.00010	2 (100%)	3 (100%)
	Cobalt (Co)	µg/L	-	-	-	0.10	0.10	2 (100%)	3 (100%)
	Copper (Cu)	mg/L	-	-	-	0.00050	0.00050	2 (100%)	3 (100%)
	Iron (Fe)	mg/L	-	0.35	-	0.010	0.010	2 (100%)	3 (100%)
	Lead (Pb)	mg/L	-	-	-	0.000050	0.000050	2 (100%)	3 (100%)
	Lithium (Li)	mg/L	-	-	-	0.0010	0.0010	2 (100%)	3 (100%)
	Magnesium (Mg)	mg/L	-	-	-	0.10	0.005	3 (100%)	5 (100%)
	Manganese (Mn)	mg/L	-	-	-	0.00010	0.00010	2 (100%)	3 (100%)
	Mercury (Hg)	mg/L	-	-	-	0.0000050	0.0000050	2 (100%)	3 (100%)
	Molybdenum (Mo)	mg/L	-	-	-	0.000050	0.000050	2 (100%)	3 (100%)
	Nickel (Ni)	mg/L	-	-	-	0.00050	0.00050	2 (100%)	3 (100%)
	Potassium (K)	mg/L	-	-	-	0.050	0.050	3 (100%)	5 (100%)
	Selenium (Se)	µg/L	-	-	-	0.050	0.050	2 (100%)	3 (100%)
	Silicon (Si)	mg/L	-	-	-	0.050	0.050	2 (100%)	3 (100%)
	Silver (Ag)	mg/L	-	-	-	0.000010	0.000010	2 (100%)	3 (100%)
	Sodium (Na)	mg/L	-	-	-	0.050	0.050	3 (100%)	5 (100%)
	Strontium (Sr)	mg/L	-	-	-	0.00020	0.00020	2 (100%)	3 (100%)
	Thallium (Tl)	mg/L	-	-	-	0.000010	0.000010	2 (100%)	3 (100%)
	Tin (Sn)	mg/L	-	-	-	0.00010	0.00010	2 (100%)	3 (100%)
	Titanium (Ti)	mg/L	-	-	-	0.010	0.010	2 (100%)	3 (100%)
	Uranium (U)	mg/L	-	-	-	0.000010	0.000010	2 (100%)	3 (100%)
	Vanadium (V)	mg/L	-	-	-	0.00050	0.00050	2 (100%)	3 (100%)
	Zinc (Zn)	mg/L	-	-	-	0.0010	0.0010	2 (100%)	3 (100%)

Shading indicates blank concentrations greater than the LRL.
Shading indicates an LRL greater than the lowest EVWQP Level 1 Benchmark (Teck 2014) or relevant, site-specific screening value.
Shading indicates an LRL greater than the lowest BC WQG for the protection of freshwater aquatic life (BCMOE 2017; BCMOECCS 2019).

Notes: BC WQG = British Columbia Water Quality Guidelines; EVWQP = Elk Valley Water Quality Plan; LRL = Laboratory Reporting Limit; - = no data/not applicable; $CaCO_3$ = calcium carbonate; mg/L = milligrams per litre; NTU = Nephelometric Turbidity Units; µg/L = micrograms per litre.

[a] Working (BCMOE 2017) or Accepted (BCMOECCS 2019) BC WQG for the Protection of Aquatic Life.

[b] Where more than one EVWQP Level 1 benchmark was applicable, the most conservative (lowest) value was used (Teck 2014).

[c] The LRLs for all analytes were consistently less than the applicable BCWQG (BCMOE 2017; BCMOECCS 2019) and EVWQP Level 1 Benchmarks (Teck 2014).

[d] Total n = 4 (n = 2 trip blanks and n = 2 field blanks) for 2018 and n = 6 (n = 3 trip blanks and n = 3 field blanks) for 2019. Additionally, some parameters were not consistently analyzed and reported for the blank samples; differences in sample numbers are reflected in the table.

[e] Based on most conservative guideline using highest temperature (20) and pH (8.51).

[f] Hardness-based guidelines calculated using the minimum hardness observed for all samples (97.6 mg/L).

[g] Minimum water quality guidelines for Nitrite (as N) reported in BCMOECCS (2019) for chloride concentrations < 2 mg/L.

[h] Guideline for Chromium VI (0.001 mg/L) was selected because this is the principal species found in surface waters.

[i] The most conservative guideline (0.00125 µg/L) was applied.

Table A.4: Field Duplicate Results for Water Chemistry Samples, 2018 to 2019

	Analyte	Units	L2086365			L2291233			L2332191			L2333505		
			RG_ER_WS_20180427_0940			RG_GC_U1_WS_20190612_1200			RG_GC_U1_WS_20190819_1210			RG_TN_U1_WS_20190820_0945		
			RG_ER	DUP	RPD (%)	RG_GC	DUP	RPD (%)	RG-GC	DUP	RPD (%)	RG_TN_U1	DUP	RPD (%)
Non-Metals	Hardness (as $CaCO_3$)	mg/L	175	169	3.5	108	97.6	10	118	121	2.5	128	124	3.2
	Total Suspended Solids	mg/L	50.1	64.9	26	2.9	2.0	37	<1.0	1.7	52	<1.0	<1.0	-
	Total Dissolved Solids	mg/L	193	191	1.0	117	126	7.4	125	129	3.1	145	139	4.2
	Turbidity	mg/L	34.2	45.1	27	3.49	3.13	11	0.900	0.890	1.1	0.520	0.490	5.9
	Ammonia (as N)	mg/L	0.0106	0.0115	8.1	0.0193	0.00660	98	0.0103	0.00610	51	0.0137	0.00690	66
	Bromide (Br)	mg/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-
	Chloride (Cl)	mg/L	4.20	4.20	0	1.56	1.58	1.3	1.87	1.90	1.6	1.97	1.93	2.1
	Fluoride (F)	mg/L	0.100	0.0990	1.0	0.0720	0.0730	1.4	0.0880	0.0900	2.2	0.0630	0.0600	4.9
	Total Kjeldahl Nitrogen	mg/L	0.270	0.245	9.7	0.113	0.121	6.8	0.114	0.0940	19	0.0850	0.0770	9.9
	Nitrate (as N)	mg/L	0.284	0.282	0.71	0.208	0.200	3.9	0.139	0.140	0.72	0.126	0.133	5.4
	Nitrite (as N)	mg/L	0.0016	0.0015	6.5	<0.0010	0.0011	9.5	0.0020	0.0021	4.9	0.0038	0.0036	5.4
	Phosphorus (P)-Total	mg/L	0.0261	0.0235	10	0.0040	0.0055	32	<0.0020	<0.0020	-	<0.0020	<0.0020	-
	Orthophosphate (P) - Dissolved	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-
	Sulphate (SO_4)	mg/L	36.5	36.6	0.27	17.3	17.1	1.2	21.9	21.8	0.46	23.5	23.1	1.7
	Dissolved Organic Carbon	mg/L	2.25	2.08	7.9	1.45	0.930	44	1.04	1.14	9.2	1.11	1.05	5.6
	Total Organic Carbon	mg/L	2.32	2.3	0.87	1.51	1.55	2.6	1.24	1.19	4.1	1.17	1.13	3.5
Total Metals	Aluminum (Al)	mg/L	0.564	0.633	12	0.0456	0.0355	25	0.0198	0.0165	18	0.00810	0.00930	14
	Antimony (Sb)	mg/L	<0.00010	0.00012	18	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-
	Arsenic (As)	mg/L	0.000790	0.000830	4.9	0.000350	0.000350	0	0.000350	0.000310	12	0.000340	0.000320	6.1
	Barium (Ba)	mg/L	0.0608	0.0610	0.33	0.0346	0.0346	0	0.0398	0.0392	1.5	0.0386	0.0380	1.6
	Beryllium (Be)	µg/L	0.031	0.033	6.3	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
	Bismuth (Bi)	mg/L	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-
	Boron (B)	mg/L	0.010	<0.010	0	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	Cadmium (Cd)	µg/L	0.0267	0.0249	7.0	0.0056	0.0050	11	<0.0050	<0.0050	-	<0.0050	<0.0050	-
	Calcium (Ca)	mg/L	46.0	45.7	0.65	28.1	29.6	5.2	31.0	32.3	4.1	35.2	36.5	3.6
	Chromium (Cr)	mg/L	0.000860	0.000940	8.9	0.000130	0.000110	17	0.000130	0.000120	8.0	0.000120	0.000120	0
	Cobalt (Co)	µg/L	0.43	0.48	11	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-
	Copper (Cu)	mg/L	0.00115	0.00123	6.7	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Iron (Fe)	mg/L	0.838	0.993	17	0.0360	0.0290	22	0.0130	0.0120	8.0	<0.010	<0.010	-
	Lead (Pb)	mg/L	0.000893	0.000983	9.6	0.0000680	0.0000620	9.2	<0.000050	<0.000050	-	<0.000050	<0.000050	-
	Lithium (Li)	mg/L	0.00380	0.00400	5.1	0.00130	0.00140	7.4	0.00170	0.00180	5.7	0.00170	0.00170	0
	Magnesium (Mg)	mg/L	13.7	13.3	3.0	7.83	8.01	2.3	9.73	10.1	3.7	10.0	10.3	3.0
	Manganese (Mn)	mg/L	0.0313	0.0346	10	0.00443	0.00362	20	0.00119	0.00111	7.0	0.00093	0.00101	8.2
	Mercury (Hg)	µg/L	0.00199	0.00196	1.5	0.00052	<0.00050	3.9	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Molybdenum (Mo)	mg/L	0.000678	0.000695	2.5	0.000522	0.000502	3.9	0.000610	0.000639	4.6	0.000676	0.000634	6.4
	Nickel (Ni)	mg/L	0.00112	0.00119	6.1	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Potassium (K)	mg/L	0.819	0.812	0.86	0.435	0.428	1.6	0.449	0.461	2.6	0.442	0.446	0.90
	Selenium (Se)	µg/L	1.16	1.19	2.6	0.624	0.617	1.1	0.926	0.968	4.4	0.938	0.941	0.32
	Silicon (Si)	mg/L	3.29	3.43	4.2	2.22	2.26	1.8	1.34	1.33	0.75	1.29	1.31	1.5
	Silver (Ag)	mg/L	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-
	Sodium (Na)	mg/L	5.12	5.25	2.5	2.11	2.24	6.0	2.48	2.51	1.2	2.84	2.83	0.35
	Strontium (Sr)	mg/L	0.159	0.165	3.7	0.103	0.106	2.9	0.126	0.126	0	0.148	0.143	3.4
	Thallium (Tl)	mg/L	0.000013	0.000013	0	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-
	Tin (Sn)	mg/L	<0.00010	<0.00010	-	<0.00010	<0.00010	-	0.00017	0.00014	19	<0.00010	<0.00010	-
	Titanium (Ti)	mg/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	Uranium (U)	mg/L	0.00084	0.000843	0.36	0.000581	0.000591	1.7	0.000571	0.000569	0.35	0.000658	0.000661	0.45
	Vanadium (V)	mg/L	0.00103	0.00114	10	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Zinc (Zn)	mg/L	0.0041	0.0043	4.8	<0.0030	<0.0030	-	<0.0030	<0.0030	-	<0.0030	<0.0030	-
Dissolved Metals	Aluminum (Al)	mg/L	0.0080	0.0112	33	0.0090	0.0098	8.5	0.0036	0.0045	22	0.0034	0.0037	8.5
	Antimony (Sb)	mg/L	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-
	Arsenic (As)	mg/L	0.00050	0.00046	8.3	0.00033	0.00030	9.5	0.00033	0.00028	16	0.00036	0.00031	15
	Barium (Ba)	mg/L	0.0632	0.0603	4.7	0.0336	0.0351	4.4	0.0394	0.0388	1.5	0.0391	0.0386	1.3
	Beryllium (Be)	µg/L	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
	Bismuth (Bi)	mg/L	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-
	Boron (B)	mg/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	Cadmium (Cd)	µg/L	<0.0050	0.0059	17	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-
	Calcium (Ca)	mg/L	46.6	44.4	4.8	29.7	26.8	10	32.2	33.6	4.3	33.7	32.6	3.3
	Chromium (Cr)	mg/L	0.00013	0.00012	8.0	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-
	Cobalt (Co)	µg/L	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-
	Copper (Cu)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Iron (Fe)	mg/L	0.015	0.018	18	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	Lead (Pb)	mg/L	<0.000050	0.000056	11	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-
	Lithium (Li)	mg/L	0.0027	0.0026	3.8	0.0013	0.0013	0	0.0018	0.0019	5.4	0.0018	0.0017	5.7
	Magnesium (Mg)	mg/L	14.3	14.0	2.1	8.19	7.44	9.6	9.19	8.97	2.4	10.7	10.3	3.8
	Manganese (Mn)	mg/L	0.00083	0.0008	3.7	0.00011	0.0001	9.5	<0.00010	<0.00010	-	<0.00010	<0.00010	-
	Mercury (Hg)	mg/L	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-
	Molybdenum (Mo)	mg/L	0.000679	0.000655	3.6	0.000491	0.000514	4.6	0.000585	0.000602	2.9	0.000641	0.000626	2.4
	Nickel (Ni)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Potassium (K)	mg/L	0.792	0.762	3.9	0.414	0.401	3.2	0.443	0.437	1.4	0.48	0.47	2.1
	Selenium (Se)	µg/L	1.26	1.29	2.4	0.657	0.667	1.5	0.949	0.924	2.7	1.03	0.976	5.4
	Silicon (Si)	mg/L	2.48	2.48	0	2.20	2.18	0.91	1.19	1.23	3.3	1.25	1.22	2.4
	Silver (Ag)	mg/L	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-
	Sodium (Na)	mg/L	5.73	5.56	3.0	2.08	1.99	4.4	2.41	2.28	5.5	2.75	2.74	0.36
	Strontium (Sr)	mg/L	0.171	0.165	3.6	0.106	0.101	4.8	0.123	0.120	2.5	0.134	0.127	5.4
	Thallium (Tl)	mg/L	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-
	Tin (Sn)	mg/L	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-
	Titanium (Ti)	mg/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	Uranium (U)	mg/L	0.000877	0.000843	4.0	0.000590	0.000532	10	0.000653	0.000607	7.3	0.000612	0.000630	2.9
	Vanadium (V)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Zinc (Zn)	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-

Notes: The RPD was calculated using <LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL.
RPD = relative percent difference; % = percent; µS/cm = microSiemens per centimetre; $CaCO_3$ = calcium carbonate; mg/L = milligrams per litre; < = less than; NTU = Nephelometric Turbidity Units; - = no data/not calculated; µg/L = micrograms per litre; LRL = Laboratory Reporting Limit; ≤ = less than or equal to.

Table A.5: Laboratory Reporting Limit (LRL) Evaluation for Sediment Chemistry Analyses, 2018 and 2019

	Analyte	Units	BC WSQGs [b]		Range of LRLs		No. LRLs > ISQG		No. LRLs > PEL		No. Sample Results < LRL [c]	
			ISQG	PEL	2018	2019	2018	2019	2018	2019	2018	2019
Non-metal	Total Organic Carbon	%	-	-	0.47 to 1.0	0.89 to 1.0	-	-	-	-	0	0
	pH	pH units	-	-	0.10	0.10	-	-	-	-	0	0
	Moisture	%	-	-	0.25	0.25	-	-	-	-	0	0
Particle Size	% Gravel (>2mm)	%	-	-	1.0	1.0	-	-	-	-	24 (89%)	11 (100%)
	% Sand (2.00mm - 1.00mm)	%	-	-	1.0	1.0	-	-	-	-	25 (92%)	11 (100%)
	% Sand (1.00mm - 0.50mm)	%	-	-	1.0	1.0	-	-	-	-	20 (74%)	11 (100%)
	% Sand (0.50mm - 0.25mm)	%	-	-	1.0	1.0	-	-	-	-	17 (63%)	11 (100%)
	% Sand (0.25mm - 0.125mm)	%	-	-	1.0	1.0	-	-	-	-	13 (48%)	9 (82%)
	% Sand (0.125mm - 0.063mm)	%	-	-	1.0	1.0	-	-	-	-	4 (15%)	3 (27%)
	% Silt (0.063mm - 0.0312mm)	%	-	-	1.0	1.0	-	-	-	-	0	0
	% Silt (0.0312mm - 0.004mm)	%	-	-	1.0	1.0	-	-	-	-	0	0
	% Clay (<4µm)	%	-	-	1.0	1.0	-	-	-	-	0	0
Metals	Aluminum (Al)	mg/kg	-	-	50	50	-	-	-	-	0	0
	Antimony (Sb)	mg/kg	-	-	0.10	0.10	-	-	-	-	0	0
	Arsenic (As)	mg/kg	5.9	17	0.10	0.10	0	0	0	0	0	0
	Barium (Ba)	mg/kg	-	-	0.50	0.50	-	-	-	-	0	0
	Beryllium (Be)	mg/kg	-	-	0.10	0.10	-	-	-	-	0	0
	Bismuth (Bi)	mg/kg	-	-	0.20	0.20	-	-	-	-	23 (85%)	4 (36%)
	Boron	mg/kg	-	-	5.0	5.0	-	-	-	-	22 (81%)	11 (100%)
	Cadmium (Cd)	mg/kg	0.60	3.5	0.020	0.020	0	0	0	0	0	0
	Calcium (Ca)	mg/kg	-	-	50	50	-	-	-	-	0	0
	Chromium (Cr)	mg/kg	37.3	90.0	0.50	0.50	0	0	0	0	0	0
	Cobalt (Co)	mg/kg	-	-	0.10	0.10	-	-	-	-	0	0
	Copper (Cu)	mg/kg	35.7	197	0.50	0.50	0	0	0	0	0	0
	Iron (Fe)	mg/kg	21,200	43,766	50	50	0	0	0	0	0	0
	Lead (Pb)	mg/kg	35.0	91.3	0.50	0.50	0	0	0	0	0	0
	Lithium (Li)	mg/kg	-	-	2.0	2.0	-	-	-	-	0	0
	Magnesium (Mg)	mg/kg	-	-	20	20	-	-	-	-	0	0
	Manganese (Mn)	mg/kg	460	1,100	1.0	1.0	0	0	0	0	0	0
	Mercury (Hg)	mg/kg	0.170	0.486	0.0050	0.0050	0	0	0	0	0	0
	Molybdenum (Mo)	mg/kg	-	-	0.10	0.10	-	-	-	-	0	0
	Nickel (Ni)	mg/kg	16.0	75.0	0.50	0.50	0	0	0	0	0	0
	Phosphorus (P)	mg/kg	-	-	50	50	-	-	-	-	0	0
	Potassium (K)	mg/kg	-	-	100	100	-	-	-	-	0	0
	Selenium (Se)	mg/kg	2.0 [b]		0.20	0.20	0	0	0	0	7 (26%)	5 (45%)
	Silver (Ag)	mg/kg	0.50	-	0.10	0.10	0	0	0	0	23 (85%)	7 (64%)
	Sodium (Na)	mg/kg	-	-	50	50	-	-	-	-	0	0
	Strontium (Sr)	mg/kg	-	-	0.50	0.50	-	-	-	-	0	0
	Sulphur (S)	mg/kg	-	-	1,000	1,000	-	-	-	-	27 (100%)	11 (100%)
	Thallium (Tl)	mg/kg	-	-	0.050	0.050	-	-	-	-	0	0
	Tin (Sn)	mg/kg	-	-	2.0	2.0	-	-	-	-	27 (100%)	11 (100%)
	Titanium (Ti)	mg/kg	-	-	1.0	1.0	-	-	-	-	0	0
	Tungsten (W)	mg/kg	-	-	0.50	0.50	-	-	-	-	27 (100%)	11 (100%)
	Uranium (U)	mg/kg	-	-	0.050	0.050	-	-	-	-	0	0
	Vanadium (V)	mg/kg	-	-	0.20	0.20	-	-	-	-	0	0
	Zinc (Zn)	mg/kg	123	315	2.0	2.0	0	0	0	0	0	0
	Zirconium (Zr)	mgkg	-	-	1.0	1.0	-	-	-	-	2 (7.41%)	0
Polycyclic Aromatic Hydrocarbons	Acenaphthene	mg/kg	0.00671	0.0889	0.0050	0.0050	0	0	0	0	27 (100%)	11 (100%)
	Acenaphthylene	mg/kg	0.00587	0.128	0.0050	0.0050	0	0	0	0	26 (96%)	11 (100%)
	Acridine	mg/kg	-	-	0.010	0.010	-	-	-	-	27 (100%)	10 (91%)
	Anthracene	mg/kg	0.0469	0.245	0.0040	0.0040	0	0	0	0	24 (89%)	10 (91%)
	Benz(a)anthracene	mg/kg	0.0317	0.385	0.010	0.010	0	0	0	0	22 (81%)	9 (82%)
	Benzo(a)pyrene	mg/kg	0.0319	0.782	0.010	0.010	0	0	0	0	24 (89%)	11 (100%)
	Benzo(b&j)fluoranthene	mg/kg	-	-	0.010	0.010	-	-	-	-	17 (63%)	7 (64%)
	Benzo(b+j+k)fluoranthene	mg/kg	-	-	-	0.015	-	-	-	-	-	8 (73%)
	Benzo(e)pyrene	mg/kg	-	-	0.010	0.010	-	-	-	-	21 (78%)	10 (91%)
	Benzo(g,h,i)perylene	mg/kg	0.170	3.20	0.010	0.010	0	0	0	0	23 (85%)	11 (100%)
	Benzo(k)fluoranthene	mg/kg	0.240	13.4	0.010	0.010	0	0	0	0	24 (89%)	11 (100%)
	Chrysene	mg/kg	0.0571	0.862	0.010	0.010	0	0	0	0	16 (59%)	6 (54%)
	Dibenz(a,h)anthracene	mg/kg	0.00622	0.135	0.0050	0.0050	0	0	0	0	25 (92%)	11 (100%)
	Fluoranthene	mg/kg	0.111	2.36	0.010	0.010	0	0	0	0	18 (67%)	7 (64%)
	Fluorene	mg/kg	0.0212	0.144	0.010	0.010	0	0	0	0	27 (100%)	11 (100%)
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.200	3.20	0.010	0.010	0	0	0	0	24 (89%)	11 (100%)
	1-Methylnaphthalene	mg/kg	-	-	0.010	0.010	-	-	-	-	17 (63%)	5 (45%)
	2-Methylnaphthalene	mg/kg	0.0202	0.201	0.010	0.010	0	0	0	0	16 (59%)	5 (45%)
	Naphthalene	mg/kg	0.0346	0.391	0.010	0.010	0	0	0	0	17 (63%)	5 (45%)
	Perylene	mg/kg	-	-	0.010	0.010	-	-	-	-	17 (63%)	10 (91%)
	Phenanthrene	mg/kg	0.0419	0.515	0.010	0.010	0	0	0	0	15 (56%)	5 (45%)
	Pyrene	mg/kg	0.0530	0.875	0.010	0.010	0	0	0	0	20 (74%)	8 (73%)
	Quinoline	mg/kg	-	-	0.010	0.010	-	-	-	-	27 (100%)	11 (100%)
	B(a)P Total Potency Equivalent	mg/kg	-	-	0.020	0.020	-	-	-	-	24 (89%)	11 (100%)
	IACR (CCME)	mg/kg	-	-	0.15	0.15	-	-	-	-	17 (63%)	8 (73%)

Shading indicates an LRL greater than the lowest BC WSQG (i.e., the ISQG).

Shading indicates an LRL greater than the both the upper BC WSQG (i.e., the PEL) and the BC WSQG (ISGQ).

Notes: BC WSQG = British Columbia Working Sediment Quality Guidelines; LRL = Laboratory Reporting Limit; ISQG = Interim Sediment Quality Guideline; PEL = Probable Effects Level; > = greater than; mm = millimetres; < = less than; µm = micrometres; - = no data/not applicable; mg/kg = milligrams per kilogram; BCMOECCS = British Columbia Ministry of Environment and Climate Change Strategy.

[a] BC WSQG for the protection of freshwater aquatic life (BCMOE 2017).

[b] The 2 mg/kg alert concentrations from BCMOECCS (2019) was applied; there is currently no BC WSQG for selenium.

[c] The total number of samples in 2018 was n = 27 (n = 25 sediment samples and n = 2 duplicate samples); in 2019, the total number of samples was n = 11 (n = 10 sediment samples and n = 1 duplicate samples).

Table A.6: Field Duplicate Results for Sediment Chemistry Samples, 2018 to 2019

	Analyte	Units	L2089149			L2157301			L2334973		
			RG_GC_03_SS_20180427-1315			RG_T4_4_SED_20180828-1430			RG_T4_1_SE_20190821-1027		
			RG_GC	DUP	RPD (%)	RG_T4	DUP	RPD (%)	RG_T4	DUP	RPD (%)
Non-metal	Total Organic Carbon	%	1.28	1.20	6.5	2.20	2.30	4.4	1.45	1.48	2.0
	pH	pH units	8.17	8.18	0.12	8.43	8.45	0.24	8.14	8.18	0.49
	Moisture	%	44.1	44.5	0.90	43.3	42.3	2.3	40.8	40.1	1.7
Metals	Aluminum (Al)	mg/kg	9,640	10,100	4.7	13,500	14,700	8.5	12,200	12,000	1.7
	Antimony (Sb)	mg/kg	0.28	0.26	7.4	0.42	0.44	4.7	0.40	0.40	0
	Arsenic (As)	mg/kg	2.63	2.73	3.7	7.59	8.24	8.2	6.37	6.48	1.7
	Barium (Ba)	mg/kg	103	106	2.9	141	142	0.71	151	149	1.3
	Beryllium (Be)	mg/kg	0.34	0.37	8.5	0.48	0.5	4.1	0.54	0.55	1.8
	Bismuth (Bi)	mg/kg	<0.20	<0.20	-	<0.20	0.21	4.9	0.20	0.21	4.9
	Boron	mg/kg	<5.0	<5.0	-	<5.0	<5.0	-	<5.0	<5.0	-
	Cadmium (Cd)	mg/kg	0.0870	0.0880	1.1	0.462	0.454	1.7	0.508	0.490	3.6
	Calcium (Ca)	mg/kg	24,900	27,900	11	122,000	140,000	14	98,800	99,200	0.40
	Chromium (Cr)	mg/kg	10.3	10.7	3.8	20.4	21.8	6.6	18.9	18.3	3.2
	Cobalt (Co)	mg/kg	6.81	6.65	2.4	10.2	11.2	9.3	8.40	8.49	1.1
	Copper (Cu)	mg/kg	10.4	9.98	4.1	17.5	19.2	9.3	15.6	15.9	1.9
	Iron (Fe)	mg/kg	15,000	14,900	0.67	24,700	26,900	8.5	22,000	22,000	0
	Lead (Pb)	mg/kg	6.05	6.11	1.0	15.9	17.8	11	14.2	14.6	2.8
	Lithium (Li)	mg/kg	13.5	13.8	2.2	25.6	27.7	7.9	22.3	22.6	1.3
	Magnesium (Mg)	mg/kg	11,800	12,300	4.1	26,200	28,400	8.1	22,000	22,300	1.4
	Manganese (Mn)	mg/kg	246	253	2.8	568	629	10	572	573	0.17
	Mercury (Hg)	mg/kg	0.096	0.029	108	0.0291	0.0462	45	0.0382	0.0388	1.6
	Molybdenum (Mo)	mg/kg	0.170	0.190	11	0.940	1.05	11	0.830	0.830	0
	Nickel (Ni)	mg/kg	11.2	11.3	0.89	23.9	25.6	6.9	21.8	21.8	0
	Phosphorus (P)	mg/kg	528	534	1.1	830	876	5.4	724	754	4.1
	Potassium (K)	mg/kg	840	920	9.1	1,160	1,110	4.4	1330	1320	0.75
	Selenium (Se)	mg/kg	0.22	<0.20	9.5	0.510	0.520	1.9	0.680	0.720	5.7
	Silver (Ag)	mg/kg	<0.10	<0.10	-	<0.10	<0.10	-	0.110	0.110	0
	Sodium (Na)	mg/kg	58.0	64.0	9.8	100	105	4.9	100	100	0
	Strontium (Sr)	mg/kg	32.0	39.8	22	250	288	14	201	201	0
	Sulphur (S)	mg/kg	<1,000	<1,000	-	<1,000	<1,000	-	<1,000	<1,000	-
	Thallium (Tl)	mg/kg	0.0580	0.0580	0	0.131	0.132	0.76	0.154	0.153	0.65
	Tin (Sn)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	<2.0	<2.0	-
	Titanium (Ti)	mg/kg	198	209	5.4	99.6	101	1.4	55.1	57.6	4.4
	Tungsten (W)	mg/kg	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-
	Uranium (U)	mg/kg	0.596	0.593	0.50	0.811	0.907	11	0.760	0.786	3.4
	Vanadium (V)	mg/kg	12.5	13.0	3.9	19.3	19.6	1.5	19.2	19.5	1.6
	Zinc (Zn)	mg/kg	21.7	23.1	6.3	84.4	88.7	5.0	73.5	73.7	0.27
	Zirconium (Zr)	mgkg	1.8	1.7	5.7	1.3	1.8	32	1.5	1.4	6.9
Polycyclic Aromatic Hydrocarbons	Acenaphthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-
	Acenaphthylene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-
	Acridine	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	Anthracene	mg/kg	<0.0040	<0.0040	-	<0.0040	<0.0040	-	<0.0040	0.0045	12
	Benz(a)anthracene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	0.010	0
	Benzo(a)pyrene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	Benzo(b&j)fluoranthene	mg/kg	<0.010	<0.010	-	0.015	0.015	0	0.012	0.012	0
	Benzo(e)pyrene	mg/kg	<0.010	<0.010	-	0.010	<0.010	0	<0.010	<0.010	-
	Benzo(g,h,i)perylene	mg/kg	<0.010	<0.010	-	0.014	<0.010	33	<0.010	<0.010	-
	Benzo(k)fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	Chrysene	mg/kg	<0.010	<0.010	-	0.018	0.015	18	0.016	0.017	6.1
	Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	-	0.0057	<0.0050	-	<0.0050	<0.0050	-
	Fluoranthene	mg/kg	<0.010	<0.010	-	0.014	0.013	7.4	0.013	0.020	42
	Fluorene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	1-Methylnaphthalene	mg/kg	<0.010	<0.010	-	0.016	0.019	17	0.026	0.022	17
	2-Methylnaphthalene	mg/kg	<0.010	<0.010	-	0.030	0.029	3.4	0.045	0.037	20
	Naphthalene	mg/kg	<0.010	<0.010	-	0.010	0.013	26	0.019	0.016	17
	Perylene	mg/kg	0.011	0.016	37	0.011	0.011	0	<0.010	<0.010	-
	Phenanthrene	mg/kg	<0.010	<0.010	-	0.027	0.028	3.6	0.037	0.036	2.7
	Pyrene	mg/kg	<0.010	<0.010	-	0.011	<0.010	9.5	0.011	0.016	37
	Quinoline	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-

Notes: The RPD was calculated using <LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL.
RPD = relative percent difference; - = no data/not calculated. LRL = Laboratory Reporting Limit.

Table A.7: Calculation of Benthic Invertebrate Community Subsampling Error, 2018

Station	Whole Organisms	Number of Organisms in Fraction 1	Number of Organisms in Fraction 2	Number of Organisms in Fraction 3	Number of Organisms in Fraction 4	Precision	
						% range	
TN-4	-	125	135	-	-	7.4	-

Highlighted values did not meet the DQO of <20%.
min = minimum absolute % error.
max = maximum absolute % error.

Table A.8: Benthic Invertebrate Community Sample Fractions Sorted, 2018

Station	Fraction Sorted	Station	Fraction Sorted (500 µm)
TN-1	1/4	T4-2	Whole
TN-2	1/2	T4-3	Whole
TN-3	1/4	T4-4	1/8
TN-4	Whole[a]	T4-5	1/4
TN-5	1/2	T4-6	Whole

[a] two halves sorted for subsampling error calculations.

Table A.9: Percent Recovery of Benthic Macroinvertebrates, 2018

Station	Number of Organisms Recovered (initial sort)	Number of Organisms in Re-sort	Percent Recovery
TN-5	123	151	81.5%
T4-2	72	76	94.7%
		Average % Recovery	**88.1%**

Highlighted values did not meet the DQO of >90%.

QA/QC Notes

Pupae were not counted toward total number of taxa unless they were the sole representative of their taxa group.
Immatures were not counted toward total number of taxa unless they were the sole representative of their taxa group.

Table A.11: Laboratory Reporting Limit (LRL) Evaluation for Zooplankton Tissue Chemistry Analyses, 2018 and 2019

Analyte	Units	Range of LRLs [a,b]		No. Sample Results < LRL [b]	
		2018	2019	2018	2019
Aluminum	µg/g dw	20 to 200	5 to 50	0	0
Antimony	µg/g dw	0.1 to 1	0.01 to 0.1	9 (30%)	1 (6.67%)
Arsenic	µg/g dw	0.05 to 0.5	0.01 to 0.5	0	0
Barium	µg/g dw	0.05 to 0.5	0.02 to 5	0	0
Beryllium	µg/g dw	0.01 to 0.1	0.01 to 0.02	5 (17%)	0
Boron	µg/g dw	1 to 10	1 to 50	14 (47%)	11 (73%)
Cadmium	µg/g dw	0.01 to 0.1	0.01 to 0.02	0	0
Chromium	µg/g dw	0.5 to 5	0.05 to 5	12 (40%)	2 (13%)
Cobalt	µg/g dw	0.01 to 0.1	0.01 to 5	0	2 (13%)
Copper	µg/g dw	0.05 to 0.5	0.05 to 5	0	0
Iron	µg/g dw	20 to 200	5 to 50	0	0
Lead	µg/g dw	0.01 to 1	0.01 to 0.5	0	0
Manganese	µg/g dw	0.1 to 1	0.1 to 5	0	0
Mercury	µg/g dw	0.005 to 0.05	0.005 to 0.02	10 (33%)	0
Molybdenum	µg/g dw	0.1 to 1	0.02 to 0.5	12 (40%)	2 (13%)
Nickel	µg/g dw	0.05 to 0.5	0.05 to5	0	1 (6.67%)
Selenium	µg/g dw	0.05 to 0.5	0.01 to 0.5	0	0
Silver	µg/g dw	0.01 to 0.1	0.01 to 0.02	16 (53%)	0
Strontium	µg/g dw	0.1 to 1	0.05 to 1	0	0
Thallium	µg/g dw	0.05 to 0.5	0.005 to 0.1	22 (73%)	2 (13%)
Tin	µg/g dw	0.05 to 0.5	0.05 to 2	2 (6.67%)	2 (13%)
Titanium	µg/g dw	0.05 to 0.5	0.2 to 5	0	0
Uranium	µg/g dw	0.005 to 0.05	0.005 to 0.1	0	0
Vanadium	µg/g dw	0.1 to 1	0.1 to 1	0	0
Zinc	µg/g dw	0.5 to 5	0.5 to 50	0	0

Notes: LRL = Laboratory Reporting Limit; µg/g dw = microgram per gram dry weight; SRC = Saskatchewan Research Council Environmental Analytical Laboratory.

[a] LRLs from the analytical laboratory (SRC) were reported to one significant digit.

[b] The total number of samples in 2018 was n = 30 samples; in 2019 the total number of samples was n = 15 samples.

Table A.12: Laboratory Recount Results for Zooplankton Samples, 2018 to 2019

Taxonomic Group		RG_TN5			RG_TN4			RG_TN1		
		11-Jun-18			31-Aug-18			4-Sep-18		
		Sample	DUP	RPD	Sample	DUP	RPD	Sample	DUP	RPD
Density	Total Calanoida ind/L	1	2	43	2	3	10	2	2	21
	Total Cyclopoida ind/L	1	1	14	11	9	20	5	6	32
	Total Cladocera ind/L	4	3	36	2	3	19	2	1	72
	Total Rotifera ind/L	2	2	10	8	8	4.6	4	5	19
	Total Zooplankton ind/L	8	8	4.1	24	22	6.9	12	14	16
	Total Count	158	159	0.63	193	187	3.2	165	207	23
Biomass	Total Calanoida ug/L	51.7	55.6	7.2	151	106	35	63.7	74.8	16
	Total Cyclopoida ug/L	11.9	16.1	31	100	78.2	25	34.6	59.3	53
	Total Cladocera ug/L	415	189	75	565	662	16	137	124	10
	Total Rotifera ug/L	0.305	0.325	6.4	2.44	2.19	11	0.918	1.29	34
	Total Zooplankton ug/L	479	261	59	736	807	9.2	221	221	0.074

Highlighted values did not meet the data quality objective of ≤ 20% RPD.

Note: RPD = relative percent difference.

Table A.12: Laboratory Recount Results for Zooplankton Samples, 2018 to 2019

Taxonomic Group		RG_TN4			RG_T43		
		22-Aug-19			21-Aug-19		
		Sample	DUP	RPD	Sample	DUP	RPD
Density	Total Calanoida ind/L	2	1	19	2	1	18
	Total Cyclopoida ind/L	10	13	23	9	13	32
	Total Cladocera ind/L	2	1	43	2	1	93
	Total Rotifera ind/L	3	4	31	9	4	74
	Total Zooplankton ind/L	17	19	16	21	19	14
	Total Count	169	187	10	226	171	28
Biomass	Total Calanoida ug/L	58.4	65.0	11	53.6	22.4	82
	Total Cyclopoida ug/L	110	127	14	51.9	93.6	57
	Total Cladocera ug/L	229	174	27	361	99.0	114
	Total Rotifera ug/L	0.849	1.32	43	1.81	0.984	59
	Total Zooplankton ug/L	398	366	8.2	468	216	74

Highlighted values did not meet the data quality objective of ≤ 20% RPD.

Note: RPD = relative percent difference.

Table A.13: Laboratory Recount Results for Phytoplankton Abundance Samples, 2018

Taxonomic Group	Biomass (mg/m^3)			Density (# cells/L)		
	RG_TN-2	Recount	RPD	RG_TN-2	Recount	RPD
Cyanobacteria	0	0	0	0	0	0
Chlorophyte	6.95	4.41	45	144,080	64,856	76
Euglenophyte	0	0	0	0	0	0
Chrysophyte	45.3	35.8	24	395,320	352,216	12
Diatom	1,087	1,027	5.7	4,814,696	4,558,672	5.5
Cryptophyte	81.6	83.6	2.4	383,984	410,120	6.6
Dinoflagellate	14.8	17.4	16	1,000	1,600	46
Total	1,235	1,168	5.6	5,739,080	5,387,464	6.3

Highlighted values did not meet the data quality objective of ≤ 20% RPD.

Note: RPD = relative percent difference.

Table A.14: Laboratory Reporting Limit (LRL) Evaluation for Fish Tissue Chemistry Analyses, 2018 and 2019

Analyte	Units	Human Health Guidelines[a]	Range of LRLs [b,c]		No. LRLs > Guideline/ Benchmark [c]		No. Sample Results < LRL [c]	
			2018	2019	2018	2019	2018	2019
Aluminum	µg/g dw	-	2 - 1,000	2 - 50	-	-	147 (67%)	72 (46%)
Antimony	µg/g dw	-	0.1 - 50	0.01 - 0.1	-	-	218 (100%)	144 (92%)
Arsenic	µg/g dw	3.5	0.05 - 20	0.01 - 0.5	48 (22%)	0	144 (66%)	35 (22%)
Barium	µg/g dw	-	0.05 - 20	0.02 - 5	-	-	61 (28%)	41 (26%)
Beryllium	µg/g dw	-	0.01 - 5	0.01 - 0.02	-	-	218 (100%)	156 (100%)
Boron	µg/g dw	-	1 - 500	1 - 50	-	-	218 (100%)	156 (100%)
Cadmium	µg/g dw	-	0.01 - 5	0.01 - 0.02	-	-	189 (87%)	109 (70%)
Chromium	µg/g dw	-	0.5 - 200	0.05 - 5	-	-	218 (100%)	124 (79%)
Cobalt	µg/g dw	-	0.01 - 5	0.01 - 5	-	-	139 (64%)	81 (52%)
Copper	µg/g dw	-	0.05 - 20	0.05 - 5	-	-	42 (19%)	36 (23%)
Iron	µg/g dw		2 - 1,000	2 - 50	-	-	63 (29%)	33 (21%)
Lead	µg/g dw	0.50	0.01 - 5	0.01 - 0.5	48 (22%)	0	137 (63%)	92 (59%)
Manganese	µg/g dw	-	0.1 - 50	0.1 - 5	-	-	53 (24%)	35 (22%)
Mercury	µg/g dw	0.50	0.005 - 2	0.005 - 0.1	1 (0.5%)	0	64 (29%)	1 (0.6%)
Molybdenum	µg/g dw	-	0.1 - 50	0.02 - 0.5	-	-	194 (89%)	97 (62%)
Nickel	µg/g dw	-	0.05 - 20	0.05 - 5	-	-	210 (96%)	135 (86%)
Selenium	µg/g dw	4.0	0.05 - 2	0.01 - 0.5	0	0	1 (0.5%)	0
Silver	µg/g dw	-	0.01 - 5	0.01 - 0.02	-	-	199 (91%)	105 (67%)
Strontium	µg/g dw	-	0.1 - 50	0.05 - 1	-	-	83 (38%)	30 (19%)
Thallium	µg/g dw	-	0.05 - 20	0.005 - 0.1	-	-	216 (99%)	42 (27%)
Tin	µg/g dw	-	0.05 - 20	0.05 - 2	-	-	217 (100%)	156 (100%)
Titanium	µg/g dw	-	0.05 - 20	0.2 - 5	-	-	124 (57%)	116 (74%)
Uranium	µg/g dw	-	0.005 - 2	0.005 - 0.1	-	-	213 (98%)	152 (97%)
Vanadium	µg/g dw	-	0.1 - 50	0.1 - 1	-	-	218 (100%)	151 (97%)
Zinc	µg/g dw	-	0.5 - 200	0.5 - 50	-	-	43 (20%)	31 (20%)

Shading indicates an LRL greater than the Health Canada human health concentration for muscle tissue in fish (BCMOECCS 2019; CFIA 2015).

[a] Health Canada human health guidelines from the CFIA (2015) are reported on a wet weight basis; moisture data for individual samples were used to calculate dry weight guidelines for screening purposes.

[b] Samples were analyzed by SRC; LRLs from the analytical laboratory were reported to one significant digit.

[c] The total number of samples in 2018 was n = 218 samples (135 muscle, 83 ovaries); in 2019 the total number of samples was n = 156 samples (96 muscle and 60 ovaries).

Table A.15: Fish Aging Verification Results, 2018 and 2019

Year	Sample ID	Initial Age	QA/QC	Difference (years)	Final Age Assigned
2018	ER-NSC-01	10	10	0	10
	ER-NSC-02	9	9	0	9
	ER-NSC-03	10	9	1	10
	ER-NSC-04	12	12	0	12
	ER-NSC-05	11	11	0	11
	ER-NSC-06	6	6	0	6
	GC-NSC-01	9	9	0	9
	GC-NSC-02	9	9	0	9
	GC-NSC-03	15	15	0	15
	SC-NSC-07	17	17	0	17
	ERKR-PCC-03	7	7	0	7
	ERKR-PCC-04	5	5	0	5
	ERKR-PCC-06	5	5	0	5
	ERKR-PCC-07	7	7	0	7
	ERKR-PCC-09	11	11	0	11
	ERKR-PCC-11	11	12	1	11
	ERKR-PCC-12	13	13	0	13
	ERKR-PCC-15	5	5	0	5
	ERKR-PCC-16	15	15	0	15
	ERKR-PCC-19	4	3	1	4
	ERKR-PCC-22	6	5	1	5
	ERKR-PCC-23	6	6	0	6
	ERKR-PCC-25	5	5	0	5
	ERKR-PCC-31	5	5	0	5
	ERKR-PCC-32	14	14	0	14
	ERKR-PCC-35	5	5	0	5
	ERKR-PCC-38	5	5	0	5
	ERKR-PCC-42	6	6	0	6
	ERKR-PCC-47	6	6	0	6
	ERKR-PCC-52	5	5	0	5
	ERKR-PCC-58	5	5	0	5
	GCKR-PCC-18	7	7	0	7
	GCKR-PCC-32	5	5	0	5
	GCKR-PCC-42	7	6	1	7
	GCKR-PCC-43	4	4	0	4
	GCKR-PCC-49	5	5	0	5
	GCKR-PCC-51	4	4	0	4
	GCKR-PCC-53	5	5	0	5
	GCKR-PCC-54	6	6	0	6
	GCKR-PCC-55	6	6	0	6
	GCKR-PCC-56	10	10	0	10
	GCKR-PCC-57	6	6	0	6
	GCKR-PCC-58	6	6	0	6
	GCKR-PCC-59	5	5	0	5
	SCKR-PCC-05	5	5	0	5
	SCKR-PCC-13	7	6	1	7
	SCKR-PCC-21	18	18	0	18
	SCKR-PCC-29	7	5	2	5
	SCKR-PCC-36	5	5	0	5
	SCKR-PCC-45	7	6	1	7
	SCKR-PCC-52	6	6	0	6
	SCKR-PCC-60	6	6	0	6
	ERKR-RSC-17	3	3	0	3
	ERKR-RSC-25	5	5	0	5
	ERKR-RSC-26	4	4	0	4
	ERKR-RSC-28	3	3	0	3
	ERKR-RSC-32	3	3	0	3
	ERKR-RSC-34	4	4	0	4
	ERKR-RSC-35	4	4	0	4
	ERKR-RSC-36	4	4	0	4
	ERKR-RSC-38	2	2	0	2
	ERKR-RSC-39	3	2	1	2
	ERKR-RSC-42	3	3	0	3
	ERKR-RSC-43	3	3	0	3
	ERKR-RSC-44	3	3	0	3
	ERKR-RSC-45	5	5	0	5
	ERKR-RSC-46	3	3	0	3
	ERKR-RSC-47	2	2	0	2
	ERKR-RSC-48	5	4	1	4
	ERKR-RSC-49	4	4	0	4
	ERKR-RSC-50	3	3	0	3
	ERKR-RSC-52	4	4	0	4
	ERKR-RSC-53	4	4	0	4
	ERKR-RSC-55	4	4	0	4
	ERKR-RSC-56	4	4	0	4
	ERKR-RSC-57	8	7	1	7
	ERKR-RSC-59	4	4	0	4
	ERKR-RSC-60	5	5	0	5
	ERKR-RSC-62	5	5	0	5
	ERKR-RSC-64	4	4	0	4
	ERKR-RSC-68	4	5	1	4
	ERKR-RSC-71	4	4	0	4

Table A.15: Fish Aging Verification Results, 2018 and 2019

Year	Sample ID	Initial Age	QA/QC	Difference (years)	Final Age Assigned
2018	ERKR-RSC-72	3	3	0	3
	ERKR-RSC-74	3	3	0	3
	ERKR-RSC-75	4	4	0	4
	ERKR-RSC-76	7	7	0	7
	ERKR-RSC-77	4	4	0	4
	ERKR-RSC-78	4	5	1	5
	ERKR-RSC-79	4	4	0	4
	ERKR-RSC-80	6	5	1	5
	ERKR-RSC-81	4	5	1	5
	ERKR-RSC-82	4	4	0	4
	ERKR-RSC-83	4	4	0	4
	ERKR-RSC-84	3	3	0	3
	ERKR-RSC-85	3	3	0	3
	ERKR-RSC-86	3	3	0	3
	ERKR-RSC-87	3	3	0	3
	GCKR-RSC-01	3	3	0	3
	GCKR-RSC-04	3	3	0	3
	GCKR-RSC-05	3	3	0	3
	GCKR-RSC-06	2	2	0	2
	GCKR-RSC-09	4	4	0	4
	GCKR-RSC-10	3	3	0	3
	GCKR-RSC-13	2	2	0	2
	GCKR-RSC-15	4	4	0	4
	GCKR-RSC-17	5	5	0	5
	GCKR-RSC-18	3	3	0	3
	GCKR-RSC-19	4	4	0	4
	GCKR-RSC-20	3	3	0	3
	GCKR-RSC-21	4	4	0	4
	GCKR-RSC-22	3	3	0	3
	GCKR-RSC-24	3	3	0	3
	GCKR-RSC-25	4	4	0	4
	GCKR-RSC-27	3	3	0	3
	GCKR-RSC-28	3	3	0	3
	GCKR-RSC-31	3	3	0	3
	GCKR-RSC-33	3	3	0	3
	GCKR-RSC-35	2	2	0	2
	GCKR-RSC-36	3	3	0	3
	GCKR-RSC-37	4	5	1	4
	GCKR-RSC-38	2	2	0	2
	GCKR-RSC-64	3	3	0	3
	GCKR-RSC-68	4	4	0	4
	GCKR-RSC-69	3	3	0	3
	GCKR-RSC-70	4	5	1	5
	GCKR-RSC-72	4	4	0	4
	GCKR-RSC-73	3	3	0	3
	GCKR-RSC-75	4	4	0	4
	GCKR-RSC-76	3	3	0	3
	GCKR-RSC-77	5	5	0	5
	GCKR-RSC-78	4	3	1	3
	GCKR-RSC-79	2	2	0	2
	GCKR-RSC-80	3	2	1	2
	GCKR-RSC-82	4	3	1	3
	GCKR-RSC-83	4	4	0	4
	GCKR-RSC-84	3	3	0	3
	GCKR-RSC-85	3	3	0	3
	GCKR-RSC-87	3	3	0	3
	SCKR-RSC-02	4	3	1	3
	SCKR-RSC-08	4	3	1	4
	SCKR-RSC-09	3	3	0	3
	SCKR-RSC-22	3	4	1	3
	SCKR-RSC-24	4	4	0	4
	SCKR-RSC-25	3	4	1	4
	SCKR-RSC-28	3	3	0	3
	SCKR-RSC-29	4	4	0	4
	SCKR-RSC-30	5	5	0	5
	SCKR-RSC-31	4	5	1	5
	SCKR-RSC-32	3	4	1	4
	SCKR-RSC-33	3	4	1	4
	SCKR-RSC-34	4	4	0	4
	SCKR-RSC-39	4	4	0	4
	SCKR-RSC-40	5	5	0	5
	SCKR-RSC-41	3	3	0	3
	SCKR-RSC-43	5	5	0	5
	SCKR-RSC-44	3	3	0	3
	SCKR-RSC-46	4	4	0	4
	SCKR-RSC-47	5	5	0	5
	SCKR-RSC-49	4	4	0	4
	SCKR-RSC-52	4	4	0	4
	SCKR-RSC-53	3	3	0	3
	SCKR-RSC-55	3	2	1	3
	SCKR-RSC-56	2	2	0	2
	SCKR-RSC-57	4	3	1	3

Table A.15: Fish Aging Verification Results, 2018 and 2019

Year	Sample ID	Initial Age	QA/QC	Difference (years)	Final Age Assigned
2018	SCKR-RSC-61	5	5	0	5
	SCKR-RSC-68	4	4	0	4
	SCKR-RSC-69	3	3	0	3
	SCKR-RSC-71	4	4	0	4
	SCKR-RSC-72	5	5	0	5
	SCKR-RSC-76	3	3	0	3
	SCKR-RSC-78	3	3	0	3
	SCKR-RSC-80	3	3	0	3
	SCKR-RSC-82	5	5	0	5
	SCKR-RT-02	3	3	0	3
	GCKR-YP-01	6	7	1	7
	GCKR-YP-03	4	4	0	4
	GCKR-YP-07	5	5	0	5
	GCKR-YP-08	3	3	0	3
	GCKR-YP-09	4	4	0	4
	SCKR-YP-01	5	5	0	5
	SC-RSC-83	1	1	0	1
	SC-RSC-06	0	0	0	0
	SC-RSC-05	0	0	0	0
	SC-RSC-49	0	0	0	0
	SC-RSC-01	0	0	0	0
	ER-RSC-10	0	0	0	0
	ER-RSC-14	0	0	0	0
	ER-RSC-15	0	0	0	0
	ER-RSC-17	0	0	0	0
	ER-RSC-41	0	0	0	0
	GC-RSC-27	0	0	0	0
	GC-RSC-28	0	0	0	0
	GC-RSC-32	0	0	0	0
	GC-RSC-34	0	0	0	0
	GC-RSC-47	0	0	0	0
2019	RG_SC-RSC-02	1	1	0	1
	RG_SC-RSC-31	0	0	0	0
	RG_SC-RSC-32	0	0	0	0
	RG_SC-RSC-41	1	2	1	2
	RG_SC-RSC-47	1	1	0	1
	RG_SC-RSC-49	1	0	1	1
	RG_SC-RSC-52	1	1	0	1
	RG_SC-RSC-53	0	0	0	0
	RG_SC-RSC-54	1	1	0	1
	RG_SC-RSC-55	1	1	0	1
	RG_GC-RSC-01	0	0	0	0
	RG_GC-RSC-04	1	1	0	1
	RG_GC-RSC-06	0	0	0	0
	RG_GC-RSC-08	0	0	0	0
	RG_GC-RSC-10	0	0	0	0
	RG_GC-RSC-12	0	0	0	0
	RG_GC-RSC-15	0	0	0	0
	RG_GC-RSC-16	0	0	0	0
	RG_GC-RSC-23	0	0	0	0
	RG_GC-RSC-42	0	0	0	0
	RG_ER-RSC-02	0	0	0	0
	RG_ER-RSC-08	0	0	0	0
	RG_ER-RSC-10	0	0	0	0
	RG_ER-RSC-13	0	0	0	0
	RG_ER-RSC-14	0	0	0	0
	RG_ER-RSC-15	0	0	0	0
	RG_ER-RSC-16	0	0	0	0
	RG_ER-RSC-17	1	0	1	1
	RG_ER-RSC-18	0	0	0	0
	RG_ER-RSC-72	0	0	0	0
	RG_SC_PCC-02	6	6	0	6
	RG_SC_PCC-04	6	6	0	6
	RG_SC_PCC-06	7	7	0	7
	RG_SC_PCC-08	6	6	0	6
	RG_SC_PCC-10	5	5	0	5
	RG_SC_RSC-02	3	3	0	3
	RG_SC_RSC-04	3	3	0	3
	RG_SC_RSC-06	3	3	0	3
	RG_SC_RSC-08	2	2	0	2
	RG_SC_RSC-10	2	2	0	2
	RG_ER_PCC-02	6	6	0	6
	RG_ER_PCC-04	6	6	0	6
	RG_ER_PCC-06	6	6	0	6
	RG_ER_PCC-08	5	5	0	6
	RG_ER_PCC-10	6	6	0	6
	RG_ER_RSC-02	2	2	0	2
	RG_ER_RSC-04	2	2	0	2
	RG_ER_RSC-06	3	3	0	3
	RG_ER_RSC-08	2	2	0	2
	RG_ER_RSC-10	2	2	0	2
	RG_GC_PCC-02	15	15	0	15

Table A.15: Fish Aging Verification Results, 2018 and 2019

Year	Sample ID	Initial Age	QA/QC	Difference (years)	Final Age Assigned
2019	RG_GC_PCC-04	7	7	0	7
	RG_GC_PCC-06	6	6	0	6
	RG_GC_PCC-08	6	6	0	6
	RG_GC_PCC-10	6	6	0	6
	RG_GC_RSC-02	3	3	0	3
	RG_GC_RSC-04	3	3	0	3
	RG_GC_RSC-06	3	3	0	3
	RG_GC_RSC-08	2	2	0	2
	RG_GC_RSC-10	2	2	0	2

Highlighted values did not meet the data quality objective of ± 1 year.

Teck Coal Ltd.
ATTN: Lee Wilm
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 28-APR-18
Report Date: 08-MAY-18 11:58 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2086365

Project P.O. #:	VPO00563596
Job Reference:	REGIONAL EFFECTS PROGRAM
C of C Numbers:	REP-2018-04-27
Legal Site Desc:	

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2086365-1	L2086365-2	L2086365-3	L2086365-4	L2086365-5
	Description	WS	WQ	WS	WQ	WS
	Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	27-APR-18
	Sampled Time	09:40	09:40	09:40	09:40	14:00
	Client ID	RG_ER_WS_20180427-940	RG_DUP__ER_WQ_20180427-940	RG_ER_WS_20180427-940_FB-HG	RG_DUP_ER_WQ_20180427-940_FB-HG	RG_GC_WS_20180427-1400
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	325	323			337
	Hardness (as CaCO3) (mg/L)	175	169			184
	pH (pH)	8.29	8.27			8.22
	ORP (mV)	318	320			293
	Total Suspended Solids (mg/L)	50.1	64.9			43.1
	Total Dissolved Solids (mg/L)	193 DLHC	191 DLHC			196 DLHC
	Turbidity (NTU)	34.2	45.1			39.2
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0 DLM	<1.0 DLM			<1.0 DLM
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	120	135			131
	Alkalinity, Carbonate (as CaCO3) (mg/L)	2.6	<1.0			<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	122	135			131
	Ammonia as N (mg/L)	0.0106	0.0115			0.0258
	Bromide (Br) (mg/L)	<0.050	<0.050			<0.050
	Chloride (Cl) (mg/L)	4.20	4.20			3.71
	Fluoride (F) (mg/L)	0.100	0.099			0.108
	Ion Balance (%)	113	101			111
	Nitrate (as N) (mg/L)	0.284	0.282			0.457
	Nitrite (as N) (mg/L)	0.0016	0.0015			0.0020
	Total Kjeldahl Nitrogen (mg/L)	0.270	0.245			0.274
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010			<0.0010
	Phosphorus (P)-Total (mg/L)	0.0261	0.0235			0.0333
	Sulfate (SO4) (mg/L)	36.5	36.6			37.7
	Anion Sum (meq/L)	3.35	3.60			3.54
	Cation Sum (meq/L)	3.77	3.64			3.92
	Cation - Anion Balance (%)	6.0	0.5			5.1
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.25	2.08			2.83
	Total Organic Carbon (mg/L)	2.32	2.30			2.98
Total Metals	Aluminum (Al)-Total (mg/L)	0.564	0.633			0.853
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00012			0.00011
	Arsenic (As)-Total (mg/L)	0.00079	0.00083			0.00109
	Barium (Ba)-Total (mg/L)	0.0608	0.0610			0.0767
	Beryllium (Be)-Total (ug/L)	0.031	0.033			0.051
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			<0.000050
	Boron (B)-Total (mg/L)	0.010	<0.010			<0.010
	Cadmium (Cd)-Total (ug/L)	0.0267	0.0249			0.0378

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2086365-6	L2086365-7	L2086365-8	L2086365-9	L2086365-10
	Description	WS	WQ	WQ	WS	WS
	Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	27-APR-18
	Sampled Time	14:00	15:30	15:30	14:30	14:30
	Client ID	RG_GC_WS_20180427-1400_FB-HG	RG_FBLANK_WQ_20180427-1530	RG_FBLANK_WQ_20180427-1530_FB-HG	RG_SC_WS_20180427-1430	RG_SC_WS_20180427-1430_FB-HG
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)		<2.0		311	
	Hardness (as CaCO3) (mg/L)		<0.50		172	
	pH (pH)		5.08		8.24	
	ORP (mV)		468		328	
	Total Suspended Solids (mg/L)		<1.0		265	
	Total Dissolved Solids (mg/L)		<10		176 DLHC	
	Turbidity (NTU)		<0.10		88.6	
Anions and Nutrients	Acidity (as CaCO3) (mg/L)		2.0		<1.0 DLM	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)		<1.0		121	
	Alkalinity, Carbonate (as CaCO3) (mg/L)		<1.0		<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)		<1.0		<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)		<1.0		121	
	Ammonia as N (mg/L)		<0.0050		0.0130	
	Bromide (Br) (mg/L)		<0.050		<0.050	
	Chloride (Cl) (mg/L)		<0.50		4.33	
	Fluoride (F) (mg/L)		<0.020		0.088	
	Ion Balance (%)		0.0		115	
	Nitrate (as N) (mg/L)		<0.0050		0.104	
	Nitrite (as N) (mg/L)		<0.0010		0.0010	
	Total Kjeldahl Nitrogen (mg/L)		<0.050		0.373	
	Orthophosphate-Dissolved (as P) (mg/L)		<0.0010		<0.0010	
	Phosphorus (P)-Total (mg/L)		<0.0010		0.0651	
	Sulfate (SO4) (mg/L)		<0.30		33.0	
	Anion Sum (meq/L)		<0.10		3.23	
	Cation Sum (meq/L)		<0.10		3.71	
	Cation - Anion Balance (%)		0.0		6.9	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		<0.50		2.90	
	Total Organic Carbon (mg/L)		<0.50		3.08	
Total Metals	Aluminum (Al)-Total (mg/L)		<0.0030		1.70	
	Antimony (Sb)-Total (mg/L)		<0.00010		<0.00010	
	Arsenic (As)-Total (mg/L)		<0.00010		0.00126	
	Barium (Ba)-Total (mg/L)		<0.00010		0.0584	
	Beryllium (Be)-Total (ug/L)		<0.020		0.084	
	Bismuth (Bi)-Total (mg/L)		<0.000050		<0.000050	
	Boron (B)-Total (mg/L)		<0.010		<0.010	
	Cadmium (Cd)-Total (ug/L)		<0.0050		0.0335	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2086365-11	L2086365-12			
	Description	WQ	WQ			
	Sampled Date	27-APR-18	27-APR-18			
	Sampled Time	14:30	14:30			
	Client ID	RG_TRIP_WQ_20180427	RG_TRIP_WQ_20180427-1430_FB-HG			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	<2.0				
	Hardness (as CaCO3) (mg/L)					
	pH (pH)	5.51				
	ORP (mV)	435				
	Total Suspended Solids (mg/L)	1.5				
	Total Dissolved Solids (mg/L)	<10				
	Turbidity (NTU)	<0.10				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	1.9 DLM				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0				
	Ammonia as N (mg/L)	0.0133				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	<0.50				
	Fluoride (F) (mg/L)	<0.020				
	Ion Balance (%)	0.0				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	<0.050				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	<0.0010				
	Sulfate (SO4) (mg/L)	<0.30				
	Anion Sum (meq/L)	<0.10				
	Cation Sum (meq/L)	<0.10				
	Cation - Anion Balance (%)	0.0				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	<0.00010				
	Barium (Ba)-Total (mg/L)	<0.00010				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	<0.0050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2086365-1 WS 27-APR-18 09:40 RG_ER_WS_20180427-940	L2086365-2 WQ 27-APR-18 09:40 RG_DUP__ER_WQ_20180427-940	L2086365-3 WS 27-APR-18 09:40 RG_ER_WS_20180427-940_FB-HG	L2086365-4 WQ 27-APR-18 09:40 RG_DUP_ER_WQ_20180427-940_FB-HG	L2086365-5 WS 27-APR-18 14:00 RG_GC_WS_20180427-1400
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	46.0	45.7			45.6
	Chromium (Cr)-Total (mg/L)	0.00086	0.00094			0.00112
	Cobalt (Co)-Total (ug/L)	0.43	0.48			0.61
	Copper (Cu)-Total (mg/L)	0.00115	0.00123			0.00172
	Iron (Fe)-Total (mg/L)	0.838	0.993			1.19
	Lead (Pb)-Total (mg/L)	0.000893	0.000983			0.00124
	Lithium (Li)-Total (mg/L)	0.0038	0.0040			0.0044
	Magnesium (Mg)-Total (mg/L)	13.7	13.3			13.0
	Manganese (Mn)-Total (mg/L)	0.0313	0.0346			0.0548
	Mercury (Hg)-Total (ug/L)	0.00199	0.00196	<0.00050	<0.00050	0.00146
	Molybdenum (Mo)-Total (mg/L)	0.000678	0.000695			0.000740
	Nickel (Ni)-Total (mg/L)	0.00112	0.00119			0.00170
	Potassium (K)-Total (mg/L)	0.819	0.812			0.860
	Selenium (Se)-Total (ug/L)	1.16	1.19			1.83
	Silicon (Si)-Total (mg/L)	3.29	3.43			4.00
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			<0.000010
	Sodium (Na)-Total (mg/L)	5.12	5.25			4.27
	Strontium (Sr)-Total (mg/L)	0.159	0.165			0.145
	Thallium (Tl)-Total (mg/L)	0.000013	0.000013			0.000016
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010			<0.010
	Uranium (U)-Total (mg/L)	0.000840	0.000843			0.000849
	Vanadium (V)-Total (mg/L)	0.00103	0.00114			0.00161
	Zinc (Zn)-Total (mg/L)	0.0041	0.0043			0.0045
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB			LAB
	Dissolved Metals Filtration Location	LAB	LAB			LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0080	0.0112			0.0154
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00050	0.00046			0.00062
	Barium (Ba)-Dissolved (mg/L)	0.0632	0.0603			0.0831
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020			<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010			<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	0.0059			0.0061
	Calcium (Ca)-Dissolved (mg/L)	46.6	44.4			49.0
	Chromium (Cr)-Dissolved (mg/L)	0.00013	0.00012			<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10			<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2086365-6	L2086365-7	L2086365-8	L2086365-9	L2086365-10
	Description	WS	WQ	WQ	WS	WS
	Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	27-APR-18
	Sampled Time	14:00	15:30	15:30	14:30	14:30
	Client ID	RG_GC_WS_2018 0427-1400_FB-HG	RG_FBLANK_WQ_ 20180427-1530	RG_FBLANK_WQ_ 20180427-1530_FB-HG	RG_SC_WS_2018 0427-1430	RG_SC_WS_2018 0427-1430_FB-HG
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)		<0.050		59.6	
	Chromium (Cr)-Total (mg/L)		<0.00010		0.00248	
	Cobalt (Co)-Total (ug/L)		<0.10		1.36	
	Copper (Cu)-Total (mg/L)		<0.00050		0.00263	
	Iron (Fe)-Total (mg/L)		<0.010		2.95	
	Lead (Pb)-Total (mg/L)		<0.000050		0.00257	
	Lithium (Li)-Total (mg/L)		<0.0010		0.0053	
	Magnesium (Mg)-Total (mg/L)		<0.10		14.5	
	Manganese (Mn)-Total (mg/L)		<0.00010		0.0820	
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050	<0.00050	0.00288	<0.00050
	Molybdenum (Mo)-Total (mg/L)		<0.000050		0.000639	
	Nickel (Ni)-Total (mg/L)		<0.00050		0.00276	
	Potassium (K)-Total (mg/L)		<0.050		0.875	
	Selenium (Se)-Total (ug/L)		<0.050		0.191	
	Silicon (Si)-Total (mg/L)		<0.10		4.77	
	Silver (Ag)-Total (mg/L)		<0.000010		<0.000010	
	Sodium (Na)-Total (mg/L)		<0.050		5.16	
	Strontium (Sr)-Total (mg/L)		<0.00020		0.200	
	Thallium (Tl)-Total (mg/L)		<0.000010		0.000020	
	Tin (Sn)-Total (mg/L)		<0.00010		<0.00010	
	Titanium (Ti)-Total (mg/L)		<0.010		0.015	
	Uranium (U)-Total (mg/L)		<0.000010		0.000872	
	Vanadium (V)-Total (mg/L)		<0.00050		0.00201	
	Zinc (Zn)-Total (mg/L)		<0.0030		0.0102	
Dissolved Metals	Dissolved Mercury Filtration Location		LAB		LAB	
	Dissolved Metals Filtration Location		LAB		LAB	
	Aluminum (Al)-Dissolved (mg/L)		<0.0030		0.0083	
	Antimony (Sb)-Dissolved (mg/L)		<0.00010		<0.00010	
	Arsenic (As)-Dissolved (mg/L)		<0.00010		0.00045	
	Barium (Ba)-Dissolved (mg/L)		<0.00010		0.0502	
	Beryllium (Be)-Dissolved (ug/L)		<0.020		<0.020	
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050		<0.000050	
	Boron (B)-Dissolved (mg/L)		<0.010		<0.010	
	Cadmium (Cd)-Dissolved (ug/L)		<0.0050		<0.0050	
	Calcium (Ca)-Dissolved (mg/L)		<0.050		46.3	
	Chromium (Cr)-Dissolved (mg/L)		<0.00010		<0.00010	
	Cobalt (Co)-Dissolved (ug/L)		<0.10		<0.10	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2086365-11	L2086365-12			
	Description	WQ	WQ			
	Sampled Date	27-APR-18	27-APR-18			
	Sampled Time	14:30	14:30			
	Client ID	RG_TRIP_WQ_20180427	RG_TRIP_WQ_20180427-1430_FB-HG			
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	<0.050				
	Chromium (Cr)-Total (mg/L)	<0.00010				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	<0.0010				
	Magnesium (Mg)-Total (mg/L)	<0.10				
	Manganese (Mn)-Total (mg/L)	<0.00010				
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050			
	Molybdenum (Mo)-Total (mg/L)	<0.000050				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Potassium (K)-Total (mg/L)	<0.050				
	Selenium (Se)-Total (ug/L)	<0.050				
	Silicon (Si)-Total (mg/L)	<0.10				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	<0.050				
	Strontium (Sr)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	<0.000010				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (ug/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (ug/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2086365-1 WS 27-APR-18 09:40 RG_ER_WS_20180427-940	L2086365-2 WQ 27-APR-18 09:40 RG_DUP__ER_WQ_20180427-940	L2086365-3 WS 27-APR-18 09:40 RG_ER_WS_20180427-940_FB-HG	L2086365-4 WQ 27-APR-18 09:40 RG_DUP_ER_WQ_20180427-940_FB-HG	L2086365-5 WS 27-APR-18 14:00 RG_GC_WS_20180427-1400
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050			0.00057
	Iron (Fe)-Dissolved (mg/L)	0.015	0.018			0.023
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000056			0.000054
	Lithium (Li)-Dissolved (mg/L)	0.0027	0.0026			0.0031
	Magnesium (Mg)-Dissolved (mg/L)	14.3	14.0			15.1
	Manganese (Mn)-Dissolved (mg/L)	0.00083	0.00080			0.0141
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000679	0.000655			0.000667
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050			<0.00050
	Potassium (K)-Dissolved (mg/L)	0.792	0.762			0.835
	Selenium (Se)-Dissolved (ug/L)	1.26	1.29			1.82
	Silicon (Si)-Dissolved (mg/L)	2.48	2.48			2.70
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			<0.000010
	Sodium (Na)-Dissolved (mg/L)	5.73	5.56			4.86
	Strontium (Sr)-Dissolved (mg/L)	0.171	0.165			0.165
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010			<0.010
	Uranium (U)-Dissolved (mg/L)	0.000877	0.000843			0.000877
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010			<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2086365-6	L2086365-7	L2086365-8	L2086365-9	L2086365-10
Description	WS	WQ	WQ	WS	WS
Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	27-APR-18
Sampled Time	14:00	15:30	15:30	14:30	14:30
Client ID	RG_GC_WS_20180427-1400_FB-HG	RG_FBLANK_WQ_20180427-1530	RG_FBLANK_WQ_20180427-1530_FB-HG	RG_SC_WS_20180427-1430	RG_SC_WS_20180427-1430_FB-HG
Grouping **Analyte**					
WATER					
Dissolved Metals Copper (Cu)-Dissolved (mg/L)		<0.00050		<0.00050	
Iron (Fe)-Dissolved (mg/L)		<0.010		0.017	
Lead (Pb)-Dissolved (mg/L)		<0.000050		0.000051	
Lithium (Li)-Dissolved (mg/L)		<0.0010		0.0019	
Magnesium (Mg)-Dissolved (mg/L)		<0.10		13.6	
Manganese (Mn)-Dissolved (mg/L)		<0.00010		0.00098	
Mercury (Hg)-Dissolved (mg/L)		<0.0000050		<0.0000050	
Molybdenum (Mo)-Dissolved (mg/L)		<0.000050		0.000603	
Nickel (Ni)-Dissolved (mg/L)		<0.00050		<0.00050	
Potassium (K)-Dissolved (mg/L)		<0.050		0.790	
Selenium (Se)-Dissolved (ug/L)		<0.050		0.238	
Silicon (Si)-Dissolved (mg/L)		<0.050		2.56	
Silver (Ag)-Dissolved (mg/L)		<0.000010		<0.000010	
Sodium (Na)-Dissolved (mg/L)		<0.050		5.90	
Strontium (Sr)-Dissolved (mg/L)		<0.00020		0.168	
Thallium (Tl)-Dissolved (mg/L)		<0.000010		<0.000010	
Tin (Sn)-Dissolved (mg/L)		<0.00010		<0.00010	
Titanium (Ti)-Dissolved (mg/L)		<0.010		<0.010	
Uranium (U)-Dissolved (mg/L)		<0.000010		0.000838	
Vanadium (V)-Dissolved (mg/L)		<0.00050		<0.00050	
Zinc (Zn)-Dissolved (mg/L)		<0.0010		<0.0010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2086365-11	L2086365-12			
	Description	WQ	WQ			
	Sampled Date	27-APR-18	27-APR-18			
	Sampled Time	14:30	14:30			
	Client ID	RG_TRIP_WQ_20180427	RG_TRIP_WQ_20180427-1430_FB-HG			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (ug/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Strontium (Sr)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
EXTEMP10	Samples Received with temperature >10 Degrees C - 15C
SFPL	Sample was Filtered and Preserved at the laboratory - DOC, Diss-Metals/Hg

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Molybdenum (Mo)-Total	MB-LOR	L2086365-11
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2086365-1, -2, -5, -7, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2086365-1, -2, -5, -7, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2086365-1, -2, -5, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2086365-1, -2, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2086365-1, -2, -5, -7, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L2086365-1, -11, -2, -5, -7, -9
Matrix Spike	Arsenic (As)-Total	MS-B	L2086365-11
Matrix Spike	Barium (Ba)-Total	MS-B	L2086365-1, -11, -2, -5, -7, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2086365-11
Matrix Spike	Boron (B)-Total	MS-B	L2086365-11
Matrix Spike	Calcium (Ca)-Total	MS-B	L2086365-1, -11, -2, -5, -7, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2086365-11
Matrix Spike	Cobalt (Co)-Total	MS-B	L2086365-11
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2086365-1, -11, -2, -5, -7, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2086365-11
Matrix Spike	Manganese (Mn)-Total	MS-B	L2086365-1, -11, -2, -5, -7, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L2086365-11
Matrix Spike	Potassium (K)-Total	MS-B	L2086365-11
Matrix Spike	Sodium (Na)-Total	MS-B	L2086365-1, -11, -2, -5, -7, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2086365-11
Matrix Spike	Strontium (Sr)-Total	MS-B	L2086365-1, -11, -2, -5, -7, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2086365-11
Matrix Spike	Ammonia as N	MS-B	L2086365-1, -11, -2, -5, -7, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Reference Information

BR-L-IC-N-CL Water Bromide in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL Water Dissolved Organic Carbon APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL Water Total Organic Carbon APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Reference Information

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Reference Information

Chain of Custody Numbers:

REP-2018-04-27

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4033052								
WG2764828-12 DUP		**L2086365-7**						
Acidity (as CaCO3)		2.0	1.9		mg/L	4.1	20	03-MAY-18
WG2764828-11 LCS								
Acidity (as CaCO3)			102.9		%		85-115	03-MAY-18
WG2764828-10 MB								
Acidity (as CaCO3)			1.8		mg/L		2	03-MAY-18
ALK-MAN-CL	**Water**							
Batch R4032387								
WG2764074-8 LCS								
Alkalinity, Total (as CaCO3)			98.5		%		85-115	02-MAY-18
WG2764074-7 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	02-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4035791								
WG2764413-3 DUP		**L2086365-5**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	06-MAY-18
WG2764413-2 LCS								
Beryllium (Be)-Dissolved			92.7		%		80-120	06-MAY-18
WG2764413-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	06-MAY-18
WG2764413-4 MS		**L2086365-1**						
Beryllium (Be)-Dissolved			92.6		%		70-130	06-MAY-18
BE-T-L-CCMS-VA	**Water**							
Batch R4033943								
WG2764124-3 DUP		**L2086365-2**						
Beryllium (Be)-Total		0.000032	0.000034		mg/L	5.2	20	05-MAY-18
WG2764124-2 LCS								
Beryllium (Be)-Total			102.1		%		80-120	05-MAY-18
WG2764124-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	05-MAY-18
WG2764124-4 MS		**L2086365-1**						
Beryllium (Be)-Total			98.3		%		70-130	05-MAY-18
BR-L-IC-N-CL	**Water**							
Batch R4031083								
WG2763499-31 DUP		**L2086365-11**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	28-APR-18
WG2763499-30 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-CL	**Water**							
Batch R4031083								
WG2763499-30 LCS								
Bromide (Br)			100.3		%		85-115	28-APR-18
WG2763499-29 MB								
Bromide (Br)			<0.050		mg/L		0.05	28-APR-18
WG2763499-32 MS		**L2086365-11**						
Bromide (Br)			87.9		%		75-125	28-APR-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4034471								
WG2765468-7 DUP		**L2086365-9**						
Dissolved Organic Carbon		2.90	1.94	J	mg/L	0.96	1	05-MAY-18
WG2765468-2 LCS								
Dissolved Organic Carbon			104.1		%		80-120	05-MAY-18
WG2765468-6 LCS								
Dissolved Organic Carbon			101.3		%		80-120	05-MAY-18
WG2765468-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	05-MAY-18
WG2765468-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	05-MAY-18
WG2765468-8 MS		**L2086365-9**						
Dissolved Organic Carbon			106.5		%		70-130	05-MAY-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4034471								
WG2765468-7 DUP		**L2086365-9**						
Total Organic Carbon		3.08	3.24		mg/L	5.1	20	05-MAY-18
WG2765468-2 LCS								
Total Organic Carbon			107.8		%		80-120	05-MAY-18
WG2765468-6 LCS								
Total Organic Carbon			104.1		%		80-120	05-MAY-18
WG2765468-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	05-MAY-18
WG2765468-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	05-MAY-18
WG2765468-8 MS		**L2086365-9**						
Total Organic Carbon			108.9		%		70-130	05-MAY-18
CL-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-CL	**Water**							
Batch R4031083								
WG2763499-31 DUP		**L2086365-11**						
Chloride (Cl)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	28-APR-18
WG2763499-30 LCS								
Chloride (Cl)			101.0		%		90-110	28-APR-18
WG2763499-29 MB								
Chloride (Cl)			<0.50		mg/L		0.5	28-APR-18
WG2763499-32 MS		**L2086365-11**						
Chloride (Cl)			88.7		%		75-125	28-APR-18
EC-L-PCT-CL	**Water**							
Batch R4032387								
WG2764074-8 LCS								
Conductivity (@ 25C)			100.4		%		90-110	02-MAY-18
WG2764074-7 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	02-MAY-18
F-IC-N-CL	**Water**							
Batch R4031083								
WG2763499-31 DUP		**L2086365-11**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	28-APR-18
WG2763499-30 LCS								
Fluoride (F)			104.2		%		90-110	28-APR-18
WG2763499-29 MB								
Fluoride (F)			<0.020		mg/L		0.02	28-APR-18
WG2763499-32 MS		**L2086365-11**						
Fluoride (F)			91.9		%		75-125	28-APR-18
HG-D-CVAA-VA	**Water**							
Batch R4033477								
WG2764909-3 DUP		**L2086365-2**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	04-MAY-18
WG2764909-2 LCS								
Mercury (Hg)-Dissolved			102.4		%		80-120	04-MAY-18
WG2764909-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	04-MAY-18
WG2764909-4 MS		**L2086365-1**						
Mercury (Hg)-Dissolved			102.6		%		70-130	04-MAY-18
HG-T-U-CVAF-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-U-CVAF-VA	**Water**							
Batch R4032847								
WG2764547-2 LCS								
Mercury (Hg)-Total			106.1		%		80-120	03-MAY-18
WG2764547-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	03-MAY-18
WG2764547-4 MS		**L2086365-1**						
Mercury (Hg)-Total			93.0		%		70-130	03-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4035791								
WG2764413-3 DUP		**L2086365-5**						
Aluminum (Al)-Dissolved		0.0154	0.0156		mg/L	1.5	20	06-MAY-18
Antimony (Sb)-Dissolved		<0.00010	0.00010	RPD-NA	mg/L	N/A	20	06-MAY-18
Arsenic (As)-Dissolved		0.00062	0.00059		mg/L	5.2	20	06-MAY-18
Barium (Ba)-Dissolved		0.0831	0.0775		mg/L	7.0	20	06-MAY-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	06-MAY-18
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	06-MAY-18
Cadmium (Cd)-Dissolved		0.0000061	<0.000005C	RPD-NA	mg/L	N/A	20	06-MAY-18
Calcium (Ca)-Dissolved		49.0	45.0		mg/L	8.5	20	06-MAY-18
Chromium (Cr)-Dissolved		<0.00010	0.00010	RPD-NA	mg/L	N/A	20	06-MAY-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-MAY-18
Copper (Cu)-Dissolved		0.00057	0.00053		mg/L	7.4	20	06-MAY-18
Iron (Fe)-Dissolved		0.023	0.024		mg/L	4.5	20	06-MAY-18
Lead (Pb)-Dissolved		0.000054	<0.000050	RPD-NA	mg/L	N/A	20	06-MAY-18
Lithium (Li)-Dissolved		0.0031	0.0030		mg/L	3.2	20	06-MAY-18
Magnesium (Mg)-Dissolved		15.1	14.5		mg/L	4.1	20	06-MAY-18
Manganese (Mn)-Dissolved		0.0141	0.0132		mg/L	6.7	20	06-MAY-18
Molybdenum (Mo)-Dissolved		0.000667	0.000690		mg/L	3.4	20	06-MAY-18
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	06-MAY-18
Potassium (K)-Dissolved		0.835	0.793		mg/L	5.1	20	06-MAY-18
Selenium (Se)-Dissolved		0.00182	0.00219		mg/L	18	20	06-MAY-18
Silicon (Si)-Dissolved		2.70	2.75		mg/L	2.0	20	06-MAY-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	06-MAY-18
Sodium (Na)-Dissolved		4.86	4.69		mg/L	3.6	20	06-MAY-18
Strontium (Sr)-Dissolved		0.165	0.155		mg/L	6.5	20	06-MAY-18
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	06-MAY-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-MAY-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	06-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4035791								
WG2764413-3 DUP		**L2086365-5**						
Uranium (U)-Dissolved		0.000877	0.000886		mg/L	0.9	20	06-MAY-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	06-MAY-18
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	06-MAY-18
WG2764413-2 LCS								
Aluminum (Al)-Dissolved			109.5		%		80-120	06-MAY-18
Antimony (Sb)-Dissolved			98.0		%		80-120	06-MAY-18
Arsenic (As)-Dissolved			100.8		%		80-120	06-MAY-18
Barium (Ba)-Dissolved			106.5		%		80-120	06-MAY-18
Bismuth (Bi)-Dissolved			97.3		%		80-120	06-MAY-18
Boron (B)-Dissolved			87.9		%		80-120	06-MAY-18
Cadmium (Cd)-Dissolved			100.2		%		80-120	06-MAY-18
Calcium (Ca)-Dissolved			103.4		%		80-120	06-MAY-18
Chromium (Cr)-Dissolved			102.4		%		80-120	06-MAY-18
Cobalt (Co)-Dissolved			104.7		%		80-120	06-MAY-18
Copper (Cu)-Dissolved			98.9		%		80-120	06-MAY-18
Iron (Fe)-Dissolved			105.0		%		80-120	06-MAY-18
Lead (Pb)-Dissolved			98.9		%		80-120	06-MAY-18
Lithium (Li)-Dissolved			95.3		%		80-120	06-MAY-18
Magnesium (Mg)-Dissolved			105.7		%		80-120	06-MAY-18
Manganese (Mn)-Dissolved			102.0		%		80-120	06-MAY-18
Molybdenum (Mo)-Dissolved			101.7		%		80-120	06-MAY-18
Nickel (Ni)-Dissolved			101.3		%		80-120	06-MAY-18
Potassium (K)-Dissolved			103.6		%		80-120	06-MAY-18
Selenium (Se)-Dissolved			95.5		%		80-120	06-MAY-18
Silicon (Si)-Dissolved			102.9		%		80-120	06-MAY-18
Silver (Ag)-Dissolved			103.7		%		80-120	06-MAY-18
Sodium (Na)-Dissolved			106.0		%		80-120	06-MAY-18
Strontium (Sr)-Dissolved			104.1		%		80-120	06-MAY-18
Thallium (Tl)-Dissolved			100.6		%		80-120	06-MAY-18
Tin (Sn)-Dissolved			98.6		%		80-120	06-MAY-18
Titanium (Ti)-Dissolved			98.4		%		80-120	06-MAY-18
Uranium (U)-Dissolved			99.0		%		80-120	06-MAY-18
Vanadium (V)-Dissolved			103.1		%		80-120	06-MAY-18
Zinc (Zn)-Dissolved			103.9		%		80-120	06-MAY-18
WG2764413-1 MB		**LF**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4035791								
WG2764413-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	06-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	06-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	06-MAY-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	06-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	06-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	06-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	06-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	06-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	06-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	06-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	06-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	06-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	06-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	06-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	06-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	06-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	06-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	06-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	06-MAY-18
WG2764413-4 MS		**L2086365-1**						
Aluminum (Al)-Dissolved			104.1		%		70-130	06-MAY-18
Antimony (Sb)-Dissolved			101.7		%		70-130	06-MAY-18
Arsenic (As)-Dissolved			101.9		%		70-130	06-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4035791								
WG2764413-4 MS		**L2086365-1**						
Barium (Ba)-Dissolved			N/A	MS-B	%		-	06-MAY-18
Bismuth (Bi)-Dissolved			90.4		%		70-130	06-MAY-18
Boron (B)-Dissolved			87.1		%		70-130	06-MAY-18
Cadmium (Cd)-Dissolved			105.6		%		70-130	06-MAY-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	06-MAY-18
Chromium (Cr)-Dissolved			102.2		%		70-130	06-MAY-18
Cobalt (Co)-Dissolved			102.1		%		70-130	06-MAY-18
Copper (Cu)-Dissolved			100.7		%		70-130	06-MAY-18
Iron (Fe)-Dissolved			100.4		%		70-130	06-MAY-18
Lead (Pb)-Dissolved			96.2		%		70-130	06-MAY-18
Lithium (Li)-Dissolved			91.5		%		70-130	06-MAY-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	06-MAY-18
Manganese (Mn)-Dissolved			97.3		%		70-130	06-MAY-18
Molybdenum (Mo)-Dissolved			99.6		%		70-130	06-MAY-18
Nickel (Ni)-Dissolved			97.5		%		70-130	06-MAY-18
Potassium (K)-Dissolved			99.2		%		70-130	06-MAY-18
Selenium (Se)-Dissolved			101.0		%		70-130	06-MAY-18
Silicon (Si)-Dissolved			89.5		%		70-130	06-MAY-18
Silver (Ag)-Dissolved			101.9		%		70-130	06-MAY-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	06-MAY-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	06-MAY-18
Thallium (Tl)-Dissolved			95.6		%		70-130	06-MAY-18
Tin (Sn)-Dissolved			99.4		%		70-130	06-MAY-18
Titanium (Ti)-Dissolved			101.2		%		70-130	06-MAY-18
Uranium (U)-Dissolved			95.1		%		70-130	06-MAY-18
Vanadium (V)-Dissolved			103.1		%		70-130	06-MAY-18
Zinc (Zn)-Dissolved			93.8		%		70-130	06-MAY-18
MET-T-CCMS-VA	**Water**							
Batch R4033943								
WG2764124-3 DUP		**L2086365-2**						
Aluminum (Al)-Total		0.633	0.642		mg/L	1.3	20	05-MAY-18
Antimony (Sb)-Total		0.00012	<0.00010	RPD-NA	mg/L	N/A	20	05-MAY-18
Arsenic (As)-Total		0.00083	0.00085		mg/L	2.6	20	05-MAY-18
Barium (Ba)-Total		0.0610	0.0606		mg/L	0.7	20	05-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4033943								
WG2764124-3 DUP		**L2086365-2**						
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	05-MAY-18
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	05-MAY-18
Cadmium (Cd)-Total		0.0000249	0.0000309	J	mg/L	0.000006	0.00001	05-MAY-18
Calcium (Ca)-Total		45.7	44.2		mg/L	3.2	20	05-MAY-18
Chromium (Cr)-Total		0.00094	0.00092		mg/L	1.8	20	05-MAY-18
Cobalt (Co)-Total		0.00048	0.00049		mg/L	2.4	20	05-MAY-18
Copper (Cu)-Total		0.00123	0.00131		mg/L	6.4	20	05-MAY-18
Iron (Fe)-Total		0.993	0.980		mg/L	1.4	20	05-MAY-18
Lead (Pb)-Total		0.000983	0.000954		mg/L	3.0	20	05-MAY-18
Lithium (Li)-Total		0.0040	0.0038		mg/L	4.2	20	05-MAY-18
Magnesium (Mg)-Total		13.3	13.0		mg/L	2.1	20	05-MAY-18
Manganese (Mn)-Total		0.0346	0.0344		mg/L	0.5	20	05-MAY-18
Molybdenum (Mo)-Total		0.000695	0.000676		mg/L	2.7	20	05-MAY-18
Nickel (Ni)-Total		0.00119	0.00126		mg/L	5.2	20	05-MAY-18
Potassium (K)-Total		0.812	0.825		mg/L	1.6	20	05-MAY-18
Selenium (Se)-Total		0.00119	0.00124		mg/L	4.6	20	05-MAY-18
Silicon (Si)-Total		3.43	3.39		mg/L	1.2	20	05-MAY-18
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	05-MAY-18
Sodium (Na)-Total		5.25	5.17		mg/L	1.5	20	05-MAY-18
Strontium (Sr)-Total		0.165	0.157		mg/L	4.8	20	05-MAY-18
Thallium (Tl)-Total		0.000013	0.000011		mg/L	16	20	05-MAY-18
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	05-MAY-18
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	05-MAY-18
Uranium (U)-Total		0.000843	0.000811		mg/L	3.8	20	05-MAY-18
Vanadium (V)-Total		0.00114	0.00113		mg/L	0.7	20	05-MAY-18
Zinc (Zn)-Total		0.0043	0.0040		mg/L	6.5	20	05-MAY-18
WG2764124-2 LCS								
Aluminum (Al)-Total			101.2		%		80-120	05-MAY-18
Antimony (Sb)-Total			100.2		%		80-120	05-MAY-18
Arsenic (As)-Total			97.2		%		80-120	05-MAY-18
Barium (Ba)-Total			100.2		%		80-120	05-MAY-18
Bismuth (Bi)-Total			98.0		%		80-120	05-MAY-18
Boron (B)-Total			93.5		%		80-120	05-MAY-18
Cadmium (Cd)-Total			101.9		%		80-120	05-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4033943								
WG2764124-2 LCS								
Calcium (Ca)-Total			97.3		%		80-120	05-MAY-18
Chromium (Cr)-Total			100.3		%		80-120	05-MAY-18
Cobalt (Co)-Total			99.4		%		80-120	05-MAY-18
Copper (Cu)-Total			100.6		%		80-120	05-MAY-18
Iron (Fe)-Total			94.5		%		80-120	05-MAY-18
Lead (Pb)-Total			100.6		%		80-120	05-MAY-18
Lithium (Li)-Total			99.5		%		80-120	05-MAY-18
Magnesium (Mg)-Total			98.6		%		80-120	05-MAY-18
Manganese (Mn)-Total			94.6		%		80-120	05-MAY-18
Molybdenum (Mo)-Total			98.9		%		80-120	05-MAY-18
Nickel (Ni)-Total			98.8		%		80-120	05-MAY-18
Potassium (K)-Total			98.6		%		80-120	05-MAY-18
Selenium (Se)-Total			95.6		%		80-120	05-MAY-18
Silicon (Si)-Total			100.9		%		80-120	05-MAY-18
Silver (Ag)-Total			94.1		%		80-120	05-MAY-18
Sodium (Na)-Total			99.3		%		80-120	05-MAY-18
Strontium (Sr)-Total			99.3		%		80-120	05-MAY-18
Thallium (Tl)-Total			97.3		%		80-120	05-MAY-18
Tin (Sn)-Total			99.5		%		80-120	05-MAY-18
Titanium (Ti)-Total			96.2		%		80-120	05-MAY-18
Uranium (U)-Total			101.6		%		80-120	05-MAY-18
Vanadium (V)-Total			99.4		%		80-120	05-MAY-18
Zinc (Zn)-Total			95.4		%		80-120	05-MAY-18
WG2764124-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	05-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	05-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	05-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	05-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	05-MAY-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	05-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	05-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	05-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4033943								
WG2764124-1 MB								
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	05-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	05-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	05-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	05-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	05-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	05-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	05-MAY-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	05-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	05-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	05-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	05-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	05-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	05-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	05-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	05-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	05-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	05-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	05-MAY-18
WG2764124-4 MS		**L2086365-1**						
Aluminum (Al)-Total			N/A	MS-B	%		-	05-MAY-18
Antimony (Sb)-Total			92.8		%		70-130	05-MAY-18
Arsenic (As)-Total			97.5		%		70-130	05-MAY-18
Barium (Ba)-Total			N/A	MS-B	%		-	05-MAY-18
Bismuth (Bi)-Total			94.1		%		70-130	05-MAY-18
Boron (B)-Total			96.2		%		70-130	05-MAY-18
Cadmium (Cd)-Total			98.6		%		70-130	05-MAY-18
Calcium (Ca)-Total			N/A	MS-B	%		-	05-MAY-18
Chromium (Cr)-Total			98.2		%		70-130	05-MAY-18
Cobalt (Co)-Total			95.2		%		70-130	05-MAY-18
Copper (Cu)-Total			93.9		%		70-130	05-MAY-18
Iron (Fe)-Total			91.5		%		70-130	05-MAY-18
Lead (Pb)-Total			94.2		%		70-130	05-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4033943								
WG2764124-4 MS		**L2086365-1**						
Lithium (Li)-Total			95.8		%		70-130	05-MAY-18
Magnesium (Mg)-Total			N/A	MS-B	%		-	05-MAY-18
Manganese (Mn)-Total			N/A	MS-B	%		-	05-MAY-18
Molybdenum (Mo)-Total			94.8		%		70-130	05-MAY-18
Nickel (Ni)-Total			92.5		%		70-130	05-MAY-18
Potassium (K)-Total			93.0		%		70-130	05-MAY-18
Selenium (Se)-Total			90.2		%		70-130	05-MAY-18
Silicon (Si)-Total			92.8		%		70-130	05-MAY-18
Silver (Ag)-Total			92.3		%		70-130	05-MAY-18
Sodium (Na)-Total			N/A	MS-B	%		-	05-MAY-18
Strontium (Sr)-Total			N/A	MS-B	%		-	05-MAY-18
Thallium (Tl)-Total			92.0		%		70-130	05-MAY-18
Tin (Sn)-Total			96.9		%		70-130	05-MAY-18
Titanium (Ti)-Total			106.9		%		70-130	05-MAY-18
Uranium (U)-Total			96.3		%		70-130	05-MAY-18
Vanadium (V)-Total			96.4		%		70-130	05-MAY-18
Zinc (Zn)-Total			87.9		%		70-130	05-MAY-18
Batch R4036052								
WG2765995-2 LCS								
Aluminum (Al)-Total			104.8		%		80-120	07-MAY-18
Antimony (Sb)-Total			107.7		%		80-120	07-MAY-18
Arsenic (As)-Total			106.8		%		80-120	07-MAY-18
Barium (Ba)-Total			105.9		%		80-120	07-MAY-18
Bismuth (Bi)-Total			101.7		%		80-120	07-MAY-18
Boron (B)-Total			86.4		%		80-120	07-MAY-18
Cadmium (Cd)-Total			112.1		%		80-120	07-MAY-18
Calcium (Ca)-Total			101.7		%		80-120	07-MAY-18
Chromium (Cr)-Total			101.5		%		80-120	07-MAY-18
Cobalt (Co)-Total			105.8		%		80-120	07-MAY-18
Copper (Cu)-Total			107.0		%		80-120	07-MAY-18
Iron (Fe)-Total			101.8		%		80-120	07-MAY-18
Lead (Pb)-Total			104.5		%		80-120	07-MAY-18
Lithium (Li)-Total			95.0		%		80-120	07-MAY-18
Magnesium (Mg)-Total			97.2		%		80-120	07-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4036052								
WG2765995-2 LCS								
Manganese (Mn)-Total			101.9		%		80-120	07-MAY-18
Molybdenum (Mo)-Total			102.1		%		80-120	07-MAY-18
Nickel (Ni)-Total			106.1		%		80-120	07-MAY-18
Potassium (K)-Total			108.9		%		80-120	07-MAY-18
Selenium (Se)-Total			108.0		%		80-120	07-MAY-18
Silicon (Si)-Total			109.3		%		80-120	07-MAY-18
Silver (Ag)-Total			100.5		%		80-120	07-MAY-18
Sodium (Na)-Total			103.7		%		80-120	07-MAY-18
Strontium (Sr)-Total			96.7		%		80-120	07-MAY-18
Thallium (Tl)-Total			102.6		%		80-120	07-MAY-18
Tin (Sn)-Total			98.2		%		80-120	07-MAY-18
Titanium (Ti)-Total			104.3		%		80-120	07-MAY-18
Uranium (U)-Total			101.8		%		80-120	07-MAY-18
Vanadium (V)-Total			107.3		%		80-120	07-MAY-18
Zinc (Zn)-Total			100.8		%		80-120	07-MAY-18
WG2765995-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	07-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	07-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	07-MAY-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	07-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	07-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	07-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	07-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	07-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	07-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	07-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Molybdenum (Mo)-Total			0.000205	MB-LOR	mg/L		0.00005	07-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	07-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4036052								
WG2765995-1 MB								
Potassium (K)-Total			<0.050		mg/L		0.05	07-MAY-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	07-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	07-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	07-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	07-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	07-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	07-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	07-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	07-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	07-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	07-MAY-18
NH3-L-F-CL	**Water**							
Batch R4033330								
WG2765118-6 LCS								
Ammonia as N			103.9		%		85-115	04-MAY-18
WG2765118-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	04-MAY-18
NO2-L-IC-N-CL	**Water**							
Batch R4031083								
WG2763499-31 DUP		**L2086365-11**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	28-APR-18
WG2763499-30 LCS								
Nitrite (as N)			105.4		%		90-110	28-APR-18
WG2763499-29 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	28-APR-18
WG2763499-32 MS		**L2086365-11**						
Nitrite (as N)			92.8		%		75-125	28-APR-18
NO3-L-IC-N-CL	**Water**							
Batch R4031083								
WG2763499-31 DUP		**L2086365-11**						
Nitrate (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	28-APR-18
WG2763499-30 LCS								
Nitrate (as N)			101.4		%		90-110	28-APR-18
WG2763499-29 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	28-APR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4031083								
WG2763499-32 MS		**L2086365-11**						
Nitrate (as N)			89.1		%		75-125	28-APR-18
ORP-CL	**Water**							
Batch R4035889								
WG2765339-1 CRM		**CL-ORP**						
ORP			221		mV		210-230	04-MAY-18
WG2765339-2 CRM		**CL-ORP**						
ORP			221		mV		210-230	04-MAY-18
P-T-L-COL-ED	**Water**							
Batch R4036287								
WG2766259-14 LCS								
Phosphorus (P)-Total			105.4		%		80-120	07-MAY-18
WG2766259-16 LCS								
Phosphorus (P)-Total			103.4		%		80-120	07-MAY-18
WG2766259-18 LCS								
Phosphorus (P)-Total			103.8		%		80-120	07-MAY-18
WG2766259-2 LCS								
Phosphorus (P)-Total			105.2		%		80-120	07-MAY-18
WG2766259-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	07-MAY-18
WG2766259-13 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	07-MAY-18
WG2766259-15 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	07-MAY-18
WG2766259-17 MB								
Phosphorus (P)-Total			0.0010		mg/L		0.001	07-MAY-18
PH-CL	**Water**							
Batch R4032387								
WG2764074-8 LCS								
pH			7.02		pH		6.9-7.1	02-MAY-18
PO4-DO-L-COL-ED	**Water**							
Batch R4025111								
WG2760976-2 LCS								
Orthophosphate-Dissolved (as P)			95.2		%		80-120	29-APR-18
WG2760976-6 LCS								
Orthophosphate-Dissolved (as P)			103.8		%		80-120	29-APR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-ED	**Water**							
Batch R4025111								
WG2760976-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	29-APR-18
WG2760976-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	29-APR-18
SO4-IC-N-CL	**Water**							
Batch R4031083								
WG2763499-31 DUP		**L2086365-11**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	28-APR-18
WG2763499-30 LCS								
Sulfate (SO4)			101.6		%		90-110	28-APR-18
WG2763499-29 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	28-APR-18
WG2763499-32 MS		**L2086365-11**						
Sulfate (SO4)			89.6		%		75-125	28-APR-18
SOLIDS-TDS-CL	**Water**							
Batch R4033264								
WG2763855-5 LCS								
Total Dissolved Solids			99.6		%		85-115	03-MAY-18
WG2763855-4 MB								
Total Dissolved Solids			<10		mg/L		10	03-MAY-18
TKN-L-F-CL	**Water**							
Batch R4029812								
WG2762325-15 DUP		**L2086365-2**						
Total Kjeldahl Nitrogen		0.245	0.223		mg/L	9.4	20	01-MAY-18
WG2762325-10 LCS								
Total Kjeldahl Nitrogen			111.5		%		75-125	01-MAY-18
WG2762325-14 LCS								
Total Kjeldahl Nitrogen			107.8		%		75-125	01-MAY-18
WG2762325-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	01-MAY-18
WG2762325-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	01-MAY-18
WG2762325-16 MS		**L2086365-5**						
Total Kjeldahl Nitrogen			102.8		%		70-130	01-MAY-18
TSS-L-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-L-CL	**Water**							
Batch R4033361								
WG2764537-8 LCS								
Total Suspended Solids			92.7		%		85-115	03-MAY-18
WG2764537-7 MB								
Total Suspended Solids			<1.0		mg/L		1	03-MAY-18
TURBIDITY-CL	**Water**							
Batch R4025066								
WG2760902-11 LCS								
Turbidity			98.5		%		85-115	28-APR-18
WG2760902-10 MB								
Turbidity			<0.10		NTU		0.1	28-APR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	27-APR-18 09:40	02-MAY-18 11:00	0.25	121	hours	EHTR-FM
	2	27-APR-18 09:40	02-MAY-18 11:00	0.25	121	hours	EHTR-FM
	5	27-APR-18 14:00	02-MAY-18 11:00	0.25	117	hours	EHTR-FM
	7	27-APR-18 15:30	02-MAY-18 11:00	0.25	115	hours	EHTR-FM
	9	27-APR-18 14:30	02-MAY-18 11:00	0.25	116	hours	EHTR-FM
	11	27-APR-18 14:30	02-MAY-18 11:00	0.25	116	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2086365 were received on 28-APR-18 13:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2086365-COFC

COC ID: REP-2018-04-27 | TURNAROUND TIME:

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program
Project Manager	Lee Wilm
Email	lee.wilm@teck.com
Address	PO Box 1777, 124B Aspen Drive
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-865-5289

LABORATORY

Lab Name	ALS Calgary
Lab Contact	Lyudmyla Shvets
Email	lyudmyla.shvets@alsglobal.com
Address	2559 29 Street NE
City	Calgary
Province	AB
Postal Code	T1Y 7B5
Country	Canada
Phone Number	1 403 407 1794

DF: teckcoal@equisonline.com, carla.fraser@teck.com, andrew.wright@teck.com, jwilson@minnow.ca — X

EDD: X

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered: F: Field, L: Lab, FL: Field & Lab, N: None

FILT: | PRESERV: x | | | x | | |

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	TECKCOAL-ROUTINE-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-T-U-CVAF-VA	HG-D-CVAF-VA	TECKCOAL-MET-T-VA	TECKCOAL-MET-D-VA
1	RG_ER_WS_20180427-940	~~Elk Rafter~~ RG_ER	WS	NO	April 27.18	0940	G	7	/	/	/	/	/	/	/
2	RG_DUP_ER_WQ_20180427-940	RG_ER	WQ	NO	April 27.18	0940	G	7	/	/	/	/	/	/	/
3	RG_ER_WS_20180427-940_FB-Hg	RG_ER	WS	NO	April 27.18	0940	G	1				/			
4	RG-DUP_ER-WQ-20180427-940	FB-Hg RG_ER	WQ	NO	April 27.18	0940	G	1				/			
5	RG-GC-WS_20180427-1400	RG_GC	WS	NO	April 27.18	1400	G	7	/	/	/	/	/	/	/
6	RG-GC-WS_20180427-1400_FB-Hg	RG_GC	WS	NO	April 27.18	1400	G	1				/			
7	RG_FBLANK-WQ-20180427-1530	RG-FBLANK	WQ	NO	April 27.18	15:30	G	7	/	/	/	/	/	/	/
8	RG-FBLANK-WQ-20180427-1530-FB-Hg	RG_FBLANK	WQ	NO	April 27.18	15:30	G	1				/			
9	RG_SC-WS-20180427-1430	RG_SC	WS	NO	April 27.18	1430	G	7	/	/	/	/	/	/	/
10	RG-SC-WS_20180427-1430_FB-Hg	RG_SC	WS	NO	April 27.18	1430	G	1				(1)		Id (RG_FBLANK_WQ 2018...	
11	RG_TRIP-WQ-20180427-	RG_TRIP	WQ	NO	April 27.18	1430	—	4	/		/	/		/	1430 FB-Hg ~~1430~~ 20-Apr-18

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

12) RG_TRIP_WQ -FB-Hg

*HG-T-U Rcd-WQ 28-Apr-18

All metals samples must be shipped to ALS Burnaby for analysis.

RELINQUISHED BY/AFFILIATION / DATE/TIME / ACCEPTED BY/AFFILIATION

28 Apr 18 — 15°C — 13:00

NO OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	x
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	JUSTIN WILSON	Mobile #	519-803-3923
Sampler's Signature		Date/Time	Apr. 27.18 / 1700.

Teck Coal Ltd.
ATTN: Lee Wilm
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 01-MAY-18
Report Date: 09-MAY-18 14:37 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2087338

Project P.O. #: VPO00563596
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: REP-2018-04-29
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2087338-1	L2087338-2	L2087338-3	L2087338-4	
	Description	Water	Water	Water	Water	
	Sampled Date	29-APR-18	29-APR-18	30-APR-18	30-APR-18	
	Sampled Time	11:30	11:30	12:30	12:30	
	Client ID	RG_T4_WS_20180429-1130	RG_T4_WS_20180429-1130-FB-HG	RG_TN_WS_20180430-1230	RG_TN_WS_20180430-1230-FB-HG	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	284		253		
	Hardness (as CaCO3) (mg/L)	137		120		
	pH (pH)	8.20		8.21		
	ORP (mV)	242		288		
	Total Suspended Solids (mg/L)	879		544		
	Total Dissolved Solids (mg/L)	165		151		
	Turbidity (NTU)	19.8		206		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0		<1.0		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	117		105		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0		<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0		<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	117		105		
	Ammonia as N (mg/L)	0.045 DLM		0.031 DLM		
	Bromide (Br) (mg/L)	<0.050		<0.050		
	Chloride (Cl) (mg/L)	2.87		3.22		
	Fluoride (F) (mg/L)	0.103		0.079		
	Ion Balance (%)	94.8		96.7		
	Nitrate (as N) (mg/L)	0.463		0.192		
	Nitrite (as N) (mg/L)	0.0025		0.0013		
	Total Kjeldahl Nitrogen (mg/L)	0.603		0.320		
	Orthophosphate-Dissolved (as P) (mg/L)	0.0017		<0.0010		
	Phosphorus (P)-Total (mg/L)	0.370 DLHC		0.139 DLHC		
	Sulfate (SO4) (mg/L)	28.8		22.2		
	Anion Sum (meq/L)	3.06		2.67		
	Cation Sum (meq/L)	2.90		2.58		
	Cation - Anion Balance (%)	-2.7		-1.7		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.59		2.79		
	Total Organic Carbon (mg/L)	2.84		2.46		
Total Metals	Aluminum (Al)-Total (mg/L)	5.64		3.26		
	Antimony (Sb)-Total (mg/L)	0.00026		<0.00020 DLA		
	Arsenic (As)-Total (mg/L)	0.00381		0.00238		
	Barium (Ba)-Total (mg/L)	0.121		0.0594		
	Beryllium (Be)-Total (ug/L)	0.267		0.137		
	Bismuth (Bi)-Total (mg/L)	0.00012		<0.00010 DLA		
	Boron (B)-Total (mg/L)	<0.020		<0.020 DLA		
	Cadmium (Cd)-Total (ug/L)	0.268		0.074		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID Description Sampled Date Sampled Time Client ID	L2087338-1 Water 29-APR-18 11:30 RG_T4_WS_20180429-1130	L2087338-2 Water 29-APR-18 11:30 RG_T4_WS_20180429-1130-FB-HG	L2087338-3 Water 30-APR-18 12:30 RG_TN_WS_20180430-1230	L2087338-4 Water 30-APR-18 12:30 RG_TN_WS_20180430-1230-FB-HG	
WATER							
Total Metals	Calcium (Ca)-Total (mg/L)		99.3		82.9		
	Chromium (Cr)-Total (mg/L)		0.00820		0.00466		
	Cobalt (Co)-Total (ug/L)		4.41		2.85		
	Copper (Cu)-Total (mg/L)		0.0095		0.0060		
	Iron (Fe)-Total (mg/L)		9.99		6.17		
	Lead (Pb)-Total (mg/L)		0.0101		0.00629		
	Lithium (Li)-Total (mg/L)		0.0136		0.0083		
	Magnesium (Mg)-Total (mg/L)		21.4		17.5		
	Manganese (Mn)-Total (mg/L)		0.291		0.172		
	Mercury (Hg)-Total (ug/L)		0.0196	<0.00050	0.00442	<0.00050	
	Molybdenum (Mo)-Total (mg/L)		0.00103		0.00072		
	Nickel (Ni)-Total (mg/L)		0.0103		0.0059		
	Potassium (K)-Total (mg/L)		1.50		0.97		
	Selenium (Se)-Total (ug/L)		2.46		0.20		
	Silicon (Si)-Total (mg/L)		9.81		6.71		
	Silver (Ag)-Total (mg/L)		0.000065		<0.000020 DLA		
	Sodium (Na)-Total (mg/L)		3.72		4.04		
	Strontium (Sr)-Total (mg/L)		0.270		0.242		
	Thallium (Tl)-Total (mg/L)		0.000093		0.000035		
	Tin (Sn)-Total (mg/L)		<0.00020 DLA		<0.00020 DLA		
	Titanium (Ti)-Total (mg/L)		0.043		0.033		
	Uranium (U)-Total (mg/L)		0.00112		0.000939		
	Vanadium (V)-Total (mg/L)		0.0088		0.0040		
	Zinc (Zn)-Total (mg/L)		0.0424		0.0226		
Dissolved Metals	Dissolved Mercury Filtration Location		LAB		LAB		
	Dissolved Metals Filtration Location		LAB		LAB		
	Aluminum (Al)-Dissolved (mg/L)		0.0147		0.0119		
	Antimony (Sb)-Dissolved (mg/L)		<0.00020 DLA		<0.00020 DLA		
	Arsenic (As)-Dissolved (mg/L)		0.00060		0.00048		
	Barium (Ba)-Dissolved (mg/L)		0.0579		0.0332		
	Beryllium (Be)-Dissolved (ug/L)		<0.040 DLA		<0.040 DLA		
	Bismuth (Bi)-Dissolved (mg/L)		<0.00010 DLA		<0.00010 DLA		
	Boron (B)-Dissolved (mg/L)		<0.020 DLA		<0.020 DLA		
	Cadmium (Cd)-Dissolved (ug/L)		<0.010 DLA		<0.010 DLA		
	Calcium (Ca)-Dissolved (mg/L)		36.9		32.6		
	Chromium (Cr)-Dissolved (mg/L)		<0.00020 DLA		<0.00020 DLA		
	Cobalt (Co)-Dissolved (ug/L)		<0.20 DLA		<0.20 DLA		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2087338-1	L2087338-2	L2087338-3	L2087338-4	
	Description	Water	Water	Water	Water	
	Sampled Date	29-APR-18	29-APR-18	30-APR-18	30-APR-18	
	Sampled Time	11:30	11:30	12:30	12:30	
	Client ID	RG_T4_WS_20180429-1130	RG_T4_WS_20180429-1130-FB-HG	RG_TN_WS_20180430-1230	RG_TN_WS_20180430-1230-FB-HG	
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	0.00060		<0.00050		
	Iron (Fe)-Dissolved (mg/L)	0.022		0.022		
	Lead (Pb)-Dissolved (mg/L)	<0.00010 DLA		<0.00010 DLA		
	Lithium (Li)-Dissolved (mg/L)	0.0026		0.0012		
	Magnesium (Mg)-Dissolved (mg/L)	10.9		9.43		
	Manganese (Mn)-Dissolved (mg/L)	0.00072		0.00060		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.00065		0.00048		
	Nickel (Ni)-Dissolved (mg/L)	<0.0010 DLA		<0.0010 DLA		
	Potassium (K)-Dissolved (mg/L)	0.56		0.53		
	Selenium (Se)-Dissolved (ug/L)	2.06		0.14		
	Silicon (Si)-Dissolved (mg/L)	2.67		2.86		
	Silver (Ag)-Dissolved (mg/L)	<0.000020 DLA		<0.000020 DLA		
	Sodium (Na)-Dissolved (mg/L)	3.25		3.58		
	Strontium (Sr)-Dissolved (mg/L)	0.124		0.124		
	Thallium (Tl)-Dissolved (mg/L)	<0.000020 DLA		<0.000020 DLA		
	Tin (Sn)-Dissolved (mg/L)	<0.00020 DLA		<0.00020 DLA		
	Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		
	Uranium (U)-Dissolved (mg/L)	0.000749		0.000673		
	Vanadium (V)-Dissolved (mg/L)	<0.0010 DLA		<0.0010 DLA		
	Zinc (Zn)-Dissolved (mg/L)	<0.0020 DLA		<0.0020 DLA		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC and dissolved metals to filtered and preserved in lab; filter code added
UCM	Unknown sample container (non-ALS) submitted for metals analysis (excluding Hg). ALS cannot verify container cleanliness or suitability for trace metals tests.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Molybdenum (Mo)-Dissolved	MB-LOR	L2087338-1, -3
Method Blank	Total Dissolved Solids	MB-LOR	L2087338-1, -3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2087338-1, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2087338-1, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2087338-1, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2087338-1, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2087338-1, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2087338-1, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2087338-1, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2087338-1, -3
Matrix Spike	Calcium (Ca)-Total	MS-B	L2087338-1, -3
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2087338-1, -3
Matrix Spike	Sodium (Na)-Total	MS-B	L2087338-1, -3
Matrix Spike	Strontium (Sr)-Total	MS-B	L2087338-1, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

Reference Information

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL Water Total Organic Carbon APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-ED Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

REP-2018-04-29

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4037712								
WG2767019-2 LCS								
Acidity (as CaCO3)			103.2		%		85-115	07-MAY-18
WG2767019-1 MB								
Acidity (as CaCO3)			2.0		mg/L		2	07-MAY-18
ALK-MAN-CL	**Water**							
Batch R4035147								
WG2766144-11 LCS								
Alkalinity, Total (as CaCO3)			101.5		%		85-115	04-MAY-18
WG2766144-20 LCS								
Alkalinity, Total (as CaCO3)			99.0		%		85-115	04-MAY-18
WG2766144-10 MB								
Alkalinity, Total (as CaCO3)			1.0		mg/L		1	04-MAY-18
WG2766144-19 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	04-MAY-18
BE-D-L-CCMS-VA	**Water**							
Batch R4034954								
WG2765591-2 LCS								
Beryllium (Be)-Dissolved			100.5		%		80-120	06-MAY-18
WG2765591-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	06-MAY-18
BE-T-L-CCMS-VA	**Water**							
Batch R4036388								
WG2765501-2 LCS								
Beryllium (Be)-Total			108.0		%		80-120	07-MAY-18
WG2765501-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	07-MAY-18
BR-L-IC-N-CL	**Water**							
Batch R4030617								
WG2763063-10 LCS								
Bromide (Br)			103.0		%		85-115	01-MAY-18
WG2763063-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	01-MAY-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4034471								
WG2765468-6 LCS								
Dissolved Organic Carbon			101.3		%		80-120	05-MAY-18
WG2765468-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4034471								
WG2765468-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	05-MAY-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4034471								
WG2765468-6 LCS								
Total Organic Carbon			104.1		%		80-120	05-MAY-18
WG2765468-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	05-MAY-18
CL-IC-N-CL	**Water**							
Batch R4030617								
WG2763063-10 LCS								
Chloride (Cl)			100.8		%		90-110	01-MAY-18
WG2763063-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	01-MAY-18
EC-L-PCT-CL	**Water**							
Batch R4035147								
WG2766144-11 LCS								
Conductivity (@ 25C)			99.4		%		90-110	04-MAY-18
WG2766144-20 LCS								
Conductivity (@ 25C)			105.2		%		90-110	04-MAY-18
WG2766144-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	04-MAY-18
WG2766144-19 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	04-MAY-18
F-IC-N-CL	**Water**							
Batch R4030617								
WG2763063-10 LCS								
Fluoride (F)			107.1		%		90-110	01-MAY-18
WG2763063-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	01-MAY-18
HG-D-CVAA-VA	**Water**							
Batch R4033477								
WG2764912-3 DUP		**L2087338-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	04-MAY-18
WG2764912-2 LCS								
Mercury (Hg)-Dissolved			103.4		%		80-120	04-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R4033477								
WG2764912-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	04-MAY-18
WG2764912-4 MS		**L2087338-1**						
Mercury (Hg)-Dissolved			98.3		%		70-130	04-MAY-18
HG-T-U-CVAF-VA	**Water**							
Batch R4033793								
WG2765618-2 LCS								
Mercury (Hg)-Total			101.6		%		80-120	05-MAY-18
WG2765618-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	05-MAY-18
MET-D-CCMS-VA	**Water**							
Batch R4034954								
WG2765591-2 LCS								
Aluminum (Al)-Dissolved			103.1		%		80-120	06-MAY-18
Antimony (Sb)-Dissolved			98.6		%		80-120	06-MAY-18
Arsenic (As)-Dissolved			99.9		%		80-120	06-MAY-18
Barium (Ba)-Dissolved			97.6		%		80-120	06-MAY-18
Bismuth (Bi)-Dissolved			104.6		%		80-120	06-MAY-18
Boron (B)-Dissolved			92.6		%		80-120	06-MAY-18
Cadmium (Cd)-Dissolved			104.1		%		80-120	06-MAY-18
Calcium (Ca)-Dissolved			101.3		%		80-120	06-MAY-18
Chromium (Cr)-Dissolved			99.3		%		80-120	06-MAY-18
Cobalt (Co)-Dissolved			102.0		%		80-120	06-MAY-18
Copper (Cu)-Dissolved			101.3		%		80-120	06-MAY-18
Iron (Fe)-Dissolved			94.3		%		80-120	06-MAY-18
Lead (Pb)-Dissolved			98.4		%		80-120	06-MAY-18
Magnesium (Mg)-Dissolved			106.8		%		80-120	06-MAY-18
Manganese (Mn)-Dissolved			102.2		%		80-120	06-MAY-18
Molybdenum (Mo)-Dissolved			98.8		%		80-120	06-MAY-18
Nickel (Ni)-Dissolved			102.3		%		80-120	06-MAY-18
Potassium (K)-Dissolved			103.8		%		80-120	06-MAY-18
Selenium (Se)-Dissolved			101.4		%		80-120	06-MAY-18
Silicon (Si)-Dissolved			99.1		%		80-120	06-MAY-18
Silver (Ag)-Dissolved			96.2		%		80-120	06-MAY-18
Sodium (Na)-Dissolved			105.4		%		80-120	06-MAY-18
Strontium (Sr)-Dissolved			95.4		%		80-120	06-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4034954								
WG2765591-2 LCS								
Thallium (Tl)-Dissolved			100.2		%		80-120	06-MAY-18
Tin (Sn)-Dissolved			99.0		%		80-120	06-MAY-18
Titanium (Ti)-Dissolved			102.7		%		80-120	06-MAY-18
Uranium (U)-Dissolved			104.6		%		80-120	06-MAY-18
Vanadium (V)-Dissolved			103.6		%		80-120	06-MAY-18
Zinc (Zn)-Dissolved			97.9		%		80-120	06-MAY-18
WG2765591-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	06-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	06-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	06-MAY-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	06-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	06-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	06-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	06-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	06-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	06-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	06-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	06-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	06-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	06-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	06-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	06-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	06-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	06-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4034954								
WG2765591-1 MB		**LF**						
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	06-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	06-MAY-18
Batch R4038294								
WG2767160-2 LCS								
Aluminum (Al)-Dissolved			96.8		%		80-120	08-MAY-18
Antimony (Sb)-Dissolved			93.5		%		80-120	08-MAY-18
Arsenic (As)-Dissolved			91.6		%		80-120	08-MAY-18
Barium (Ba)-Dissolved			99.3		%		80-120	08-MAY-18
Bismuth (Bi)-Dissolved			93.4		%		80-120	08-MAY-18
Boron (B)-Dissolved			81.8		%		80-120	08-MAY-18
Cadmium (Cd)-Dissolved			99.4		%		80-120	08-MAY-18
Calcium (Ca)-Dissolved			93.1		%		80-120	08-MAY-18
Chromium (Cr)-Dissolved			95.7		%		80-120	08-MAY-18
Cobalt (Co)-Dissolved			93.9		%		80-120	08-MAY-18
Copper (Cu)-Dissolved			94.0		%		80-120	08-MAY-18
Iron (Fe)-Dissolved			88.8		%		80-120	08-MAY-18
Lead (Pb)-Dissolved			93.6		%		80-120	08-MAY-18
Lithium (Li)-Dissolved			94.7		%		80-120	08-MAY-18
Magnesium (Mg)-Dissolved			102.5		%		80-120	08-MAY-18
Manganese (Mn)-Dissolved			97.9		%		80-120	08-MAY-18
Molybdenum (Mo)-Dissolved			95.7		%		80-120	08-MAY-18
Nickel (Ni)-Dissolved			94.1		%		80-120	08-MAY-18
Potassium (K)-Dissolved			99.6		%		80-120	08-MAY-18
Selenium (Se)-Dissolved			89.0		%		80-120	08-MAY-18
Silicon (Si)-Dissolved			92.1		%		80-120	08-MAY-18
Silver (Ag)-Dissolved			95.0		%		80-120	08-MAY-18
Sodium (Na)-Dissolved			100.9		%		80-120	08-MAY-18
Strontium (Sr)-Dissolved			93.2		%		80-120	08-MAY-18
Thallium (Tl)-Dissolved			92.2		%		80-120	08-MAY-18
Tin (Sn)-Dissolved			95.1		%		80-120	08-MAY-18
Titanium (Ti)-Dissolved			93.7		%		80-120	08-MAY-18
Uranium (U)-Dissolved			89.7		%		80-120	08-MAY-18
Vanadium (V)-Dissolved			96.1		%		80-120	08-MAY-18
Zinc (Zn)-Dissolved			92.9		%		80-120	08-MAY-18
WG2767160-1		**LF**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4038294								
WG2767160-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	08-MAY-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	08-MAY-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	08-MAY-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	08-MAY-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	08-MAY-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Molybdenum (Mo)-Dissolved			0.000056	MB-LOR	mg/L		0.00005	08-MAY-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	08-MAY-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	08-MAY-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	08-MAY-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	08-MAY-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	08-MAY-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	08-MAY-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	08-MAY-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	08-MAY-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	08-MAY-18
MET-T-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4036388								
WG2765501-2 LCS								
Aluminum (Al)-Total			105.8		%		80-120	07-MAY-18
Antimony (Sb)-Total			105.4		%		80-120	07-MAY-18
Arsenic (As)-Total			101.9		%		80-120	07-MAY-18
Barium (Ba)-Total			102.8		%		80-120	07-MAY-18
Bismuth (Bi)-Total			95.7		%		80-120	07-MAY-18
Boron (B)-Total			100.5		%		80-120	07-MAY-18
Cadmium (Cd)-Total			103.3		%		80-120	07-MAY-18
Calcium (Ca)-Total			105.2		%		80-120	07-MAY-18
Chromium (Cr)-Total			99.2		%		80-120	07-MAY-18
Cobalt (Co)-Total			102.8		%		80-120	07-MAY-18
Copper (Cu)-Total			102.7		%		80-120	07-MAY-18
Iron (Fe)-Total			106.9		%		80-120	07-MAY-18
Lead (Pb)-Total			99.4		%		80-120	07-MAY-18
Lithium (Li)-Total			107.6		%		80-120	07-MAY-18
Magnesium (Mg)-Total			99.0		%		80-120	07-MAY-18
Manganese (Mn)-Total			104.9		%		80-120	07-MAY-18
Molybdenum (Mo)-Total			103.6		%		80-120	07-MAY-18
Nickel (Ni)-Total			103.1		%		80-120	07-MAY-18
Potassium (K)-Total			99.0		%		80-120	07-MAY-18
Selenium (Se)-Total			100.7		%		80-120	07-MAY-18
Silicon (Si)-Total			101.2		%		80-120	07-MAY-18
Silver (Ag)-Total			106.7		%		80-120	07-MAY-18
Sodium (Na)-Total			103.4		%		80-120	07-MAY-18
Strontium (Sr)-Total			103.4		%		80-120	07-MAY-18
Thallium (Tl)-Total			94.2		%		80-120	07-MAY-18
Tin (Sn)-Total			102.9		%		80-120	07-MAY-18
Titanium (Ti)-Total			92.7		%		80-120	07-MAY-18
Uranium (U)-Total			102.7		%		80-120	07-MAY-18
Vanadium (V)-Total			105.4		%		80-120	07-MAY-18
Zinc (Zn)-Total			101.5		%		80-120	07-MAY-18
WG2765501-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	07-MAY-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	07-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4036388								
WG2765501-1 MB								
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	07-MAY-18
Boron (B)-Total			<0.010		mg/L		0.01	07-MAY-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	07-MAY-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	07-MAY-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	07-MAY-18
Iron (Fe)-Total			<0.010		mg/L		0.01	07-MAY-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	07-MAY-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	07-MAY-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	07-MAY-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	07-MAY-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	07-MAY-18
Potassium (K)-Total			<0.050		mg/L		0.05	07-MAY-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	07-MAY-18
Silicon (Si)-Total			<0.10		mg/L		0.1	07-MAY-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	07-MAY-18
Sodium (Na)-Total			<0.050		mg/L		0.05	07-MAY-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	07-MAY-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	07-MAY-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	07-MAY-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	07-MAY-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	07-MAY-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	07-MAY-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	07-MAY-18
Batch R4036551								
WG2765501-1 MB								
Arsenic (As)-Total			<0.00010		mg/L		0.0001	07-MAY-18
NH3-L-F-CL	**Water**							
Batch R4035468								
WG2766462-16 DUP		**L2087338-1**						
Ammonia as N		0.045	0.0446		mg/L	0.0	20	08-MAY-18
WG2766462-14 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-L-F-CL	**Water**							
Batch R4035468								
WG2766462-14 LCS								
Ammonia as N			101.9		%		85-115	07-MAY-18
WG2766462-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	07-MAY-18
WG2766462-15 MS		**L2087338-1**						
Ammonia as N			103.0		%		75-125	07-MAY-18
Ammonia as N			89.7		%		75-125	08-MAY-18
NO2-L-IC-N-CL	**Water**							
Batch R4030617								
WG2763063-10 LCS								
Nitrite (as N)			106.1		%		90-110	01-MAY-18
WG2763063-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	01-MAY-18
NO3-L-IC-N-CL	**Water**							
Batch R4030617								
WG2763063-10 LCS								
Nitrate (as N)			100.9		%		90-110	01-MAY-18
WG2763063-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	01-MAY-18
ORP-CL	**Water**							
Batch R4038204								
WG2767635-7 CRM		**CL-ORP**						
ORP			215		mV		210-230	08-MAY-18
WG2767635-8 CRM		**CL-ORP**						
ORP			223		mV		210-230	08-MAY-18
P-T-L-COL-ED	**Water**							
Batch R4036287								
WG2766259-14 LCS								
Phosphorus (P)-Total			105.4		%		80-120	07-MAY-18
WG2766259-16 LCS								
Phosphorus (P)-Total			103.4		%		80-120	07-MAY-18
WG2766259-18 LCS								
Phosphorus (P)-Total			103.8		%		80-120	07-MAY-18
WG2766259-2 LCS								
Phosphorus (P)-Total			105.2		%		80-120	07-MAY-18
WG2766259-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	07-MAY-18
WG2766259-13								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-ED	**Water**							
Batch R4036287								
WG2766259-13 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	07-MAY-18
WG2766259-15 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	07-MAY-18
WG2766259-17 MB								
Phosphorus (P)-Total			0.0010		mg/L		0.001	07-MAY-18
PH-CL	**Water**							
Batch R4035147								
WG2766144-11 LCS								
pH			7.03		pH		6.9-7.1	04-MAY-18
WG2766144-20 LCS								
pH			7.00		pH		6.9-7.1	04-MAY-18
PO4-DO-L-COL-ED	**Water**							
Batch R4030926								
WG2762964-10 LCS								
Orthophosphate-Dissolved (as P)			98.2		%		80-120	02-MAY-18
WG2762964-14 LCS								
Orthophosphate-Dissolved (as P)			99.8		%		80-120	02-MAY-18
WG2762964-2 LCS								
Orthophosphate-Dissolved (as P)			98.0		%		80-120	02-MAY-18
WG2762964-6 LCS								
Orthophosphate-Dissolved (as P)			100.2		%		80-120	02-MAY-18
WG2762964-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAY-18
WG2762964-13 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAY-18
WG2762964-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAY-18
WG2762964-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	02-MAY-18
SO4-IC-N-CL	**Water**							
Batch R4030617								
WG2763063-10 LCS								
Sulfate (SO4)			101.8		%		90-110	01-MAY-18
WG2763063-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	01-MAY-18
SOLIDS-TDS-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-CL	**Water**							
Batch R4035306								
WG2764840-8 LCS								
Total Dissolved Solids			94.6		%		85-115	04-MAY-18
WG2764840-7 MB								
Total Dissolved Solids			19	MB-LOR	mg/L		10	04-MAY-18
TKN-L-F-CL	**Water**							
Batch R4037088								
WG2766927-2 LCS								
Total Kjeldahl Nitrogen			99.9		%		75-125	04-MAY-18
WG2766927-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	04-MAY-18
TSS-L-CL	**Water**							
Batch R4035648								
WG2765188-8 LCS								
Total Suspended Solids			96.4		%		85-115	04-MAY-18
WG2765188-7 MB								
Total Suspended Solids			<1.0		mg/L		1	04-MAY-18
TURBIDITY-CL	**Water**							
Batch R4032594								
WG2762597-8 LCS								
Turbidity			100.0		%		85-115	01-MAY-18
WG2762597-7 MB								
Turbidity			<0.10		NTU		0.1	01-MAY-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	29-APR-18 11:30	04-MAY-18 15:00	0.25	124	hours	EHTR-FM
	3	30-APR-18 12:30	04-MAY-18 15:00	0.25	98	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2087338 were received on 01-MAY-18 09:20.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2087338-COFC

COC ID: REP-2018-04-29 | TURNAROUND T

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program			Lab Name	ALS		
Project Manager	Lee Wilm			Lab Contact	Lyudmyla Shvets		
Email	lee.wilm@teck.com			Email	lyudmyla.shvets@alsglobal.com		
Address	PO Box 1777, 124B Aspen Drive			Address	2559 29 Street NE		
City	Sparwood	Province	BC	City	Calgary	Province	AB
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada
Phone Number	250-865-5289			Phone Number	1 403 407 1794		

	Excel	PDF	EDD
lee.wilm@teck.com	x	x	x
teckcoal@equisonline.com			x
carla.fraser@teck.com	x	x	x
andrew.wight@teck.com	x	x	x
justinwilson@mmm.ca	x	x	x

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	TECKCOAL-ROUTINE-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-T-U-CVAF-VA	HG-D-CVAF-VA	TECKCOAL-MET-T-VA	TECKCOAL-MET-D-VA
	FIELD														
	PRESERV.										x			x	
	ANALYSIS														
1	RG_T4_WS_20180429-1130	RG_T4	water	NO	April 29,18	11:30	G	7	1	1	1	1	1	1	1
2	RG-T4-WS-20180429-1130-FB-Hg	RG_T4	Water	NO	April 29,18	11:30	G	1				1			
3	RG_TN_WS_20180430-1230	RG_TN	Water	NO	Apr 30/18	12:30	G	7	1	1	1	1	1	1	1
4	RG_TN_WQ_20180430-1230-FB-Hg	RG_TN	Water	NO	April 30/18	12:30	G	1				1			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

All metals samples must be shipped to ALS Burnaby for analysis

RELINQUISHED BY/AFFILIATION | DATE/TIME | ACCEPTED BY/AFFILIATION

5/1 9:20

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default) x
Priority (2-3 business days) - 50% surcharge
Emergency (1 Business Day) - 100% surcharge
For Emergency <1 Day, ASAP or Weekend - Contact ALS

Sampler's Name	JUSTIN WILSON	Mobile #	519-803-3923
Sampler's Signature		Date/Time	April 29.18 / 10:30pm

JW

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 09-JUN-18
Report Date: 06-JUL-18 16:06 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2109376

Project P.O. #:	VPO00563596
Job Reference:	REGIONAL EFFECTS PROGRAM
C of C Numbers:	REGIONAL Koocanusa
Legal Site Desc:	

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2109376-1	L2109376-2	L2109376-3	L2109376-4	L2109376-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	08-JUN-18	08-JUN-18	08-JUN-18	08-JUN-18	08-JUN-18
	Sampled Time	12:00	12:00	12:00	12:00	12:00
	Client ID	RG_T4U1_WS_20180608-1200	RG_T4U1_WS_20180608-1200_FB-HG	RG_T4U2_WS_20180608-1200	RG_T4U2_WS_20180608-1200_FB-HG	RG_T4U3_WS_20180608-1200
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	217		206		239
	Hardness (as CaCO3) (mg/L)	103		107		122
	pH (pH)	8.06		8.10		8.23
	ORP (mV)	396		399		301
	Total Suspended Solids (mg/L)	2.3		2.1		10.1
	Total Dissolved Solids (mg/L)	129 DLHC		126 DLHC		145 DLHC
	Turbidity (NTU)	2.89		3.24		12.5
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	98.0		96.5		109
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	98.0		96.5		109
	Ammonia as N (mg/L)	0.0094		0.0134		0.0087
	Bromide (Br) (mg/L)	<0.050		<0.050		<0.050
	Chloride (Cl) (mg/L)	3.16		2.49		1.41
	Fluoride (F) (mg/L)	0.071		0.069		0.097
	Ion Balance (%)	93.2		96.0		93.0
	Nitrate (as N) (mg/L)	0.187		0.212		0.462
	Nitrite (as N) (mg/L)	0.0016		0.0012		<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050		<0.050		<0.050
	Orthophosphate-Dissolved (as P) (mg/L)	0.0012		<0.0010		0.0023
	Phosphorus (P)-Total (mg/L)	0.0116		0.0074		0.0138
	Sulfate (SO4) (mg/L)	15.1		15.4		22.2
	Anion Sum (meq/L)	2.38		2.34		2.71
	Cation Sum (meq/L)	2.22		2.24		2.52
	Cation - Anion Balance (%)	-3.5		-2.1		-3.6
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.89		1.70		1.21
	Total Organic Carbon (mg/L)	2.22		1.96		2.39
Total Metals	Aluminum (Al)-Total (mg/L)	0.0472		0.0549		0.176
	Antimony (Sb)-Total (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Total (mg/L)	0.00040		0.00037		0.00039
	Barium (Ba)-Total (mg/L)	0.0363		0.0334		0.0464
	Beryllium (Be)-Total (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Total (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Total (ug/L)	0.0075		0.0066		0.0200

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2109376-6	L2109376-7	L2109376-8		
Description	WS	WS	WS		
Sampled Date	08-JUN-18	08-JUN-18	08-JUN-18		
Sampled Time	12:00	13:00	13:00		
Client ID	RG_T4U3_WS_20180608-1200_FB-HG	RG_GC_WS_20180608-1300	RG_GC_WS_20180608-1300_FB-HG		
Grouping / **Analyte**					
WATER					
Physical Tests					
Conductivity (@ 25C) (uS/cm)		204			
Hardness (as CaCO3) (mg/L)		100			
pH (pH)		8.14			
ORP (mV)		293			
Total Suspended Solids (mg/L)		1.9			
Total Dissolved Solids (mg/L)		117 DLHC			
Turbidity (NTU)		2.44			
Anions and Nutrients					
Acidity (as CaCO3) (mg/L)		<1.0			
Alkalinity, Bicarbonate (as CaCO3) (mg/L)		98.8			
Alkalinity, Carbonate (as CaCO3) (mg/L)		<1.0			
Alkalinity, Hydroxide (as CaCO3) (mg/L)		<1.0			
Alkalinity, Total (as CaCO3) (mg/L)		98.8			
Ammonia as N (mg/L)		0.0060			
Bromide (Br) (mg/L)		<0.050			
Chloride (Cl) (mg/L)		1.18			
Fluoride (F) (mg/L)		0.066			
Ion Balance (%)		90.8			
Nitrate (as N) (mg/L)		0.168			
Nitrite (as N) (mg/L)		0.0018			
Total Kjeldahl Nitrogen (mg/L)		0.422			
Orthophosphate-Dissolved (as P) (mg/L)		0.0014			
Phosphorus (P)-Total (mg/L)		0.0053			
Sulfate (SO4) (mg/L)		13.7			
Anion Sum (meq/L)		2.31			
Cation Sum (meq/L)		2.10			
Cation - Anion Balance (%)		-4.8			
Organic / Inorganic Carbon					
Dissolved Organic Carbon (mg/L)		1.77			
Total Organic Carbon (mg/L)		1.83			
Total Metals					
Aluminum (Al)-Total (mg/L)		0.0367			
Antimony (Sb)-Total (mg/L)		<0.00010			
Arsenic (As)-Total (mg/L)		0.00037			
Barium (Ba)-Total (mg/L)		0.0374			
Beryllium (Be)-Total (ug/L)		<0.020			
Bismuth (Bi)-Total (mg/L)		<0.000050			
Boron (B)-Total (mg/L)		<0.010			
Cadmium (Cd)-Total (ug/L)		<0.0050			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2109376-1 WS 08-JUN-18 12:00 RG_T4U1_WS_20180608-1200	L2109376-2 WS 08-JUN-18 12:00 RG_T4U1_WS_20180608-1200_FB-HG	L2109376-3 WS 08-JUN-18 12:00 RG_T4U2_WS_20180608-1200	L2109376-4 WS 08-JUN-18 12:00 RG_T4U2_WS_20180608-1200_FB-HG	L2109376-5 WS 08-JUN-18 12:00 RG_T4U3_WS_20180608-1200
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	28.9		28.3		34.2
	Chromium (Cr)-Total (mg/L)	0.00013		0.00013		0.00038
	Cobalt (Co)-Total (ug/L)	<0.10		<0.10		0.14
	Copper (Cu)-Total (mg/L)	0.00065		<0.00050		0.00055
	Iron (Fe)-Total (mg/L)	0.043		0.053		0.212
	Lead (Pb)-Total (mg/L)	0.000170		0.000114		0.000235
	Lithium (Li)-Total (mg/L)	0.0016		0.0015		0.0028
	Magnesium (Mg)-Total (mg/L)	8.38		7.67		10.0
	Manganese (Mn)-Total (mg/L)	0.00263		0.00320		0.0107
	Mercury (Hg)-Total (ug/L)	0.00067	<0.00050	0.00068	<0.00050	0.00086
	Molybdenum (Mo)-Total (mg/L)	0.000536		0.000506		0.000681
	Nickel (Ni)-Total (mg/L)	<0.00050		<0.00050		0.00055
	Potassium (K)-Total (mg/L)	0.595		0.492		0.517
	Selenium (Se)-Total (ug/L)	0.880		0.752		2.23
	Silicon (Si)-Total (mg/L)	2.47		2.40		2.49
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Sodium (Na)-Total (mg/L)	4.47		2.40		1.64
	Strontium (Sr)-Total (mg/L)	0.0993		0.0980		0.114
	Thallium (Tl)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Tin (Sn)-Total (mg/L)	0.00057		0.00012		<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010		<0.010		<0.010
	Uranium (U)-Total (mg/L)	0.000612		0.000612		0.000657
	Vanadium (V)-Total (mg/L)	<0.00050		<0.00050		0.00061
	Zinc (Zn)-Total (mg/L)	0.0032		<0.0030		<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	LAB		LAB		LAB
	Dissolved Metals Filtration Location	LAB		LAB		LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0154		0.0183		0.0130
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00036		0.00036		0.00030
	Barium (Ba)-Dissolved (mg/L)	0.0375		0.0365		0.0455
	Beryllium (Be)-Dissolved (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050		<0.0050		0.0153
	Calcium (Ca)-Dissolved (mg/L)	27.6		29.0		32.5
	Chromium (Cr)-Dissolved (mg/L)	<0.00010		<0.00010		0.00012
	Cobalt (Co)-Dissolved (ug/L)	<0.10		<0.10		<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2109376-6	L2109376-7	L2109376-8		
	Description	WS	WS	WS		
	Sampled Date	08-JUN-18	08-JUN-18	08-JUN-18		
	Sampled Time	12:00	13:00	13:00		
	Client ID	RG_T4U3_WS_20180608-1200_FB-HG	RG_GC_WS_20180608-1300	RG_GC_WS_20180608-1300_FB-HG		
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)		28.1			
	Chromium (Cr)-Total (mg/L)		0.00023			
	Cobalt (Co)-Total (ug/L)		<0.10			
	Copper (Cu)-Total (mg/L)		<0.00050			
	Iron (Fe)-Total (mg/L)		0.031			
	Lead (Pb)-Total (mg/L)		<0.000050			
	Lithium (Li)-Total (mg/L)		0.0014			
	Magnesium (Mg)-Total (mg/L)		8.04			
	Manganese (Mn)-Total (mg/L)		0.00230			
	Mercury (Hg)-Total (ug/L)	<0.00050	0.00057	<0.00050		
	Molybdenum (Mo)-Total (mg/L)		0.000477			
	Nickel (Ni)-Total (mg/L)		<0.00050			
	Potassium (K)-Total (mg/L)		0.530			
	Selenium (Se)-Total (ug/L)		0.765			
	Silicon (Si)-Total (mg/L)		2.62			
	Silver (Ag)-Total (mg/L)		<0.000010			
	Sodium (Na)-Total (mg/L)		1.82			
	Strontium (Sr)-Total (mg/L)		0.0917			
	Thallium (Tl)-Total (mg/L)		<0.000010			
	Tin (Sn)-Total (mg/L)		<0.00010			
	Titanium (Ti)-Total (mg/L)		<0.010			
	Uranium (U)-Total (mg/L)		0.000593			
	Vanadium (V)-Total (mg/L)		<0.00050			
	Zinc (Zn)-Total (mg/L)		<0.0030			
Dissolved Metals	Dissolved Mercury Filtration Location		LAB			
	Dissolved Metals Filtration Location		LAB			
	Aluminum (Al)-Dissolved (mg/L)		0.0144			
	Antimony (Sb)-Dissolved (mg/L)		<0.00010			
	Arsenic (As)-Dissolved (mg/L)		0.00033			
	Barium (Ba)-Dissolved (mg/L)		0.0382			
	Beryllium (Be)-Dissolved (ug/L)		<0.020			
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050			
	Boron (B)-Dissolved (mg/L)		<0.010			
	Cadmium (Cd)-Dissolved (ug/L)		<0.0050			
	Calcium (Ca)-Dissolved (mg/L)		27.1			
	Chromium (Cr)-Dissolved (mg/L)		<0.00010			
	Cobalt (Co)-Dissolved (ug/L)		<0.10			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2109376-1	L2109376-2	L2109376-3	L2109376-4	L2109376-5
Description	WS	WS	WS	WS	WS
Sampled Date	08-JUN-18	08-JUN-18	08-JUN-18	08-JUN-18	08-JUN-18
Sampled Time	12:00	12:00	12:00	12:00	12:00
Client ID	RG_T4U1_WS_20180608-1200	RG_T4U1_WS_20180608-1200_FB-HG	RG_T4U2_WS_20180608-1200	RG_T4U2_WS_20180608-1200_FB-HG	RG_T4U3_WS_20180608-1200
Grouping **Analyte**					
WATER					
Dissolved Metals Copper (Cu)-Dissolved (mg/L)	<0.00050		<0.00050		0.00077
Iron (Fe)-Dissolved (mg/L)	<0.010		<0.010		<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
Lithium (Li)-Dissolved (mg/L)	0.0014		0.0015		0.0025
Magnesium (Mg)-Dissolved (mg/L)	8.27		8.29		9.85
Manganese (Mn)-Dissolved (mg/L)	0.00026		0.00068		0.00058
Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000483		0.000533		0.000652
Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Potassium (K)-Dissolved (mg/L)	0.603		0.556		0.510
Selenium (Se)-Dissolved (ug/L)	0.816		0.777		2.26
Silicon (Si)-Dissolved (mg/L)	2.33		2.28		2.14
Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Sodium (Na)-Dissolved (mg/L)	3.28		2.24		1.69
Strontium (Sr)-Dissolved (mg/L)	0.0921		0.0983		0.104
Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Tin (Sn)-Dissolved (mg/L)	0.00046		0.00010		<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		<0.010
Uranium (U)-Dissolved (mg/L)	0.000573		0.000583		0.000588
Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Zinc (Zn)-Dissolved (mg/L)	0.0019		<0.0010		<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2109376-6	L2109376-7	L2109376-8		
	Description	WS	WS	WS		
	Sampled Date	08-JUN-18	08-JUN-18	08-JUN-18		
	Sampled Time	12:00	13:00	13:00		
	Client ID	RG_T4U3_WS_20180608-1200_FB-HG	RG_GC_WS_20180608-1300	RG_GC_WS_20180608-1300_FB-HG		
Grouping	Analyte					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)		<0.00050			
	Iron (Fe)-Dissolved (mg/L)		<0.010			
	Lead (Pb)-Dissolved (mg/L)		<0.000050			
	Lithium (Li)-Dissolved (mg/L)		0.0013			
	Magnesium (Mg)-Dissolved (mg/L)		7.90			
	Manganese (Mn)-Dissolved (mg/L)		0.00027			
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)		0.000465			
	Nickel (Ni)-Dissolved (mg/L)		<0.00050			
	Potassium (K)-Dissolved (mg/L)		0.538			
	Selenium (Se)-Dissolved (ug/L)		0.807			
	Silicon (Si)-Dissolved (mg/L)		2.50			
	Silver (Ag)-Dissolved (mg/L)		<0.000010			
	Sodium (Na)-Dissolved (mg/L)		1.79			
	Strontium (Sr)-Dissolved (mg/L)		0.0870			
	Thallium (Tl)-Dissolved (mg/L)		<0.000010			
	Tin (Sn)-Dissolved (mg/L)		<0.00010			
	Titanium (Ti)-Dissolved (mg/L)		<0.010			
	Uranium (U)-Dissolved (mg/L)		0.000571			
	Vanadium (V)-Dissolved (mg/L)		<0.00050			
	Zinc (Zn)-Dissolved (mg/L)		<0.0010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC, DIS METALS LAB FILTER/PRESERVE

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L2109376-1, -3, -5, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2109376-1, -3, -5, -7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2109376-1, -3, -5, -7
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2109376-1, -3, -5, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2109376-1, -3, -5, -7
Matrix Spike	Aluminum (Al)-Total	MS-B	L2109376-1, -3, -5, -7
Matrix Spike	Barium (Ba)-Total	MS-B	L2109376-1, -3, -5, -7
Matrix Spike	Calcium (Ca)-Total	MS-B	L2109376-1, -3, -5, -7
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2109376-1, -3, -5, -7
Matrix Spike	Strontium (Sr)-Total	MS-B	L2109376-1, -3, -5, -7

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

Reference Information

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Reference Information

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

REGIONAL Koocanusa

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4095288								
WG2804457-18 DUP		**L2109376-5**						
Acidity (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	21-JUN-18
WG2804457-17 LCS								
Acidity (as CaCO3)			101.4		%		85-115	21-JUN-18
WG2804457-16 MB								
Acidity (as CaCO3)			2.0		mg/L		2	21-JUN-18
ALK-MAN-CL	**Water**							
Batch R4095370								
WG2804813-17 LCS								
Alkalinity, Total (as CaCO3)			99.98		%		85-115	22-JUN-18
WG2804813-16 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	22-JUN-18
BE-D-L-CCMS-VA	**Water**							
Batch R4087847								
WG2797795-2 LCS								
Beryllium (Be)-Dissolved			101.1		%		80-120	16-JUN-18
WG2797795-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	16-JUN-18
BE-T-L-CCMS-VA	**Water**							
Batch R4086554								
WG2796596-2 LCS								
Beryllium (Be)-Total			109.3		%		80-120	16-JUN-18
WG2796596-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	16-JUN-18
BR-L-IC-N-CL	**Water**							
Batch R4078430								
WG2794005-6 LCS								
Bromide (Br)			101.1		%		85-115	09-JUN-18
WG2794005-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	09-JUN-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4095942								
WG2805554-2 LCS								
Dissolved Organic Carbon			91.2		%		80-120	23-JUN-18
WG2805554-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	23-JUN-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4095942								
WG2805554-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-JUN-18
CL-IC-N-CL	**Water**							
Batch R4078430								
WG2794005-6 LCS								
Chloride (Cl)			99.1		%		90-110	09-JUN-18
WG2794005-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	09-JUN-18
EC-L-PCT-CL	**Water**							
Batch R4095370								
WG2804813-17 LCS								
Conductivity (@ 25C)			99.9		%		90-110	22-JUN-18
WG2804813-16 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	22-JUN-18
F-IC-N-CL	**Water**							
Batch R4078430								
WG2794005-6 LCS								
Fluoride (F)			104.6		%		90-110	09-JUN-18
WG2794005-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	09-JUN-18
HG-D-CVAA-VA	**Water**							
Batch R4083873								
WG2797456-2 LCS								
Mercury (Hg)-Dissolved			99.2		%		80-120	15-JUN-18
WG2797456-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005		mg/L		0.000005	15-JUN-18
HG-T-U-CVAF-VA	**Water**							
Batch R4084136								
WG2798627-2 LCS								
Mercury (Hg)-Total			100.3		%		80-120	15-JUN-18
WG2798627-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	15-JUN-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4087847								
WG2797795-2 LCS								
Aluminum (Al)-Dissolved			101.3		%		80-120	16-JUN-18
Antimony (Sb)-Dissolved			97.2		%		80-120	16-JUN-18
Arsenic (As)-Dissolved			99.7		%		80-120	16-JUN-18
Barium (Ba)-Dissolved			102.4		%		80-120	16-JUN-18
Bismuth (Bi)-Dissolved			97.2		%		80-120	16-JUN-18
Boron (B)-Dissolved			95.5		%		80-120	16-JUN-18
Cadmium (Cd)-Dissolved			99.6		%		80-120	16-JUN-18
Calcium (Ca)-Dissolved			96.4		%		80-120	16-JUN-18
Chromium (Cr)-Dissolved			96.2		%		80-120	16-JUN-18
Cobalt (Co)-Dissolved			100.8		%		80-120	16-JUN-18
Copper (Cu)-Dissolved			100.6		%		80-120	16-JUN-18
Iron (Fe)-Dissolved			97.0		%		80-120	16-JUN-18
Lead (Pb)-Dissolved			98.5		%		80-120	16-JUN-18
Lithium (Li)-Dissolved			100.2		%		80-120	16-JUN-18
Magnesium (Mg)-Dissolved			102.1		%		80-120	16-JUN-18
Manganese (Mn)-Dissolved			100.5		%		80-120	16-JUN-18
Molybdenum (Mo)-Dissolved			99.8		%		80-120	16-JUN-18
Nickel (Ni)-Dissolved			100.8		%		80-120	16-JUN-18
Potassium (K)-Dissolved			102.7		%		80-120	16-JUN-18
Selenium (Se)-Dissolved			95.7		%		80-120	16-JUN-18
Silicon (Si)-Dissolved			102.2		%		80-120	16-JUN-18
Silver (Ag)-Dissolved			98.0		%		80-120	16-JUN-18
Sodium (Na)-Dissolved			103.3		%		80-120	16-JUN-18
Strontium (Sr)-Dissolved			98.2		%		80-120	16-JUN-18
Thallium (Tl)-Dissolved			98.5		%		80-120	16-JUN-18
Tin (Sn)-Dissolved			99.6		%		80-120	16-JUN-18
Titanium (Ti)-Dissolved			98.0		%		80-120	16-JUN-18
Uranium (U)-Dissolved			97.7		%		80-120	16-JUN-18
Vanadium (V)-Dissolved			102.6		%		80-120	16-JUN-18
Zinc (Zn)-Dissolved			94.9		%		80-120	16-JUN-18
WG2797795-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	16-JUN-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4087847								
WG2797795-1 MB		**LF**						
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	16-JUN-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	16-JUN-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	16-JUN-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	16-JUN-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	16-JUN-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	16-JUN-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	16-JUN-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	16-JUN-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	16-JUN-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	16-JUN-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	16-JUN-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	16-JUN-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	16-JUN-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	16-JUN-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	16-JUN-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	16-JUN-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	16-JUN-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	16-JUN-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	16-JUN-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	16-JUN-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	16-JUN-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	16-JUN-18
MET-T-CCMS-VA	**Water**							
Batch R4086554								
WG2796596-2 LCS								
Aluminum (Al)-Total			104.1		%		80-120	16-JUN-18
Antimony (Sb)-Total			105.2		%		80-120	16-JUN-18
Arsenic (As)-Total			101.0		%		80-120	16-JUN-18
Barium (Ba)-Total			101.2		%		80-120	16-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4086554								
WG2796596-2 LCS								
Bismuth (Bi)-Total			99.9		%		80-120	16-JUN-18
Boron (B)-Total			103.1		%		80-120	16-JUN-18
Cadmium (Cd)-Total			101.4		%		80-120	16-JUN-18
Calcium (Ca)-Total			103.0		%		80-120	16-JUN-18
Chromium (Cr)-Total			97.6		%		80-120	16-JUN-18
Cobalt (Co)-Total			98.8		%		80-120	16-JUN-18
Copper (Cu)-Total			101.7		%		80-120	16-JUN-18
Iron (Fe)-Total			101.7		%		80-120	16-JUN-18
Lead (Pb)-Total			103.1		%		80-120	16-JUN-18
Lithium (Li)-Total			106.1		%		80-120	16-JUN-18
Magnesium (Mg)-Total			103.4		%		80-120	16-JUN-18
Manganese (Mn)-Total			102.1		%		80-120	16-JUN-18
Molybdenum (Mo)-Total			104.9		%		80-120	16-JUN-18
Nickel (Ni)-Total			102.0		%		80-120	16-JUN-18
Potassium (K)-Total			104.1		%		80-120	16-JUN-18
Selenium (Se)-Total			109.0		%		80-120	16-JUN-18
Silicon (Si)-Total			108.2		%		80-120	16-JUN-18
Silver (Ag)-Total			103.6		%		80-120	16-JUN-18
Sodium (Na)-Total			103.4		%		80-120	16-JUN-18
Strontium (Sr)-Total			104.4		%		80-120	16-JUN-18
Thallium (Tl)-Total			103.3		%		80-120	16-JUN-18
Tin (Sn)-Total			100.3		%		80-120	16-JUN-18
Titanium (Ti)-Total			103.4		%		80-120	16-JUN-18
Uranium (U)-Total			104.1		%		80-120	16-JUN-18
Vanadium (V)-Total			103.9		%		80-120	16-JUN-18
Zinc (Zn)-Total			94.3		%		80-120	16-JUN-18
WG2796596-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	16-JUN-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	16-JUN-18
Boron (B)-Total			<0.010		mg/L		0.01	16-JUN-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	16-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4086554								
WG2796596-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	16-JUN-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	16-JUN-18
Iron (Fe)-Total			<0.010		mg/L		0.01	16-JUN-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	16-JUN-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	16-JUN-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	16-JUN-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	16-JUN-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	16-JUN-18
Potassium (K)-Total			<0.050		mg/L		0.05	16-JUN-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	16-JUN-18
Silicon (Si)-Total			<0.10		mg/L		0.1	16-JUN-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	16-JUN-18
Sodium (Na)-Total			<0.050		mg/L		0.05	16-JUN-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	16-JUN-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	16-JUN-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	16-JUN-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	16-JUN-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	16-JUN-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	16-JUN-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	16-JUN-18
NH3-L-F-CL	**Water**							
Batch R4091552								
WG2802250-14 LCS								
Ammonia as N			99.5		%		85-115	20-JUN-18
WG2802250-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	20-JUN-18
NO2-L-IC-N-CL	**Water**							
Batch R4078430								
WG2794005-6 LCS								
Nitrite (as N)			104.0		%		90-110	09-JUN-18
WG2794005-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	09-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4078430								
WG2794005-6 LCS								
Nitrate (as N)			100.0		%		90-110	09-JUN-18
WG2794005-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	09-JUN-18
ORP-CL	**Water**							
Batch R4109595								
WG2812061-3 CRM		**CL-ORP**						
ORP			230		mV		210-230	02-JUL-18
WG2812061-4 DUP		**L2109376-7**						
ORP		293	294	J	mV	1.0	15	02-JUL-18
P-T-L-COL-ED	**Water**							
Batch R4112778								
WG2812806-19 DUP		**L2109376-1**						
Phosphorus (P)-Total		0.0116	0.0106		mg/L	9.0	20	04-JUL-18
WG2812806-10 LCS								
Phosphorus (P)-Total			104.2		%		80-120	04-JUL-18
WG2812806-14 LCS								
Phosphorus (P)-Total			106.0		%		80-120	04-JUL-18
WG2812806-18 LCS								
Phosphorus (P)-Total			107.4		%		80-120	04-JUL-18
WG2812806-2 LCS								
Phosphorus (P)-Total			107.0		%		80-120	04-JUL-18
WG2812806-22 LCS								
Phosphorus (P)-Total			105.4		%		80-120	04-JUL-18
WG2812806-6 LCS								
Phosphorus (P)-Total			106.4		%		80-120	04-JUL-18
WG2812806-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	04-JUL-18
WG2812806-13 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	04-JUL-18
WG2812806-17 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	04-JUL-18
WG2812806-21 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	04-JUL-18
WG2812806-5 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	04-JUL-18
WG2812806-9 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	04-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-ED	**Water**							
Batch R4112778								
WG2812806-20 MS		**L2109376-1**						
Phosphorus (P)-Total			107.6		%		70-130	04-JUL-18
PH-CL	**Water**							
Batch R4095370								
WG2804813-17 LCS								
pH			7.01		pH		6.9-7.1	22-JUN-18
PO4-DO-L-COL-CL	**Water**							
Batch R4077060								
WG2793135-6 LCS								
Orthophosphate-Dissolved (as P)			107.6		%		80-120	09-JUN-18
WG2793135-3 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	09-JUN-18
SO4-IC-N-CL	**Water**							
Batch R4078430								
WG2794005-6 LCS								
Sulfate (SO4)			100.3		%		90-110	09-JUN-18
WG2794005-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	09-JUN-18
SOLIDS-TDS-CL	**Water**							
Batch R4086468								
WG2798118-3 DUP		**L2109376-7**						
Total Dissolved Solids		117	118		mg/L	0.6	20	15-JUN-18
WG2798118-2 LCS								
Total Dissolved Solids			96.5		%		85-115	15-JUN-18
WG2798118-1 MB								
Total Dissolved Solids			<10		mg/L		10	15-JUN-18
TKN-L-F-CL	**Water**							
Batch R4095550								
WG2805054-6 LCS								
Total Kjeldahl Nitrogen			83.5		%		75-125	21-JUN-18
WG2805054-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	21-JUN-18
TSS-L-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-L-CL	**Water**							
Batch R4084710								
WG2798782-3 DUP		**L2109376-5**						
Total Suspended Solids		10.1	11.9		mg/L	16	20	15-JUN-18
WG2798782-2 LCS								
Total Suspended Solids			94.0		%		85-115	15-JUN-18
WG2798782-1 MB								
Total Suspended Solids			<1.0		mg/L		1	15-JUN-18
TURBIDITY-CL	**Water**							
Batch R4076873								
WG2792948-14 LCS								
Turbidity			98.5		%		85-115	09-JUN-18
WG2792948-13 MB								
Turbidity			<0.10		NTU		0.1	09-JUN-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	08-JUN-18 12:00	22-JUN-18 08:00	0.25	332	hours	EHTR-FM
	3	08-JUN-18 12:00	22-JUN-18 08:00	0.25	332	hours	EHTR-FM
	5	08-JUN-18 12:00	22-JUN-18 08:00	0.25	332	hours	EHTR-FM
	7	08-JUN-18 13:00	22-JUN-18 08:00	0.25	331	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2109376 were received on 09-JUN-18 08:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

Page 1 of 1

COC ID: REGIONAL Koocanusa Reservoir | TURNAROUND TIME: Regular

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	FRO LAEMP			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Can Dang			Email 1:	[redacted]	X	X	X
Email	[redacted]			Email	can.dang@alsglobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	8081 Lougheed Hwy			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	jwilson@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-425-8202			Phone Number	604-253-4188			PO number	VPO00563596			

L2109376-COFC

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS FIL	N	N	N	N	N	N	N					
								PRESERV	NONE	NONE	H2SO4	NONE	NONE	HNO3	NONE					
								ANALYSIS	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_T4U1_WS_20180608-1200	RG_T4U1	Water		8-Jun-18	12:00:00 PM	G	7		1	1	1	1	1	1	1					
RG_T4U1_WS_20180608-1200_FB-HG	RG_T4U1	Water		8-Jun-18	12:00:00 PM	G	1		1											
RG_T4U2_WS_20180608-1200	RG_T4U2	Water		8-Jun-18	12:00:00 PM	G	7		1	1	1	1	1	1	1					
RG_T4U2_WS_20180608-1200_FB-HG	RG_T4U2	Water		8-Jun-18	12:00:00 PM	G	1		1											
RG_T4U3_WS_20180608-1200	RG_T4U3	Water		8-Jun-18	12:00:00 PM	G	7		1	1	1	1	1	1	1					
RG_T4U3_WS_20180608-1200_FB-HG	RG_T4U3	Water		8-Jun-18	12:00:00 PM	G	1		1											
RG_GC_WS_20180608-1300	RG_GC	Water		8-Jun-18	13:00:00 PM	G	7		1	1	1	1	1	1	1					
RG_GC_WS_20180608-1300_FB-HG	RG_GC	Water		8-Jun-18	13:00:00 PM	G	1		1											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Koocanusa - VPO00563596				6/7 8:30

SERVICE REQUEST (rush - subject to availability)					
Regular (default) X	Sampler's Name	Justin Wilson	Mobile #	519-803-3923	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	June 8, 2018	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 12-JUN-18
Report Date: 06-JUL-18 20:22 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2110751

Project P.O. #: VPO00563596
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: REGIONAL Koocanusa
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2110751-1 WS 11-JUN-18 10:30 RG_TNU1_WS_20180611-1030	L2110751-2 WS 11-JUN-18 10:30 RG_TNU1_WS_20180611-1030_FB-HG	L2110751-3 WS 11-JUN-18 10:30 RG_TNU2_WS_20180611-1030	L2110751-4 WS 11-JUN-18 10:30 RG_TNU2_WS_20180611-1030_FB-HG	L2110751-5 WS 11-JUN-18 10:30 RG_TNU3_WS_20180611-1030
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	199		193		195
	Hardness (as CaCO3) (mg/L)	97.0		95.7		94.8
	pH (pH)	8.01		8.08		7.99
	ORP (mV)	287		265		262
	Total Suspended Solids (mg/L)	6.5		6.9		3.3
	Total Dissolved Solids (mg/L)	120 DLHC		119 DLHC		115 DLHC
	Turbidity (NTU)	5.47		7.04		5.98
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0		1.0		<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	87.2		89.9		87.8
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	87.2		89.9		87.8
	Ammonia as N (mg/L)	0.0067		0.0080		0.0073
	Bromide (Br) (mg/L)	<0.050		<0.050		<0.050
	Chloride (Cl) (mg/L)	1.54		1.51		1.48
	Fluoride (F) (mg/L)	0.063		0.067		0.063
	Ion Balance (%)	96.1		92.6		93.5
	Nitrate (as N) (mg/L)	0.0879		0.0880		0.0880
	Nitrite (as N) (mg/L)	<0.0010		<0.0010		<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050		<0.050		<0.10
	Orthophosphate-Dissolved (as P) (mg/L)	0.0018		0.0011		0.0021
	Phosphorus (P)-Total (mg/L)	0.0066		0.0066		0.0069
	Sulfate (SO4) (mg/L)	15.9		15.8		15.9
	Anion Sum (meq/L)	2.13		2.18		2.14
	Cation Sum (meq/L)	2.04		2.02		2.00
	Cation - Anion Balance (%)	-2.0		-3.9		-3.4
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.06		0.88		0.90
	Total Organic Carbon (mg/L)	1.20		1.16		0.83
Total Metals	Aluminum (Al)-Total (mg/L)	0.0944		0.0917		0.0854
	Antimony (Sb)-Total (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Total (mg/L)	0.00036		0.00035		0.00040
	Barium (Ba)-Total (mg/L)	0.0272		0.0264		0.0259
	Beryllium (Be)-Total (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Total (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Total (ug/L)	0.0056		0.0079		0.0160

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2110751-6				
	Description	WS				
	Sampled Date	11-JUN-18				
	Sampled Time	10:30				
	Client ID	RG_TNU3_WS_20180611-1030_FB-HG				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
	ORP (mV)					
	Total Suspended Solids (mg/L)					
	Total Dissolved Solids (mg/L)					
	Turbidity (NTU)					
Anions and Nutrients	Acidity (as CaCO3) (mg/L)					
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)					
	Alkalinity, Carbonate (as CaCO3) (mg/L)					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)					
	Ammonia as N (mg/L)					
	Bromide (Br) (mg/L)					
	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Ion Balance (%)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Orthophosphate-Dissolved (as P) (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Sulfate (SO4) (mg/L)					
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (ug/L)					
	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2110751-1 WS 11-JUN-18 10:30 RG_TNU1_WS_20180611-1030	L2110751-2 WS 11-JUN-18 10:30 RG_TNU1_WS_20180611-1030_FB-HG	L2110751-3 WS 11-JUN-18 10:30 RG_TNU2_WS_20180611-1030	L2110751-4 WS 11-JUN-18 10:30 RG_TNU2_WS_20180611-1030_FB-HG	L2110751-5 WS 11-JUN-18 10:30 RG_TNU3_WS_20180611-1030
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	27.9		27.0		28.2
	Chromium (Cr)-Total (mg/L)	0.00016		0.00017		0.00021
	Cobalt (Co)-Total (ug/L)	<0.10		<0.10		<0.10
	Copper (Cu)-Total (mg/L)	<0.00050		0.00052		0.00102
	Iron (Fe)-Total (mg/L)	0.123		0.121		0.117
	Lead (Pb)-Total (mg/L)	0.000176		0.000195		0.00134
	Lithium (Li)-Total (mg/L)	0.0010		0.0010		<0.0010
	Magnesium (Mg)-Total (mg/L)	7.80		7.69		7.74
	Manganese (Mn)-Total (mg/L)	0.00728		0.00686		0.00792
	Mercury (Hg)-Total (ug/L)	0.00070	<0.00050	0.00065	<0.00050	0.00063
	Molybdenum (Mo)-Total (mg/L)	0.000504		0.000494		0.000547
	Nickel (Ni)-Total (mg/L)	<0.00050		<0.00050		<0.00050
	Potassium (K)-Total (mg/L)	0.474		0.464		0.470
	Selenium (Se)-Total (ug/L)	0.135		0.138		0.124
	Silicon (Si)-Total (mg/L)	2.30		2.29		2.21
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Sodium (Na)-Total (mg/L)	2.03		1.99		2.03
	Strontium (Sr)-Total (mg/L)	0.101		0.101		0.0982
	Thallium (Tl)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Tin (Sn)-Total (mg/L)	0.00015		0.00012		0.00013
	Titanium (Ti)-Total (mg/L)	<0.010		<0.010		<0.010
	Uranium (U)-Total (mg/L)	0.000572		0.000555		0.000532
	Vanadium (V)-Total (mg/L)	<0.00050		<0.00050		<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030		<0.0030		0.0803
Dissolved Metals	Dissolved Mercury Filtration Location	LAB		LAB		LAB
	Dissolved Metals Filtration Location	LAB		LAB		LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0135		0.0142		0.0137
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00032		0.00027		0.00031
	Barium (Ba)-Dissolved (mg/L)	0.0266		0.0268		0.0265
	Beryllium (Be)-Dissolved (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050		<0.0050		<0.0050
	Calcium (Ca)-Dissolved (mg/L)	26.3		25.8		25.6
	Chromium (Cr)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10		<0.10		<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2110751-6				
	Description	WS				
	Sampled Date	11-JUN-18				
	Sampled Time	10:30				
	Client ID	RG_TNU3_WS_20180611-1030_FB-HG				
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (ug/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (ug/L)	<0.00050				
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (ug/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (ug/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (ug/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2110751-1	L2110751-2	L2110751-3	L2110751-4	L2110751-5
Description	WS	WS	WS	WS	WS
Sampled Date	11-JUN-18	11-JUN-18	11-JUN-18	11-JUN-18	11-JUN-18
Sampled Time	10:30	10:30	10:30	10:30	10:30
Client ID	RG_TNU1_WS_20180611-1030	RG_TNU1_WS_20180611-1030_FB-HG	RG_TNU2_WS_20180611-1030	RG_TNU2_WS_20180611-1030_FB-HG	RG_TNU3_WS_20180611-1030
Grouping **Analyte**					
WATER					
Dissolved Metals Copper (Cu)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Iron (Fe)-Dissolved (mg/L)	<0.010		<0.010		<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		0.000144
Lithium (Li)-Dissolved (mg/L)	<0.0010		<0.0010		<0.0010
Magnesium (Mg)-Dissolved (mg/L)	7.62		7.59		7.48
Manganese (Mn)-Dissolved (mg/L)	0.00259		0.00237		0.00244
Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000536		0.000526		0.000528
Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Potassium (K)-Dissolved (mg/L)	0.476		0.469		0.476
Selenium (Se)-Dissolved (ug/L)	0.130		0.110		0.110
Silicon (Si)-Dissolved (mg/L)	2.16		2.21		2.15
Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Sodium (Na)-Dissolved (mg/L)	2.10		2.09		2.07
Strontium (Sr)-Dissolved (mg/L)	0.100		0.100		0.0997
Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Tin (Sn)-Dissolved (mg/L)	0.00014		0.00010		<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		<0.010
Uranium (U)-Dissolved (mg/L)	0.000560		0.000547		0.000545
Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2110751-6				
	Description	WS				
	Sampled Date	11-JUN-18				
	Sampled Time	10:30				
	Client ID	RG_TNU3_WS_20180611-1030_FB-HG				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (ug/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Strontium (Sr)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC, DISSOLVED METALS

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L2110751-1, -3, -5
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2110751-1, -3, -5
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2110751-1, -3, -5
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2110751-1, -3, -5
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2110751-1, -3, -5
Matrix Spike	Calcium (Ca)-Total	MS-B	L2110751-1, -3, -5
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2110751-1, -3, -5
Matrix Spike	Strontium (Sr)-Total	MS-B	L2110751-1, -3, -5

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

Reference Information

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA	Water	Total Mercury in Water by CVAFS (Ultra)	EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

Reference Information

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

REGIONAL Koocanusa

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4097683								
WG2807344-6 DUP		**L2110751-3**						
Acidity (as CaCO3)		1.0	2.3	J	mg/L	1.3	2	25-JUN-18
WG2807344-2 LCS								
Acidity (as CaCO3)			96.4		%		85-115	25-JUN-18
WG2807344-5 LCS								
Acidity (as CaCO3)			92.9		%		85-115	25-JUN-18
WG2807344-1 MB								
Acidity (as CaCO3)			<1.0		mg/L		2	25-JUN-18
WG2807344-4 MB								
Acidity (as CaCO3)			1.2		mg/L		2	25-JUN-18
ALK-MAN-CL	**Water**							
Batch R4097665								
WG2806978-12 DUP		**L2110751-1**						
Alkalinity, Total (as CaCO3)		87.2	86.6		mg/L	0.7	20	25-JUN-18
WG2806978-11 LCS								
Alkalinity, Total (as CaCO3)			100.5		%		85-115	25-JUN-18
WG2806978-2 LCS								
Alkalinity, Total (as CaCO3)			95.4		%		85-115	25-JUN-18
WG2806978-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	25-JUN-18
WG2806978-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	26-JUN-18
BE-D-L-CCMS-VA	**Water**							
Batch R4087847								
WG2797795-2 LCS								
Beryllium (Be)-Dissolved			101.1		%		80-120	16-JUN-18
WG2797795-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	16-JUN-18
BE-T-L-CCMS-VA	**Water**							
Batch R4087951								
WG2797807-2 LCS								
Beryllium (Be)-Total			98.0		%		80-120	17-JUN-18
WG2797807-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	17-JUN-18
BR-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-14 LCS								
Bromide (Br)			100.3		%		85-115	12-JUN-18
WG2796060-13 MB								
Bromide (Br)			<0.050		mg/L		0.05	12-JUN-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4095939								
WG2805547-2 LCS								
Dissolved Organic Carbon			101.8		%		80-120	23-JUN-18
WG2805547-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	23-JUN-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4095939								
WG2805547-2 LCS								
Total Organic Carbon			99.95		%		80-120	23-JUN-18
WG2805547-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-JUN-18
CL-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-14 LCS								
Chloride (Cl)			101.8		%		90-110	12-JUN-18
WG2796060-13 MB								
Chloride (Cl)			<0.50		mg/L		0.5	12-JUN-18
EC-L-PCT-CL	**Water**							
Batch R4097665								
WG2806978-12 DUP		**L2110751-1**						
Conductivity (@ 25C)		199	196		uS/cm	1.3	10	25-JUN-18
WG2806978-11 LCS								
Conductivity (@ 25C)			103.0		%		90-110	25-JUN-18
WG2806978-2 LCS								
Conductivity (@ 25C)			101.3		%		90-110	25-JUN-18
WG2806978-1 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	25-JUN-18
WG2806978-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	26-JUN-18
F-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-14 LCS								
Fluoride (F)			107.4		%		90-110	12-JUN-18
WG2796060-13 MB								
Fluoride (F)			<0.020		mg/L		0.02	12-JUN-18
HG-D-CVAA-VA	**Water**							
Batch R4083841								
WG2797836-6 LCS								
Mercury (Hg)-Dissolved			95.2		%		80-120	15-JUN-18
WG2797836-5 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	15-JUN-18
HG-T-U-CVAF-VA	**Water**							
Batch R4084703								
WG2799225-2 LCS								
Mercury (Hg)-Total			102.4		%		80-120	16-JUN-18
WG2799225-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	16-JUN-18
Batch R4084704								
WG2799229-2 LCS								
Mercury (Hg)-Total			95.9		%		80-120	16-JUN-18
WG2799229-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	16-JUN-18
MET-D-CCMS-VA	**Water**							
Batch R4087847								
WG2797795-2 LCS								
Aluminum (Al)-Dissolved			101.3		%		80-120	16-JUN-18
Antimony (Sb)-Dissolved			97.2		%		80-120	16-JUN-18
Arsenic (As)-Dissolved			99.7		%		80-120	16-JUN-18
Barium (Ba)-Dissolved			102.4		%		80-120	16-JUN-18
Bismuth (Bi)-Dissolved			97.2		%		80-120	16-JUN-18
Boron (B)-Dissolved			95.5		%		80-120	16-JUN-18
Cadmium (Cd)-Dissolved			99.6		%		80-120	16-JUN-18
Calcium (Ca)-Dissolved			96.4		%		80-120	16-JUN-18
Chromium (Cr)-Dissolved			96.2		%		80-120	16-JUN-18
Cobalt (Co)-Dissolved			100.8		%		80-120	16-JUN-18
Copper (Cu)-Dissolved			100.6		%		80-120	16-JUN-18
Iron (Fe)-Dissolved			97.0		%		80-120	16-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4087847								
WG2797795-2 LCS								
Lead (Pb)-Dissolved			98.5		%		80-120	16-JUN-18
Lithium (Li)-Dissolved			100.2		%		80-120	16-JUN-18
Magnesium (Mg)-Dissolved			102.1		%		80-120	16-JUN-18
Manganese (Mn)-Dissolved			100.5		%		80-120	16-JUN-18
Molybdenum (Mo)-Dissolved			99.8		%		80-120	16-JUN-18
Nickel (Ni)-Dissolved			100.8		%		80-120	16-JUN-18
Potassium (K)-Dissolved			102.7		%		80-120	16-JUN-18
Selenium (Se)-Dissolved			95.7		%		80-120	16-JUN-18
Silicon (Si)-Dissolved			102.2		%		80-120	16-JUN-18
Silver (Ag)-Dissolved			98.0		%		80-120	16-JUN-18
Sodium (Na)-Dissolved			103.3		%		80-120	16-JUN-18
Strontium (Sr)-Dissolved			98.2		%		80-120	16-JUN-18
Thallium (Tl)-Dissolved			98.5		%		80-120	16-JUN-18
Tin (Sn)-Dissolved			99.6		%		80-120	16-JUN-18
Titanium (Ti)-Dissolved			98.0		%		80-120	16-JUN-18
Uranium (U)-Dissolved			97.7		%		80-120	16-JUN-18
Vanadium (V)-Dissolved			102.6		%		80-120	16-JUN-18
Zinc (Zn)-Dissolved			94.9		%		80-120	16-JUN-18
WG2797795-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	16-JUN-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	16-JUN-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	16-JUN-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	16-JUN-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	16-JUN-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	16-JUN-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	16-JUN-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	16-JUN-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	16-JUN-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	16-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4087847								
WG2797795-1 MB		**LF**						
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	16-JUN-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	16-JUN-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	16-JUN-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	16-JUN-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	16-JUN-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	16-JUN-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	16-JUN-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	16-JUN-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	16-JUN-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	16-JUN-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	16-JUN-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	16-JUN-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	16-JUN-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	16-JUN-18
MET-T-CCMS-VA	**Water**							
Batch R4087951								
WG2797807-2 LCS								
Aluminum (Al)-Total			107.7		%		80-120	17-JUN-18
Antimony (Sb)-Total			103.2		%		80-120	17-JUN-18
Arsenic (As)-Total			104.4		%		80-120	17-JUN-18
Barium (Ba)-Total			106.4		%		80-120	17-JUN-18
Bismuth (Bi)-Total			101.5		%		80-120	17-JUN-18
Boron (B)-Total			96.2		%		80-120	17-JUN-18
Cadmium (Cd)-Total			104.0		%		80-120	17-JUN-18
Calcium (Ca)-Total			101.9		%		80-120	17-JUN-18
Chromium (Cr)-Total			104.7		%		80-120	17-JUN-18
Cobalt (Co)-Total			105.3		%		80-120	17-JUN-18
Copper (Cu)-Total			103.5		%		80-120	17-JUN-18
Iron (Fe)-Total			105.4		%		80-120	17-JUN-18
Lead (Pb)-Total			100.2		%		80-120	17-JUN-18
Lithium (Li)-Total			99.4		%		80-120	17-JUN-18
Magnesium (Mg)-Total			108.0		%		80-120	17-JUN-18
Manganese (Mn)-Total			106.7		%		80-120	17-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4087951								
WG2797807-2 LCS								
Molybdenum (Mo)-Total			99.2		%		80-120	17-JUN-18
Nickel (Ni)-Total			105.8		%		80-120	17-JUN-18
Potassium (K)-Total			107.0		%		80-120	17-JUN-18
Selenium (Se)-Total			98.8		%		80-120	17-JUN-18
Silicon (Si)-Total			102.7		%		80-120	17-JUN-18
Silver (Ag)-Total			96.5		%		80-120	17-JUN-18
Sodium (Na)-Total			105.8		%		80-120	17-JUN-18
Strontium (Sr)-Total			100.1		%		80-120	17-JUN-18
Thallium (Tl)-Total			99.7		%		80-120	17-JUN-18
Tin (Sn)-Total			101.2		%		80-120	17-JUN-18
Titanium (Ti)-Total			101.6		%		80-120	17-JUN-18
Uranium (U)-Total			99.9		%		80-120	17-JUN-18
Vanadium (V)-Total			106.4		%		80-120	17-JUN-18
Zinc (Zn)-Total			100.1		%		80-120	17-JUN-18
WG2797807-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	17-JUN-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	17-JUN-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	17-JUN-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	17-JUN-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	17-JUN-18
Boron (B)-Total			<0.010		mg/L		0.01	17-JUN-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	17-JUN-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	17-JUN-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	17-JUN-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	17-JUN-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	17-JUN-18
Iron (Fe)-Total			<0.010		mg/L		0.01	17-JUN-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	17-JUN-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	17-JUN-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	17-JUN-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	17-JUN-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	17-JUN-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	17-JUN-18
Potassium (K)-Total			<0.050		mg/L		0.05	17-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4087951								
WG2797807-1 MB								
Selenium (Se)-Total			<0.000050		mg/L		0.00005	17-JUN-18
Silicon (Si)-Total			<0.10		mg/L		0.1	17-JUN-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	17-JUN-18
Sodium (Na)-Total			<0.050		mg/L		0.05	17-JUN-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	17-JUN-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	17-JUN-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	17-JUN-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	17-JUN-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	17-JUN-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	17-JUN-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	17-JUN-18
NH3-L-F-CL	**Water**							
Batch R4091552								
WG2802250-26 LCS								
Ammonia as N			106.6		%		85-115	20-JUN-18
WG2802250-25 MB								
Ammonia as N			<0.0050		mg/L		0.005	20-JUN-18
NO2-L-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-14 LCS								
Nitrite (as N)			107.2		%		90-110	12-JUN-18
WG2796060-13 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	12-JUN-18
NO3-L-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-14 LCS								
Nitrate (as N)			100.4		%		90-110	12-JUN-18
WG2796060-13 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	12-JUN-18
ORP-CL	**Water**							
Batch R4112750								
WG2814039-4 CRM		**CL-ORP**						
ORP			230		mV		210-230	04-JUL-18
WG2814039-5 CRM		**CL-ORP**						
ORP			218		mV		210-230	04-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-ED	**Water**							
Batch R4113733								
WG2813996-10 LCS								
Phosphorus (P)-Total			116.2		%		80-120	05-JUL-18
WG2813996-6 LCS								
Phosphorus (P)-Total			111.0		%		80-120	05-JUL-18
WG2813996-7 LCS								
Phosphorus (P)-Total			114.2		%		80-120	05-JUL-18
WG2813996-8 LCS								
Phosphorus (P)-Total			116.8		%		80-120	05-JUL-18
WG2813996-9 LCS								
Phosphorus (P)-Total			118.6		%		80-120	05-JUL-18
WG2813996-1 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	05-JUL-18
WG2813996-2 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	05-JUL-18
WG2813996-3 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	05-JUL-18
WG2813996-4 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	05-JUL-18
WG2813996-5 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	05-JUL-18
PH-CL	**Water**							
Batch R4097665								
WG2806978-12 DUP		**L2110751-1**						
pH		8.01	8.03	J	pH	0.02	0.2	25-JUN-18
WG2806978-11 LCS								
pH			6.97		pH		6.9-7.1	25-JUN-18
WG2806978-2 LCS								
pH			7.01		pH		6.9-7.1	25-JUN-18
PO4-DO-L-COL-CL	**Water**							
Batch R4082874								
WG2796136-6 LCS								
Orthophosphate-Dissolved (as P)			97.4		%		80-120	13-JUN-18
WG2796136-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	13-JUN-18
SO4-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-CL	**Water**							
Batch R4081998								
WG2796060-14 LCS								
Sulfate (SO4)			100.1		%		90-110	12-JUN-18
WG2796060-13 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	12-JUN-18
SOLIDS-TDS-CL	**Water**							
Batch R4086468								
WG2798118-5 LCS								
Total Dissolved Solids			99.6		%		85-115	15-JUN-18
WG2798118-4 MB								
Total Dissolved Solids			<10		mg/L		10	15-JUN-18
TKN-L-F-CL	**Water**							
Batch R4095550								
WG2805054-10 LCS								
Total Kjeldahl Nitrogen			87.6		%		75-125	21-JUN-18
WG2805054-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	21-JUN-18
TSS-L-CL	**Water**							
Batch R4086473								
WG2799502-5 LCS								
Total Suspended Solids			90.0		%		85-115	17-JUN-18
WG2799502-4 MB								
Total Suspended Solids			<1.0		mg/L		1	17-JUN-18
TURBIDITY-CL	**Water**							
Batch R4083327								
WG2796138-11 LCS								
Turbidity			99.0		%		85-115	13-JUN-18
WG2796138-10 MB								
Turbidity			<0.10		NTU		0.1	13-JUN-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	11-JUN-18 10:30	25-JUN-18 13:00	0.25	338	hours	EHTR-FM
	3	11-JUN-18 10:30	25-JUN-18 13:00	0.25	338	hours	EHTR-FM
	5	11-JUN-18 10:30	25-JUN-18 13:00	0.25	338	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2110751 were received on 12-JUN-18 09:45.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID:	REGIONAL Koocanusa Reservoir	TURNAROUND TIME:	Regular

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	FRO LAEMP			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Lyuda Shvets			Email 1:	[redacted]	X	X	X
Email	[redacted]			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	2559 29 Street NE			Email 3:	andrew.wight@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:	jwilson@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	250-425-8202			Phone Number	403-407-1800			PO number	VPO00563596			

SAMPLE DETAILS

L2110751-COFC

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Fil.	PRESERV.	ANALYSIS										
								N	NONE	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_TNU1_WS_20180611-1030	RG_TNU1	Water	No	11-Jun-18	10:30:00 AM	G	7	1		1	1	1	1	1	1	1					
RG_TNU1_WS_20180611-1030_FB-HG	RG_TNU1	Water	No	11-Jun-18	10:30:00 AM	G	1	1													
RG_TNU2_WS_20180611-1030	RG_TNU2	Water	No	11-Jun-18	10:30:00 AM	G	7	1		1	1	1	1	1	1	1					
RG_TNU2_WS_20180611-1030_FB-HG	RG_TNU2	Water	No	11-Jun-18	10:30:00 AM	G	1	1													
RG_TNU3_WS_20180611-1030	RG_TNU3	Water	No	11-Jun-18	10:30:00 AM	G	7	1		1	1	1	1	1	1	1					
RG_TNU3_WS_20180611-1030_FB-HG	RG_TNU3	Water	No	11-Jun-18	10:30:00 AM	G	1	1													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Koocanusa - VPO00563596				6/12 9:45

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name	Justin Wilson	Mobile #	519-803-3923
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	June 11, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 14-JUN-18
Report Date: 12-JUL-18 08:48 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2112645

Project P.O. #:	VPO00563596
Job Reference:	REGIONAL EFFECTS PROGRAM
C of C Numbers:	Regional Effects
Legal Site Desc:	

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2112645-1	L2112645-2	L2112645-3	L2112645-4	
	Description	WS	WS	WS	WS	
	Sampled Date	13-JUN-18	13-JUN-18	13-JUN-18	13-JUN-18	
	Sampled Time	10:00	10:00	11:30	11:30	
	Client ID	RG_ER_WS_2018 0613-1000	RG_ER_WS_2018 0613-1000_FB-HG	RG_SC_WS_2018 0613-1130	RG_SC_WS_2018 0613-1130_FB-HG	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	195		181		
	Hardness (as CaCO3) (mg/L)	103		93.2		
	pH (pH)	8.25		8.24		
	ORP (mV)	262		252		
	Total Suspended Solids (mg/L)	2.5		9.8		
	Total Dissolved Solids (mg/L)	111 DLHC		104 DLHC		
	Turbidity (NTU)	4.74		10.5		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0		1.2		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	84.5		77.5		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0		<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0		<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	84.5		77.5		
	Ammonia as N (mg/L)	0.0073		<0.0050		
	Bromide (Br) (mg/L)	<0.050		<0.050		
	Chloride (Cl) (mg/L)	<0.50		1.08		
	Fluoride (F) (mg/L)	<0.020		0.057		
	Ion Balance (%)	128		105		
	Nitrate (as N) (mg/L)	<0.0050		0.0756		
	Nitrite (as N) (mg/L)	<0.0010		<0.0010		
	Total Kjeldahl Nitrogen (mg/L)	0.077		<0.050		
	Orthophosphate-Dissolved (as P) (mg/L)	0.0010		0.0012		
	Phosphorus (P)-Total (mg/L)	0.0118		0.0061		
	Sulfate (SO4) (mg/L)	<0.30		13.7		
	Anion Sum (meq/L)	1.69		1.87		
	Cation Sum (meq/L)	2.16		1.96		
	Cation - Anion Balance (%)	12.3		2.4		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.30		1.18		
	Total Organic Carbon (mg/L)	1.64		1.13		
Total Metals	Aluminum (Al)-Total (mg/L)	0.0772		0.132		
	Antimony (Sb)-Total (mg/L)	0.00021		<0.00010		
	Arsenic (As)-Total (mg/L)	0.00039		0.00038		
	Barium (Ba)-Total (mg/L)	0.0279		0.0242		
	Beryllium (Be)-Total (ug/L)	<0.020		<0.020		
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050		
	Boron (B)-Total (mg/L)	<0.010		<0.010		
	Cadmium (Cd)-Total (ug/L)	0.0269		0.0057		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2112645-1	L2112645-2	L2112645-3	L2112645-4	
	Description	WS	WS	WS	WS	
	Sampled Date	13-JUN-18	13-JUN-18	13-JUN-18	13-JUN-18	
	Sampled Time	10:00	10:00	11:30	11:30	
	Client ID	RG_ER_WS_2018 0613-1000	RG_ER_WS_2018 0613-1000_FB-HG	RG_SC_WS_2018 0613-1130	RG_SC_WS_2018 0613-1130_FB-HG	
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	27.1		25.3		
	Chromium (Cr)-Total (mg/L)	0.00023		0.00022		
	Cobalt (Co)-Total (ug/L)	<0.10		0.11		
	Copper (Cu)-Total (mg/L)	0.00100		<0.00050		
	Iron (Fe)-Total (mg/L)	0.094		0.187		
	Lead (Pb)-Total (mg/L)	0.00382		0.000229		
	Lithium (Li)-Total (mg/L)	0.0012		0.0011		
	Magnesium (Mg)-Total (mg/L)	7.71		6.96		
	Manganese (Mn)-Total (mg/L)	0.00642		0.00813		
	Mercury (Hg)-Total (ug/L)	0.00056	<0.00050	0.00080	<0.00050	
	Molybdenum (Mo)-Total (mg/L)	0.000521		0.000522		
	Nickel (Ni)-Total (mg/L)	<0.00050		<0.00050		
	Potassium (K)-Total (mg/L)	0.510		0.442		
	Selenium (Se)-Total (ug/L)	0.319		0.081		
	Silicon (Si)-Total (mg/L)	2.31		2.31		
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010		
	Sodium (Na)-Total (mg/L)	2.14		1.96		
	Strontium (Sr)-Total (mg/L)	0.0998		0.0961		
	Thallium (Tl)-Total (mg/L)	<0.000010		<0.000010		
	Tin (Sn)-Total (mg/L)	<0.00010		<0.00010		
	Titanium (Ti)-Total (mg/L)	<0.010		<0.010		
	Uranium (U)-Total (mg/L)	0.000561		0.000554		
	Vanadium (V)-Total (mg/L)	0.00053		0.00052		
	Zinc (Zn)-Total (mg/L)	0.0049		<0.0030		
Dissolved Metals	Dissolved Mercury Filtration Location	LAB		LAB		
	Dissolved Metals Filtration Location	LAB		LAB		
	Aluminum (Al)-Dissolved (mg/L)	0.0172		0.0165		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		
	Arsenic (As)-Dissolved (mg/L)	0.00034		0.00031		
	Barium (Ba)-Dissolved (mg/L)	0.0306		0.0253		
	Beryllium (Be)-Dissolved (ug/L)	<0.020		<0.020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		
	Cadmium (Cd)-Dissolved (ug/L)	0.0116		<0.0050		
	Calcium (Ca)-Dissolved (mg/L)	27.7		25.4		
	Chromium (Cr)-Dissolved (mg/L)	<0.00010		<0.00010		
	Cobalt (Co)-Dissolved (ug/L)	<0.10		<0.10		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2112645-1	L2112645-2	L2112645-3	L2112645-4	
	Description	WS	WS	WS	WS	
	Sampled Date	13-JUN-18	13-JUN-18	13-JUN-18	13-JUN-18	
	Sampled Time	10:00	10:00	11:30	11:30	
	Client ID	RG_ER_WS_2018 0613-1000	RG_ER_WS_2018 0613-1000_FB-HG	RG_SC_WS_2018 0613-1130	RG_SC_WS_2018 0613-1130_FB-HG	
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	<0.00050		<0.00050		
	Iron (Fe)-Dissolved (mg/L)	<0.010		<0.010		
	Lead (Pb)-Dissolved (mg/L)	0.000533		<0.000050		
	Lithium (Li)-Dissolved (mg/L)	0.0011		<0.0010		
	Magnesium (Mg)-Dissolved (mg/L)	8.14		7.24		
	Manganese (Mn)-Dissolved (mg/L)	0.00033		0.00246		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.000543		0.000508		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		
	Potassium (K)-Dissolved (mg/L)	0.507		0.456		
	Selenium (Se)-Dissolved (ug/L)	0.326		0.102		
	Silicon (Si)-Dissolved (mg/L)	2.19		2.08		
	Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		
	Sodium (Na)-Dissolved (mg/L)	2.18		2.05		
	Strontium (Sr)-Dissolved (mg/L)	0.103		0.100		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		
	Uranium (U)-Dissolved (mg/L)	0.000587		0.000566		
	Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC, DIS METALS LAB FILTER/PRESERVE

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Chromium (Cr)-Dissolved	MES	L2112645-1, -3
Matrix Spike	Barium (Ba)-Total	MS-B	L2112645-1, -3
Matrix Spike	Calcium (Ca)-Total	MS-B	L2112645-1, -3
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2112645-1, -3
Matrix Spike	Strontium (Sr)-Total	MS-B	L2112645-1, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-ED Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

Reference Information

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Regional Effects

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2112645 Report Date: 12-JUL-18

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4098728								
WG2808164-32 LCS								
Acidity (as CaCO3)			101.1		%		85-115	26-JUN-18
WG2808164-31 MB								
Acidity (as CaCO3)			1.4		mg/L		2	26-JUN-18
ALK-MAN-CL	**Water**							
Batch R4098803								
WG2808901-14 LCS								
Alkalinity, Total (as CaCO3)			98.3		%		85-115	27-JUN-18
WG2808901-13 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	27-JUN-18
BE-D-L-CCMS-VA	**Water**							
Batch R4090282								
WG2800455-2 LCS								
Beryllium (Be)-Dissolved			103.1		%		80-120	19-JUN-18
WG2800455-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	19-JUN-18
BE-T-L-CCMS-VA	**Water**							
Batch R4090279								
WG2800351-2 LCS								
Beryllium (Be)-Total			101.5		%		80-120	19-JUN-18
WG2800351-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	19-JUN-18
BR-L-IC-N-CL	**Water**							
Batch R4090194								
WG2801503-10 LCS								
Bromide (Br)			100.4		%		85-115	15-JUN-18
WG2801503-9 MB								
Bromide (Br)			<0.050		mg/L		0.05	15-JUN-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4115648								
WG2817137-6 LCS								
Dissolved Organic Carbon			92.9		%		80-120	07-JUL-18
WG2817137-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-JUL-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4115648								
WG2817137-6 LCS								
Total Organic Carbon			106.6		%		80-120	07-JUL-18
WG2817137-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-JUL-18
CL-IC-N-CL	**Water**							
Batch R4090194								
WG2801503-10 LCS								
Chloride (Cl)			100.5		%		90-110	15-JUN-18
WG2801503-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	15-JUN-18
EC-L-PCT-CL	**Water**							
Batch R4098803								
WG2808901-14 LCS								
Conductivity (@ 25C)			104.4		%		90-110	27-JUN-18
WG2808901-13 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	27-JUN-18
F-IC-N-CL	**Water**							
Batch R4090194								
WG2801503-10 LCS								
Fluoride (F)			102.5		%		90-110	15-JUN-18
WG2801503-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	15-JUN-18
HG-D-CVAA-VA	**Water**							
Batch R4089054								
WG2800620-3 DUP		**L2112645-1**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	19-JUN-18
WG2800620-2 LCS								
Mercury (Hg)-Dissolved			101.3		%		80-120	19-JUN-18
WG2800620-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	19-JUN-18
HG-T-U-CVAF-VA	**Water**							
Batch R4094481								
WG2803711-2 LCS								
Mercury (Hg)-Total			99.3		%		80-120	21-JUN-18
WG2803711-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	21-JUN-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4090282								
WG2800455-2 LCS								
Aluminum (Al)-Dissolved			112.7		%		80-120	19-JUN-18
Antimony (Sb)-Dissolved			102.4		%		80-120	19-JUN-18
Arsenic (As)-Dissolved			109.4		%		80-120	19-JUN-18
Barium (Ba)-Dissolved			113.2		%		80-120	19-JUN-18
Bismuth (Bi)-Dissolved			97.6		%		80-120	19-JUN-18
Boron (B)-Dissolved			96.5		%		80-120	19-JUN-18
Cadmium (Cd)-Dissolved			110.8		%		80-120	19-JUN-18
Calcium (Ca)-Dissolved			101.1		%		80-120	19-JUN-18
Chromium (Cr)-Dissolved			129.2	MES	%		80-120	19-JUN-18
Cobalt (Co)-Dissolved			112.0		%		80-120	19-JUN-18
Copper (Cu)-Dissolved			109.5		%		80-120	19-JUN-18
Lead (Pb)-Dissolved			100.3		%		80-120	19-JUN-18
Lithium (Li)-Dissolved			99.8		%		80-120	19-JUN-18
Magnesium (Mg)-Dissolved			109.9		%		80-120	19-JUN-18
Manganese (Mn)-Dissolved			112.0		%		80-120	19-JUN-18
Molybdenum (Mo)-Dissolved			105.0		%		80-120	19-JUN-18
Nickel (Ni)-Dissolved			109.7		%		80-120	19-JUN-18
Potassium (K)-Dissolved			112.5		%		80-120	19-JUN-18
Selenium (Se)-Dissolved			101.8		%		80-120	19-JUN-18
Silicon (Si)-Dissolved			105.3		%		80-120	19-JUN-18
Silver (Ag)-Dissolved			100.8		%		80-120	19-JUN-18
Sodium (Na)-Dissolved			112.2		%		80-120	19-JUN-18
Strontium (Sr)-Dissolved			104.3		%		80-120	19-JUN-18
Thallium (Tl)-Dissolved			98.8		%		80-120	19-JUN-18
Tin (Sn)-Dissolved			103.9		%		80-120	19-JUN-18
Titanium (Ti)-Dissolved			109.6		%		80-120	19-JUN-18
Uranium (U)-Dissolved			103.9		%		80-120	19-JUN-18
Vanadium (V)-Dissolved			110.9		%		80-120	19-JUN-18
Zinc (Zn)-Dissolved			108.6		%		80-120	19-JUN-18
WG2800455-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	19-JUN-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	19-JUN-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	19-JUN-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	19-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4090282								
WG2800455-1 MB		**LF**						
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	19-JUN-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	19-JUN-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	19-JUN-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	19-JUN-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	19-JUN-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	19-JUN-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	19-JUN-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	19-JUN-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	19-JUN-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	19-JUN-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	19-JUN-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	19-JUN-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	19-JUN-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	19-JUN-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	19-JUN-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	19-JUN-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	19-JUN-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	19-JUN-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	19-JUN-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	19-JUN-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	19-JUN-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	19-JUN-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	19-JUN-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	19-JUN-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	19-JUN-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	19-JUN-18
Batch R4093147								
WG2800455-2 LCS								
Iron (Fe)-Dissolved			100.2		%		80-120	20-JUN-18
MET-T-CCMS-VA	**Water**							
Batch R4090279								
WG2800351-2 LCS								
Aluminum (Al)-Total			106.4		%		80-120	19-JUN-18
Antimony (Sb)-Total			102.0		%		80-120	19-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4090279								
WG2800351-2 LCS								
Arsenic (As)-Total			103.1		%		80-120	19-JUN-18
Barium (Ba)-Total			101.8		%		80-120	19-JUN-18
Bismuth (Bi)-Total			98.6		%		80-120	19-JUN-18
Boron (B)-Total			98.2		%		80-120	19-JUN-18
Cadmium (Cd)-Total			101.4		%		80-120	19-JUN-18
Calcium (Ca)-Total			100.3		%		80-120	19-JUN-18
Chromium (Cr)-Total			102.7		%		80-120	19-JUN-18
Cobalt (Co)-Total			105.3		%		80-120	19-JUN-18
Copper (Cu)-Total			103.8		%		80-120	19-JUN-18
Iron (Fe)-Total			102.3		%		80-120	19-JUN-18
Lead (Pb)-Total			98.6		%		80-120	19-JUN-18
Lithium (Li)-Total			99.4		%		80-120	19-JUN-18
Magnesium (Mg)-Total			101.1		%		80-120	19-JUN-18
Manganese (Mn)-Total			107.1		%		80-120	19-JUN-18
Molybdenum (Mo)-Total			99.9		%		80-120	19-JUN-18
Nickel (Ni)-Total			102.3		%		80-120	19-JUN-18
Potassium (K)-Total			108.1		%		80-120	19-JUN-18
Selenium (Se)-Total			96.0		%		80-120	19-JUN-18
Silicon (Si)-Total			103.8		%		80-120	19-JUN-18
Silver (Ag)-Total			96.5		%		80-120	19-JUN-18
Sodium (Na)-Total			108.6		%		80-120	19-JUN-18
Strontium (Sr)-Total			99.4		%		80-120	19-JUN-18
Thallium (Tl)-Total			98.9		%		80-120	19-JUN-18
Tin (Sn)-Total			98.5		%		80-120	19-JUN-18
Titanium (Ti)-Total			99.9		%		80-120	19-JUN-18
Uranium (U)-Total			102.0		%		80-120	19-JUN-18
Vanadium (V)-Total			104.0		%		80-120	19-JUN-18
Zinc (Zn)-Total			104.6		%		80-120	19-JUN-18
WG2800351-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	19-JUN-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	19-JUN-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	19-JUN-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	19-JUN-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	19-JUN-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4090279								
WG2800351-1 MB								
Boron (B)-Total			<0.010		mg/L		0.01	19-JUN-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	19-JUN-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	19-JUN-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	19-JUN-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	19-JUN-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	19-JUN-18
Iron (Fe)-Total			<0.010		mg/L		0.01	19-JUN-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	19-JUN-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	19-JUN-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	19-JUN-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	19-JUN-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	19-JUN-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	19-JUN-18
Potassium (K)-Total			<0.050		mg/L		0.05	19-JUN-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	19-JUN-18
Silicon (Si)-Total			<0.10		mg/L		0.1	19-JUN-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	19-JUN-18
Sodium (Na)-Total			<0.050		mg/L		0.05	19-JUN-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	19-JUN-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	19-JUN-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	19-JUN-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	19-JUN-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	19-JUN-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	19-JUN-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	19-JUN-18
NH3-L-F-CL	**Water**							
Batch R4095891								
WG2805500-2 LCS								
Ammonia as N			100.3		%		85-115	23-JUN-18
WG2805500-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-JUN-18
NO2-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-CL	**Water**							
Batch R4090194								
WG2801503-10 LCS								
Nitrite (as N)			104.4		%		90-110	15-JUN-18
WG2801503-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	15-JUN-18
NO3-L-IC-N-CL	**Water**							
Batch R4090194								
WG2801503-10 LCS								
Nitrate (as N)			102.0		%		90-110	15-JUN-18
WG2801503-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	15-JUN-18
ORP-CL	**Water**							
Batch R4114092								
WG2815703-13 CRM		**CL-ORP**						
ORP			229		mV		210-230	05-JUL-18
WG2815703-14 CRM		**CL-ORP**						
ORP			229		mV		210-230	05-JUL-18
P-T-L-COL-ED	**Water**							
Batch R4121968								
WG2817683-14 LCS								
Phosphorus (P)-Total			101.4		%		80-120	10-JUL-18
WG2817683-13 MB								
Phosphorus (P)-Total			<0.0010		mg/L		0.001	10-JUL-18
PH-CL	**Water**							
Batch R4098803								
WG2808901-14 LCS								
pH			7.03		pH		6.9-7.1	27-JUN-18
PO4-DO-L-COL-CL	**Water**							
Batch R4086159								
WG2798751-6 LCS								
Orthophosphate-Dissolved (as P)			102.0		%		80-120	15-JUN-18
WG2798751-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	15-JUN-18
SO4-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-CL	**Water**							
Batch R4090194								
WG2801503-10 LCS								
Sulfate (SO4)			99.0		%		90-110	15-JUN-18
WG2801503-9 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	15-JUN-18
SOLIDS-TDS-CL	**Water**							
Batch R4094138								
WG2802049-2 LCS								
Total Dissolved Solids			98.7		%		85-115	20-JUN-18
WG2802049-1 MB								
Total Dissolved Solids			<10		mg/L		10	20-JUN-18
TKN-L-F-CL	**Water**							
Batch R4098762								
WG2808821-10 LCS								
Total Kjeldahl Nitrogen			79.4		%		75-125	27-JUN-18
WG2808821-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	27-JUN-18
TSS-L-CL	**Water**							
Batch R4091718								
WG2801473-5 LCS								
Total Suspended Solids			92.2		%		85-115	19-JUN-18
WG2801473-4 MB								
Total Suspended Solids			<1.0		mg/L		1	19-JUN-18
Batch R4094140								
WG2802775-8 LCS								
Total Suspended Solids			110.2		%		85-115	20-JUN-18
WG2802775-7 MB								
Total Suspended Solids			<1.0		mg/L		1	20-JUN-18
TURBIDITY-CL	**Water**							
Batch R4084774								
WG2798217-14 LCS								
Turbidity			99.0		%		85-115	15-JUN-18
WG2798217-13 MB								
Turbidity			<0.10		NTU		0.1	15-JUN-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	13-JUN-18 10:00	27-JUN-18 13:00	0.25	339	hours	EHTR-FM
	3	13-JUN-18 11:30	27-JUN-18 13:00	0.25	337	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2112645 were received on 14-JUN-18 09:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: Regional Effects Program | **TURNAROUND TIME:** Regular

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Effects Program			Lab Name	ALS Calgary			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Lyuda Shvets			Email 1:	X	X	X
Email				Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2: carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	2559 29 Street NE			Email 3: andrew.wight@teck.com	X	X	X
								Email 4: teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5: jwilson@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada				
Phone Number	250-425-8202			Phone Number	403-407-1800			PO number	VPO00563596		

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered : F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTER	N	N	N	N	N	N	N					
								PRESERV.	NONE	NONE	H2SO4	NONE	NONE	HNO3	NONE					
								ANALYSIS	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
RG_ER_WS_20180613-1000	RG_ER	WS	No	13-Jun-18	10:00:00 AM	G	7		1	1	1	1	1	1	1					
RG_ER_WS_20180613-1000_FB-HG	RG_ER	WS	No	13-Jun-18	10:00:00 AM	G	1		1											
RG_SC_WS_20180613-1130	RG_SC	WS	No	13-Jun-18	11:30:00 AM	G	7		1	1	1	1	1	1	1					
RG_SC_WS_20180613-1130_FB-HG	RG_SC	WS	No	13-Jun-18	11:30:00 AM	G	1		1											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Koocanusa - VPO00563596			Brian,	6/14 9:00

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name	Justin Wilson	Mobile #	519-803-3923
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	June 13, 2018
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

9°C

L2112645-COFC

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 31-AUG-18
Report Date: 27-SEP-18 12:00 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2157222

Project P.O. #: VPO00563596
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: REGIONAL Koocanusa
Legal Site Desc:

Comments: Samples L2157222-1, -3, -5, -7, -9 expired for Nitrate and Nitrite and samples L2157222-3 and -5 expired for Acidity prior to analysis.

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157222-1	L2157222-2	L2157222-3	L2157222-4	L2157222-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	13:00	13:00	13:30	13:30	14:00
	Client ID	RG_SCU1_WS_20180829-1300	RG_SCU1_WS_20180829-1300_FB-HG	RG_SCU2_WS_20180829-1330	RG_SCU2_WS_20180829-1330_FB-HG	RG_SCU3_WS_20180829-1400
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	264		268		301
	Hardness (as CaCO3) (mg/L)	124		119		132
	pH (pH)	8.33		8.32		8.36
	ORP (mV)	422		412		333
	Total Suspended Solids (mg/L)	<1.0		1.5		2.9
	Total Dissolved Solids (mg/L)	146 DLHC		143 DLHC		168 DLHC
	Turbidity (NTU)	1.20		0.98		3.05
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	111		110		117
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	111		110		117
	Ammonia as N (mg/L)	0.0107		0.0146		0.0173
	Bromide (Br) (mg/L)	<0.050		<0.050		<0.050
	Chloride (Cl) (mg/L)	2.54		2.65		4.25
	Fluoride (F) (mg/L)	0.093		0.092		0.094
	Ion Balance (%)	92.4		89.3		92.4
	Nitrate (as N) (mg/L)	0.0703		0.0590		0.0345
	Nitrite (as N) (mg/L)	0.0014		<0.0010		<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.082		0.057		0.062
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010		<0.0010		<0.0010
	Phosphorus (P)-Total (mg/L)	0.0023		<0.0020		0.0037
	Sulfate (SO4) (mg/L)	26.4		26.5		31.9
	Anion Sum (meq/L)	2.86		2.84		3.13
	Cation Sum (meq/L)	2.64		2.54		2.89
	Cation - Anion Balance (%)	-4.0		-5.7		-3.9
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.33		1.48		1.50
	Total Organic Carbon (mg/L)	1.81		1.48		1.27
Total Metals	Aluminum (Al)-Total (mg/L)	0.0100		0.0100		0.0349
	Antimony (Sb)-Total (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Total (mg/L)	0.00038		0.00037		0.00048
	Barium (Ba)-Total (mg/L)	0.0376		0.0373		0.0392
	Beryllium (Be)-Total (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Total (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Total (ug/L)	<0.0050		<0.0050		<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157222-6	L2157222-7	L2157222-8	L2157222-9	L2157222-10
	Description	WS	WS	WS	WS	WS
	Sampled Date	29-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18
	Sampled Time	14:00	08:45	08:45	09:00	09:00
	Client ID	RG_SCU3_WS_20180829-1400_FB-HG	RG_ERU1_WS_20180830-0845	RG_ERU1_WS_20180830-0845_FB-HG	RG_ERU2_WS_20180830-0900	RG_ERU2_WS_20180830-0900_FB-HG
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)		259		255	
	Hardness (as CaCO3) (mg/L)		119		116	
	pH (pH)		8.36		8.31	
	ORP (mV)		428		382	
	Total Suspended Solids (mg/L)		2.2		1.3	
	Total Dissolved Solids (mg/L)		151 DLHC		152 DLHC	
	Turbidity (NTU)		0.84		1.13	
Anions and Nutrients	Acidity (as CaCO3) (mg/L)		<1.0		<1.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)		105		111	
	Alkalinity, Carbonate (as CaCO3) (mg/L)		3.6		<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)		<1.0		<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)		109		111	
	Ammonia as N (mg/L)		0.0201		0.0179	
	Bromide (Br) (mg/L)		<0.050		<0.050	
	Chloride (Cl) (mg/L)		2.13		2.13	
	Fluoride (F) (mg/L)		0.092		0.092	
	Ion Balance (%)		91.0		87.5	
	Nitrate (as N) (mg/L)		0.118		0.117	
	Nitrite (as N) (mg/L)		0.0018		0.0018	
	Total Kjeldahl Nitrogen (mg/L)		0.089		0.241	
	Orthophosphate-Dissolved (as P) (mg/L)		<0.0010		<0.0010	
	Phosphorus (P)-Total (mg/L)		<0.0020		<0.0020	
	Sulfate (SO4) (mg/L)		24.9		25.0	
	Anion Sum (meq/L)		2.77		2.81	
	Cation Sum (meq/L)		2.52		2.46	
	Cation - Anion Balance (%)		-4.7		-6.6	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		1.42		1.71	
	Total Organic Carbon (mg/L)		1.45		1.53	
Total Metals	Aluminum (Al)-Total (mg/L)		0.0103		0.0113	
	Antimony (Sb)-Total (mg/L)		<0.00010		<0.00010	
	Arsenic (As)-Total (mg/L)		0.00034		0.00036	
	Barium (Ba)-Total (mg/L)		0.0396		0.0400	
	Beryllium (Be)-Total (ug/L)		<0.020		<0.020	
	Bismuth (Bi)-Total (mg/L)		<0.000050		<0.000050	
	Boron (B)-Total (mg/L)		<0.010		<0.010	
	Cadmium (Cd)-Total (ug/L)		<0.0050		<0.0050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157222-1	L2157222-2	L2157222-3	L2157222-4	L2157222-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	13:00	13:00	13:30	13:30	14:00
	Client ID	RG_SCU1_WS_20180829-1300	RG_SCU1_WS_20180829-1300_FB-HG	RG_SCU2_WS_20180829-1330	RG_SCU2_WS_20180829-1330_FB-HG	RG_SCU3_WS_20180829-1400
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	33.1		33.5		37.0
	Chromium (Cr)-Total (mg/L)	<0.00010		0.00016		0.00012
	Cobalt (Co)-Total (ug/L)	<0.10		<0.10		<0.10
	Copper (Cu)-Total (mg/L)	<0.00050		0.00067		<0.00050
	Iron (Fe)-Total (mg/L)	0.011		0.044		0.057
	Lead (Pb)-Total (mg/L)	<0.000050		<0.000050		0.000096
	Lithium (Li)-Total (mg/L)	0.0018		0.0017		0.0016
	Magnesium (Mg)-Total (mg/L)	9.70		9.86		11.3
	Manganese (Mn)-Total (mg/L)	0.00125		0.00176		0.00475
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)-Total (mg/L)	0.000667		0.000777		0.000764
	Nickel (Ni)-Total (mg/L)	<0.00050		0.00133		<0.00050
	Potassium (K)-Total (mg/L)	0.503		0.501		0.597
	Selenium (Se)-Total (ug/L)	0.837		0.712		0.180
	Silicon (Si)-Total (mg/L)	1.12		1.14		1.86
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Sodium (Na)-Total (mg/L)	3.11		3.21		5.26
	Strontium (Sr)-Total (mg/L)	0.130		0.132		0.156
	Thallium (Tl)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010		<0.00010		0.00019
	Titanium (Ti)-Total (mg/L)	<0.010		<0.010		<0.010
	Uranium (U)-Total (mg/L)	0.000679		0.000693		0.000786
	Vanadium (V)-Total (mg/L)	<0.00050		<0.00050		<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030		<0.0030		<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	LAB		LAB		LAB
	Dissolved Metals Filtration Location	LAB		LAB		LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0039		0.0040		0.0042
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00037		0.00038		0.00043
	Barium (Ba)-Dissolved (mg/L)	0.0373		0.0372		0.0385
	Beryllium (Be)-Dissolved (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050		<0.0050		<0.0050
	Calcium (Ca)-Dissolved (mg/L)	32.9		31.2		34.7
	Chromium (Cr)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10		<0.10		<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2157222-6 WS 29-AUG-18 14:00 RG_SCU3_WS_20180829-1400_FB-HG	L2157222-7 WS 30-AUG-18 08:45 RG_ERU1_WS_20180830-0845	L2157222-8 WS 30-AUG-18 08:45 RG_ERU1_WS_20180830-0845_FB-HG	L2157222-9 WS 30-AUG-18 09:00 RG_ERU2_WS_20180830-0900	L2157222-10 WS 30-AUG-18 09:00 RG_ERU2_WS_20180830-0900_FB-HG
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)		33.2		33.5	
	Chromium (Cr)-Total (mg/L)		<0.00010		<0.00010	
	Cobalt (Co)-Total (ug/L)		<0.10		<0.10	
	Copper (Cu)-Total (mg/L)		<0.00050		<0.00050	
	Iron (Fe)-Total (mg/L)		<0.010		<0.010	
	Lead (Pb)-Total (mg/L)		<0.000050		<0.000050	
	Lithium (Li)-Total (mg/L)		0.0019		0.0019	
	Magnesium (Mg)-Total (mg/L)		9.42		9.65	
	Manganese (Mn)-Total (mg/L)		0.00125		0.00119	
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)-Total (mg/L)		0.000671		0.000687	
	Nickel (Ni)-Total (mg/L)		<0.00050		<0.00050	
	Potassium (K)-Total (mg/L)		0.493		0.501	
	Selenium (Se)-Total (ug/L)		1.16		1.13	
	Silicon (Si)-Total (mg/L)		1.16		1.10	
	Silver (Ag)-Total (mg/L)		<0.000010		<0.000010	
	Sodium (Na)-Total (mg/L)		2.65		2.69	
	Strontium (Sr)-Total (mg/L)		0.123		0.123	
	Thallium (Tl)-Total (mg/L)		<0.000010		<0.000010	
	Tin (Sn)-Total (mg/L)		0.00023		<0.00010	
	Titanium (Ti)-Total (mg/L)		<0.010		<0.010	
	Uranium (U)-Total (mg/L)		0.000686		0.000675	
	Vanadium (V)-Total (mg/L)		<0.00050		<0.00050	
	Zinc (Zn)-Total (mg/L)		<0.0030		<0.0030	
Dissolved Metals	Dissolved Mercury Filtration Location		LAB		LAB	
	Dissolved Metals Filtration Location		LAB		LAB	
	Aluminum (Al)-Dissolved (mg/L)		0.0042		0.0040	
	Antimony (Sb)-Dissolved (mg/L)		<0.00010		<0.00010	
	Arsenic (As)-Dissolved (mg/L)		0.00036		0.00031	
	Barium (Ba)-Dissolved (mg/L)		0.0404		0.0404	
	Beryllium (Be)-Dissolved (ug/L)		<0.020		<0.020	
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050		<0.000050	
	Boron (B)-Dissolved (mg/L)		<0.010		<0.010	
	Cadmium (Cd)-Dissolved (ug/L)		<0.0050		<0.0050	
	Calcium (Ca)-Dissolved (mg/L)		31.9		30.7	
	Chromium (Cr)-Dissolved (mg/L)		<0.00010		<0.00010	
	Cobalt (Co)-Dissolved (ug/L)		<0.10		<0.10	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2157222-1	L2157222-2	L2157222-3	L2157222-4	L2157222-5
Description	WS	WS	WS	WS	WS
Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
Sampled Time	13:00	13:00	13:30	13:30	14:00
Client ID	RG_SCU1_WS_20180829-1300	RG_SCU1_WS_20180829-1300_FB-HG	RG_SCU2_WS_20180829-1330	RG_SCU2_WS_20180829-1330_FB-HG	RG_SCU3_WS_20180829-1400
Grouping **Analyte**					
WATER					
Dissolved Metals Copper (Cu)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Iron (Fe)-Dissolved (mg/L)	<0.010		<0.010		<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
Lithium (Li)-Dissolved (mg/L)	0.0017		0.0017		0.0015
Magnesium (Mg)-Dissolved (mg/L)	10.1		9.85		11.0
Manganese (Mn)-Dissolved (mg/L)	<0.00010		<0.00010		0.00010
Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000684		0.000652		0.000725
Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Potassium (K)-Dissolved (mg/L)	0.530		0.539		0.591
Selenium (Se)-Dissolved (ug/L)	0.807		0.690		0.140
Silicon (Si)-Dissolved (mg/L)	1.09		1.14		1.81
Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Sodium (Na)-Dissolved (mg/L)	3.46		3.53		5.54
Strontium (Sr)-Dissolved (mg/L)	0.129		0.127		0.151
Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		0.00018
Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		<0.010
Uranium (U)-Dissolved (mg/L)	0.000670		0.000687		0.000788
Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157222-6	L2157222-7	L2157222-8	L2157222-9	L2157222-10
	Description	WS	WS	WS	WS	WS
	Sampled Date	29-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18
	Sampled Time	14:00	08:45	08:45	09:00	09:00
	Client ID	RG_SCU3_WS_20180829-1400_FB-HG	RG_ERU1_WS_20180830-0845	RG_ERU1_WS_20180830-0845_FB-HG	RG_ERU2_WS_20180830-0900	RG_ERU2_WS_20180830-0900_FB-HG
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)		<0.00050		<0.00050	
	Iron (Fe)-Dissolved (mg/L)		<0.010		<0.010	
	Lead (Pb)-Dissolved (mg/L)		<0.000050		<0.000050	
	Lithium (Li)-Dissolved (mg/L)		0.0018		0.0018	
	Magnesium (Mg)-Dissolved (mg/L)		9.63		9.61	
	Manganese (Mn)-Dissolved (mg/L)		<0.00010		<0.00010	
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050		<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)		0.000655		0.000630	
	Nickel (Ni)-Dissolved (mg/L)		<0.00050		<0.00050	
	Potassium (K)-Dissolved (mg/L)		0.511		0.507	
	Selenium (Se)-Dissolved (ug/L)		1.17		1.16	
	Silicon (Si)-Dissolved (mg/L)		1.16		1.08	
	Silver (Ag)-Dissolved (mg/L)		<0.000010		<0.000010	
	Sodium (Na)-Dissolved (mg/L)		2.88		2.83	
	Strontium (Sr)-Dissolved (mg/L)		0.121		0.119	
	Thallium (Tl)-Dissolved (mg/L)		<0.000010		<0.000010	
	Tin (Sn)-Dissolved (mg/L)		0.00012		0.00014	
	Titanium (Ti)-Dissolved (mg/L)		<0.010		<0.010	
	Uranium (U)-Dissolved (mg/L)		0.000700		0.000669	
	Vanadium (V)-Dissolved (mg/L)		<0.00050		<0.00050	
	Zinc (Zn)-Dissolved (mg/L)		<0.0010		<0.0010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC and dissolved metals to be filtered and preserve in lab; filter code added

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Manganese (Mn)-Total	MB-LOR	L2157222-1, -3, -5, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Arsenic (As)-Total	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Iron (Fe)-Total	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2157222-1, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2157222-1, -3, -5, -7, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

Reference Information

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL Water Total Organic Carbon APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-L-IC-N-VA Water Chloride in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

REGIONAL Koocanusa

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4214521								
WG2872644-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			101.8		%		85-115	12-SEP-18
WG2872644-1 MB								
Acidity (as CaCO3)			1.4		mg/L		2	12-SEP-18
ALK-TITR-VA	**Water**							
Batch R4211237								
WG2872116-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			101.5		%		85-115	11-SEP-18
WG2872116-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	11-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-2 LCS								
Beryllium (Be)-Dissolved			83.0		%		80-120	04-SEP-18
WG2867389-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	04-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4201797								
WG2867375-2 LCS								
Beryllium (Be)-Total			94.4		%		80-120	05-SEP-18
WG2867375-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	05-SEP-18
BR-L-IC-N-VA	**Water**							
Batch R4211850								
WG2872638-2 LCS								
Bromide (Br)			99.2		%		85-115	10-SEP-18
WG2872638-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	10-SEP-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4214062								
WG2874366-11 DUP		**L2157222-9**						
Dissolved Organic Carbon		1.71	1.72		mg/L	0.2	20	11-SEP-18
WG2874366-10 LCS								
Dissolved Organic Carbon			101.2		%		80-120	11-SEP-18
WG2874366-9 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	11-SEP-18
WG2874366-12 MS		**L2157222-9**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4214062								
WG2874366-12 MS		**L2157222-9**						
Dissolved Organic Carbon			92.5		%		70-130	11-SEP-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4214062								
WG2874366-11 DUP		**L2157222-9**						
Total Organic Carbon		1.53	1.72		mg/L	12	20	11-SEP-18
WG2874366-10 LCS								
Total Organic Carbon			100.4		%		80-120	11-SEP-18
WG2874366-9 MB								
Total Organic Carbon			<0.50		mg/L		0.5	11-SEP-18
WG2874366-12 MS		**L2157222-9**						
Total Organic Carbon			96.1		%		70-130	11-SEP-18
CL-L-IC-N-VA	**Water**							
Batch R4211850								
WG2872638-2 LCS								
Chloride (Cl)			99.8		%		90-110	10-SEP-18
WG2872638-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	10-SEP-18
EC-PCT-VA	**Water**							
Batch R4214521								
WG2872644-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			101.2		%		90-110	12-SEP-18
WG2872644-1 MB								
Conductivity			<2.0		uS/cm		2	12-SEP-18
F-IC-N-VA	**Water**							
Batch R4211850								
WG2872638-2 LCS								
Fluoride (F)			99.96		%		90-110	10-SEP-18
WG2872638-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	10-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4203031								
WG2867841-3 DUP		**L2157222-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	05-SEP-18
WG2867841-2 LCS								
Mercury (Hg)-Dissolved			99.7		%		80-120	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R4203031								
WG2867841-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	05-SEP-18
WG2867841-4 MS		**L2157222-1**						
Mercury (Hg)-Dissolved			84.0		%		70-130	05-SEP-18
HG-T-U-CVAF-VA	**Water**							
Batch R4204226								
WG2869430-6 DUP		**L2157222-9**						
Mercury (Hg)-Total		<0.00050	<0.00050	RPD-NA	ug/L	N/A	20	06-SEP-18
WG2869430-2 LCS								
Mercury (Hg)-Total			106.0		%		80-120	06-SEP-18
WG2869430-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	06-SEP-18
WG2869430-5 MS		**L2157222-5**						
Mercury (Hg)-Total			92.0		%		70-130	06-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-2 LCS								
Aluminum (Al)-Dissolved			95.0		%		80-120	04-SEP-18
Antimony (Sb)-Dissolved			97.7		%		80-120	04-SEP-18
Arsenic (As)-Dissolved			100.4		%		80-120	04-SEP-18
Barium (Ba)-Dissolved			91.3		%		80-120	04-SEP-18
Bismuth (Bi)-Dissolved			92.4		%		80-120	04-SEP-18
Boron (B)-Dissolved			89.6		%		80-120	04-SEP-18
Cadmium (Cd)-Dissolved			93.1		%		80-120	04-SEP-18
Calcium (Ca)-Dissolved			89.9		%		80-120	04-SEP-18
Chromium (Cr)-Dissolved			93.1		%		80-120	04-SEP-18
Cobalt (Co)-Dissolved			93.8		%		80-120	04-SEP-18
Copper (Cu)-Dissolved			91.3		%		80-120	04-SEP-18
Iron (Fe)-Dissolved			97.3		%		80-120	04-SEP-18
Lead (Pb)-Dissolved			94.5		%		80-120	04-SEP-18
Lithium (Li)-Dissolved			83.6		%		80-120	04-SEP-18
Magnesium (Mg)-Dissolved			94.0		%		80-120	04-SEP-18
Manganese (Mn)-Dissolved			95.8		%		80-120	04-SEP-18
Molybdenum (Mo)-Dissolved			93.3		%		80-120	04-SEP-18
Nickel (Ni)-Dissolved			92.2		%		80-120	04-SEP-18
Potassium (K)-Dissolved			95.5		%		80-120	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-2 LCS								
Selenium (Se)-Dissolved			97.4		%		80-120	04-SEP-18
Silicon (Si)-Dissolved			96.5		%		60-140	04-SEP-18
Silver (Ag)-Dissolved			94.4		%		80-120	04-SEP-18
Sodium (Na)-Dissolved			97.3		%		80-120	04-SEP-18
Strontium (Sr)-Dissolved			91.8		%		80-120	04-SEP-18
Thallium (Tl)-Dissolved			95.4		%		80-120	04-SEP-18
Tin (Sn)-Dissolved			97.1		%		80-120	04-SEP-18
Titanium (Ti)-Dissolved			93.3		%		80-120	04-SEP-18
Uranium (U)-Dissolved			96.9		%		80-120	04-SEP-18
Vanadium (V)-Dissolved			94.3		%		80-120	04-SEP-18
Zinc (Zn)-Dissolved			92.3		%		80-120	04-SEP-18
WG2867389-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	04-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	04-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-1 MB		**LF**						
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	04-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4201797								
WG2867375-2 LCS								
Aluminum (Al)-Total			92.5		%		80-120	05-SEP-18
Antimony (Sb)-Total			95.9		%		80-120	05-SEP-18
Arsenic (As)-Total			92.9		%		80-120	05-SEP-18
Barium (Ba)-Total			91.9		%		80-120	05-SEP-18
Bismuth (Bi)-Total			92.9		%		80-120	05-SEP-18
Boron (B)-Total			88.0		%		80-120	05-SEP-18
Cadmium (Cd)-Total			93.8		%		80-120	05-SEP-18
Calcium (Ca)-Total			92.7		%		80-120	05-SEP-18
Chromium (Cr)-Total			95.1		%		80-120	05-SEP-18
Cobalt (Co)-Total			93.3		%		80-120	05-SEP-18
Copper (Cu)-Total			93.5		%		80-120	05-SEP-18
Iron (Fe)-Total			94.8		%		80-120	05-SEP-18
Lead (Pb)-Total			96.5		%		80-120	05-SEP-18
Lithium (Li)-Total			91.3		%		80-120	05-SEP-18
Magnesium (Mg)-Total			92.6		%		80-120	05-SEP-18
Manganese (Mn)-Total			92.1		%		80-120	05-SEP-18
Molybdenum (Mo)-Total			94.7		%		80-120	05-SEP-18
Nickel (Ni)-Total			91.8		%		80-120	05-SEP-18
Potassium (K)-Total			91.6		%		80-120	05-SEP-18
Selenium (Se)-Total			93.3		%		80-120	05-SEP-18
Silicon (Si)-Total			92.9		%		80-120	05-SEP-18
Silver (Ag)-Total			92.5		%		80-120	05-SEP-18
Sodium (Na)-Total			93.0		%		80-120	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4201797								
WG2867375-2 LCS								
Strontium (Sr)-Total			91.3		%		80-120	05-SEP-18
Thallium (Tl)-Total			93.6		%		80-120	05-SEP-18
Tin (Sn)-Total			96.2		%		80-120	05-SEP-18
Titanium (Ti)-Total			90.0		%		80-120	05-SEP-18
Uranium (U)-Total			102.3		%		80-120	05-SEP-18
Vanadium (V)-Total			94.8		%		80-120	05-SEP-18
Zinc (Zn)-Total			91.6		%		80-120	05-SEP-18
WG2867375-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	05-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	05-SEP-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	05-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	05-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	05-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	05-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	05-SEP-18
Manganese (Mn)-Total			0.00013	MB-LOR	mg/L		0.0001	05-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	05-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	05-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	05-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	05-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4201797								
WG2867375-1 MB								
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	05-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	05-SEP-18
NH3-L-F-CL	**Water**							
Batch R4214247								
WG2874603-2 LCS								
Ammonia as N			101.2		%		85-115	12-SEP-18
WG2874603-6 LCS								
Ammonia as N			102.1		%		85-115	12-SEP-18
WG2874603-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	12-SEP-18
WG2874603-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	12-SEP-18
NO2-L-IC-N-VA	**Water**							
Batch R4211850								
WG2872638-2 LCS								
Nitrite (as N)			99.6		%		90-110	10-SEP-18
WG2872638-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	10-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4211850								
WG2872638-2 LCS								
Nitrate (as N)			100.3		%		90-110	10-SEP-18
WG2872638-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	10-SEP-18
ORP-CL	**Water**							
Batch R4207627								
WG2872339-7 CRM		**CL-ORP**						
ORP			224		mV		210-230	10-SEP-18
P-T-L-COL-CL	**Water**							
Batch R4218310								
WG2879315-2 LCS								
Phosphorus (P)-Total			95.8		%		80-120	17-SEP-18
WG2879315-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-CL	**Water**							
Batch R4218310								
WG2879315-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	17-SEP-18
PH-PCT-VA	**Water**							
Batch R4214521								
WG2872644-2 CRM		**VA-PH7-BUF**						
pH			7.00		pH		6.9-7.1	12-SEP-18
PO4-DO-L-COL-CL	**Water**							
Batch R4196670								
WG2866156-22 LCS								
Orthophosphate-Dissolved (as P)			96.6		%		80-120	01-SEP-18
WG2866156-21 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	01-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4211850								
WG2872638-2 LCS								
Sulfate (SO4)			100.6		%		90-110	10-SEP-18
WG2872638-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	10-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4202808								
WG2866943-8 LCS								
Total Dissolved Solids			102.2		%		85-115	04-SEP-18
WG2866943-7 MB								
Total Dissolved Solids			<10		mg/L		10	04-SEP-18
TKN-L-F-CL	**Water**							
Batch R4207713								
WG2870103-11 LCS								
Total Kjeldahl Nitrogen			101.9		%		75-125	09-SEP-18
WG2870103-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	09-SEP-18
TSS-L-CL	**Water**							
Batch R4202812								
WG2867552-8 LCS								
Total Suspended Solids			93.1		%		85-115	04-SEP-18
WG2867552-7 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TSS-L-CL	**Water**							
Batch R4202812								
WG2867552-7 MB								
Total Suspended Solids			<1.0		mg/L		1	04-SEP-18
Batch R4203976								
WG2868851-8 LCS								
Total Suspended Solids			95.1		%		85-115	05-SEP-18
WG2868851-7 MB								
Total Suspended Solids			<1.0		mg/L		1	05-SEP-18
TSS-LOW-VA	**Water**							
Batch R4203669								
WG2867937-2 LCS								
Total Suspended Solids			105.6		%		85-115	05-SEP-18
WG2867937-1 MB								
Total Suspended Solids			<1.0		mg/L		1	05-SEP-18
TURBIDITY-CL	**Water**							
Batch R4200147								
WG2866363-3 DUP		**L2157222-1**						
Turbidity		1.20	1.14		NTU	5.1	15	01-SEP-18
WG2866363-2 LCS								
Turbidity			98.5		%		85-115	01-SEP-18
WG2866363-5 LCS								
Turbidity			99.0		%		85-115	01-SEP-18
WG2866363-1 MB								
Turbidity			<0.10		NTU		0.1	01-SEP-18
WG2866363-4 MB								
Turbidity			<0.10		NTU		0.1	01-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	29-AUG-18 13:00	10-SEP-18 00:00	0.25	275	hours	EHTR-FM
	3	29-AUG-18 13:30	10-SEP-18 00:00	0.25	275	hours	EHTR-FM
	5	29-AUG-18 14:00	10-SEP-18 00:00	0.25	274	hours	EHTR-FM
	7	30-AUG-18 08:45	10-SEP-18 00:00	0.25	255	hours	EHTR-FM
	9	30-AUG-18 09:00	10-SEP-18 00:00	0.25	255	hours	EHTR-FM
pH by Meter (Automated)							
	1	29-AUG-18 13:00	12-SEP-18 14:06	0.25	337	hours	EHTR-FM
	3	29-AUG-18 13:30	13-SEP-18 09:31	0.25	356	hours	EHTR-FM
	5	29-AUG-18 14:00	13-SEP-18 09:31	0.25	355	hours	EHTR-FM
	7	30-AUG-18 08:45	13-SEP-18 09:31	0.25	337	hours	EHTR-FM
	9	30-AUG-18 09:00	12-SEP-18 14:06	0.25	317	hours	EHTR-FM
Anions and Nutrients							
Acidity by Automatic Titration							
	3	29-AUG-18 13:30	13-SEP-18 09:31	14	15	days	EHT
	5	29-AUG-18 14:00	13-SEP-18 09:31	14	15	days	EHT
Nitrate in Water by IC (Low Level)							
	1	29-AUG-18 13:00	10-SEP-18 11:34	3	12	days	EHT
	3	29-AUG-18 13:30	10-SEP-18 11:34	3	12	days	EHT
	5	29-AUG-18 14:00	10-SEP-18 11:34	3	12	days	EHT
	7	30-AUG-18 08:45	10-SEP-18 11:34	3	11	days	EHT
	9	30-AUG-18 09:00	10-SEP-18 11:34	3	11	days	EHT
Nitrite in Water by IC (Low Level)							
	1	29-AUG-18 13:00	10-SEP-18 11:34	3	12	days	EHT
	3	29-AUG-18 13:30	10-SEP-18 11:34	3	12	days	EHT
	5	29-AUG-18 14:00	10-SEP-18 11:34	3	12	days	EHT
	7	30-AUG-18 08:45	10-SEP-18 11:34	3	11	days	EHT
	9	30-AUG-18 09:00	10-SEP-18 11:34	3	11	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2157222 were received on 31-AUG-18 10:40.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

L2157222-COFC

COC ID:	REGIONAL Koocanusa Reservoir	TURNAI

PROJECT/CLIENT INFO										OTHER INFO			
Facility Name / Job#	Regional Koocanusa				Lab					istribution	Excel	PDF	EDD
Project Manager	Cait Good				Lab C						X	X	X
Email										er@teck.com	X	X	X
Address	421 Pine Avenue				Address	2559 29 Street NE			Email 3:				
									Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC		City	Calgary	Province	AB	Email 5:	lwilson@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada		Postal Code	T1Y7B5	Country	Canada					
Phone Number	250-425-8202				Phone Number	14034071794			PO number	VPO00563596			

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Filtered - F: Field, L: Lab, FL: Field & Lab, N: None											
								FILTER	N	N	N	N	N	N	N				
								PRESERV.	NONE	NONE	H2SO4	NONE	NONE	HNO3	NONE				
	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA				
1	RG_SCU1_WS_20180829-1300	RG_SCU1	WS		29-Aug-18	1:00:00 PM	G	7	1	1	1	1	1	1	1				
2	RG_SCU1_WS_20180829-1300_FB-HG	RG_SCU1	WS		29-Aug-18	1:00:00 PM	G	1	1										
3	RG_SCU2_WS_20180829-1330	RG_SCU2	WS		29-Aug-18	1:30:00 PM	G	7	1	1	1	1	1	1	1				
4	RG_SCU2_WS_20180829-1330_FB-HG	RG_SCU2	WS		29-Aug-18	1:30:00 PM	G	1	1										
5	RG_SCU3_WS_20180829-1400	RG_SCU3	WS		29-Aug-18	2:00:00 PM	G	7	1	1	1	1	1	1	1				
6	RG_SCU3_WS_20180829-1400_FB-HG	RG_SCU3	WS		29-Aug-18	2:00:00 PM	G	1	1										
7	RG_ERU1_WS_20180830-0845	RG_ERU1	WS		30-Aug-18	8:45:00 AM	G	7	1	1	1	1	1	1	1				
8	RG_ERU1_WS_20180830-0845_FB-HG	RG_ERU1	WS		30-Aug-18	8:45:00 AM	G	1	1										
9	RG_ERU2_WS_20180830-0900	RG_ERU2	WS		30-Aug-18	9:00:00 AM	G	7	1	1	1	1	1	1	1				
10	RG_ERU2_WS_20180830-0900_FB-HG	RG_ERU2	WS		30-Aug-18	9:00:00 AM	G	1	1										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Koocanusa - VPO00563596				08/31 1040

SERVICE REQUEST (rush - subject to availability)					
Regular (default) X	Sampler's Name	Justin Wilson	Mobile #	519-803-3923
Priority (2-3 business days) - 50% surcharge				
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	August 30, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS				

9

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 31-AUG-18
Report Date: 05-JUN-19 14:46 (MT)
Version: FINAL REV. 2

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2157225

Project P.O. #: VPO00563596
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: REGIONAL Koocanusa
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157225-1	L2157225-2			
	Description	WQ	WQ			
	Sampled Date	29-AUG-18	30-AUG-18			
	Sampled Time	18:30	09:30			
	Client ID	RG_TRIP_WQ_20180829-1830	RG_FBLANK_WQ_20180830-0930			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	<2.0			
	Hardness (as CaCO3) (mg/L)	<0.50	<0.50			
	pH (pH)	6.09	5.85			
	ORP (mV)	437	496			
	Total Suspended Solids (mg/L)	<1.0	<1.0			
	Total Dissolved Solids (mg/L)	<10	<10			
	Turbidity (NTU)	<0.10	<0.10			
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	1.9	2.0			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	<1.0			
	Ammonia as N (mg/L)	0.0231 RRV	<0.0050			
	Bromide (Br) (mg/L)	<0.050	<0.050			
	Chloride (Cl) (mg/L)	<0.10	<0.10			
	Fluoride (F) (mg/L)	<0.020	<0.020			
	Ion Balance (%)	0.0	0.0			
	Nitrate (as N) (mg/L)	<0.0050	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050			
	Orthophosphate-Dissolved (as P) (mg/L)	0.0010	<0.0010			
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020			
	Sulfate (SO4) (mg/L)	<0.30	<0.30			
	Anion Sum (meq/L)	<0.10	<0.10			
	Cation Sum (meq/L)	<0.10	<0.10			
	Cation - Anion Balance (%)	0.0	0.0			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		<0.50			
	Total Organic Carbon (mg/L)	<0.50	<0.50			
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030			
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010			
	Barium (Ba)-Total (mg/L)	0.00018	<0.00010			
	Beryllium (Be)-Total (ug/L)	<0.020	<0.020			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Total (ug/L)	<0.0050	<0.0050			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157225-1	L2157225-2			
	Description	WQ	WQ			
	Sampled Date	29-AUG-18	30-AUG-18			
	Sampled Time	18:30	09:30			
	Client ID	RG_TRIP_WQ_20180829-1830	RG_FBLANK_WQ_20180830-0930			
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	<0.050	<0.050			
	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Total (ug/L)	<0.10	<0.10			
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.010	<0.010			
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010			
	Magnesium (Mg)-Total (mg/L)	<0.10	<0.10			
	Manganese (Mn)-Total (mg/L)	<0.00010	<0.00010			
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050			
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050			
	Potassium (K)-Total (mg/L)	<0.050	<0.050			
	Selenium (Se)-Total (ug/L)	<0.050	<0.050			
	Silicon (Si)-Total (mg/L)	<0.10	<0.10			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	<0.050	<0.050			
	Strontium (Sr)-Total (mg/L)	<0.00020	<0.00020			
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010			
	Uranium (U)-Total (mg/L)	<0.000010	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030			
Dissolved Metals	Dissolved Mercury Filtration Location		LAB			
	Dissolved Metals Filtration Location	LAB	LAB			
	Aluminum (Al)-Dissolved (mg/L)		<0.0030			
	Antimony (Sb)-Dissolved (mg/L)		<0.00010			
	Arsenic (As)-Dissolved (mg/L)		<0.00010			
	Barium (Ba)-Dissolved (mg/L)		<0.00010			
	Beryllium (Be)-Dissolved (ug/L)		<0.020			
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050			
	Boron (B)-Dissolved (mg/L)		<0.010			
	Cadmium (Cd)-Dissolved (ug/L)		<0.0050			
	Calcium (Ca)-Dissolved (mg/L)	<0.050	<0.050			
	Chromium (Cr)-Dissolved (mg/L)		<0.00010			
	Cobalt (Co)-Dissolved (ug/L)		<0.10			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157225-1	L2157225-2			
	Description	WQ	WQ			
	Sampled Date	29-AUG-18	30-AUG-18			
	Sampled Time	18:30	09:30			
	Client ID	RG_TRIP_WQ_20180829-1830	RG_FBLANK_WQ_20180830-0930			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)		<0.00050			
	Iron (Fe)-Dissolved (mg/L)		<0.010			
	Lead (Pb)-Dissolved (mg/L)		<0.000050			
	Lithium (Li)-Dissolved (mg/L)		<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	<0.0050	<0.10			
	Manganese (Mn)-Dissolved (mg/L)		<0.00010			
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)		<0.000050			
	Nickel (Ni)-Dissolved (mg/L)		<0.00050			
	Potassium (K)-Dissolved (mg/L)	<0.050	<0.050			
	Selenium (Se)-Dissolved (ug/L)		<0.050			
	Silicon (Si)-Dissolved (mg/L)		<0.050			
	Silver (Ag)-Dissolved (mg/L)		<0.000010			
	Sodium (Na)-Dissolved (mg/L)	<0.050	<0.050			
	Strontium (Sr)-Dissolved (mg/L)		<0.00020			
	Thallium (Tl)-Dissolved (mg/L)		<0.000010			
	Tin (Sn)-Dissolved (mg/L)		<0.00010			
	Titanium (Ti)-Dissolved (mg/L)		<0.010			
	Uranium (U)-Dissolved (mg/L)		<0.000010			
	Vanadium (V)-Dissolved (mg/L)		<0.00050			
	Zinc (Zn)-Dissolved (mg/L)		<0.0010			

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC and dissolved metals to be filtered and preserved in lab; filter code added

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2157225-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2157225-2
Matrix Spike	Boron (B)-Dissolved	MS-B	L2157225-2
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2157225-2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2157225-2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2157225-2
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L2157225-2
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2157225-2
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2157225-2
Matrix Spike	Barium (Ba)-Total	MS-B	L2157225-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2157225-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2157225-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2157225-1, -2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

		Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

Reference Information

C-TOT-ORG-LOW-CL Water

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-L-IC-N-VA Water Chloride in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-CL Water Hardness APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-CL Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

Reference Information

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Reference Information

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

REGIONAL Koocanusa

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4214521								
WG2872644-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			101.8		%		85-115	12-SEP-18
WG2872644-1 MB								
Acidity (as CaCO3)			1.4		mg/L		2	12-SEP-18
ALK-TITR-VA	**Water**							
Batch R4211237								
WG2872116-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			101.5		%		85-115	11-SEP-18
WG2872116-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	11-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4200610								
WG2867559-2 LCS								
Beryllium (Be)-Dissolved			93.6		%		80-120	04-SEP-18
WG2867559-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	04-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4203396								
WG2867549-2 LCS								
Beryllium (Be)-Total			93.1		%		80-120	05-SEP-18
WG2867549-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	05-SEP-18
BR-L-IC-N-VA	**Water**							
Batch R4214491								
WG2872646-2 LCS								
Bromide (Br)			106.4		%		85-115	11-SEP-18
WG2872646-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	11-SEP-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4216218								
WG2876863-2 LCS								
Dissolved Organic Carbon			101.6		%		80-120	13-SEP-18
WG2876863-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	13-SEP-18
C-TOT-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LOW-CL	**Water**							
Batch R4216218								
WG2876863-2 LCS								
Total Organic Carbon			99.5		%		80-120	13-SEP-18
WG2876863-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-SEP-18
CL-L-IC-N-VA	**Water**							
Batch R4214491								
WG2872646-2 LCS								
Chloride (Cl)			104.2		%		90-110	11-SEP-18
WG2872646-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	11-SEP-18
EC-PCT-VA	**Water**							
Batch R4214521								
WG2872644-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			101.2		%		90-110	12-SEP-18
WG2872644-1 MB								
Conductivity			<2.0		uS/cm		2	12-SEP-18
F-IC-N-VA	**Water**							
Batch R4214491								
WG2872646-2 LCS								
Fluoride (F)			101.6		%		90-110	11-SEP-18
WG2872646-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	11-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4203031								
WG2867841-2 LCS								
Mercury (Hg)-Dissolved			99.7		%		80-120	05-SEP-18
WG2867841-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	05-SEP-18
HG-T-U-CVAF-VA	**Water**							
Batch R4204226								
WG2869430-2 LCS								
Mercury (Hg)-Total			106.0		%		80-120	06-SEP-18
WG2869430-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	06-SEP-18
MET-D-CCMS-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R4204096								
WG2869757-10 LCS		**TMRM**						
Calcium (Ca)-Dissolved			104.2		%		80-120	06-SEP-18
Magnesium (Mg)-Dissolved			112.8		%		80-120	06-SEP-18
Potassium (K)-Dissolved			108.7		%		80-120	06-SEP-18
Sodium (Na)-Dissolved			102.4		%		80-120	06-SEP-18
WG2869757-2 LCS		**TMRM**						
Calcium (Ca)-Dissolved			97.0		%		80-120	06-SEP-18
Magnesium (Mg)-Dissolved			107.6		%		80-120	06-SEP-18
Potassium (K)-Dissolved			98.5		%		80-120	06-SEP-18
Sodium (Na)-Dissolved			99.0		%		80-120	06-SEP-18
WG2869757-6 LCS		**TMRM**						
Calcium (Ca)-Dissolved			95.8		%		80-120	06-SEP-18
Magnesium (Mg)-Dissolved			102.9		%		80-120	06-SEP-18
Potassium (K)-Dissolved			96.0		%		80-120	06-SEP-18
Sodium (Na)-Dissolved			96.2		%		80-120	06-SEP-18
WG2869757-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-SEP-18
WG2869757-5 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-SEP-18
WG2869757-9 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-SEP-18
WG2869757-8 MS		**L2157225-1**						
Calcium (Ca)-Dissolved			99.5		%		70-130	06-SEP-18
Magnesium (Mg)-Dissolved			101.4		%		70-130	06-SEP-18
Potassium (K)-Dissolved			99.0		%		70-130	06-SEP-18
Sodium (Na)-Dissolved			102.1		%		70-130	06-SEP-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200610								
WG2867559-2 LCS								
Aluminum (Al)-Dissolved			95.6		%		80-120	04-SEP-18
Antimony (Sb)-Dissolved			97.3		%		80-120	04-SEP-18
Arsenic (As)-Dissolved			101.5		%		80-120	04-SEP-18
Barium (Ba)-Dissolved			92.0		%		80-120	04-SEP-18
Bismuth (Bi)-Dissolved			85.1		%		80-120	04-SEP-18
Boron (B)-Dissolved			93.4		%		80-120	04-SEP-18
Cadmium (Cd)-Dissolved			97.0		%		80-120	04-SEP-18
Calcium (Ca)-Dissolved			91.7		%		80-120	04-SEP-18
Chromium (Cr)-Dissolved			94.9		%		80-120	04-SEP-18
Cobalt (Co)-Dissolved			95.4		%		80-120	04-SEP-18
Copper (Cu)-Dissolved			94.9		%		80-120	04-SEP-18
Iron (Fe)-Dissolved			92.4		%		80-120	04-SEP-18
Lead (Pb)-Dissolved			91.2		%		80-120	04-SEP-18
Lithium (Li)-Dissolved			94.7		%		80-120	04-SEP-18
Magnesium (Mg)-Dissolved			95.0		%		80-120	04-SEP-18
Manganese (Mn)-Dissolved			96.6		%		80-120	04-SEP-18
Molybdenum (Mo)-Dissolved			98.4		%		80-120	04-SEP-18
Nickel (Ni)-Dissolved			95.8		%		80-120	04-SEP-18
Potassium (K)-Dissolved			98.8		%		80-120	04-SEP-18
Selenium (Se)-Dissolved			103.1		%		80-120	04-SEP-18
Silicon (Si)-Dissolved			99.8		%		60-140	04-SEP-18
Silver (Ag)-Dissolved			90.3		%		80-120	04-SEP-18
Sodium (Na)-Dissolved			93.8		%		80-120	04-SEP-18
Thallium (Tl)-Dissolved			89.3		%		80-120	04-SEP-18
Tin (Sn)-Dissolved			98.0		%		80-120	04-SEP-18
Titanium (Ti)-Dissolved			94.7		%		80-120	04-SEP-18
Uranium (U)-Dissolved			90.4		%		80-120	04-SEP-18
Vanadium (V)-Dissolved			97.8		%		80-120	04-SEP-18
Zinc (Zn)-Dissolved			95.0		%		80-120	04-SEP-18
WG2867559-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200610								
WG2867559-1 MB		**LF**						
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	04-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	04-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	04-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Batch R4203376								
WG2868184-3 DUP		**L2157225-2**						
Aluminum (Al)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	05-SEP-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	05-SEP-18
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	05-SEP-18
Barium (Ba)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	05-SEP-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	05-SEP-18
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	05-SEP-18
Cadmium (Cd)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4203376								
WG2868184-3 DUP		**L2157225-2**						
Calcium (Ca)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	05-SEP-18
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	05-SEP-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	05-SEP-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	05-SEP-18
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	05-SEP-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	05-SEP-18
Lithium (Li)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	05-SEP-18
Magnesium (Mg)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	05-SEP-18
Manganese (Mn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	05-SEP-18
Molybdenum (Mo)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	05-SEP-18
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	05-SEP-18
Potassium (K)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	05-SEP-18
Selenium (Se)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	05-SEP-18
Silicon (Si)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	05-SEP-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	05-SEP-18
Sodium (Na)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	05-SEP-18
Strontium (Sr)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	05-SEP-18
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	05-SEP-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	05-SEP-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	05-SEP-18
Uranium (U)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	05-SEP-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	05-SEP-18
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	05-SEP-18
WG2868184-2 LCS								
Aluminum (Al)-Dissolved			98.9		%		80-120	05-SEP-18
Antimony (Sb)-Dissolved			97.4		%		80-120	05-SEP-18
Arsenic (As)-Dissolved			101.1		%		80-120	05-SEP-18
Barium (Ba)-Dissolved			99.7		%		80-120	05-SEP-18
Bismuth (Bi)-Dissolved			93.8		%		80-120	05-SEP-18
Boron (B)-Dissolved			97.0		%		80-120	05-SEP-18
Cadmium (Cd)-Dissolved			96.6		%		80-120	05-SEP-18
Calcium (Ca)-Dissolved			93.2		%		80-120	05-SEP-18
Chromium (Cr)-Dissolved			96.6		%		80-120	05-SEP-18
Cobalt (Co)-Dissolved			93.2		%		80-120	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4203376								
WG2868184-2 LCS								
Copper (Cu)-Dissolved			93.6		%		80-120	05-SEP-18
Iron (Fe)-Dissolved			91.4		%		80-120	05-SEP-18
Lead (Pb)-Dissolved			95.0		%		80-120	05-SEP-18
Lithium (Li)-Dissolved			92.0		%		80-120	05-SEP-18
Magnesium (Mg)-Dissolved			93.2		%		80-120	05-SEP-18
Manganese (Mn)-Dissolved			95.0		%		80-120	05-SEP-18
Molybdenum (Mo)-Dissolved			97.4		%		80-120	05-SEP-18
Nickel (Ni)-Dissolved			92.7		%		80-120	05-SEP-18
Potassium (K)-Dissolved			93.2		%		80-120	05-SEP-18
Selenium (Se)-Dissolved			94.7		%		80-120	05-SEP-18
Silicon (Si)-Dissolved			93.7		%		60-140	05-SEP-18
Silver (Ag)-Dissolved			91.0		%		80-120	05-SEP-18
Sodium (Na)-Dissolved			94.0		%		80-120	05-SEP-18
Strontium (Sr)-Dissolved			96.0		%		80-120	05-SEP-18
Thallium (Tl)-Dissolved			89.8		%		80-120	05-SEP-18
Tin (Sn)-Dissolved			97.2		%		80-120	05-SEP-18
Titanium (Ti)-Dissolved			95.4		%		80-120	05-SEP-18
Uranium (U)-Dissolved			98.7		%		80-120	05-SEP-18
Vanadium (V)-Dissolved			96.7		%		80-120	05-SEP-18
Zinc (Zn)-Dissolved			90.4		%		80-120	05-SEP-18
WG2868184-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	05-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	05-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	05-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	05-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	05-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	05-SEP-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	05-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	05-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	05-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	05-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	05-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	05-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4203376								
WG2868184-1 MB		**LF**						
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	05-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	05-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	05-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	05-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	05-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	05-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	05-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	05-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	05-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	05-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	05-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	05-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	05-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	05-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	05-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	05-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	05-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4203396								
WG2867549-2 LCS								
Aluminum (Al)-Total			94.5		%		80-120	05-SEP-18
Antimony (Sb)-Total			93.9		%		80-120	05-SEP-18
Arsenic (As)-Total			96.8		%		80-120	05-SEP-18
Barium (Ba)-Total			91.6		%		80-120	05-SEP-18
Bismuth (Bi)-Total			88.1		%		80-120	05-SEP-18
Boron (B)-Total			90.4		%		80-120	05-SEP-18
Cadmium (Cd)-Total			93.2		%		80-120	05-SEP-18
Calcium (Ca)-Total			90.0		%		80-120	05-SEP-18
Chromium (Cr)-Total			94.0		%		80-120	05-SEP-18
Cobalt (Co)-Total			92.0		%		80-120	05-SEP-18
Copper (Cu)-Total			89.2		%		80-120	05-SEP-18
Iron (Fe)-Total			94.0		%		80-120	05-SEP-18
Lead (Pb)-Total			89.8		%		80-120	05-SEP-18
Lithium (Li)-Total			91.8		%		80-120	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4203396								
WG2867549-2 LCS								
Magnesium (Mg)-Total			93.5		%		80-120	05-SEP-18
Manganese (Mn)-Total			93.7		%		80-120	05-SEP-18
Molybdenum (Mo)-Total			93.4		%		80-120	05-SEP-18
Nickel (Ni)-Total			90.1		%		80-120	05-SEP-18
Potassium (K)-Total			91.9		%		80-120	05-SEP-18
Selenium (Se)-Total			94.6		%		80-120	05-SEP-18
Silicon (Si)-Total			101.7		%		80-120	05-SEP-18
Silver (Ag)-Total			89.4		%		80-120	05-SEP-18
Sodium (Na)-Total			93.5		%		80-120	05-SEP-18
Strontium (Sr)-Total			96.1		%		80-120	05-SEP-18
Thallium (Tl)-Total			89.9		%		80-120	05-SEP-18
Tin (Sn)-Total			97.4		%		80-120	05-SEP-18
Titanium (Ti)-Total			94.5		%		80-120	05-SEP-18
Uranium (U)-Total			94.7		%		80-120	05-SEP-18
Vanadium (V)-Total			91.4		%		80-120	05-SEP-18
Zinc (Zn)-Total			86.2		%		80-120	05-SEP-18
WG2867549-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	05-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	05-SEP-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	05-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	05-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	05-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	05-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	05-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4203396								
WG2867549-1 MB								
Potassium (K)-Total			<0.050		mg/L		0.05	05-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	05-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	05-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	05-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	05-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	05-SEP-18
Batch R4203418								
WG2867549-1 MB								
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-SEP-18
NH3-L-F-CL	**Water**							
Batch R4215488								
WG2875984-2 LCS								
Ammonia as N			101.5		%		85-115	13-SEP-18
WG2875984-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	13-SEP-18
NO2-L-IC-N-VA	**Water**							
Batch R4214491								
WG2872646-2 LCS								
Nitrite (as N)			100.9		%		90-110	11-SEP-18
WG2872646-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	11-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4214491								
WG2872646-2 LCS								
Nitrate (as N)			104.4		%		90-110	11-SEP-18
WG2872646-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	11-SEP-18
ORP-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ORP-CL	**Water**							
Batch R4207627								
WG2872339-7 CRM		**CL-ORP**						
ORP			224		mV		210-230	10-SEP-18
P-T-L-COL-CL	**Water**							
Batch R4218310								
WG2879315-2 LCS								
Phosphorus (P)-Total			95.8		%		80-120	17-SEP-18
WG2879315-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	17-SEP-18
PH-PCT-VA	**Water**							
Batch R4214521								
WG2872644-2 CRM		**VA-PH7-BUF**						
pH			7.00		pH		6.9-7.1	12-SEP-18
PO4-DO-L-COL-CL	**Water**							
Batch R4196670								
WG2866156-22 LCS								
Orthophosphate-Dissolved (as P)			96.6		%		80-120	01-SEP-18
WG2866156-21 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	01-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4214491								
WG2872646-2 LCS								
Sulfate (SO4)			104.9		%		90-110	11-SEP-18
WG2872646-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	11-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4202808								
WG2866943-8 LCS								
Total Dissolved Solids			102.2		%		85-115	04-SEP-18
WG2866943-7 MB								
Total Dissolved Solids			<10		mg/L		10	04-SEP-18
TKN-L-F-CL	**Water**							
Batch R4207713								
WG2870103-11 LCS								
Total Kjeldahl Nitrogen			101.9		%		75-125	09-SEP-18
WG2870103-9 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R4207713								
WG2870103-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	09-SEP-18
TSS-L-CL	**Water**							
Batch R4202812								
WG2867552-11 LCS								
Total Suspended Solids			95.8		%		85-115	04-SEP-18
WG2867552-10 MB								
Total Suspended Solids			<1.0		mg/L		1	04-SEP-18
TSS-LOW-VA	**Water**							
Batch R4204527								
WG2869011-2 LCS								
Total Suspended Solids			98.5		%		85-115	06-SEP-18
WG2869011-1 MB								
Total Suspended Solids			<1.0		mg/L		1	06-SEP-18
TURBIDITY-CL	**Water**							
Batch R4200147								
WG2866363-12 DUP		**L2157225-2**						
Turbidity		<0.10	<0.10	RPD-NA	NTU	N/A	15	01-SEP-18
WG2866363-11 LCS								
Turbidity			98.0		%		85-115	01-SEP-18
WG2866363-10 MB								
Turbidity			<0.10		NTU		0.1	01-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	29-AUG-18 18:30	10-SEP-18 00:00	0.25	270	hours	EHTR-FM
	2	30-AUG-18 09:30	10-SEP-18 00:00	0.25	254	hours	EHTR-FM
pH by Meter (Automated)							
	1	29-AUG-18 18:30	12-SEP-18 14:06	0.25	332	hours	EHTR-FM
	2	30-AUG-18 09:30	12-SEP-18 14:06	0.25	317	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	29-AUG-18 18:30	11-SEP-18 07:05	3	13	days	EHT
	2	30-AUG-18 09:30	11-SEP-18 07:05	3	12	days	EHT
Nitrite in Water by IC (Low Level)							
	1	29-AUG-18 18:30	11-SEP-18 07:05	3	13	days	EHT
	2	30-AUG-18 09:30	11-SEP-18 07:05	3	12	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2157225 were received on 31-AUG-18 10:40.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: REGIONAL Koocanusa Reservoir | TU

L2157225-COFC

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Koocanusa				
Project Manager	Cait Good				
Email	[redacted]				
Address	421 Pine Avenue				
City	Sparwood	Province	BC		
Postal Code	V0B 2G0	Country	Canada		
Phone Number	250-425-8202				

Address	2559 29 Street NE		
City	Calgary	Province	AB
Postal Code	T1Y7B5	Country	Canada
Phone Number	14034071794		

OTHER INFO

		Excel	PDF	EDD
nat / Distribution	[redacted]	X	X	X
Email 2:	carla.fraser@teck.com	X	X	X
Email 3:				
Email 4:	teckcoal@equisonline.com			X
Email 5:	jwilson@minnow.ca	X	X	X
PO number	VPO00563596			

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
Filtered								N	N	N	N	N	N	N
PRESERVE								NONE	NONE	H2SO4	NONE	NONE	HNO3	NONE
RG_TRIP_WQ_20180829-1830	RG_TRIP	WQ		29-Aug-18	6:30:00 PM	G	4	1		1			1	1
RG_FBLANK_WQ_20180830-0930	RG_FBLANK	WQ		30-Aug-18	9:30:00 AM	G	7	1	1	1	1	1	1	1
RG_FBLANK_WQ_20180830-0930_FB-HG	RG_FBLANK	WQ		30-Aug-18	9:30:00 AM	G	1	1						

3211

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Koocanusa - VPO00563596

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			08/31 10:40

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Justin Wilson	Mobile #	519-803-3923
Sampler's Signature		Date/Time	August 30, 2018

7

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 31-AUG-18
Report Date: 05-JUN-19 13:05 (MT)
Version: FINAL REV. 2

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2157230

Project P.O. #: VPO00563596
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: REGIONAL Koocanusa
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157230-1	L2157230-2	L2157230-3	L2157230-4	L2157230-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	09:30	09:30	09:30	09:30	09:30
	Client ID	RG_T4U1_WS_20180829-0930	RG_T4U1_WS_20180829-0930_FB-HG	RG_T4U2_WS_20180829-0930	RG_T4U2_WS_20180829-0930_FB-HG	RG_T4U3_WS_20180829-0930
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	228		232		279
	Hardness (as CaCO3) (mg/L)	116		118		143
	pH (pH)	8.27		8.30		8.24
	ORP (mV)	430		476		459
	Total Suspended Solids (mg/L)	1.3		1.1		3.1
	Total Dissolved Solids (mg/L)	140 DLHC		111 DLHC		212 DLHC
	Turbidity (NTU)	0.81		0.77		2.40
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	99.6		98.8		113
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0		2.4		<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	99.6		101		113
	Ammonia as N (mg/L)	0.0127		0.0181		0.0259
	Bromide (Br) (mg/L)	<0.050		<0.050		<0.050
	Chloride (Cl) (mg/L)	2.00		2.11		2.56
	Fluoride (F) (mg/L)	0.093		0.093		0.114
	Ion Balance (%)	95.8		95.4		98.9
	Nitrate (as N) (mg/L)	0.116		0.124		0.386
	Nitrite (as N) (mg/L)	0.0022		0.0019		0.0052
	Total Kjeldahl Nitrogen (mg/L)	0.098		0.086		0.114
	Orthophosphate-Dissolved (as P) (mg/L)	0.0011		<0.0010		<0.0010
	Phosphorus (P)-Total (mg/L)	<0.0020		<0.0020		0.0035
	Sulfate (SO4) (mg/L)	23.9		24.7		33.4
	Anion Sum (meq/L)	2.56		2.61		3.06
	Cation Sum (meq/L)	2.45		2.49		3.02
	Cation - Anion Balance (%)	-2.2		-2.3		-0.5
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.91		1.71		1.08
	Total Organic Carbon (mg/L)	1.85		1.72		1.19
Total Metals	Aluminum (Al)-Total (mg/L)	0.0138		0.0122		0.0262
	Antimony (Sb)-Total (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Total (mg/L)	0.00036		0.00039		0.00041
	Barium (Ba)-Total (mg/L)	0.0408		0.0400		0.0514
	Beryllium (Be)-Total (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Total (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Total (ug/L)	<0.0050		<0.0050		0.0056

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2157230-6	L2157230-7	L2157230-8	L2157230-9	L2157230-10
Description	WS	WS	WS	WS	WS
Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
Sampled Time	09:30	11:30	11:30	11:30	11:30
Client ID	RG_T4U3_WS_20180829-0930_FB-HG	RG_TNS1_WS_20180829-1130	RG_TNS1_WS_20180829-1130_FB-HG	RG_TNS2_WS_20180829-1130	RG_TNS2_WS_20180829-1130_FB-HG
Grouping / **Analyte**					
WATER					
Physical Tests					
Conductivity (uS/cm)		243		276	
Hardness (as CaCO3) (mg/L)		121		128	
pH (pH)		8.43		8.28	
ORP (mV)		387		415	
Total Suspended Solids (mg/L)		1.5		3.1	
Total Dissolved Solids (mg/L)		222 DLHC		231 DLHC	
Turbidity (NTU)		1.12		2.61	
Anions and Nutrients					
Acidity (as CaCO3) (mg/L)		<1.0		<1.0	
Alkalinity, Bicarbonate (as CaCO3) (mg/L)		97.4		110	
Alkalinity, Carbonate (as CaCO3) (mg/L)		5.2		<1.0	
Alkalinity, Hydroxide (as CaCO3) (mg/L)		<1.0		<1.0	
Alkalinity, Total (as CaCO3) (mg/L)		103		110	
Ammonia as N (mg/L)		0.0073		0.0198	
Bromide (Br) (mg/L)		<0.050		<0.050	
Chloride (Cl) (mg/L)		2.39		4.10	
Fluoride (F) (mg/L)		0.095		0.096	
Ion Balance (%)		95.5		94.3	
Nitrate (as N) (mg/L)		0.102		0.0368	
Nitrite (as N) (mg/L)		0.0022		0.0012	
Total Kjeldahl Nitrogen (mg/L)		0.086		<0.050	
Orthophosphate-Dissolved (as P) (mg/L)		<0.0010		<0.0010	
Phosphorus (P)-Total (mg/L)		<0.0020		0.0041	
Sulfate (SO4) (mg/L)		26.5		31.5	
Anion Sum (meq/L)		2.68		2.97	
Cation Sum (meq/L)		2.56		2.80	
Cation - Anion Balance (%)		-2.3		-3.0	
Organic / Inorganic Carbon					
Dissolved Organic Carbon (mg/L)		1.14		0.99	
Total Organic Carbon (mg/L)		1.22		1.08	
Total Metals					
Aluminum (Al)-Total (mg/L)		0.0100		0.0329	
Antimony (Sb)-Total (mg/L)		<0.00010		<0.00010	
Arsenic (As)-Total (mg/L)		0.00037		0.00049	
Barium (Ba)-Total (mg/L)		0.0383		0.0381	
Beryllium (Be)-Total (ug/L)		<0.020		<0.020	
Bismuth (Bi)-Total (mg/L)		<0.000050		<0.000050	
Boron (B)-Total (mg/L)		<0.010		<0.010	
Cadmium (Cd)-Total (ug/L)		<0.0050		<0.0050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157230-1	L2157230-2	L2157230-3	L2157230-4	L2157230-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	09:30	09:30	09:30	09:30	09:30
	Client ID	RG_T4U1_WS_20180829-0930	RG_T4U1_WS_20180829-0930_FB-HG	RG_T4U2_WS_20180829-0930	RG_T4U2_WS_20180829-0930_FB-HG	RG_T4U3_WS_20180829-0930
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	31.1		31.8		37.3
	Chromium (Cr)-Total (mg/L)	<0.00010		<0.00010		0.00016
	Cobalt (Co)-Total (ug/L)	<0.10		<0.10		<0.10
	Copper (Cu)-Total (mg/L)	<0.00050		<0.00050		<0.00050
	Iron (Fe)-Total (mg/L)	<0.010		<0.010		0.040
	Lead (Pb)-Total (mg/L)	<0.000050		<0.000050		0.000080
	Lithium (Li)-Total (mg/L)	0.0019		0.0020		0.0031
	Magnesium (Mg)-Total (mg/L)	9.38		9.70		11.6
	Manganese (Mn)-Total (mg/L)	0.00123		0.00138		0.00778
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)-Total (mg/L)	0.000677		0.000648		0.000798
	Nickel (Ni)-Total (mg/L)	<0.00050		<0.00050		<0.00050
	Potassium (K)-Total (mg/L)	0.484		0.489		0.545
	Selenium (Se)-Total (ug/L)	1.15		1.15		2.16
	Silicon (Si)-Total (mg/L)	1.15		1.23		1.96
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Sodium (Na)-Total (mg/L)	2.66		2.74		3.23
	Strontium (Sr)-Total (mg/L)	0.122		0.124		0.149
	Thallium (Tl)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010		<0.00010		<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010		<0.010		<0.010
	Uranium (U)-Total (mg/L)	0.000726		0.000665		0.000789
	Vanadium (V)-Total (mg/L)	<0.00050		<0.00050		<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030		<0.0030		0.0035
Dissolved Metals	Dissolved Mercury Filtration Location	LAB		LAB		LAB
	Dissolved Metals Filtration Location	LAB		LAB		LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0044		0.0045		0.0034
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00032		0.00033		0.00040
	Barium (Ba)-Dissolved (mg/L)	0.0398		0.0388		0.0502
	Beryllium (Be)-Dissolved (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050		<0.0050		<0.0050
	Calcium (Ca)-Dissolved (mg/L)	31.1		31.7		37.9
	Chromium (Cr)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10		<0.10		<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2157230-6	L2157230-7	L2157230-8	L2157230-9	L2157230-10
Description	WS	WS	WS	WS	WS
Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
Sampled Time	09:30	11:30	11:30	11:30	11:30
Client ID	RG_T4U3_WS_20180829-0930_FB-HG	RG_TNS1_WS_20180829-1130	RG_TNS1_WS_20180829-1130_FB-HG	RG_TNS2_WS_20180829-1130	RG_TNS2_WS_20180829-1130_FB-HG
Grouping / **Analyte**					
WATER					
Total Metals Calcium (Ca)-Total (mg/L)		32.6		35.2	
Chromium (Cr)-Total (mg/L)		0.00011		0.00011	
Cobalt (Co)-Total (ug/L)		<0.10		<0.10	
Copper (Cu)-Total (mg/L)		<0.00050		<0.00050	
Iron (Fe)-Total (mg/L)		<0.010		0.051	
Lead (Pb)-Total (mg/L)		<0.000050		0.000090	
Lithium (Li)-Total (mg/L)		0.0020		0.0017	
Magnesium (Mg)-Total (mg/L)		10.1		11.0	
Manganese (Mn)-Total (mg/L)		0.00099		0.00392	
Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)-Total (mg/L)		0.000652		0.000679	
Nickel (Ni)-Total (mg/L)		<0.00050		<0.00050	
Potassium (K)-Total (mg/L)		0.506		0.569	
Selenium (Se)-Total (ug/L)		1.07		0.229	
Silicon (Si)-Total (mg/L)		1.14		1.85	
Silver (Ag)-Total (mg/L)		<0.000010		<0.000010	
Sodium (Na)-Total (mg/L)		3.06		5.17	
Strontium (Sr)-Total (mg/L)		0.131		0.156	
Thallium (Tl)-Total (mg/L)		<0.000010		<0.000010	
Tin (Sn)-Total (mg/L)		<0.00010		<0.00010	
Titanium (Ti)-Total (mg/L)		<0.010		<0.010	
Uranium (U)-Total (mg/L)		0.000689		0.000777	
Vanadium (V)-Total (mg/L)		<0.00050		<0.00050	
Zinc (Zn)-Total (mg/L)		<0.0030		<0.0030	
Dissolved Metals Dissolved Mercury Filtration Location		LAB		LAB	
Dissolved Metals Filtration Location		LAB		LAB	
Aluminum (Al)-Dissolved (mg/L)		0.0037		0.0041	
Antimony (Sb)-Dissolved (mg/L)		<0.00010		<0.00010	
Arsenic (As)-Dissolved (mg/L)		0.00034		0.00044	
Barium (Ba)-Dissolved (mg/L)		0.0390		0.0371	
Beryllium (Be)-Dissolved (ug/L)		<0.020		<0.020	
Bismuth (Bi)-Dissolved (mg/L)		<0.000050		<0.000050	
Boron (B)-Dissolved (mg/L)		<0.010		<0.010	
Cadmium (Cd)-Dissolved (ug/L)		<0.0050		<0.0050	
Calcium (Ca)-Dissolved (mg/L)		32.0		33.6	
Chromium (Cr)-Dissolved (mg/L)		<0.00010		<0.00010	
Cobalt (Co)-Dissolved (ug/L)		<0.10		<0.10	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157230-1	L2157230-2	L2157230-3	L2157230-4	L2157230-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	09:30	09:30	09:30	09:30	09:30
	Client ID	RG_T4U1_WS_20180829-0930	RG_T4U1_WS_20180829-0930_FB-HG	RG_T4U2_WS_20180829-0930	RG_T4U2_WS_20180829-0930_FB-HG	RG_T4U3_WS_20180829-0930
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0019		0.0018		0.0029
	Magnesium (Mg)-Dissolved (mg/L)	9.33		9.42		11.8
	Manganese (Mn)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000623		0.000609		0.000819
	Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
	Potassium (K)-Dissolved (mg/L)	0.520		0.514		0.590
	Selenium (Se)-Dissolved (ug/L)	1.01		1.00		2.11
	Silicon (Si)-Dissolved (mg/L)	1.16		1.20		1.84
	Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.67		2.83		3.45
	Strontium (Sr)-Dissolved (mg/L)	0.118		0.117		0.151
	Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Uranium (U)-Dissolved (mg/L)	0.000663		0.000670		0.000809
	Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157230-6	L2157230-7	L2157230-8	L2157230-9	L2157230-10
	Description	WS	WS	WS	WS	WS
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	09:30	11:30	11:30	11:30	11:30
	Client ID	RG_T4U3_WS_20180829-0930_FB-HG	RG_TNS1_WS_20180829-1130	RG_TNS1_WS_20180829-1130_FB-HG	RG_TNS2_WS_20180829-1130	RG_TNS2_WS_20180829-1130_FB-HG
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)		<0.00050		<0.00050	
	Iron (Fe)-Dissolved (mg/L)		<0.010		<0.010	
	Lead (Pb)-Dissolved (mg/L)		<0.000050		<0.000050	
	Lithium (Li)-Dissolved (mg/L)		0.0018		0.0015	
	Magnesium (Mg)-Dissolved (mg/L)		9.84		10.8	
	Manganese (Mn)-Dissolved (mg/L)		<0.00010		<0.00010	
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050		<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)		0.000655		0.000691	
	Nickel (Ni)-Dissolved (mg/L)		<0.00050		<0.00050	
	Potassium (K)-Dissolved (mg/L)		0.535		0.575	
	Selenium (Se)-Dissolved (ug/L)		1.04		0.204	
	Silicon (Si)-Dissolved (mg/L)		1.06		1.86	
	Silver (Ag)-Dissolved (mg/L)		<0.000010		<0.000010	
	Sodium (Na)-Dissolved (mg/L)		3.22		5.12	
	Strontium (Sr)-Dissolved (mg/L)		0.126		0.151	
	Thallium (Tl)-Dissolved (mg/L)		<0.000010		<0.000010	
	Tin (Sn)-Dissolved (mg/L)		<0.00010		<0.00010	
	Titanium (Ti)-Dissolved (mg/L)		<0.010		<0.010	
	Uranium (U)-Dissolved (mg/L)		0.000700		0.000760	
	Vanadium (V)-Dissolved (mg/L)		<0.00050		<0.00050	
	Zinc (Zn)-Dissolved (mg/L)		<0.0010		<0.0010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC and dissolved metals to be filtered and preserved in lab; filter code added

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2157230-1, -3, -5, -7, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2157230-1, -3, -5, -7, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2157230-1, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2157230-1, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2157230-1, -3, -5, -7, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2157230-1, -3, -5, -7, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2157230-1, -3, -5, -7, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2157230-1, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2157230-1, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2157230-1, -3, -5, -7, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a

Reference Information

halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-L-IC-N-VA Water Chloride in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

Reference Information

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

REGIONAL Koocanusa

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4205784								
WG2870664-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			102.0		%		85-115	08-SEP-18
WG2870664-5 DUP		**L2157230-5**						
Acidity (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	08-SEP-18
WG2870664-1 MB								
Acidity (as CaCO3)			1.5		mg/L		2	08-SEP-18
ALK-TITR-VA	**Water**							
Batch R4205790								
WG2870671-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			97.5		%		85-115	09-SEP-18
WG2870671-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	09-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-3 DUP		**L2157230-3**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	04-SEP-18
WG2867389-2 LCS								
Beryllium (Be)-Dissolved			83.0		%		80-120	04-SEP-18
WG2867389-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	04-SEP-18
WG2867389-4 MS		**L2157230-1**						
Beryllium (Be)-Dissolved			90.2		%		70-130	04-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4203396								
WG2867444-2 LCS								
Beryllium (Be)-Total			95.5		%		80-120	05-SEP-18
WG2867444-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	05-SEP-18
WG2867444-4 MS		**L2157230-1**						
Beryllium (Be)-Total			87.0		%		70-130	05-SEP-18
BR-L-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-3 DUP		**L2157230-1**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	07-SEP-18
WG2870656-2 LCS								
Bromide (Br)			102.5		%		85-115	07-SEP-18
WG2870656-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	07-SEP-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4215207								
WG2875706-2 LCS								
Dissolved Organic Carbon			102.5		%		80-120	12-SEP-18
WG2875706-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	12-SEP-18
Batch R4216038								
WG2876683-2 LCS								
Dissolved Organic Carbon			98.6		%		80-120	13-SEP-18
WG2876683-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	13-SEP-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4215207								
WG2875706-2 LCS								
Total Organic Carbon			103.2		%		80-120	12-SEP-18
WG2875706-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	12-SEP-18
Batch R4216038								
WG2876683-2 LCS								
Total Organic Carbon			109.6		%		80-120	13-SEP-18
WG2876683-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-SEP-18
CL-L-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-3 DUP		**L2157230-1**						
Chloride (Cl)		2.00	2.00		mg/L	0.2	20	07-SEP-18
WG2870656-2 LCS								
Chloride (Cl)			99.9		%		90-110	07-SEP-18
WG2870656-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	07-SEP-18
EC-PCT-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-PCT-VA	**Water**							
Batch R4205784								
WG2870664-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			99.6		%		90-110	08-SEP-18
WG2870664-1 MB								
Conductivity			<2.0		uS/cm		2	08-SEP-18
F-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-3 DUP		**L2157230-1**						
Fluoride (F)		0.093	0.092		mg/L	1.5	20	07-SEP-18
WG2870656-2 LCS								
Fluoride (F)			100.5		%		90-110	07-SEP-18
WG2870656-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	07-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4203031								
WG2867841-2 LCS								
Mercury (Hg)-Dissolved			99.7		%		80-120	05-SEP-18
WG2867841-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	05-SEP-18
HG-T-U-CVAF-VA	**Water**							
Batch R4204226								
WG2869430-3 DUP		**L2157230-1**						
Mercury (Hg)-Total		<0.00050	<0.00050	RPD-NA	ug/L	N/A	20	06-SEP-18
WG2869430-2 LCS								
Mercury (Hg)-Total			106.0		%		80-120	06-SEP-18
WG2869430-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	06-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-3 DUP		**L2157230-3**						
Aluminum (Al)-Dissolved		0.0045	0.0048		mg/L	6.4	20	04-SEP-18
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-SEP-18
Arsenic (As)-Dissolved		0.00033	0.00032		mg/L	3.4	20	04-SEP-18
Barium (Ba)-Dissolved		0.0388	0.0400		mg/L	3.1	20	04-SEP-18
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-SEP-18
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-SEP-18
Cadmium (Cd)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	04-SEP-18
Calcium (Ca)-Dissolved		31.7	31.6		mg/L	0.2	20	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-3 DUP		**L2157230-3**						
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-SEP-18
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-SEP-18
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-SEP-18
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-SEP-18
Lithium (Li)-Dissolved		0.0018	0.0019		mg/L	4.8	20	04-SEP-18
Magnesium (Mg)-Dissolved		9.42	9.55		mg/L	1.4	20	04-SEP-18
Manganese (Mn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-SEP-18
Molybdenum (Mo)-Dissolved		0.000609	0.000669		mg/L	9.3	20	04-SEP-18
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-SEP-18
Potassium (K)-Dissolved		0.514	0.534		mg/L	3.7	20	04-SEP-18
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-SEP-18
Sodium (Na)-Dissolved		2.83	2.83		mg/L	0.1	20	04-SEP-18
Strontium (Sr)-Dissolved		0.117	0.121		mg/L	3.2	20	04-SEP-18
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-SEP-18
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-SEP-18
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-SEP-18
Uranium (U)-Dissolved		0.000670	0.000670		mg/L	0.1	20	04-SEP-18
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-SEP-18
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	04-SEP-18
WG2867389-2 LCS								
Aluminum (Al)-Dissolved			95.0		%		80-120	04-SEP-18
Antimony (Sb)-Dissolved			97.7		%		80-120	04-SEP-18
Arsenic (As)-Dissolved			100.4		%		80-120	04-SEP-18
Barium (Ba)-Dissolved			91.3		%		80-120	04-SEP-18
Bismuth (Bi)-Dissolved			92.4		%		80-120	04-SEP-18
Boron (B)-Dissolved			89.6		%		80-120	04-SEP-18
Cadmium (Cd)-Dissolved			93.1		%		80-120	04-SEP-18
Calcium (Ca)-Dissolved			89.9		%		80-120	04-SEP-18
Chromium (Cr)-Dissolved			93.1		%		80-120	04-SEP-18
Cobalt (Co)-Dissolved			93.8		%		80-120	04-SEP-18
Copper (Cu)-Dissolved			91.3		%		80-120	04-SEP-18
Iron (Fe)-Dissolved			97.3		%		80-120	04-SEP-18
Lead (Pb)-Dissolved			94.5		%		80-120	04-SEP-18
Lithium (Li)-Dissolved			83.6		%		80-120	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-2 LCS								
Magnesium (Mg)-Dissolved			94.0		%		80-120	04-SEP-18
Manganese (Mn)-Dissolved			95.8		%		80-120	04-SEP-18
Molybdenum (Mo)-Dissolved			93.3		%		80-120	04-SEP-18
Nickel (Ni)-Dissolved			92.2		%		80-120	04-SEP-18
Potassium (K)-Dissolved			95.5		%		80-120	04-SEP-18
Selenium (Se)-Dissolved			97.4		%		80-120	04-SEP-18
Silicon (Si)-Dissolved			96.5		%		60-140	04-SEP-18
Silver (Ag)-Dissolved			94.4		%		80-120	04-SEP-18
Sodium (Na)-Dissolved			97.3		%		80-120	04-SEP-18
Strontium (Sr)-Dissolved			91.8		%		80-120	04-SEP-18
Thallium (Tl)-Dissolved			95.4		%		80-120	04-SEP-18
Tin (Sn)-Dissolved			97.1		%		80-120	04-SEP-18
Titanium (Ti)-Dissolved			93.3		%		80-120	04-SEP-18
Uranium (U)-Dissolved			96.9		%		80-120	04-SEP-18
Vanadium (V)-Dissolved			94.3		%		80-120	04-SEP-18
Zinc (Zn)-Dissolved			92.3		%		80-120	04-SEP-18
WG2867389-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	04-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	04-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-1 MB		**LF**						
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	04-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
WG2867389-4 MS		**L2157230-1**						
Aluminum (Al)-Dissolved			98.6		%		70-130	04-SEP-18
Antimony (Sb)-Dissolved			100.2		%		70-130	04-SEP-18
Arsenic (As)-Dissolved			99.7		%		70-130	04-SEP-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	04-SEP-18
Bismuth (Bi)-Dissolved			94.7		%		70-130	04-SEP-18
Boron (B)-Dissolved			92.8		%		70-130	04-SEP-18
Cadmium (Cd)-Dissolved			96.3		%		70-130	04-SEP-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	04-SEP-18
Chromium (Cr)-Dissolved			93.8		%		70-130	04-SEP-18
Cobalt (Co)-Dissolved			94.5		%		70-130	04-SEP-18
Copper (Cu)-Dissolved			92.2		%		70-130	04-SEP-18
Iron (Fe)-Dissolved			91.1		%		70-130	04-SEP-18
Lead (Pb)-Dissolved			96.8		%		70-130	04-SEP-18
Lithium (Li)-Dissolved			89.4		%		70-130	04-SEP-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	04-SEP-18
Manganese (Mn)-Dissolved			96.2		%		70-130	04-SEP-18
Molybdenum (Mo)-Dissolved			94.7		%		70-130	04-SEP-18
Nickel (Ni)-Dissolved			91.4		%		70-130	04-SEP-18
Potassium (K)-Dissolved			94.3		%		70-130	04-SEP-18
Selenium (Se)-Dissolved			102.6		%		70-130	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-4 MS		**L2157230-1**						
Silicon (Si)-Dissolved			99.0		%		70-130	04-SEP-18
Silver (Ag)-Dissolved			99.0		%		70-130	04-SEP-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	04-SEP-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	04-SEP-18
Thallium (Tl)-Dissolved			100.1		%		70-130	04-SEP-18
Tin (Sn)-Dissolved			96.1		%		70-130	04-SEP-18
Titanium (Ti)-Dissolved			96.8		%		70-130	04-SEP-18
Uranium (U)-Dissolved			100.6		%		70-130	04-SEP-18
Vanadium (V)-Dissolved			94.6		%		70-130	04-SEP-18
Zinc (Zn)-Dissolved			91.2		%		70-130	04-SEP-18
Batch R4203410								
WG2867389-3 DUP		**L2157230-3**						
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	05-SEP-18
Selenium (Se)-Dissolved		0.00100	0.000953		mg/L	4.8	20	05-SEP-18
Silicon (Si)-Dissolved		1.20	1.22		mg/L	1.3	20	05-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4203396								
WG2867444-2 LCS								
Aluminum (Al)-Total			100.6		%		80-120	05-SEP-18
Antimony (Sb)-Total			96.0		%		80-120	05-SEP-18
Arsenic (As)-Total			101.7		%		80-120	05-SEP-18
Barium (Ba)-Total			92.3		%		80-120	05-SEP-18
Bismuth (Bi)-Total			93.4		%		80-120	05-SEP-18
Boron (B)-Total			93.6		%		80-120	05-SEP-18
Cadmium (Cd)-Total			96.4		%		80-120	05-SEP-18
Calcium (Ca)-Total			92.6		%		80-120	05-SEP-18
Chromium (Cr)-Total			94.9		%		80-120	05-SEP-18
Cobalt (Co)-Total			94.4		%		80-120	05-SEP-18
Copper (Cu)-Total			92.8		%		80-120	05-SEP-18
Iron (Fe)-Total			98.0		%		80-120	05-SEP-18
Lead (Pb)-Total			94.6		%		80-120	05-SEP-18
Lithium (Li)-Total			93.8		%		80-120	05-SEP-18
Magnesium (Mg)-Total			98.8		%		80-120	05-SEP-18
Manganese (Mn)-Total			96.1		%		80-120	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4203396								
WG2867444-2 LCS								
Molybdenum (Mo)-Total			96.7		%		80-120	05-SEP-18
Nickel (Ni)-Total			93.0		%		80-120	05-SEP-18
Potassium (K)-Total			95.3		%		80-120	05-SEP-18
Selenium (Se)-Total			101.5		%		80-120	05-SEP-18
Silicon (Si)-Total			103.4		%		80-120	05-SEP-18
Silver (Ag)-Total			92.9		%		80-120	05-SEP-18
Sodium (Na)-Total			97.7		%		80-120	05-SEP-18
Strontium (Sr)-Total			96.8		%		80-120	05-SEP-18
Thallium (Tl)-Total			94.0		%		80-120	05-SEP-18
Tin (Sn)-Total			100.8		%		80-120	05-SEP-18
Titanium (Ti)-Total			97.4		%		80-120	05-SEP-18
Uranium (U)-Total			100.9		%		80-120	05-SEP-18
Vanadium (V)-Total			96.4		%		80-120	05-SEP-18
Zinc (Zn)-Total			89.2		%		80-120	05-SEP-18
WG2867444-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	05-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	05-SEP-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	05-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	05-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	05-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	05-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	05-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4203396								
WG2867444-1 MB								
Selenium (Se)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	05-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	05-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	05-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	05-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	05-SEP-18
WG2867444-4 MS		**L2157230-1**						
Aluminum (Al)-Total			87.4		%		70-130	05-SEP-18
Antimony (Sb)-Total			92.9		%		70-130	05-SEP-18
Arsenic (As)-Total			92.4		%		70-130	05-SEP-18
Barium (Ba)-Total			N/A	MS-B	%		-	05-SEP-18
Bismuth (Bi)-Total			88.4		%		70-130	05-SEP-18
Boron (B)-Total			85.0		%		70-130	05-SEP-18
Cadmium (Cd)-Total			92.8		%		70-130	05-SEP-18
Calcium (Ca)-Total			N/A	MS-B	%		-	05-SEP-18
Chromium (Cr)-Total			87.9		%		70-130	05-SEP-18
Cobalt (Co)-Total			88.7		%		70-130	05-SEP-18
Copper (Cu)-Total			88.0		%		70-130	05-SEP-18
Iron (Fe)-Total			90.2		%		70-130	05-SEP-18
Lead (Pb)-Total			88.6		%		70-130	05-SEP-18
Lithium (Li)-Total			84.2		%		70-130	05-SEP-18
Magnesium (Mg)-Total			N/A	MS-B	%		-	05-SEP-18
Manganese (Mn)-Total			87.8		%		70-130	05-SEP-18
Molybdenum (Mo)-Total			86.2		%		70-130	05-SEP-18
Nickel (Ni)-Total			87.7		%		70-130	05-SEP-18
Potassium (K)-Total			86.6		%		70-130	05-SEP-18
Selenium (Se)-Total			97.3		%		70-130	05-SEP-18
Silicon (Si)-Total			87.8		%		70-130	05-SEP-18
Silver (Ag)-Total			94.3		%		70-130	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4203396								
WG2867444-4 MS		**L2157230-1**						
Sodium (Na)-Total			N/A	MS-B	%		-	05-SEP-18
Strontium (Sr)-Total			N/A	MS-B	%		-	05-SEP-18
Thallium (Tl)-Total			89.0		%		70-130	05-SEP-18
Tin (Sn)-Total			93.4		%		70-130	05-SEP-18
Titanium (Ti)-Total			88.6		%		70-130	05-SEP-18
Uranium (U)-Total			91.4		%		70-130	05-SEP-18
Vanadium (V)-Total			89.2		%		70-130	05-SEP-18
Zinc (Zn)-Total			81.9		%		70-130	05-SEP-18
NH3-L-F-CL	**Water**							
Batch R4215488								
WG2875984-2 LCS								
Ammonia as N			101.5		%		85-115	13-SEP-18
WG2875984-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	13-SEP-18
NO2-L-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-3 DUP		**L2157230-1**						
Nitrite (as N)		0.0022	0.0022		mg/L	1.2	20	07-SEP-18
WG2870656-2 LCS								
Nitrite (as N)			99.7		%		90-110	07-SEP-18
WG2870656-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	07-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-3 DUP		**L2157230-1**						
Nitrate (as N)		0.116	0.116		mg/L	0.0	20	07-SEP-18
WG2870656-2 LCS								
Nitrate (as N)			100.5		%		90-110	07-SEP-18
WG2870656-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	07-SEP-18
ORP-CL	**Water**							
Batch R4207627								
WG2872339-9 CRM		**CL-ORP**						
ORP			227		mV		210-230	10-SEP-18
P-T-L-COL-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-L-COL-CL	**Water**							
Batch R4218310								
WG2879315-2 LCS								
Phosphorus (P)-Total			95.8		%		80-120	17-SEP-18
WG2879315-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	17-SEP-18
PH-PCT-VA	**Water**							
Batch R4205784								
WG2870664-2 CRM		**VA-PH7-BUF**						
pH			6.94		pH		6.9-7.1	08-SEP-18
PO4-DO-L-COL-CL	**Water**							
Batch R4196670								
WG2866156-22 LCS								
Orthophosphate-Dissolved (as P)			96.6		%		80-120	01-SEP-18
WG2866156-21 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	01-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-3 DUP		**L2157230-1**						
Sulfate (SO4)		23.9	23.9		mg/L	0.0	20	07-SEP-18
WG2870656-2 LCS								
Sulfate (SO4)			100.8		%		90-110	07-SEP-18
WG2870656-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	07-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4202808								
WG2866943-12 DUP		**L2157230-7**						
Total Dissolved Solids		222	215		mg/L	3.2	20	04-SEP-18
WG2866943-11 LCS								
Total Dissolved Solids			97.7		%		85-115	04-SEP-18
WG2866943-8 LCS								
Total Dissolved Solids			102.2		%		85-115	04-SEP-18
WG2866943-10 MB								
Total Dissolved Solids			<10		mg/L		10	04-SEP-18
WG2866943-7 MB								
Total Dissolved Solids			<10		mg/L		10	04-SEP-18
TKN-L-F-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R4207713								
WG2870103-15 LCS								
Total Kjeldahl Nitrogen			95.1		%		75-125	09-SEP-18
WG2870103-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	09-SEP-18
TSS-L-CL	**Water**							
Batch R4202812								
WG2867552-11 LCS								
Total Suspended Solids			95.8		%		85-115	04-SEP-18
WG2867552-10 MB								
Total Suspended Solids			<1.0		mg/L		1	04-SEP-18
TURBIDITY-CL	**Water**							
Batch R4200147								
WG2866363-11 LCS								
Turbidity			98.0		%		85-115	01-SEP-18
WG2866363-10 MB								
Turbidity			<0.10		NTU		0.1	01-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	29-AUG-18 09:30	10-SEP-18 00:00	0.25	278	hours	EHTR-FM
	3	29-AUG-18 09:30	10-SEP-18 00:00	0.25	278	hours	EHTR-FM
	5	29-AUG-18 09:30	10-SEP-18 00:00	0.25	278	hours	EHTR-FM
	7	29-AUG-18 11:30	10-SEP-18 00:00	0.25	276	hours	EHTR-FM
	9	29-AUG-18 11:30	10-SEP-18 00:00	0.25	276	hours	EHTR-FM
pH by Meter (Automated)							
	1	29-AUG-18 09:30	09-SEP-18 11:11	0.25	266	hours	EHTR-FM
	3	29-AUG-18 09:30	09-SEP-18 11:11	0.25	266	hours	EHTR-FM
	5	29-AUG-18 09:30	09-SEP-18 11:11	0.25	266	hours	EHTR-FM
	7	29-AUG-18 11:30	09-SEP-18 11:11	0.25	264	hours	EHTR-FM
	9	29-AUG-18 11:30	09-SEP-18 11:11	0.25	264	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	29-AUG-18 09:30	07-SEP-18 13:12	3	9	days	EHTL
	3	29-AUG-18 09:30	07-SEP-18 13:12	3	9	days	EHTL
	5	29-AUG-18 09:30	07-SEP-18 13:12	3	9	days	EHTL
	7	29-AUG-18 11:30	07-SEP-18 13:12	3	9	days	EHT
	9	29-AUG-18 11:30	07-SEP-18 13:12	3	9	days	EHT
Nitrite in Water by IC (Low Level)							
	1	29-AUG-18 09:30	07-SEP-18 13:12	3	9	days	EHTL
	3	29-AUG-18 09:30	07-SEP-18 13:12	3	9	days	EHTL
	5	29-AUG-18 09:30	07-SEP-18 13:12	3	9	days	EHTL
	7	29-AUG-18 11:30	07-SEP-18 13:12	3	9	days	EHT
	9	29-AUG-18 11:30	07-SEP-18 13:12	3	9	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2157230 were received on 31-AUG-18 11:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

Page 1 of 1

COC ID: REGIONAL Koocanusa Reservoir

L2157230-COFC

PROJECT/CLIENT INFO										OTHER INFO			
Facility Name / Job#	Regional Koocanusa									Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good									1:		X	X	X
Email										2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue				Address	2559 29 Street NE				Email 3:				
										Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC		City	Calgary	Province	AB		Email 5:	jwilson@mtnnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada		Postal Code	T1Y7B5	Country	Canada						
Phone Number	250-425-8202				Phone Number	14034071794				PO number	VPO00563596			

SAMPLE DETAILS								ANALYSIS REQUESTED											Filtered: F: Field, L: Lab, FL: Field & Lab, N: None
								# of Cont.	N	N	N	N	N	N	N					
								PRESERV.	NONE	NONE	H2SO4	NONE	NONE	HNO3	NONE					
								ANALYSIS	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.												
1	RG_T4U1_WS_20180829-0930	RG_T4U1	WS		29-Aug-18	9:30:00 AM	G	7	1	1	1	1	1	1	1					
2	RG_T4U1_WS_20180829-0930_FB-HG	RG_T4U1	WS		29-Aug-18	9:30:00 AM	G	1	1											
3	RG_T4U2_WS_20180829-0930	RG_T4U2	WS		29-Aug-18	9:30:00 AM	G	7	1	1	1	1	1	1	1					
4	RG_T4U2_WS_20180829-0930_FB-HG	RG_T4U2	WS		29-Aug-18	9:30:00 AM	G	1	1											
5	RG_T4U3_WS_20180829-0930	RG_T4U3	WS		29-Aug-18	9:30:00 AM	G	7	1	1	1	1	1	1	1					
6	RG_T4U3_WS_20180829-0930_FB-HG	RG_T4U3	WS		29-Aug-18	9:30:00 AM	G	1	1											
7	RG_TNS1_WS_20180829-1130	RG_TNS1	WS		29-Aug-18	11:30:00 AM	G	7	1	1	1	1	1	1	1					
8	RG_TNS1_WS_20180829-1130_FB-HG	RG_TNS1	WS		29-Aug-18	11:30:00 AM	G	1	1											
9	RG_TNS2_WS_20180829-1130	RG_TNS2	WS		29-Aug-18	11:30:00 AM	G	7	1	1	1	1	1	1	1					
10	RG_TNS2_WS_20180829-1130_FB-HG	RG_TNS2	WS		29-Aug-18	11:30:00 AM	G	1	1											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Koocanusa - VPO00563596				08/31 11:00

SERVICE REQUEST (rush - subject to availability)					
Regular (default) X	Sampler's Name	Justin Wilson	Mobile #	519-803-3923	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	August 30, 2018	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

9

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 31-AUG-18
Report Date: 21-SEP-18 13:36 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2157237

Project P.O. #:	VPO00563596
Job Reference:	REGIONAL KOOCANUSA
C of C Numbers:	REGIONAL Koocanusa
Legal Site Desc:	

Comments: Samples L2157237-1, -3, -5, -7 and -9 exceeded hold time for Nitrite and Nitrate prior analysis.

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157237-1	L2157237-2	L2157237-3	L2157237-4	L2157237-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18
	Sampled Time	09:30	09:30	09:30	09:30	09:30
	Client ID	RG_GCU1_WS_20180830-0930	RG_GCU1_WS_20180830-0930_FB-HG	RG_GCU2_WS_20180830-0930	RG_GCU2_WS_20180830-0930_FB-HG	RG_GCU3_WS_20180830-0930
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	234		232		265
	Hardness (as CaCO3) (mg/L)	114		117		132
	pH (pH)	8.40		8.42		8.23
	ORP (mV)	448		414		478
	Total Suspended Solids (mg/L)	1.5		1.3		1.3
	Total Dissolved Solids (mg/L)	149 DLHC		152 DLHC		169 DLHC
	Turbidity (NTU)	0.94		1.15		2.25
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	97.0		96.1		111
	Alkalinity, Carbonate (as CaCO3) (mg/L)	4.0		4.6		<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	101		101		111
	Ammonia as N (mg/L)	0.0229		0.0166		0.0216
	Bromide (Br) (mg/L)	<0.050		<0.050		<0.050
	Chloride (Cl) (mg/L)	1.92		1.96		2.93
	Fluoride (F) (mg/L)	0.090		0.090		0.103
	Ion Balance (%)	93.9		96.4		95.6
	Nitrate (as N) (mg/L)	0.114		0.117		0.222
	Nitrite (as N) (mg/L)	0.0022		0.0022		0.0044
	Total Kjeldahl Nitrogen (mg/L)	0.081		0.130		0.082
	Orthophosphate-Dissolved (as P) (mg/L)	0.0018		0.0018		<0.0010
	Phosphorus (P)-Total (mg/L)	0.0028		<0.0020		0.0032
	Sulfate (SO4) (mg/L)	23.0		23.4		30.4
	Anion Sum (meq/L)	2.57		2.57		2.96
	Cation Sum (meq/L)	2.41		2.47		2.83
	Cation - Anion Balance (%)	-3.2		-1.8		-2.2
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.63		1.70		1.20
	Total Organic Carbon (mg/L)	1.46		1.43		1.02
Total Metals	Aluminum (Al)-Total (mg/L)	0.0104		0.0113		0.0225
	Antimony (Sb)-Total (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Total (mg/L)	0.00036		0.00034		0.00043
	Barium (Ba)-Total (mg/L)	0.0405		0.0391		0.0437
	Beryllium (Be)-Total (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Total (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Total (ug/L)	<0.0050		<0.0050		<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2157237-6	L2157237-7	L2157237-8	L2157237-9	L2157237-10
Description	WS	WS	WS	WS	WS
Sampled Date	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18
Sampled Time	09:30	09:30	09:30	09:15	09:15
Client ID	RG_GCU3_WS_20180830-0930_FB-HG	RG_ERU3_WS_20180830-0930	RG_ERU3_WS_20180830-0930_FB-HG	RG_ERU2_WS_20180830-0915	RG_ERU2_WS_20180830-0915_FB-HG
Grouping / **Analyte**					
WATER					
Physical Tests					
Conductivity (uS/cm)		280		240	
Hardness (as CaCO3) (mg/L)		131		120	
pH (pH)		8.30		8.33	
ORP (mV)		433		442	
Total Suspended Solids (mg/L)		2.6		1.1	
Total Dissolved Solids (mg/L)		178 DLHC		156 DLHC	
Turbidity (NTU)		2.02		0.97	
Anions and Nutrients					
Acidity (as CaCO3) (mg/L)		<1.0		<1.0	
Alkalinity, Bicarbonate (as CaCO3) (mg/L)		115		98.3	
Alkalinity, Carbonate (as CaCO3) (mg/L)		<1.0		3.4	
Alkalinity, Hydroxide (as CaCO3) (mg/L)		<1.0		<1.0	
Alkalinity, Total (as CaCO3) (mg/L)		115		102	
Ammonia as N (mg/L)		0.0204		0.0207	
Bromide (Br) (mg/L)		<0.050		<0.050	
Chloride (Cl) (mg/L)		3.87		2.14	
Fluoride (F) (mg/L)		0.092		0.094	
Ion Balance (%)		92.7		96.5	
Nitrate (as N) (mg/L)		0.0463		0.119	
Nitrite (as N) (mg/L)		0.0014		0.0021	
Total Kjeldahl Nitrogen (mg/L)		0.055		0.117	
Orthophosphate-Dissolved (as P) (mg/L)		0.0013		0.0015	
Phosphorus (P)-Total (mg/L)		<0.0020		<0.0020	
Sulfate (SO4) (mg/L)		31.5		25.2	
Anion Sum (meq/L)		3.07		2.63	
Cation Sum (meq/L)		2.85		2.54	
Cation - Anion Balance (%)		-3.8		-1.8	
Organic / Inorganic Carbon					
Dissolved Organic Carbon (mg/L)		0.98		1.53	
Total Organic Carbon (mg/L)		0.97		1.33	
Total Metals					
Aluminum (Al)-Total (mg/L)		0.0220		0.0119	
Antimony (Sb)-Total (mg/L)		<0.00010		<0.00010	
Arsenic (As)-Total (mg/L)		0.00047		0.00035	
Barium (Ba)-Total (mg/L)		0.0385		0.0386	
Beryllium (Be)-Total (ug/L)		<0.020		<0.020	
Bismuth (Bi)-Total (mg/L)		<0.000050		<0.000050	
Boron (B)-Total (mg/L)		<0.010		<0.010	
Cadmium (Cd)-Total (ug/L)		<0.0050		<0.0050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157237-1	L2157237-2	L2157237-3	L2157237-4	L2157237-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18
	Sampled Time	09:30	09:30	09:30	09:30	09:30
	Client ID	RG_GCU1_WS_20180830-0930	RG_GCU1_WS_20180830-0930_FB-HG	RG_GCU2_WS_20180830-0930	RG_GCU2_WS_20180830-0930_FB-HG	RG_GCU3_WS_20180830-0930
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	31.6		31.7		37.1
	Chromium (Cr)-Total (mg/L)	0.00014		<0.00010		<0.00010
	Cobalt (Co)-Total (ug/L)	<0.10		<0.10		<0.10
	Copper (Cu)-Total (mg/L)	<0.00050		<0.00050		<0.00050
	Iron (Fe)-Total (mg/L)	0.013		<0.010		0.026
	Lead (Pb)-Total (mg/L)	<0.000050		<0.000050		0.000106
	Lithium (Li)-Total (mg/L)	0.0018		0.0018		0.0022
	Magnesium (Mg)-Total (mg/L)	9.26		9.09		10.9
	Manganese (Mn)-Total (mg/L)	0.00115		0.00117		0.00400
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)-Total (mg/L)	0.000641		0.000647		0.000735
	Nickel (Ni)-Total (mg/L)	<0.00050		<0.00050		<0.00050
	Potassium (K)-Total (mg/L)	0.491		0.477		0.545
	Selenium (Se)-Total (ug/L)	1.06		1.10		1.11
	Silicon (Si)-Total (mg/L)	1.22		1.21		1.85
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Sodium (Na)-Total (mg/L)	2.43		2.43		3.59
	Strontium (Sr)-Total (mg/L)	0.116		0.115		0.142
	Thallium (Tl)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010		<0.00010		<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010		<0.010		<0.010
	Uranium (U)-Total (mg/L)	0.000666		0.000673		0.000763
	Vanadium (V)-Total (mg/L)	<0.00050		<0.00050		<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030		<0.0030		<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	LAB		LAB		LAB
	Dissolved Metals Filtration Location	LAB		LAB		LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0043		0.0042		0.0031
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00037		0.00035		0.00043
	Barium (Ba)-Dissolved (mg/L)	0.0406		0.0408		0.0441
	Beryllium (Be)-Dissolved (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050		<0.0050		<0.0050
	Calcium (Ca)-Dissolved (mg/L)	30.5		31.8		34.9
	Chromium (Cr)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10		<0.10		<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157237-6	L2157237-7	L2157237-8	L2157237-9	L2157237-10
	Description	WS	WS	WS	WS	WS
	Sampled Date	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18
	Sampled Time	09:30	09:30	09:30	09:15	09:15
	Client ID	RG_GCU3_WS_20180830-0930_FB-HG	RG_ERU3_WS_20180830-0930	RG_ERU3_WS_20180830-0930_FB-HG	RG_ERU2_WS_20180830-0915	RG_ERU2_WS_20180830-0915_FB-HG
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)		35.9		32.3	
	Chromium (Cr)-Total (mg/L)		0.00011		0.00011	
	Cobalt (Co)-Total (ug/L)		<0.10		<0.10	
	Copper (Cu)-Total (mg/L)		<0.00050		<0.00050	
	Iron (Fe)-Total (mg/L)		0.032		0.021	
	Lead (Pb)-Total (mg/L)		0.000065		<0.000050	
	Lithium (Li)-Total (mg/L)		0.0016		0.0018	
	Magnesium (Mg)-Total (mg/L)		10.7		9.30	
	Manganese (Mn)-Total (mg/L)		0.00372		0.00131	
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)-Total (mg/L)		0.000756		0.000702	
	Nickel (Ni)-Total (mg/L)		<0.00050		<0.00050	
	Potassium (K)-Total (mg/L)		0.564		0.490	
	Selenium (Se)-Total (ug/L)		0.309		1.11	
	Silicon (Si)-Total (mg/L)		1.74		1.09	
	Silver (Ag)-Total (mg/L)		<0.000010		<0.000010	
	Sodium (Na)-Total (mg/L)		4.61		2.63	
	Strontium (Sr)-Total (mg/L)		0.151		0.121	
	Thallium (Tl)-Total (mg/L)		<0.000010		<0.000010	
	Tin (Sn)-Total (mg/L)		<0.00010		0.00033	
	Titanium (Ti)-Total (mg/L)		<0.010		<0.010	
	Uranium (U)-Total (mg/L)		0.000766		0.000682	
	Vanadium (V)-Total (mg/L)		<0.00050		<0.00050	
	Zinc (Zn)-Total (mg/L)		<0.0030		<0.0030	
Dissolved Metals	Dissolved Mercury Filtration Location		LAB		LAB	
	Dissolved Metals Filtration Location		LAB		LAB	
	Aluminum (Al)-Dissolved (mg/L)		0.0040		0.0040	
	Antimony (Sb)-Dissolved (mg/L)		<0.00010		<0.00010	
	Arsenic (As)-Dissolved (mg/L)		0.00045		0.00034	
	Barium (Ba)-Dissolved (mg/L)		0.0385		0.0397	
	Beryllium (Be)-Dissolved (ug/L)		<0.020		<0.020	
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050		<0.000050	
	Boron (B)-Dissolved (mg/L)		<0.010		<0.010	
	Cadmium (Cd)-Dissolved (ug/L)		<0.0050		<0.0050	
	Calcium (Ca)-Dissolved (mg/L)		34.7		32.2	
	Chromium (Cr)-Dissolved (mg/L)		<0.00010		<0.00010	
	Cobalt (Co)-Dissolved (ug/L)		<0.10		<0.10	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2157237-1	L2157237-2	L2157237-3	L2157237-4	L2157237-5
Description	WS	WS	WS	WS	WS
Sampled Date	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18
Sampled Time	09:30	09:30	09:30	09:30	09:30
Client ID	RG_GCU1_WS_20180830-0930	RG_GCU1_WS_20180830-0930_FB-HG	RG_GCU2_WS_20180830-0930	RG_GCU2_WS_20180830-0930_FB-HG	RG_GCU3_WS_20180830-0930
Grouping / **Analyte**					
WATER					
Dissolved Metals					
Copper (Cu)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Iron (Fe)-Dissolved (mg/L)	<0.010		<0.010		<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
Lithium (Li)-Dissolved (mg/L)	0.0017		0.0017		0.0021
Magnesium (Mg)-Dissolved (mg/L)	9.19		9.24		11.0
Manganese (Mn)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000642		0.000632		0.000762
Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Potassium (K)-Dissolved (mg/L)	0.505		0.505		0.567
Selenium (Se)-Dissolved (ug/L)	0.920		1.09		1.06
Silicon (Si)-Dissolved (mg/L)	1.22		1.18		1.95
Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Sodium (Na)-Dissolved (mg/L)	2.63		2.62		3.81
Strontium (Sr)-Dissolved (mg/L)	0.113		0.114		0.141
Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		<0.010
Uranium (U)-Dissolved (mg/L)	0.000662		0.000671		0.000756
Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2157237-6	L2157237-7	L2157237-8	L2157237-9	L2157237-10
Description	WS	WS	WS	WS	WS
Sampled Date	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18	30-AUG-18
Sampled Time	09:30	09:30	09:30	09:15	09:15
Client ID	RG_GCU3_WS_20180830-0930_FB-HG	RG_ERU3_WS_20180830-0930	RG_ERU3_WS_20180830-0930_FB-HG	RG_ERU2_WS_20180830-0915	RG_ERU2_WS_20180830-0915_FB-HG
Grouping / **Analyte**					
WATER					
Dissolved Metals					
Copper (Cu)-Dissolved (mg/L)		<0.00050		<0.00050	
Iron (Fe)-Dissolved (mg/L)		<0.010		<0.010	
Lead (Pb)-Dissolved (mg/L)		<0.000050		<0.000050	
Lithium (Li)-Dissolved (mg/L)		0.0015		0.0018	
Magnesium (Mg)-Dissolved (mg/L)		10.8		9.64	
Manganese (Mn)-Dissolved (mg/L)		0.00013		<0.00010	
Mercury (Hg)-Dissolved (mg/L)		<0.0000050		<0.0000050	
Molybdenum (Mo)-Dissolved (mg/L)		0.000897		0.000654	
Nickel (Ni)-Dissolved (mg/L)		<0.00050		<0.00050	
Potassium (K)-Dissolved (mg/L)		0.593		0.515	
Selenium (Se)-Dissolved (ug/L)		0.316		1.10	
Silicon (Si)-Dissolved (mg/L)		1.68		1.16	
Silver (Ag)-Dissolved (mg/L)		<0.000010		<0.000010	
Sodium (Na)-Dissolved (mg/L)		4.85		2.89	
Strontium (Sr)-Dissolved (mg/L)		0.147		0.121	
Thallium (Tl)-Dissolved (mg/L)		<0.000010		<0.000010	
Tin (Sn)-Dissolved (mg/L)		<0.00010		0.00032	
Titanium (Ti)-Dissolved (mg/L)		<0.010		<0.010	
Uranium (U)-Dissolved (mg/L)		0.000772		0.000700	
Vanadium (V)-Dissolved (mg/L)		<0.00050		<0.00050	
Zinc (Zn)-Dissolved (mg/L)		<0.0010		<0.0010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC and dissolved metals to be filtered and preserved in lab; filter code added

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Manganese (Mn)-Total	MB-LOR	L2157237-1, -3, -5, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Arsenic (As)-Total	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Iron (Fe)-Total	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2157237-1, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2157237-1, -3, -5, -7, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

Reference Information

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL Water Total Organic Carbon APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-L-IC-N-VA Water Chloride in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Reference Information

Chain of Custody Numbers:

REGIONAL Koocanusa

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4205784								
WG2870664-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			102.0		%		85-115	08-SEP-18
WG2870664-1 MB								
Acidity (as CaCO3)			1.5		mg/L		2	08-SEP-18
Batch R4214521								
WG2872644-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			101.8		%		85-115	12-SEP-18
WG2872644-1 MB								
Acidity (as CaCO3)			1.4		mg/L		2	12-SEP-18
ALK-TITR-VA	**Water**							
Batch R4205790								
WG2870671-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			97.5		%		85-115	09-SEP-18
WG2870671-5 DUP		**L2157237-5**						
Alkalinity, Total (as CaCO3)		111	111		mg/L	0.5	20	09-SEP-18
WG2870671-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	09-SEP-18
Batch R4211237								
WG2872116-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			101.5		%		85-115	11-SEP-18
WG2872116-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	11-SEP-18
BE-D-L-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-2 LCS								
Beryllium (Be)-Dissolved			83.0		%		80-120	04-SEP-18
WG2867389-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	04-SEP-18
BE-T-L-CCMS-VA	**Water**							
Batch R4201797								
WG2867375-2 LCS								
Beryllium (Be)-Total			94.4		%		80-120	05-SEP-18
WG2867375-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	05-SEP-18
BR-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-2 LCS								
Bromide (Br)			102.5		%		85-115	07-SEP-18
WG2870656-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	07-SEP-18
WG2870656-4 MS		**L2157237-3**						
Bromide (Br)			102.7		%		75-125	07-SEP-18
Batch R4214491								
WG2872646-2 LCS								
Bromide (Br)			106.4		%		85-115	11-SEP-18
WG2872646-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	11-SEP-18
C-DIS-ORG-LOW-CL	**Water**							
Batch R4216038								
WG2876683-3 DUP		**L2157237-3**						
Dissolved Organic Carbon		1.70	1.53		mg/L	11	20	13-SEP-18
WG2876683-2 LCS								
Dissolved Organic Carbon			98.6		%		80-120	13-SEP-18
WG2876683-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	13-SEP-18
WG2876683-4 MS		**L2157237-3**						
Dissolved Organic Carbon			105.9		%		70-130	13-SEP-18
C-TOT-ORG-LOW-CL	**Water**							
Batch R4216038								
WG2876683-3 DUP		**L2157237-3**						
Total Organic Carbon		1.43	1.34		mg/L	6.5	20	13-SEP-18
WG2876683-2 LCS								
Total Organic Carbon			109.6		%		80-120	13-SEP-18
WG2876683-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-SEP-18
WG2876683-4 MS		**L2157237-3**						
Total Organic Carbon			97.3		%		70-130	13-SEP-18
CL-L-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-2 LCS								
Chloride (Cl)			99.9		%		90-110	07-SEP-18
WG2870656-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	07-SEP-18
WG2870656-4 MS		**L2157237-3**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-L-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-4 MS		**L2157237-3**						
Chloride (Cl)			98.7		%		75-125	07-SEP-18
Batch R4214491								
WG2872646-2 LCS								
Chloride (Cl)			104.2		%		90-110	11-SEP-18
WG2872646-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	11-SEP-18
EC-PCT-VA	**Water**							
Batch R4205784								
WG2870664-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			99.6		%		90-110	08-SEP-18
WG2870664-1 MB								
Conductivity			<2.0		uS/cm		2	08-SEP-18
Batch R4214521								
WG2872644-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			101.2		%		90-110	12-SEP-18
WG2872644-1 MB								
Conductivity			<2.0		uS/cm		2	12-SEP-18
F-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-2 LCS								
Fluoride (F)			100.5		%		90-110	07-SEP-18
WG2870656-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	07-SEP-18
WG2870656-4 MS		**L2157237-3**						
Fluoride (F)			99.1		%		75-125	07-SEP-18
Batch R4214491								
WG2872646-2 LCS								
Fluoride (F)			101.6		%		90-110	11-SEP-18
WG2872646-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	11-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4203031								
WG2867841-2 LCS								
Mercury (Hg)-Dissolved			99.7		%		80-120	05-SEP-18
WG2867841-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-U-CVAF-VA	**Water**							
Batch R4204226								
WG2869430-2 LCS								
Mercury (Hg)-Total			106.0		%		80-120	06-SEP-18
WG2869430-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	06-SEP-18
WG2869430-4 MS		**L2157237-1**						
Mercury (Hg)-Total			88.7		%		70-130	06-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-2 LCS								
Aluminum (Al)-Dissolved			95.0		%		80-120	04-SEP-18
Antimony (Sb)-Dissolved			97.7		%		80-120	04-SEP-18
Arsenic (As)-Dissolved			100.4		%		80-120	04-SEP-18
Barium (Ba)-Dissolved			91.3		%		80-120	04-SEP-18
Bismuth (Bi)-Dissolved			92.4		%		80-120	04-SEP-18
Boron (B)-Dissolved			89.6		%		80-120	04-SEP-18
Cadmium (Cd)-Dissolved			93.1		%		80-120	04-SEP-18
Calcium (Ca)-Dissolved			89.9		%		80-120	04-SEP-18
Chromium (Cr)-Dissolved			93.1		%		80-120	04-SEP-18
Cobalt (Co)-Dissolved			93.8		%		80-120	04-SEP-18
Copper (Cu)-Dissolved			91.3		%		80-120	04-SEP-18
Iron (Fe)-Dissolved			97.3		%		80-120	04-SEP-18
Lead (Pb)-Dissolved			94.5		%		80-120	04-SEP-18
Lithium (Li)-Dissolved			83.6		%		80-120	04-SEP-18
Magnesium (Mg)-Dissolved			94.0		%		80-120	04-SEP-18
Manganese (Mn)-Dissolved			95.8		%		80-120	04-SEP-18
Molybdenum (Mo)-Dissolved			93.3		%		80-120	04-SEP-18
Nickel (Ni)-Dissolved			92.2		%		80-120	04-SEP-18
Potassium (K)-Dissolved			95.5		%		80-120	04-SEP-18
Selenium (Se)-Dissolved			97.4		%		80-120	04-SEP-18
Silicon (Si)-Dissolved			96.5		%		60-140	04-SEP-18
Silver (Ag)-Dissolved			94.4		%		80-120	04-SEP-18
Sodium (Na)-Dissolved			97.3		%		80-120	04-SEP-18
Strontium (Sr)-Dissolved			91.8		%		80-120	04-SEP-18
Thallium (Tl)-Dissolved			95.4		%		80-120	04-SEP-18
Tin (Sn)-Dissolved			97.1		%		80-120	04-SEP-18
Titanium (Ti)-Dissolved			93.3		%		80-120	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4200768								
WG2867389-2 LCS								
Uranium (U)-Dissolved			96.9		%		80-120	04-SEP-18
Vanadium (V)-Dissolved			94.3		%		80-120	04-SEP-18
Zinc (Zn)-Dissolved			92.3		%		80-120	04-SEP-18
WG2867389-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	04-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	04-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	04-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	04-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	04-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	04-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	04-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	04-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	04-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	04-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	04-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4201797								
WG2867375-2 LCS								
Aluminum (Al)-Total			92.5		%		80-120	05-SEP-18
Antimony (Sb)-Total			95.9		%		80-120	05-SEP-18
Arsenic (As)-Total			92.9		%		80-120	05-SEP-18
Barium (Ba)-Total			91.9		%		80-120	05-SEP-18
Bismuth (Bi)-Total			92.9		%		80-120	05-SEP-18
Boron (B)-Total			88.0		%		80-120	05-SEP-18
Cadmium (Cd)-Total			93.8		%		80-120	05-SEP-18
Calcium (Ca)-Total			92.7		%		80-120	05-SEP-18
Chromium (Cr)-Total			95.1		%		80-120	05-SEP-18
Cobalt (Co)-Total			93.3		%		80-120	05-SEP-18
Copper (Cu)-Total			93.5		%		80-120	05-SEP-18
Iron (Fe)-Total			94.8		%		80-120	05-SEP-18
Lead (Pb)-Total			96.5		%		80-120	05-SEP-18
Lithium (Li)-Total			91.3		%		80-120	05-SEP-18
Magnesium (Mg)-Total			92.6		%		80-120	05-SEP-18
Manganese (Mn)-Total			92.1		%		80-120	05-SEP-18
Molybdenum (Mo)-Total			94.7		%		80-120	05-SEP-18
Nickel (Ni)-Total			91.8		%		80-120	05-SEP-18
Potassium (K)-Total			91.6		%		80-120	05-SEP-18
Selenium (Se)-Total			93.3		%		80-120	05-SEP-18
Silicon (Si)-Total			92.9		%		80-120	05-SEP-18
Silver (Ag)-Total			92.5		%		80-120	05-SEP-18
Sodium (Na)-Total			93.0		%		80-120	05-SEP-18
Strontium (Sr)-Total			91.3		%		80-120	05-SEP-18
Thallium (Tl)-Total			93.6		%		80-120	05-SEP-18
Tin (Sn)-Total			96.2		%		80-120	05-SEP-18
Titanium (Ti)-Total			90.0		%		80-120	05-SEP-18
Uranium (U)-Total			102.3		%		80-120	05-SEP-18
Vanadium (V)-Total			94.8		%		80-120	05-SEP-18
Zinc (Zn)-Total			91.6		%		80-120	05-SEP-18
WG2867375-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	05-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4201797								
WG2867375-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	05-SEP-18
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	05-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	05-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	05-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	05-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	05-SEP-18
Manganese (Mn)-Total			0.00013	MB-LOR	mg/L		0.0001	05-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	05-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	05-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	05-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	05-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	05-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	05-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	05-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	05-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	05-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	05-SEP-18
NH3-L-F-CL	**Water**							
Batch R4215488								
WG2875984-2 LCS								
Ammonia as N			101.5		%		85-115	13-SEP-18
WG2875984-1 MB								
Ammonia as N			<0.0050		mg/L		0.005	13-SEP-18
NO2-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-L-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-2 LCS								
Nitrite (as N)			99.7		%		90-110	07-SEP-18
WG2870656-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	07-SEP-18
WG2870656-4 MS		**L2157237-3**						
Nitrite (as N)			97.1		%		75-125	07-SEP-18
Batch R4214491								
WG2872646-2 LCS								
Nitrite (as N)			100.9		%		90-110	11-SEP-18
WG2872646-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	11-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-2 LCS								
Nitrate (as N)			100.5		%		90-110	07-SEP-18
WG2870656-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	07-SEP-18
WG2870656-4 MS		**L2157237-3**						
Nitrate (as N)			99.2		%		75-125	07-SEP-18
Batch R4214491								
WG2872646-2 LCS								
Nitrate (as N)			104.4		%		90-110	11-SEP-18
WG2872646-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	11-SEP-18
ORP-CL	**Water**							
Batch R4207627								
WG2872339-9 CRM		**CL-ORP**						
ORP			227		mV		210-230	10-SEP-18
P-T-L-COL-CL	**Water**							
Batch R4218310								
WG2879315-2 LCS								
Phosphorus (P)-Total			95.8		%		80-120	17-SEP-18
WG2879315-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	17-SEP-18
PH-PCT-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-PCT-VA	**Water**							
Batch R4205784								
WG2870664-2 CRM		**VA-PH7-BUF**						
pH			6.94		pH		6.9-7.1	08-SEP-18
Batch R4214521								
WG2872644-2 CRM		**VA-PH7-BUF**						
pH			7.00		pH		6.9-7.1	12-SEP-18
PO4-DO-L-COL-CL	**Water**							
Batch R4196670								
WG2866156-22 LCS								
Orthophosphate-Dissolved (as P)			96.6		%		80-120	01-SEP-18
WG2866156-26 LCS								
Orthophosphate-Dissolved (as P)			88.2		%		80-120	01-SEP-18
WG2866156-21 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	01-SEP-18
WG2866156-25 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	01-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4205777								
WG2870656-2 LCS								
Sulfate (SO4)			100.8		%		90-110	07-SEP-18
WG2870656-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	07-SEP-18
WG2870656-4 MS		**L2157237-3**						
Sulfate (SO4)			97.8		%		75-125	07-SEP-18
Batch R4214491								
WG2872646-2 LCS								
Sulfate (SO4)			104.9		%		90-110	11-SEP-18
WG2872646-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	11-SEP-18
SOLIDS-TDS-CL	**Water**							
Batch R4203973								
WG2868271-9 LCS								
Total Dissolved Solids			96.1		%		85-115	05-SEP-18
WG2868271-7 MB								
Total Dissolved Solids			<10		mg/L		10	05-SEP-18
TKN-L-F-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R4207713								
WG2870103-16 DUP		**L2157237-7**						
Total Kjeldahl Nitrogen		0.055	0.059		mg/L	7.0	20	09-SEP-18
WG2870103-15 LCS								
Total Kjeldahl Nitrogen			95.1		%		75-125	09-SEP-18
WG2870103-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	09-SEP-18
WG2870103-14 MS		**L2157237-7**						
Total Kjeldahl Nitrogen			99.4		%		70-130	09-SEP-18
TSS-L-CL	**Water**							
Batch R4203976								
WG2868851-8 LCS								
Total Suspended Solids			95.1		%		85-115	05-SEP-18
WG2868851-7 MB								
Total Suspended Solids			<1.0		mg/L		1	05-SEP-18
TSS-LOW-VA	**Water**							
Batch R4203669								
WG2867937-2 LCS								
Total Suspended Solids			105.6		%		85-115	05-SEP-18
WG2867937-1 MB								
Total Suspended Solids			<1.0		mg/L		1	05-SEP-18
TURBIDITY-CL	**Water**							
Batch R4202009								
WG2866714-2 LCS								
Turbidity			97.5		%		85-115	02-SEP-18
WG2866714-1 MB								
Turbidity			<0.10		NTU		0.1	02-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	30-AUG-18 09:30	10-SEP-18 00:00	0.25	254	hours	EHTR-FM
	3	30-AUG-18 09:30	10-SEP-18 00:00	0.25	254	hours	EHTR-FM
	5	30-AUG-18 09:30	10-SEP-18 00:00	0.25	254	hours	EHTR-FM
	7	30-AUG-18 09:30	10-SEP-18 00:00	0.25	254	hours	EHTR-FM
	9	30-AUG-18 09:15	10-SEP-18 00:00	0.25	255	hours	EHTR-FM
pH by Meter (Automated)							
	1	30-AUG-18 09:30	09-SEP-18 11:11	0.25	242	hours	EHTR-FM
	3	30-AUG-18 09:30	09-SEP-18 11:11	0.25	242	hours	EHTR-FM
	5	30-AUG-18 09:30	09-SEP-18 11:11	0.25	242	hours	EHTR-FM
	7	30-AUG-18 09:30	12-SEP-18 14:06	0.25	317	hours	EHTR-FM
	9	30-AUG-18 09:15	09-SEP-18 11:11	0.25	242	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)							
	1	30-AUG-18 09:30	07-SEP-18 13:12	3	8	days	EHT
	3	30-AUG-18 09:30	07-SEP-18 13:12	3	8	days	EHT
	5	30-AUG-18 09:30	07-SEP-18 13:12	3	8	days	EHT
	7	30-AUG-18 09:30	11-SEP-18 07:05	3	12	days	EHT
	9	30-AUG-18 09:15	07-SEP-18 13:12	3	8	days	EHT
Nitrite in Water by IC (Low Level)							
	1	30-AUG-18 09:30	07-SEP-18 13:12	3	8	days	EHT
	3	30-AUG-18 09:30	07-SEP-18 13:12	3	8	days	EHT
	5	30-AUG-18 09:30	07-SEP-18 13:12	3	8	days	EHT
	7	30-AUG-18 09:30	11-SEP-18 07:05	3	12	days	EHT
	9	30-AUG-18 09:15	07-SEP-18 13:12	3	8	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2157237 were received on 31-AUG-18 10:40.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: REGIONAL Koocanusa Reservoir

TURNAROUND

L2157237-COFC

PROJECT/CLIENT INFO				LAB INFO			
Facility Name / Job#	Regional Koocanusa	Lab Name			Excel	PDF	EDD
Project Manager	Cait Good	Lab Contact			X	X	X
Email	[redacted]	Email	Lyudmyla.Shvets@ALSGlobal.com	Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue	Address	2559 29 Street NE	Email 3:				
				Email 4:	teckcoal@equisonline.com			X
City	Sparwood Province BC	City	Calgary Province AB	Email 5:	jwilson@minnow.ca	X	X	X
Postal Code	V0B 2G0 Country Canada	Postal Code	T1Y7B5 Country Canada					
Phone Number	250-425-8202	Phone Number	14034071794	PO number	VPO00563596			

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	N	N	N	N	N	N	N					
									PRESERV.	NONE	NONE	H2SO4	NONE	NONE	HNO3	NONE					
									LAB ANALYSIS	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA					
1	RG_GCU1_WS_20180830-0930	RG_GCU1	WS		30-Aug-18	9:30:00 AM	G	7		1	1	1	1	1	1	1					
2	RG_GCU1_WS_20180830-0930_FB-HG	RG_GCU1	WS		30-Aug-18	9:30:00 AM	G	1		1											
3	RG_GCU2_WS_20180830-0930	RG_GCU2	WS		30-Aug-18	9:30:00 AM	G	7		1	1	1	1	1	1	1					
4	RG_GCU2_WS_20180830-0930_FB-HG	RG_GCU2	WS		30-Aug-18	9:30:00 AM	G	1		1											
5	RG_GCU3_WS_20180830-0930	RG_GCU3	WS		30-Aug-18	9:30:00 AM	G	7		1	1	1	1	1	1	1					
6	RG_GCU3_WS_20180830-0930_FB-HG	RG_GCU3	WS		30-Aug-18	9:30:00 AM	G	1		1											
7	RG_ERU3_WS_20180830-0930	RG_ERU3	WS		30-Aug-18	9:30:00 AM	G	7		1	1	1	1	1	1	1					
8	RG_ERU3_WS_20180830-0930_FB-HG	RG_ERU3	WS		30-Aug-18	9:30:00 AM	G	1		1											
9	RG_ERU2_WS_20180830-0915	RG_ERU2	WS		30-Aug-18	9:15:00 AM	G	7		1	1	1	1	1	1	1					
10	RG_ERU2_WS_20180830-0915_FB-HG	RG_ERU2	WS		30-Aug-18	9:15:00 AM	G	1		1											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Koocanusa - VPO00563596				08/31 10:40

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Justin Wilson	Mobile #	519-803-3923
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	August 30, 2018
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

10

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 31-AUG-18
Report Date: 05-JUN-19 14:47 (MT)
Version: FINAL REV. 2

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2157301

Project P.O. #: VPO00563596
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: Regional Koocanusa
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-1	L2157301-2	L2157301-3	L2157301-4	L2157301-5
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	15:15	14:45	11:30	12:30	14:00
	Client ID	RG_TN_1_SED_20180829-1515	RG_TN_2_SED_20180829-1445	RG_TN_3_SED_20180829-1130	RG_TN_4_SED_20180829-1230	RG_TN_5_SED_20180829-1400
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	41.5	38.7	41.6	33.2	35.8
	pH (1:2 soil:water) (pH)	8.40	8.59	8.35	8.83	8.77
Particle Size	% Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (2.00mm - 1.00mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (1.00mm - 0.50mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.50mm - 0.25mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.25mm - 0.125mm) (%)	<1.0	<1.0	<1.0	15.3	2.7
	% Sand (0.125mm - 0.063mm) (%)	<1.0	6.7	2.0	29.6	28.0
	% Silt (0.063mm - 0.0312mm) (%)	30.1	29.5	34.1	19.4	26.8
	% Silt (0.0312mm - 0.004mm) (%)	57.1	52.1	53.8	28.0	35.0
	% Clay (<4um) (%)	12.5	11.6	10.1	7.4	7.4
	Texture	Silt	Silt	Silt	Sandy loam	Silt loam
Organic / Inorganic Carbon	Total Organic Carbon (%)	2.00	1.99	2.4	1.83	1.91
Metals	Aluminum (Al) (mg/kg)	12100	12300	12100	9220	9860
	Antimony (Sb) (mg/kg)	0.29	0.30	0.34	0.26	0.29
	Arsenic (As) (mg/kg)	7.13	6.77	7.23	6.33	6.76
	Barium (Ba) (mg/kg)	71.1	71.7	73.8	57.3	59.5
	Beryllium (Be) (mg/kg)	0.37	0.35	0.37	0.27	0.32
	Bismuth (Bi) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Boron (B) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Cadmium (Cd) (mg/kg)	0.176	0.171	0.202	0.144	0.138
	Calcium (Ca) (mg/kg)	106000	115000	103000	111000	114000
	Chromium (Cr) (mg/kg)	17.1	16.8	18.0	15.1	15.9
	Cobalt (Co) (mg/kg)	8.98	8.88	9.52	7.98	8.40
	Copper (Cu) (mg/kg)	16.3	15.2	17.5	12.1	13.1
	Iron (Fe) (mg/kg)	22000	21900	22500	19700	20900
	Lead (Pb) (mg/kg)	16.5	15.5	18.0	14.2	14.7
	Lithium (Li) (mg/kg)	25.1	24.5	24.5	20.1	22.5
	Magnesium (Mg) (mg/kg)	22200	24600	23500	24900	26100
	Manganese (Mn) (mg/kg)	423	430	429	382	402
	Mercury (Hg) (mg/kg)	0.0196	0.0150	0.0202	0.0141	0.0126
	Molybdenum (Mo) (mg/kg)	0.58	0.61	0.65	0.55	0.59
	Nickel (Ni) (mg/kg)	18.9	19.0	20.2	16.8	17.9
	Phosphorus (P) (mg/kg)	617	641	675	633	682
	Potassium (K) (mg/kg)	800	740	800	610	630
	Selenium (Se) (mg/kg)	<0.20	<0.20	0.23	<0.20	<0.20
	Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-6	L2157301-7	L2157301-8	L2157301-9	L2157301-10
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	28-AUG-18	28-AUG-18	28-AUG-18	28-AUG-18	28-AUG-18
	Sampled Time	10:00	12:00	13:30	14:30	15:30
	Client ID	RG_T4_1_SED_20180828-1000	RG_T4_2_SED_20180828-1200	RG_T4_3_SED_20180828-1330	RG_T4_4_SED_20180828-1430	RG_T4_5_SED_20180828-1530
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	40.0	42.3	41.0	43.3	39.2
	pH (1:2 soil:water) (pH)	8.53	8.42	8.42	8.43	8.49
Particle Size	% Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (2.00mm - 1.00mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (1.00mm - 0.50mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.50mm - 0.25mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.25mm - 0.125mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.125mm - 0.063mm) (%)	<1.0	<1.0	2.2	1.9	2.9
	% Silt (0.063mm - 0.0312mm) (%)	19.4	18.5	21.6	14.8	16.0
	% Silt (0.0312mm - 0.004mm) (%)	60.8	62.2	58.8	62.8	61.2
	% Clay (<4um) (%)	19.7	19.1	17.2	20.5	19.8
	Texture	Silt	Silt	Silt	Silt	Silt
Organic / Inorganic Carbon	Total Organic Carbon (%)	2.15	2.19	2.20	2.2	1.94
Metals	Aluminum (Al) (mg/kg)	10500	13200	12000	13500	13400
	Antimony (Sb) (mg/kg)	0.46	0.48	0.41	0.42	0.42
	Arsenic (As) (mg/kg)	7.25	7.69	7.17	7.59	7.14
	Barium (Ba) (mg/kg)	161	166	135	141	116
	Beryllium (Be) (mg/kg)	0.50	0.55	0.47	0.48	0.45
	Bismuth (Bi) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Boron (B) (mg/kg)	5.0	<5.0	<5.0	<5.0	<5.0
	Cadmium (Cd) (mg/kg)	0.586	0.573	0.486	0.462	0.336
	Calcium (Ca) (mg/kg)	117000	119000	115000	122000	120000
	Chromium (Cr) (mg/kg)	17.6	20.0	18.7	20.4	19.6
	Cobalt (Co) (mg/kg)	9.08	10.3	9.45	10.2	9.83
	Copper (Cu) (mg/kg)	16.4	18.0	16.4	17.5	16.1
	Iron (Fe) (mg/kg)	22200	24500	22800	24700	23900
	Lead (Pb) (mg/kg)	14.0	15.4	15.0	15.9	15.8
	Lithium (Li) (mg/kg)	24.1	26.1	24.2	25.6	24.8
	Magnesium (Mg) (mg/kg)	24100	26700	24000	26200	24300
	Manganese (Mn) (mg/kg)	589	596	539	568	528
	Mercury (Hg) (mg/kg)	0.0323	0.0336	0.0286	0.0291	0.0208
	Molybdenum (Mo) (mg/kg)	1.03	1.01	0.94	0.94	0.85
	Nickel (Ni) (mg/kg)	22.4	24.8	22.5	23.9	22.0
	Phosphorus (P) (mg/kg)	912	979	812	830	734
	Potassium (K) (mg/kg)	950	1110	1020	1160	1010
	Selenium (Se) (mg/kg)	0.61	0.53	0.47	0.51	0.40
	Silver (Ag) (mg/kg)	0.11	0.11	<0.10	<0.10	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-11				
	Description	Sediment				
	Sampled Date	28-AUG-18				
	Sampled Time	14:35				
	Client ID	RG_T4_4_SED_20180828-1435				
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	42.3				
	pH (1:2 soil:water) (pH)	8.45				
Particle Size	% Gravel (>2mm) (%)	<1.0				
	% Sand (2.00mm - 1.00mm) (%)	<1.0				
	% Sand (1.00mm - 0.50mm) (%)	<1.0				
	% Sand (0.50mm - 0.25mm) (%)	<1.0				
	% Sand (0.25mm - 0.125mm) (%)	<1.0				
	% Sand (0.125mm - 0.063mm) (%)	1.4				
	% Silt (0.063mm - 0.0312mm) (%)	17.4				
	% Silt (0.0312mm - 0.004mm) (%)	61.6				
	% Clay (<4um) (%)	19.6				
	Texture	Silt				
Organic / Inorganic Carbon	Total Organic Carbon (%)	2.3				
Metals	Aluminum (Al) (mg/kg)	14700				
	Antimony (Sb) (mg/kg)	0.44				
	Arsenic (As) (mg/kg)	8.24				
	Barium (Ba) (mg/kg)	142				
	Beryllium (Be) (mg/kg)	0.50				
	Bismuth (Bi) (mg/kg)	0.21				
	Boron (B) (mg/kg)	<5.0				
	Cadmium (Cd) (mg/kg)	0.454				
	Calcium (Ca) (mg/kg)	140000				
	Chromium (Cr) (mg/kg)	21.8				
	Cobalt (Co) (mg/kg)	11.2				
	Copper (Cu) (mg/kg)	19.2				
	Iron (Fe) (mg/kg)	26900				
	Lead (Pb) (mg/kg)	17.8				
	Lithium (Li) (mg/kg)	27.7				
	Magnesium (Mg) (mg/kg)	28400				
	Manganese (Mn) (mg/kg)	629				
	Mercury (Hg) (mg/kg)	0.0462				
	Molybdenum (Mo) (mg/kg)	1.05				
	Nickel (Ni) (mg/kg)	25.6				
	Phosphorus (P) (mg/kg)	876				
	Potassium (K) (mg/kg)	1110				
	Selenium (Se) (mg/kg)	0.52				
	Silver (Ag) (mg/kg)	<0.10				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-1	L2157301-2	L2157301-3	L2157301-4	L2157301-5
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	15:15	14:45	11:30	12:30	14:00
	Client ID	RG_TN_1_SED_20180829-1515	RG_TN_2_SED_20180829-1445	RG_TN_3_SED_20180829-1130	RG_TN_4_SED_20180829-1230	RG_TN_5_SED_20180829-1400
Grouping	**Analyte**					
SOIL						
Metals	Sodium (Na) (mg/kg)	81	84	89	81	82
	Strontium (Sr) (mg/kg)	238	250	229	231	237
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.087	0.078	0.085	0.066	0.067
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	142	140	143	129	123
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.794	0.729	0.881	0.582	0.576
	Vanadium (V) (mg/kg)	13.4	13.4	13.9	12.0	12.5
	Zinc (Zn) (mg/kg)	69.4	66.9	73.6	61.8	64.0
	Zirconium (Zr) (mg/kg)	<1.0	<1.0	1.5	1.3	1.4
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acridine (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(e)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	0.022	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	1-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.010	0.011	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Quinoline (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: d10-Acenaphthene (%)	94.4	91.6	85.2	73.8	82.5
	Surrogate: d12-Chrysene (%)	103.9	104.2	105.8	101.4	104.4
	Surrogate: d8-Naphthalene (%)	92.6	88.9	80.5	69.6	79.5

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-6	L2157301-7	L2157301-8	L2157301-9	L2157301-10
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	28-AUG-18	28-AUG-18	28-AUG-18	28-AUG-18	28-AUG-18
	Sampled Time	10:00	12:00	13:30	14:30	15:30
	Client ID	RG_T4_1_SED_20180828-1000	RG_T4_2_SED_20180828-1200	RG_T4_3_SED_20180828-1330	RG_T4_4_SED_20180828-1430	RG_T4_5_SED_20180828-1530
Grouping	**Analyte**					
SOIL						
Metals	Sodium (Na) (mg/kg)	92	100	91	100	103
	Strontium (Sr) (mg/kg)	216	227	226	250	263
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.136	0.144	0.128	0.131	0.113
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	54.8	76.9	84.1	99.6	102
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.758	0.788	0.850	0.811	0.784
	Vanadium (V) (mg/kg)	18.0	20.2	17.9	19.3	17.2
	Zinc (Zn) (mg/kg)	81.6	88.7	79.8	84.4	77.2
	Zirconium (Zr) (mg/kg)	1.7	1.7	1.5	1.3	1.4
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acridine (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	0.012	0.013	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	0.020	0.020	0.014	0.015	<0.010
	Benzo(e)pyrene (mg/kg)	0.013	0.013	<0.010	0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.010	0.014	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	0.025	0.026	0.018	0.018	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	0.0057	<0.0050
	Fluoranthene (mg/kg)	0.017	0.019	0.014	0.014	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	1-Methylnaphthalene (mg/kg)	0.026	0.023	0.025	0.016	<0.010
	2-Methylnaphthalene (mg/kg)	0.047	0.041	0.040	0.030	0.016
	Naphthalene (mg/kg)	0.019	0.016	0.014	0.010	<0.010
	Perylene (mg/kg)	0.015	0.015	<0.010	0.011	<0.010
	Phenanthrene (mg/kg)	0.045	0.039	0.041	0.027	0.017
	Pyrene (mg/kg)	0.013	0.014	0.011	0.011	<0.010
	Quinoline (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: d10-Acenaphthene (%)	87.8	88.0	87.2	84.2	79.8
	Surrogate: d12-Chrysene (%)	106.7	116.9	104.8	104.9	104.2
	Surrogate: d8-Naphthalene (%)	84.1	84.5	84.9	81.4	75.3

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-11				
	Description	Sediment				
	Sampled Date	28-AUG-18				
	Sampled Time	14:35				
	Client ID	RG_T4_4_SED_20180828-1435				
Grouping	**Analyte**					
SOIL						
Metals	Sodium (Na) (mg/kg)	105				
	Strontium (Sr) (mg/kg)	288				
	Sulfur (S) (mg/kg)	<1000				
	Thallium (Tl) (mg/kg)	0.132				
	Tin (Sn) (mg/kg)	<2.0				
	Titanium (Ti) (mg/kg)	101				
	Tungsten (W) (mg/kg)	<0.50				
	Uranium (U) (mg/kg)	0.907				
	Vanadium (V) (mg/kg)	19.6				
	Zinc (Zn) (mg/kg)	88.7				
	Zirconium (Zr) (mg/kg)	1.8				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050				
	Acenaphthylene (mg/kg)	<0.0050				
	Acridine (mg/kg)	<0.010				
	Anthracene (mg/kg)	<0.0040				
	Benz(a)anthracene (mg/kg)	<0.010				
	Benzo(a)pyrene (mg/kg)	<0.010				
	Benzo(b&j)fluoranthene (mg/kg)	0.015				
	Benzo(e)pyrene (mg/kg)	<0.010				
	Benzo(g,h,i)perylene (mg/kg)	<0.010				
	Benzo(k)fluoranthene (mg/kg)	<0.010				
	Chrysene (mg/kg)	0.015				
	Dibenz(a,h)anthracene (mg/kg)	<0.0050				
	Fluoranthene (mg/kg)	0.013				
	Fluorene (mg/kg)	<0.010				
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010				
	1-Methylnaphthalene (mg/kg)	0.019				
	2-Methylnaphthalene (mg/kg)	0.029				
	Naphthalene (mg/kg)	0.013				
	Perylene (mg/kg)	0.011				
	Phenanthrene (mg/kg)	0.028				
	Pyrene (mg/kg)	<0.010				
	Quinoline (mg/kg)	<0.010				
	Surrogate: d10-Acenaphthene (%)	90.4				
	Surrogate: d12-Chrysene (%)	109.9				
	Surrogate: d8-Naphthalene (%)	89.5				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-1	L2157301-2	L2157301-3	L2157301-4	L2157301-5
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	15:15	14:45	11:30	12:30	14:00
	Client ID	RG_TN_1_SED_20180829-1515	RG_TN_2_SED_20180829-1445	RG_TN_3_SED_20180829-1130	RG_TN_4_SED_20180829-1230	RG_TN_5_SED_20180829-1400
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: d10-Phenanthrene (%)	95.9	93.9	92.5	84.5	88.6
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	IACR (CCME) (mg/kg)	<0.15	<0.15	<0.15	<0.15	<0.15

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-6	L2157301-7	L2157301-8	L2157301-9	L2157301-10
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	28-AUG-18	28-AUG-18	28-AUG-18	28-AUG-18	28-AUG-18
	Sampled Time	10:00	12:00	13:30	14:30	15:30
	Client ID	RG_T4_1_SED_20180828-1000	RG_T4_2_SED_20180828-1200	RG_T4_3_SED_20180828-1330	RG_T4_4_SED_20180828-1430	RG_T4_5_SED_20180828-1530
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: d10-Phenanthrene (%)	94.7	94.7	91.4	90.2	87.7
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	IACR (CCME) (mg/kg)	0.23	0.23	0.17	0.19	<0.15

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-11				
	Description	Sediment				
	Sampled Date	28-AUG-18				
	Sampled Time	14:35				
	Client ID	RG_T4_4_SED_20180828-1435				
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: d10-Phenanthrene (%)	94.6				
	B(a)P Total Potency Equivalent (mg/kg)	<0.020				
	IACR (CCME) (mg/kg)	0.17				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Certified Reference Material	Phosphorus (P)	MES	L2157301-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217

A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.

C-TOC-CALC-SK	Soil	Total Organic Carbon Calculation	CSSS (2008) 21.2

Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon. (TIC)

C-TOT-LECO-SK	Soil	Total Carbon by combustion method	CSSS (2008) 21.2

The sample is ignited in a combustion analyzer where carbon in the reduced CO2 gas is determined using a thermal conductivity detector.

HG-200.2-CVAA-CL	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-CL	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

MOISTURE-CL	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)

This analysis is carried out gravimetrically by drying the sample at 105 C

PAH-TMB-D/A-MS-CL	Soil	PAH by Tumbler Extraction (DCM/Acetone)	EPA 3570/8270

Polycyclic Aromatic Hydrocarbons in Sediment/Soil
This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of DCM and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

PH-1:2-CL	Soil	pH in soil (1:2 Soil:Water Extraction)	CSSS Ch. 16

Soil and de-ionized water (by volume) are mixed in a defined ratio. The slurry is allowed to stand, shaken, and then allowed to stand again prior to taking measurements. After equilibration, the pH of the liquid portion of the extract is measured by a pH meter. Field Measurement is recommended where accurate pH measurements are required, due to the 15 minute recommended hold time.

PSA-PIPET-DETAIL-SK	Soil	Particle size - Sieve and Pipette	SSIR-51 METHOD 3.2.1

Particle size distribution is determined by a combination of techniques. Dry sieving is performed for coarse particles, wet sieving for sand particles and the pipette sedimentation method for clay particles.

Reference:

Burt, R. (2009). Soil Survey Field and Laboratory Methods Manual. Soil Survey Investigations Report No. 5. Method 3.2.1.2.2. United States Department of Agriculture Natural Resources Conservation Service.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Reference Information

SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Regional Koocanusa

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK	**Soil**							
Batch R4207675								
WG2869426-2 LCS								
Inorganic Carbon			97.8		%		80-120	10-SEP-18
WG2869426-3 MB								
Inorganic Carbon			<0.050		%		0.05	10-SEP-18
Batch R4210968								
WG2869424-1 DUP		**L2157301-6**						
Inorganic Carbon		2.73	2.69		%	1.4	20	11-SEP-18
WG2869424-2 LCS								
Inorganic Carbon			96.9		%		80-120	11-SEP-18
WG2869424-3 MB								
Inorganic Carbon			<0.050		%		0.05	11-SEP-18
C-TOT-LECO-SK	**Soil**							
Batch R4205562								
WG2867622-2 IRM		**08-109_SOIL**						
Total Carbon by Combustion			106.5		%		80-120	07-SEP-18
WG2867622-4 LCS		**SULFADIAZINE**						
Total Carbon by Combustion			101.0		%		90-110	07-SEP-18
WG2867622-3 MB								
Total Carbon by Combustion			<0.05		%		0.05	07-SEP-18
Batch R4205816								
WG2868854-2 IRM		**08-109_SOIL**						
Total Carbon by Combustion			97.8		%		80-120	08-SEP-18
WG2868854-4 LCS		**SULFADIAZINE**						
Total Carbon by Combustion			100.0		%		90-110	08-SEP-18
WG2868854-3 MB								
Total Carbon by Combustion			<0.05		%		0.05	08-SEP-18
HG-200.2-CVAA-CL	**Soil**							
Batch R4204124								
WG2869457-9 CRM		**TILL-1**						
Mercury (Hg)			109.2		%		70-130	07-SEP-18
WG2869457-8 LCS								
Mercury (Hg)			103.0		%		80-120	07-SEP-18
WG2869457-6 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	07-SEP-18
MET-200.2-CCMS-CL	**Soil**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4204992								
WG2869457-9 CRM		**TILL-1**						
Aluminum (Al)			129.0		%		70-130	07-SEP-18
Antimony (Sb)			120.4		%		70-130	07-SEP-18
Arsenic (As)			122.1		%		70-130	07-SEP-18
Barium (Ba)			114.7		%		70-130	07-SEP-18
Beryllium (Be)			117.4		%		70-130	07-SEP-18
Bismuth (Bi)			98.6		%		70-130	07-SEP-18
Boron (B)			3.4		mg/kg		0-8.2	07-SEP-18
Cadmium (Cd)			121.6		%		70-130	07-SEP-18
Calcium (Ca)			122.7		%		70-130	07-SEP-18
Chromium (Cr)			118.6		%		70-130	07-SEP-18
Cobalt (Co)			119.5		%		70-130	07-SEP-18
Copper (Cu)			114.1		%		70-130	07-SEP-18
Iron (Fe)			120.0		%		70-130	07-SEP-18
Lead (Pb)			117.5		%		70-130	07-SEP-18
Lithium (Li)			120.3		%		70-130	07-SEP-18
Magnesium (Mg)			127.0		%		70-130	07-SEP-18
Manganese (Mn)			127.8		%		70-130	07-SEP-18
Molybdenum (Mo)			128.8		%		70-130	07-SEP-18
Nickel (Ni)			117.3		%		70-130	07-SEP-18
Phosphorus (P)			130.2	MES	%		70-130	07-SEP-18
Potassium (K)			110.0		%		70-130	07-SEP-18
Selenium (Se)			0.36		mg/kg		0.11-0.51	07-SEP-18
Silver (Ag)			0.24		mg/kg		0.13-0.33	07-SEP-18
Sodium (Na)			109.4		%		70-130	07-SEP-18
Strontium (Sr)			109.1		%		70-130	07-SEP-18
Thallium (Tl)			0.131		mg/kg		0.077-0.18	07-SEP-18
Tin (Sn)			1.2		mg/kg		0-3.1	07-SEP-18
Titanium (Ti)			121.8		%		70-130	07-SEP-18
Tungsten (W)			0.18		mg/kg		0-0.66	07-SEP-18
Uranium (U)			103.2		%		70-130	07-SEP-18
Vanadium (V)			116.7		%		70-130	07-SEP-18
Zinc (Zn)			116.2		%		70-130	07-SEP-18
Zirconium (Zr)			0.8		mg/kg		0-1.8	07-SEP-18
WG2869457-8 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4204992								
WG2869457-8 LCS								
Aluminum (Al)			101.4		%		80-120	11-SEP-18
Antimony (Sb)			93.5		%		80-120	11-SEP-18
Arsenic (As)			96.1		%		80-120	11-SEP-18
Barium (Ba)			99.5		%		80-120	11-SEP-18
Beryllium (Be)			95.8		%		80-120	11-SEP-18
Bismuth (Bi)			96.0		%		80-120	11-SEP-18
Boron (B)			93.9		%		80-120	11-SEP-18
Cadmium (Cd)			99.8		%		80-120	11-SEP-18
Calcium (Ca)			96.7		%		80-120	11-SEP-18
Chromium (Cr)			98.2		%		80-120	11-SEP-18
Cobalt (Co)			98.0		%		80-120	11-SEP-18
Copper (Cu)			96.3		%		80-120	11-SEP-18
Iron (Fe)			98.0		%		80-120	11-SEP-18
Lead (Pb)			94.0		%		80-120	11-SEP-18
Lithium (Li)			94.9		%		80-120	11-SEP-18
Magnesium (Mg)			102.4		%		80-120	11-SEP-18
Manganese (Mn)			98.5		%		80-120	11-SEP-18
Molybdenum (Mo)			99.4		%		80-120	11-SEP-18
Nickel (Ni)			96.2		%		80-120	11-SEP-18
Potassium (K)			100.3		%		80-120	11-SEP-18
Selenium (Se)			97.0		%		80-120	11-SEP-18
Silver (Ag)			96.8		%		80-120	11-SEP-18
Sodium (Na)			100.5		%		80-120	11-SEP-18
Strontium (Sr)			96.8		%		80-120	11-SEP-18
Sulfur (S)			98.5		%		80-120	11-SEP-18
Thallium (Tl)			93.8		%		80-120	11-SEP-18
Tin (Sn)			95.6		%		80-120	11-SEP-18
Titanium (Ti)			96.9		%		80-120	11-SEP-18
Tungsten (W)			98.5		%		80-120	11-SEP-18
Uranium (U)			95.5		%		80-120	11-SEP-18
Vanadium (V)			99.0		%		80-120	11-SEP-18
Zinc (Zn)			97.8		%		80-120	11-SEP-18
Zirconium (Zr)			97.9		%		80-120	11-SEP-18
WG2869457-6 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4204992								
WG2869457-6 MB								
Aluminum (Al)			<50		mg/kg		50	07-SEP-18
Antimony (Sb)			<0.10		mg/kg		0.1	07-SEP-18
Arsenic (As)			<0.10		mg/kg		0.1	07-SEP-18
Barium (Ba)			<0.50		mg/kg		0.5	07-SEP-18
Beryllium (Be)			<0.10		mg/kg		0.1	07-SEP-18
Bismuth (Bi)			<0.20		mg/kg		0.2	07-SEP-18
Boron (B)			<5.0		mg/kg		5	07-SEP-18
Cadmium (Cd)			<0.020		mg/kg		0.02	07-SEP-18
Calcium (Ca)			<50		mg/kg		50	07-SEP-18
Chromium (Cr)			<0.50		mg/kg		0.5	07-SEP-18
Cobalt (Co)			<0.10		mg/kg		0.1	07-SEP-18
Copper (Cu)			<0.50		mg/kg		0.5	07-SEP-18
Iron (Fe)			<50		mg/kg		50	07-SEP-18
Lead (Pb)			<0.50		mg/kg		0.5	07-SEP-18
Lithium (Li)			<2.0		mg/kg		2	07-SEP-18
Magnesium (Mg)			<20		mg/kg		20	07-SEP-18
Manganese (Mn)			<1.0		mg/kg		1	07-SEP-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	07-SEP-18
Nickel (Ni)			<0.50		mg/kg		0.5	07-SEP-18
Phosphorus (P)			<50		mg/kg		50	07-SEP-18
Potassium (K)			<100		mg/kg		100	07-SEP-18
Selenium (Se)			<0.20		mg/kg		0.2	07-SEP-18
Silver (Ag)			<0.10		mg/kg		0.1	07-SEP-18
Sodium (Na)			<50		mg/kg		50	07-SEP-18
Strontium (Sr)			<0.50		mg/kg		0.5	07-SEP-18
Sulfur (S)			<1000		mg/kg		1000	07-SEP-18
Thallium (Tl)			<0.050		mg/kg		0.05	07-SEP-18
Tin (Sn)			<2.0		mg/kg		2	07-SEP-18
Titanium (Ti)			<1.0		mg/kg		1	07-SEP-18
Tungsten (W)			<0.50		mg/kg		0.5	07-SEP-18
Uranium (U)			<0.050		mg/kg		0.05	07-SEP-18
Vanadium (V)			<0.20		mg/kg		0.2	07-SEP-18
Zinc (Zn)			<2.0		mg/kg		2	07-SEP-18
Zirconium (Zr)			<1.0		mg/kg		1	07-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-CL	**Soil**							
Batch R4201553								
WG2867497-2 LCS								
Moisture			105.3		%		90-110	04-SEP-18
WG2867497-1 MB								
Moisture			<0.25		%		0.25	04-SEP-18
Batch R4203606								
WG2868175-3 DUP		**L2157301-3**						
Moisture		41.6	43.5		%	4.4	20	05-SEP-18
WG2868175-2 LCS								
Moisture			104.8		%		90-110	05-SEP-18
WG2868175-1 MB								
Moisture			<0.25		%		0.25	05-SEP-18
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4204772								
WG2870492-3 DUP		**L2157301-3**						
Acenaphthene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	06-SEP-18
Acenaphthylene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	06-SEP-18
Acridine		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Anthracene		<0.0040	<0.0040	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benzo(a)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benzo(b&j)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benzo(g,h,i)perylene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benzo(k)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benzo(e)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Chrysene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Dibenz(a,h)anthracene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	06-SEP-18
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Fluorene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
1-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
2-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Perylene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Phenanthrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Quinoline		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4204772								
WG2870492-1 LCS								
Acenaphthene			95.2		%		60-130	06-SEP-18
Acenaphthylene			91.4		%		60-130	06-SEP-18
Acridine			103.3		%		60-130	06-SEP-18
Anthracene			92.6		%		60-130	06-SEP-18
Benz(a)anthracene			95.2		%		60-130	06-SEP-18
Benzo(a)pyrene			93.6		%		60-130	06-SEP-18
Benzo(b&j)fluoranthene			95.9		%		60-130	06-SEP-18
Benzo(g,h,i)perylene			103.3		%		60-130	06-SEP-18
Benzo(k)fluoranthene			99.1		%		60-130	06-SEP-18
Benzo(e)pyrene			104.9		%		60-130	06-SEP-18
Chrysene			101.1		%		60-130	06-SEP-18
Dibenz(a,h)anthracene			101.4		%		60-130	06-SEP-18
Fluoranthene			90.1		%		60-130	06-SEP-18
Fluorene			95.2		%		60-130	06-SEP-18
Indeno(1,2,3-c,d)pyrene			100.4		%		60-130	06-SEP-18
1-Methylnaphthalene			105.7		%		60-130	06-SEP-18
2-Methylnaphthalene			95.7		%		60-130	06-SEP-18
Naphthalene			95.7		%		50-130	06-SEP-18
Perylene			107.1		%		60-130	06-SEP-18
Phenanthrene			94.5		%		60-130	06-SEP-18
Pyrene			91.3		%		60-130	06-SEP-18
Quinoline			97.4		%		60-130	06-SEP-18
WG2870492-5 LCS								
Acenaphthene			83.0		%		60-130	06-SEP-18
Acenaphthylene			82.3		%		60-130	06-SEP-18
Acridine			99.9		%		60-130	06-SEP-18
Anthracene			85.0		%		60-130	06-SEP-18
Benz(a)anthracene			100.4		%		60-130	06-SEP-18
Benzo(a)pyrene			98.9		%		60-130	06-SEP-18
Benzo(b&j)fluoranthene			100.7		%		60-130	06-SEP-18
Benzo(g,h,i)perylene			100.6		%		60-130	06-SEP-18
Benzo(k)fluoranthene			105.4		%		60-130	06-SEP-18
Benzo(e)pyrene			113.0		%		60-130	06-SEP-18
Chrysene			110.8		%		60-130	06-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4204772								
WG2870492-5 LCS								
Dibenz(a,h)anthracene			97.7		%		60-130	06-SEP-18
Fluoranthene			96.6		%		60-130	06-SEP-18
Fluorene			83.8		%		60-130	06-SEP-18
Indeno(1,2,3-c,d)pyrene			100.0		%		60-130	06-SEP-18
1-Methylnaphthalene			91.8		%		60-130	06-SEP-18
2-Methylnaphthalene			82.9		%		60-130	06-SEP-18
Naphthalene			83.7		%		50-130	06-SEP-18
Perylene			113.3		%		60-130	06-SEP-18
Phenanthrene			85.9		%		60-130	06-SEP-18
Pyrene			98.1		%		60-130	06-SEP-18
Quinoline			84.8		%		60-130	06-SEP-18
WG2870492-2 MB								
Acenaphthene			<0.0050		mg/kg		0.005	06-SEP-18
Acenaphthylene			<0.0050		mg/kg		0.005	06-SEP-18
Acridine			<0.010		mg/kg		0.01	06-SEP-18
Anthracene			<0.0040		mg/kg		0.004	06-SEP-18
Benz(a)anthracene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(a)pyrene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(e)pyrene			<0.010		mg/kg		0.01	06-SEP-18
Chrysene			<0.010		mg/kg		0.01	06-SEP-18
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	06-SEP-18
Fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Fluorene			<0.010		mg/kg		0.01	06-SEP-18
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	06-SEP-18
1-Methylnaphthalene			<0.010		mg/kg		0.01	06-SEP-18
2-Methylnaphthalene			<0.010		mg/kg		0.01	06-SEP-18
Naphthalene			<0.010		mg/kg		0.01	06-SEP-18
Perylene			<0.010		mg/kg		0.01	06-SEP-18
Phenanthrene			<0.010		mg/kg		0.01	06-SEP-18
Pyrene			<0.010		mg/kg		0.01	06-SEP-18
Quinoline			<0.010		mg/kg		0.01	06-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4204772								
WG2870492-2 MB								
Surrogate: d8-Naphthalene			102.6		%		50-130	06-SEP-18
Surrogate: d10-Acenaphthene			106.0		%		60-130	06-SEP-18
Surrogate: d10-Phenanthrene			102.4		%		60-130	06-SEP-18
Surrogate: d12-Chrysene			123.2		%		60-130	06-SEP-18
WG2870492-6 MB								
Acenaphthene			<0.0050		mg/kg		0.005	06-SEP-18
Acenaphthylene			<0.0050		mg/kg		0.005	06-SEP-18
Acridine			<0.010		mg/kg		0.01	06-SEP-18
Anthracene			<0.0040		mg/kg		0.004	06-SEP-18
Benz(a)anthracene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(a)pyrene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(e)pyrene			<0.010		mg/kg		0.01	06-SEP-18
Chrysene			<0.010		mg/kg		0.01	06-SEP-18
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	06-SEP-18
Fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Fluorene			<0.010		mg/kg		0.01	06-SEP-18
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	06-SEP-18
1-Methylnaphthalene			<0.010		mg/kg		0.01	06-SEP-18
2-Methylnaphthalene			<0.010		mg/kg		0.01	06-SEP-18
Naphthalene			<0.010		mg/kg		0.01	06-SEP-18
Perylene			<0.010		mg/kg		0.01	06-SEP-18
Phenanthrene			<0.010		mg/kg		0.01	06-SEP-18
Pyrene			<0.010		mg/kg		0.01	06-SEP-18
Quinoline			<0.010		mg/kg		0.01	06-SEP-18
Surrogate: d8-Naphthalene			82.5		%		50-130	06-SEP-18
Surrogate: d10-Acenaphthene			84.7		%		60-130	06-SEP-18
Surrogate: d10-Phenanthrene			83.1		%		60-130	06-SEP-18
Surrogate: d12-Chrysene			113.0		%		60-130	06-SEP-18
WG2870492-4 MS		**L2157301-4**						
Acenaphthene			81.0		%		50-150	06-SEP-18
Acenaphthylene			77.0		%		50-150	06-SEP-18
Acridine			100.9		%		50-150	06-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4204772								
WG2870492-4 MS		**L2157301-4**						
Anthracene			88.7		%		50-150	06-SEP-18
Benz(a)anthracene			103.1		%		50-150	06-SEP-18
Benzo(a)pyrene			98.3		%		50-150	06-SEP-18
Benzo(b&j)fluoranthene			102.0		%		50-150	06-SEP-18
Benzo(g,h,i)perylene			97.4		%		50-150	06-SEP-18
Benzo(k)fluoranthene			106.5		%		50-150	06-SEP-18
Benzo(e)pyrene			112.9		%		50-150	06-SEP-18
Chrysene			109.1		%		50-150	06-SEP-18
Dibenz(a,h)anthracene			100.1		%		50-150	06-SEP-18
Fluoranthene			100.9		%		50-150	06-SEP-18
Fluorene			85.5		%		50-150	06-SEP-18
Indeno(1,2,3-c,d)pyrene			97.9		%		50-150	06-SEP-18
1-Methylnaphthalene			87.3		%		50-150	06-SEP-18
2-Methylnaphthalene			79.8		%		50-150	06-SEP-18
Naphthalene			78.2		%		50-150	06-SEP-18
Perylene			107.5		%		50-150	06-SEP-18
Phenanthrene			92.4		%		50-150	06-SEP-18
Pyrene			102.5		%		50-150	06-SEP-18
Quinoline			79.3		%		50-150	06-SEP-18
PH-1:2-CL	**Soil**							
Batch R4205885								
WG2871863-2 DUP		**L2157301-1**						
pH (1:2 soil:water)		8.40	8.37	J	pH	0.03	0.2	09-SEP-18
PSA-PIPET-DETAIL-SK	**Soil**							
Batch R4205718								
WG2869283-1 DUP		**L2157301-6**						
% Gravel (>2mm)		<1.0	<1.0	RPD-NA	%	N/A	25	08-SEP-18
% Sand (2.00mm - 1.00mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-SEP-18
% Sand (1.00mm - 0.50mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-SEP-18
% Sand (0.50mm - 0.25mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-SEP-18
% Sand (0.25mm - 0.125mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-SEP-18
% Sand (0.125mm - 0.063mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-SEP-18
% Silt (0.063mm - 0.0312mm)		19.4	18.9	J	%	0.5	5	08-SEP-18
% Silt (0.0312mm - 0.004mm)		60.8	60.5	J	%	0.4	5	08-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PSA-PIPET-DETAIL-SK	**Soil**							
Batch	**R4205718**							
WG2869283-1	**DUP**	**L2157301-6**						
% Clay (<4um)		19.7	20.4	J	%	0.7	5	08-SEP-18
WG2869283-2	**IRM**	**2017-PSA**						
% Sand (2.00mm - 1.00mm)			3.0		%		0-7.6	08-SEP-18
% Sand (1.00mm - 0.50mm)			3.8		%		0-8.9	08-SEP-18
% Sand (0.50mm - 0.25mm)			9.0		%		5.3-15.3	08-SEP-18
% Sand (0.25mm - 0.125mm)			14.7		%		10-20	08-SEP-18
% Sand (0.125mm - 0.063mm)			14.7		%		7.3-17.3	08-SEP-18
% Silt (0.063mm - 0.0312mm)			13.5		%		9.9-19.9	08-SEP-18
% Silt (0.0312mm - 0.004mm)			22.5		%		17.6-27.6	08-SEP-18
% Clay (<4um)			18.9		%		13.4-23.4	08-SEP-18

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: REGIONAL Koocanusa Reservoir | TURNAROUND TIME: Regular

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Koocanusa			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Lyudmyla Shvets			Email 1:		X	X	X
Email				Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	2559 29 Street NE			Email 3:				
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:	jwilson@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y7B5	Country	Canada					
Phone Number	250-425-8202			Phone Number	14034071794			PO number	VPO00563596			

L2157301-COFC

SAMPLE DETAILS								ANALYSIS REQUESTED												
								Filtered - F: Field, L: Lab, FL: Field & Lab, N: None												
								FIL	N	N	N	N	N	N	N					
								PRESERV	NONE	NONE	NONE	NONE	NONE	HNO3	NONE					
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Particle Size	TOC	PAH	Total Metals (including Hg)	Moisture							
RG_TN_1_SED_20180829-1515	RG_TN_1	Sediment		29-Aug-18	3:15:00 PM	G	2		X	X	X	X	X							
RG_TN_2_SED_20180829-1445	RG_TN_2	Sediment		29-Aug-18	2:45:00 PM	G	2		X	X	X	X	X							
RG_TN_3_SED_20180829-1130	RG_TN_3	Sediment		29-Aug-18	11:30:00 AM	G	2		X	X	X	X	X							
RG_TN_4_SED_20180829-1230	RG_TN_4	Sediment		29-Aug-18	12:30:00 PM	G	2		X	X	X	X	X							
RG_TN_5_SED_20180829-1400	RG_TN_5	Sediment		29-Aug-18	2:00:00 PM	G	2		X	X	X	X	X							
RG_T4_1_SED_20180828-1000	RG_T4_1	Sediment		28-Aug-18	10:00:00 AM	G	2		X	X	X	X	X							
RG_T4_2_SED_20180828-1200	RG_T4_2	Sediment		28-Aug-18	12:00:00 PM	G	2		X	X	X	X	X							
RG_T4_3_SED_20180828-1330	RG_T4_3	Sediment		28-Aug-18	1:30:00 PM	G	2		X	X	X	X	X							
RG_T4_4_SED_20180828-1430	RG_T4_4	Sediment		28-Aug-18	2:30:00 PM	G	2		X	X	X	X	X							
RG_T4_5_SED_20180828-1530	RG_T4_5	Sediment		28-Aug-18	3:30:00 PM	G	2		X	X	X	X	X							
RG_T4_4_SED_20180828-1435	RG_T4_4	Sediment		28-Aug-18	2:35:00 PM	G	2		X	X	X	X	X							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Koocanusa - VPO00563596 1 jar for PAHs and 1 bag for everything else				8/31 10:10

SERVICE REQUEST (rush = subject to availability)					
Regular (default)	X	Sampler's Name	Justin Wilson	Mobile #	519-803-3923
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	August 30, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

50

Teck Coal Ltd.
ATTN: Lee Wilm
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 02-MAY-18
Report Date: 11-MAY-18 12:48 (MT)
Version: FINAL

Client Phone: 250-425-5289

Certificate of Analysis

Lab Work Order #: L2089149

Project P.O. #: VPO00563596
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: REP-2018-05-01
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2089149-1	L2089149-2	L2089149-3	L2089149-4	L2089149-5
		Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
		Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	28-APR-18
		Sampled Time	13:00	13:45	14:30	15:45	12:30
		Client ID	RG_SC_01_SS_20 180427-1300	RG_SC_02_SS_20 180427-1345	RG_SC_03_SS_20 180427-1430	RG_SC_04_SS_20 180427-1545	RG_SC_05_SS_20 180428-1230
Grouping	**Analyte**						
SOIL							
Physical Tests	Moisture (%)		29.6	31.9	37.1	42.6	40.9
	pH (1:2 soil:water) (pH)		8.45	8.31	8.05	8.25	8.16
Particle Size	% Gravel (>2mm) (%)		<1.0	1.3	2.8	1.4	<1.0
	% Sand (2.00mm - 1.00mm) (%)		<1.0	<1.0	<1.0	1.8	<1.0
	% Sand (1.00mm - 0.50mm) (%)		1.3	6.6	1.6	9.3	<1.0
	% Sand (0.50mm - 0.25mm) (%)		3.7	11.1	5.2	22.7	3.0
	% Sand (0.25mm - 0.125mm) (%)		25.0	2.6	8.1	7.7	<1.0
	% Sand (0.125mm - 0.063mm) (%)		13.2	9.3	12.4	5.7	2.8
	% Silt (0.063mm - 0.0312mm) (%)		14.0	15.1	22.4	14.3	16.2
	% Silt (0.0312mm - 0.004mm) (%)		32.1	40.5	37.3	28.6	57.2
	% Clay (<4um) (%)		10.6	13.2	9.8	8.6	19.7
	Texture		Sandy loam	Silt loam	Silt loam	Sandy loam	Silt
Organic / Inorganic Carbon	Total Organic Carbon (%)		1.76	1.07	1.67	1.18	1.1
Metals	Aluminum (Al) (mg/kg)		9820	9760	10500	10500	13000
	Antimony (Sb) (mg/kg)		0.23	0.24	0.36	0.29	0.30
	Arsenic (As) (mg/kg)		4.73	4.53	6.09	5.70	5.68
	Barium (Ba) (mg/kg)		61.3	70.5	68.9	71.5	97.0
	Beryllium (Be) (mg/kg)		0.33	0.34	0.38	0.41	0.46
	Bismuth (Bi) (mg/kg)		<0.20	<0.20	0.22	<0.20	<0.20
	Boron (B) (mg/kg)		<5.0	<5.0	<5.0	<5.0	<5.0
	Cadmium (Cd) (mg/kg)		0.136	0.147	0.198	0.187	0.196
	Calcium (Ca) (mg/kg)		105000	107000	102000	105000	122000
	Chromium (Cr) (mg/kg)		14.0	14.6	15.3	16.0	18.0
	Cobalt (Co) (mg/kg)		6.97	6.97	7.63	7.98	9.09
	Copper (Cu) (mg/kg)		10.9	10.6	13.4	13.2	14.7
	Iron (Fe) (mg/kg)		18100	17900	19900	19200	22300
	Lead (Pb) (mg/kg)		10.9	13.2	22.1	14.0	15.1
	Lithium (Li) (mg/kg)		20.5	20.4	21.8	22.0	26.9
	Magnesium (Mg) (mg/kg)		20300	20400	21700	20500	24000
	Manganese (Mn) (mg/kg)		376	422	447	435	530
	Mercury (Hg) (mg/kg)		0.0110	0.0120	0.0140	0.0148	0.0151
	Molybdenum (Mo) (mg/kg)		0.51	0.54	0.56	0.59	0.63
	Nickel (Ni) (mg/kg)		15.7	15.9	17.1	17.5	20.5
	Phosphorus (P) (mg/kg)		468	406	534	528	515
	Potassium (K) (mg/kg)		660	770	800	890	1150
	Selenium (Se) (mg/kg)		<0.20	<0.20	0.22	0.20	0.21
	Silver (Ag) (mg/kg)		<0.10	<0.10	<0.10	<0.10	<0.10

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2089149-6	L2089149-7	L2089149-8	L2089149-9	L2089149-10
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	27-APR-18
	Sampled Time	12:00	13:00	13:10	14:30	15:30
	Client ID	RG_ER_01_SS_20 180427-1200	RG_ER_02_SS_20 180427-1300	RG_ER_03_SS_20 180427-1310	RG_ER_04_SS_20 180427-1430	RG_ER_05_SS_20 180427-1530
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	49.9	40.5	39.4	41.3	39.9
	pH (1:2 soil:water) (pH)	8.19	8.49	8.35	8.17	8.21
Particle Size	% Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (2.00mm - 1.00mm) (%)	<1.0	1.9	<1.0	<1.0	<1.0
	% Sand (1.00mm - 0.50mm) (%)	<1.0	4.0	<1.0	1.3	1.2
	% Sand (0.50mm - 0.25mm) (%)	<1.0	25.5	3.1	2.0	1.2
	% Sand (0.25mm - 0.125mm) (%)	1.5	24.9	22.3	3.6	<1.0
	% Sand (0.125mm - 0.063mm) (%)	7.7	16.5	28.1	3.9	1.4
	% Silt (0.063mm - 0.0312mm) (%)	22.6	11.8	20.8	16.3	19.7
	% Silt (0.0312mm - 0.004mm) (%)	50.8	12.0	21.1	52.7	56.2
	% Clay (<4um) (%)	15.7	3.2	4.6	19.2	18.0
	Texture	Silt loam / Silt	Loamy sand	Sandy loam	Silt loam	Silt
Organic / Inorganic Carbon	Total Organic Carbon (%)	1.83	1.98	1.99	1.90	1.7
Metals	Aluminum (Al) (mg/kg)	11000	8260	7440	9830	12100
	Antimony (Sb) (mg/kg)	0.46	0.40	0.41	0.36	0.39
	Arsenic (As) (mg/kg)	5.64	4.62	4.59	4.82	5.55
	Barium (Ba) (mg/kg)	206	131	166	137	151
	Beryllium (Be) (mg/kg)	0.61	0.47	0.47	0.48	0.51
	Bismuth (Bi) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Boron (B) (mg/kg)	6.9	5.8	5.4	<5.0	5.1
	Cadmium (Cd) (mg/kg)	0.688	0.457	0.516	0.438	0.447
	Calcium (Ca) (mg/kg)	84200	55600	57700	91400	102000
	Chromium (Cr) (mg/kg)	16.3	11.5	11.8	14.9	16.6
	Cobalt (Co) (mg/kg)	7.33	4.46	4.75	7.07	7.97
	Copper (Cu) (mg/kg)	15.1	8.91	9.94	13.4	14.9
	Iron (Fe) (mg/kg)	17600	12900	12600	16900	19100
	Lead (Pb) (mg/kg)	11.5	7.15	7.43	12.1	12.8
	Lithium (Li) (mg/kg)	20.0	14.4	13.4	20.1	23.3
	Magnesium (Mg) (mg/kg)	21100	13200	14600	19600	22000
	Manganese (Mn) (mg/kg)	502	264	310	457	525
	Mercury (Hg) (mg/kg)	0.0330	0.0214	0.0221	0.0265	0.0238
	Molybdenum (Mo) (mg/kg)	0.87	0.70	0.78	0.69	0.77
	Nickel (Ni) (mg/kg)	19.2	13.2	14.0	17.4	19.5
	Phosphorus (P) (mg/kg)	922	874	967	619	690
	Potassium (K) (mg/kg)	1650	1170	1160	1210	1390
	Selenium (Se) (mg/kg)	0.96	0.56	0.65	0.52	0.64
	Silver (Ag) (mg/kg)	0.13	<0.10	<0.10	<0.10	0.10

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2089149-11	L2089149-12	L2089149-13	L2089149-14	L2089149-15
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	28-APR-18
	Sampled Time	12:45	13:00	13:15	13:16	13:30
	Client ID	RG_GC_01_SS_20 180427-1245	RG_GC_02_SS_20 180427-1300	RG_GC_03_SS_20 180427-1315	RG_GC_03_SS_20 180427-1316	RG_GC_04_SS_20 180428-1330
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	40.3	41.8	44.1	44.5	38.6
	pH (1:2 soil:water) (pH)	8.08	8.04	8.17	8.18	8.23
Particle Size	% Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (2.00mm - 1.00mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (1.00mm - 0.50mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.50mm - 0.25mm) (%)	1.4	<1.0	<1.0	<1.0	<1.0
	% Sand (0.25mm - 0.125mm) (%)	1.6	<1.0	4.7	<1.0	4.6
	% Sand (0.125mm - 0.063mm) (%)	4.4	1.6	31.7	<1.0	25.2
	% Silt (0.063mm - 0.0312mm) (%)	25.6	20.4	27.5	11.5	29.8
	% Silt (0.0312mm - 0.004mm) (%)	51.7	57.2	28.0	63.1	33.2
	% Clay (<4um) (%)	15.1	20.1	6.3	24.9	6.3
	Texture	Silt	Silt loam	Silt loam	Silt loam	Silt loam
Organic / Inorganic Carbon	Total Organic Carbon (%)	1.76	1.69	1.28	1.20	1.66
Metals	Aluminum (Al) (mg/kg)	11100	14200	9640	10100	14000
	Antimony (Sb) (mg/kg)	0.28	0.34	0.28	0.26	0.36
	Arsenic (As) (mg/kg)	4.09	5.52	2.63	2.73	5.40
	Barium (Ba) (mg/kg)	117	157	103	106	138
	Beryllium (Be) (mg/kg)	0.48	0.57	0.34	0.37	0.53
	Bismuth (Bi) (mg/kg)	<0.20	0.21	<0.20	<0.20	0.21
	Boron (B) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Cadmium (Cd) (mg/kg)	0.145	0.216	0.087	0.088	0.270
	Calcium (Ca) (mg/kg)	48300	76200	24900	27900	106000
	Chromium (Cr) (mg/kg)	12.8	16.9	10.3	10.7	18.5
	Cobalt (Co) (mg/kg)	7.51	8.74	6.81	6.65	9.28
	Copper (Cu) (mg/kg)	12.5	15.2	10.4	9.98	15.3
	Iron (Fe) (mg/kg)	17700	20700	15000	14900	22500
	Lead (Pb) (mg/kg)	7.90	10.9	6.05	6.11	13.3
	Lithium (Li) (mg/kg)	17.2	22.0	13.5	13.8	25.9
	Magnesium (Mg) (mg/kg)	14100	17900	11800	12300	21100
	Manganese (Mn) (mg/kg)	460	601	246	253	556
	Mercury (Hg) (mg/kg)	0.0412	0.0347	0.0960	0.0286	0.0257
	Molybdenum (Mo) (mg/kg)	0.33	0.51	0.17	0.19	0.68
	Nickel (Ni) (mg/kg)	13.7	17.8	11.2	11.3	20.8
	Phosphorus (P) (mg/kg)	546	696	528	534	567
	Potassium (K) (mg/kg)	1170	1560	840	920	1640
	Selenium (Se) (mg/kg)	0.38	0.38	0.22	<0.20	0.38
	Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2089149-16				
	Description	SEDIMENT				
	Sampled Date	28-APR-18				
	Sampled Time	13:45				
	Client ID	RG_GC_05_SS_20180428-1345				
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	43.2				
	pH (1:2 soil:water) (pH)	8.12				
Particle Size	% Gravel (>2mm) (%)	<1.0				
	% Sand (2.00mm - 1.00mm) (%)	<1.0				
	% Sand (1.00mm - 0.50mm) (%)	<1.0				
	% Sand (0.50mm - 0.25mm) (%)	<1.0				
	% Sand (0.25mm - 0.125mm) (%)	1.6				
	% Sand (0.125mm - 0.063mm) (%)	4.5				
	% Silt (0.063mm - 0.0312mm) (%)	19.6				
	% Silt (0.0312mm - 0.004mm) (%)	55.7				
	% Clay (<4um) (%)	17.9				
	Texture	Silt				
Organic / Inorganic Carbon	Total Organic Carbon (%)	1.90				
Metals	Aluminum (Al) (mg/kg)	12900				
	Antimony (Sb) (mg/kg)	0.31				
	Arsenic (As) (mg/kg)	5.20				
	Barium (Ba) (mg/kg)	135				
	Beryllium (Be) (mg/kg)	0.51				
	Bismuth (Bi) (mg/kg)	<0.20				
	Boron (B) (mg/kg)	<5.0				
	Cadmium (Cd) (mg/kg)	0.164				
	Calcium (Ca) (mg/kg)	51500				
	Chromium (Cr) (mg/kg)	14.1				
	Cobalt (Co) (mg/kg)	8.43				
	Copper (Cu) (mg/kg)	13.7				
	Iron (Fe) (mg/kg)	19900				
	Lead (Pb) (mg/kg)	8.93				
	Lithium (Li) (mg/kg)	19.0				
	Magnesium (Mg) (mg/kg)	16100				
	Manganese (Mn) (mg/kg)	455				
	Mercury (Hg) (mg/kg)	0.0388				
	Molybdenum (Mo) (mg/kg)	0.35				
	Nickel (Ni) (mg/kg)	15.6				
	Phosphorus (P) (mg/kg)	637				
	Potassium (K) (mg/kg)	1290				
	Selenium (Se) (mg/kg)	0.40				
	Silver (Ag) (mg/kg)	<0.10				

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2089149-1	L2089149-2	L2089149-3	L2089149-4	L2089149-5
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	28-APR-18
	Sampled Time	13:00	13:45	14:30	15:45	12:30
	Client ID	RG_SC_01_SS_20 180427-1300	RG_SC_02_SS_20 180427-1345	RG_SC_03_SS_20 180427-1430	RG_SC_04_SS_20 180427-1545	RG_SC_05_SS_20 180428-1230
Grouping	**Analyte**					
SOIL						
Metals	Sodium (Na) (mg/kg)	100	152	97	108	118
	Strontium (Sr) (mg/kg)	257	252	220	204	306
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.067	0.066	0.080	0.089	0.086
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	102	100	109	188	135
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.552	0.519	0.586	0.679	0.731
	Vanadium (V) (mg/kg)	11.5	11.5	12.9	13.6	14.6
	Zinc (Zn) (mg/kg)	47.7	52.4	61.7	59.5	63.6
	Zirconium (Zr) (mg/kg)	1.5	1.6	1.7	1.6	1.9
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acridine (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(e)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	1-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Quinoline (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: d10-Acenaphthene (%)	67.4	63.4	72.6	64.5	70.4
	Surrogate: d12-Chrysene (%)	86.2	88.3	85.6	76.7	93.2
	Surrogate: d8-Naphthalene (%)	63.8	61.0	69.3	60.4	66.4

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2089149-6	L2089149-7	L2089149-8	L2089149-9	L2089149-10
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	27-APR-18
	Sampled Time	12:00	13:00	13:10	14:30	15:30
	Client ID	RG_ER_01_SS_20 180427-1200	RG_ER_02_SS_20 180427-1300	RG_ER_03_SS_20 180427-1310	RG_ER_04_SS_20 180427-1430	RG_ER_05_SS_20 180427-1530
Grouping	**Analyte**					
SOIL						
Metals	Sodium (Na) (mg/kg)	129	144	87	140	120
	Strontium (Sr) (mg/kg)	151	74.2	78.8	185	216
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.179	0.122	0.141	0.129	0.137
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	65.8	33.6	39.1	72.6	76.7
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.820	0.708	0.718	0.698	0.671
	Vanadium (V) (mg/kg)	22.1	18.3	19.6	16.8	18.0
	Zinc (Zn) (mg/kg)	67.3	50.1	54.4	62.5	66.7
	Zirconium (Zr) (mg/kg)	1.5	1.5	1.4	1.6	1.2
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	0.0054	<0.0050	<0.0050	<0.0050
	Acridine (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	0.0057	0.0071	0.0064	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	0.028	0.073	0.027	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	0.026	0.089	0.025	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	0.044	0.131	0.043	0.012	0.014
	Benzo(e)pyrene (mg/kg)	0.022	0.061	0.022	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	0.014	0.038	0.012	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	0.015	0.040	0.012	<0.010	<0.010
	Chrysene (mg/kg)	0.037	0.077	0.034	0.012	0.012
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	0.0143	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	0.033	0.040	0.029	<0.010	0.011
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	0.013	0.040	0.012	<0.010	<0.010
	1-Methylnaphthalene (mg/kg)	0.030	0.032	0.036	0.014	0.013
	2-Methylnaphthalene (mg/kg)	0.051	0.054	0.060	0.026	0.025
	Naphthalene (mg/kg)	0.021	0.027	0.025	0.011	0.011
	Perylene (mg/kg)	0.019	0.037	0.018	0.013	<0.010
	Phenanthrene (mg/kg)	0.054	0.047	0.058	0.020	0.023
	Pyrene (mg/kg)	0.029	0.040	0.024	<0.010	<0.010
	Quinoline (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: d10-Acenaphthene (%)	64.0	62.0	66.6	84.7	69.6
	Surrogate: d12-Chrysene (%)	88.5	79.3	92.5	95.5	84.5
	Surrogate: d8-Naphthalene (%)	57.6	57.3	62.0	83.3	65.4

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2089149-11 SEDIMENT 27-APR-18 12:45 RG_GC_01_SS_20 180427-1245	L2089149-12 SEDIMENT 27-APR-18 13:00 RG_GC_02_SS_20 180427-1300	L2089149-13 SEDIMENT 27-APR-18 13:15 RG_GC_03_SS_20 180427-1315	L2089149-14 SEDIMENT 27-APR-18 13:16 RG_GC_03_SS_20 180427-1316	L2089149-15 SEDIMENT 28-APR-18 13:30 RG_GC_04_SS_20 180428-1330
SOIL						
Metals	Sodium (Na) (mg/kg)	103	157	58	64	157
	Strontium (Sr) (mg/kg)	151	141	32.0	39.8	233
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.077	0.112	0.058	0.058	0.122
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	190	191	198	209	152
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.623	0.769	0.596	0.593	0.766
	Vanadium (V) (mg/kg)	14.5	18.4	12.5	13.0	18.1
	Zinc (Zn) (mg/kg)	32.9	47.3	21.7	23.1	62.6
	Zirconium (Zr) (mg/kg)	1.5	2.2	1.8	1.7	2.2
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acridine (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(e)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	1-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Perylene (mg/kg)	<0.010	<0.010	0.011	0.016	<0.010
	Phenanthrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Quinoline (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: d10-Acenaphthene (%)	68.6	64.8	67.8	67.2	65.7
	Surrogate: d12-Chrysene (%)	89.4	80.9	91.5	89.3	89.2
	Surrogate: d8-Naphthalene (%)	64.4	61.5	63.9	63.9	62.7

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2089149-16				
	Description	SEDIMENT				
	Sampled Date	28-APR-18				
	Sampled Time	13:45				
	Client ID	RG_GC_05_SS_20 180428-1345				
Grouping	**Analyte**					
SOIL						
Metals	Sodium (Na) (mg/kg)	109				
	Strontium (Sr) (mg/kg)	93.6				
	Sulfur (S) (mg/kg)	<1000				
	Thallium (Tl) (mg/kg)	0.084				
	Tin (Sn) (mg/kg)	<2.0				
	Titanium (Ti) (mg/kg)	180				
	Tungsten (W) (mg/kg)	<0.50				
	Uranium (U) (mg/kg)	0.641				
	Vanadium (V) (mg/kg)	15.5				
	Zinc (Zn) (mg/kg)	37.9				
	Zirconium (Zr) (mg/kg)	1.8				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050				
	Acenaphthylene (mg/kg)	<0.0050				
	Acridine (mg/kg)	<0.010				
	Anthracene (mg/kg)	<0.0040				
	Benz(a)anthracene (mg/kg)	<0.010				
	Benzo(a)pyrene (mg/kg)	<0.010				
	Benzo(b&j)fluoranthene (mg/kg)	<0.010				
	Benzo(e)pyrene (mg/kg)	<0.010				
	Benzo(g,h,i)perylene (mg/kg)	<0.010				
	Benzo(k)fluoranthene (mg/kg)	<0.010				
	Chrysene (mg/kg)	<0.010				
	Dibenz(a,h)anthracene (mg/kg)	<0.0050				
	Fluoranthene (mg/kg)	<0.010				
	Fluorene (mg/kg)	<0.010				
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010				
	1-Methylnaphthalene (mg/kg)	<0.010				
	2-Methylnaphthalene (mg/kg)	<0.010				
	Naphthalene (mg/kg)	<0.010				
	Perylene (mg/kg)	<0.010				
	Phenanthrene (mg/kg)	<0.010				
	Pyrene (mg/kg)	<0.010				
	Quinoline (mg/kg)	<0.010				
	Surrogate: d10-Acenaphthene (%)	76.6				
	Surrogate: d12-Chrysene (%)	90.4				
	Surrogate: d8-Naphthalene (%)	73.8				

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2089149-1	L2089149-2	L2089149-3	L2089149-4	L2089149-5
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	28-APR-18
	Sampled Time	13:00	13:45	14:30	15:45	12:30
	Client ID	RG_SC_01_SS_20 180427-1300	RG_SC_02_SS_20 180427-1345	RG_SC_03_SS_20 180427-1430	RG_SC_04_SS_20 180427-1545	RG_SC_05_SS_20 180428-1230
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: d10-Phenanthrene (%)	77.0	76.0	77.3	66.1	82.4
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	IACR (CCME) (mg/kg)	<0.15	<0.15	<0.15	<0.15	<0.15

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2089149-6	L2089149-7	L2089149-8	L2089149-9	L2089149-10
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	27-APR-18
	Sampled Time	12:00	13:00	13:10	14:30	15:30
	Client ID	RG_ER_01_SS_20 180427-1200	RG_ER_02_SS_20 180427-1300	RG_ER_03_SS_20 180427-1310	RG_ER_04_SS_20 180427-1430	RG_ER_05_SS_20 180427-1530
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: d10-Phenanthrene (%)	79.0	67.2	81.9	80.8	77.3
	B(a)P Total Potency Equivalent (mg/kg)	0.039	0.133	0.037	<0.020	<0.020
	IACR (CCME) (mg/kg)	0.56	1.65	0.52	0.15	0.16

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2089149-11	L2089149-12	L2089149-13	L2089149-14	L2089149-15
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	27-APR-18	27-APR-18	27-APR-18	27-APR-18	28-APR-18
	Sampled Time	12:45	13:00	13:15	13:16	13:30
	Client ID	RG_GC_01_SS_20 180427-1245	RG_GC_02_SS_20 180427-1300	RG_GC_03_SS_20 180427-1315	RG_GC_03_SS_20 180427-1316	RG_GC_04_SS_20 180428-1330
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: d10-Phenanthrene (%)	82.4	68.9	79.8	76.5	71.5
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	IACR (CCME) (mg/kg)	<0.15	<0.15	<0.15	<0.15	<0.15

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2089149-16				
	Description	SEDIMENT				
	Sampled Date	28-APR-18				
	Sampled Time	13:45				
	Client ID	RG_GC_05_SS_20180428-1345				
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: d10-Phenanthrene (%)	86.7				
	B(a)P Total Potency Equivalent (mg/kg)	<0.020				
	IACR (CCME) (mg/kg)	<0.15				

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217

A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.

C-TOC-CALC-SK	Soil	Total Organic Carbon Calculation	CSSS (2008) 21.2

Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon. (TIC)

C-TOT-LECO-SK	Soil	Total Carbon by combustion method	CSSS (2008) 21.2

The sample is ignited in a combustion analyzer where carbon in the reduced CO2 gas is determined using a thermal conductivity detector.

HG-200.2-CVAA-CL	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-CL	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CRC ICPMS.

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. This method does not dissolve all silicate materials and may result in a partial extraction. depending on the sample matrix, for some metals, including, but not limited to Al, Ba, Be, Cr, Sr, Ti, Tl, and V.

MOISTURE-CL	Soil	% Moisture	CWS for PHC in Soil - Tier 1

This analysis is carried out gravimetrically by drying the sample at 105 C

PAH-TMB-D/A-MS-CL	Soil	PAH by Tumbler Extraction (DCM/Acetone)	EPA 3570/8270

Polycyclic Aromatic Hydrocarbons in Sediment/Soil
This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of DCM and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

PH-1:2-CL	Soil	pH in soil (1:2 Soil:Water Extraction)	CSSS Ch. 16

Soil and de-ionized water (by volume) are mixed in a defined ratio. The slurry is allowed to stand, shaken, and then allowed to stand again prior to taking measurements. After equilibration, the pH of the liquid portion of the extract is measured by a pH meter. Field Measurement is recommended where accurate pH measurements are required, due to the 15 minute recommended hold time.

PSA-PIPET-DETAIL-SK	Soil	Particle size - Sieve and Pipette	SSIR-51 METHOD 3.2.1

Particle size distribution is determined by a combination of techniques. Dry sieving is performed for coarse particles, wet sieving for sand particles and the pipette sedimentation method for clay particles.

Reference:

Burt, R. (2009). Soil Survey Field and Laboratory Methods Manual. Soil Survey Investigations Report No. 5. Method 3.2.1.2.2. United States Department of Agriculture Natural Resources Conservation Service.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

REP-2018-05-01

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Lee Wilm

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK	**Soil**							
Batch R4037981								
WG2765607-1 DUP		**L2089149-8**						
Inorganic Carbon		2.02	2.07		%	2.3	20	08-MAY-18
WG2765607-2 LCS								
Inorganic Carbon			95.4		%		80-120	08-MAY-18
WG2765607-3 MB								
Inorganic Carbon			<0.050		%		0.05	08-MAY-18
C-TOT-LECO-SK	**Soil**							
Batch R4038126								
WG2765502-1 DUP		**L2089149-8**						
Total Carbon by Combustion		4.01	3.98		%	0.8	20	08-MAY-18
WG2765502-2 IRM		**08-109_SOIL**						
Total Carbon by Combustion			93.8		%		80-120	08-MAY-18
WG2765502-3 MB								
Total Carbon by Combustion			<0.05		%		0.05	08-MAY-18
HG-200.2-CVAA-CL	**Soil**							
Batch R4039234								
WG2768129-4 CRM		**TILL-1**						
Mercury (Hg)			85.5		%		70-130	10-MAY-18
WG2768129-5 DUP		**L2089149-7**						
Mercury (Hg)		0.0214	0.0210		mg/kg	1.7	40	10-MAY-18
WG2768129-3 LCS								
Mercury (Hg)			82.4		%		80-120	10-MAY-18
WG2768129-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	10-MAY-18
MET-200.2-CCMS-CL	**Soil**							
Batch R4039135								
WG2768129-4 CRM		**TILL-1**						
Aluminum (Al)			107.9		%		70-130	09-MAY-18
Antimony (Sb)			107.7		%		70-130	09-MAY-18
Arsenic (As)			102.7		%		70-130	09-MAY-18
Barium (Ba)			106.0		%		70-130	09-MAY-18
Beryllium (Be)			107.2		%		70-130	09-MAY-18
Bismuth (Bi)			102.2		%		70-130	09-MAY-18
Boron (B)			6.4		mg/kg		0-8.2	09-MAY-18
Cadmium (Cd)			115.8		%		70-130	09-MAY-18
Calcium (Ca)			104.5		%		70-130	09-MAY-18
Chromium (Cr)			105.5		%		70-130	09-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4039135								
WG2768129-4 CRM		**TILL-1**						
Cobalt (Co)			103.9		%		70-130	09-MAY-18
Copper (Cu)			105.0		%		70-130	09-MAY-18
Iron (Fe)			104.5		%		70-130	09-MAY-18
Lead (Pb)			106.5		%		70-130	09-MAY-18
Lithium (Li)			108.4		%		70-130	09-MAY-18
Magnesium (Mg)			109.6		%		70-130	09-MAY-18
Manganese (Mn)			108.7		%		70-130	09-MAY-18
Molybdenum (Mo)			107.7		%		70-130	09-MAY-18
Nickel (Ni)			104.2		%		70-130	09-MAY-18
Phosphorus (P)			100.1		%		70-130	09-MAY-18
Potassium (K)			105.5		%		70-130	09-MAY-18
Selenium (Se)			0.31		mg/kg		0.11-0.51	09-MAY-18
Silver (Ag)			0.25		mg/kg		0.13-0.33	09-MAY-18
Sodium (Na)			119.2		%		70-130	09-MAY-18
Strontium (Sr)			124.7		%		70-130	09-MAY-18
Thallium (Tl)			0.133		mg/kg		0.077-0.18	09-MAY-18
Tin (Sn)			1.1		mg/kg		0-3.1	09-MAY-18
Titanium (Ti)			119.4		%		70-130	09-MAY-18
Tungsten (W)			0.15		mg/kg		0-0.66	09-MAY-18
Uranium (U)			106.6		%		70-130	09-MAY-18
Vanadium (V)			105.9		%		70-130	09-MAY-18
Zinc (Zn)			95.5		%		70-130	09-MAY-18
Zirconium (Zr)			0.9		mg/kg		0-1.8	09-MAY-18
WG2768129-5 DUP		**L2089149-7**						
Aluminum (Al)		8260	8190		mg/kg	0.9	40	09-MAY-18
Antimony (Sb)		0.40	0.42		mg/kg	4.9	30	09-MAY-18
Arsenic (As)		4.62	4.98		mg/kg	7.4	30	09-MAY-18
Barium (Ba)		131	145		mg/kg	11	40	09-MAY-18
Beryllium (Be)		0.47	0.48		mg/kg	3.0	30	09-MAY-18
Bismuth (Bi)		<0.20	<0.20	RPD-NA	mg/kg	N/A	30	09-MAY-18
Boron (B)		5.8	6.1		mg/kg	5.5	30	09-MAY-18
Cadmium (Cd)		0.457	0.464		mg/kg	1.7	30	09-MAY-18
Calcium (Ca)		55600	59100		mg/kg	6.1	30	09-MAY-18
Chromium (Cr)		11.5	12.5		mg/kg	7.9	30	09-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4039135								
WG2768129-5 DUP		**L2089149-7**						
Cobalt (Co)		4.46	4.70		mg/kg	5.4	30	09-MAY-18
Copper (Cu)		8.91	9.45		mg/kg	5.8	30	09-MAY-18
Iron (Fe)		12900	13500		mg/kg	4.4	30	09-MAY-18
Lead (Pb)		7.15	7.46		mg/kg	4.3	40	09-MAY-18
Lithium (Li)		14.4	15.2		mg/kg	5.6	30	09-MAY-18
Magnesium (Mg)		13200	13800		mg/kg	4.5	30	09-MAY-18
Manganese (Mn)		264	296		mg/kg	11	30	09-MAY-18
Molybdenum (Mo)		0.70	0.79		mg/kg	11	40	09-MAY-18
Nickel (Ni)		13.2	14.0		mg/kg	5.7	30	09-MAY-18
Phosphorus (P)		874	899		mg/kg	2.8	30	09-MAY-18
Potassium (K)		1170	1240		mg/kg	5.8	40	09-MAY-18
Selenium (Se)		0.56	0.60		mg/kg	6.2	30	09-MAY-18
Silver (Ag)		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	09-MAY-18
Sodium (Na)		144	109		mg/kg	28	40	09-MAY-18
Strontium (Sr)		74.2	74.4		mg/kg	0.4	40	09-MAY-18
Sulfur (S)		<1000	<1000	RPD-NA	mg/kg	N/A	30	09-MAY-18
Thallium (Tl)		0.122	0.129		mg/kg	5.4	30	09-MAY-18
Tin (Sn)		<2.0	<2.0	RPD-NA	mg/kg	N/A	40	09-MAY-18
Titanium (Ti)		33.6	39.9		mg/kg	17	40	09-MAY-18
Tungsten (W)		<0.50	<0.50	RPD-NA	mg/kg	N/A	30	09-MAY-18
Uranium (U)		0.708	0.734		mg/kg	3.6	30	09-MAY-18
Vanadium (V)		18.3	19.4		mg/kg	5.8	30	09-MAY-18
Zinc (Zn)		50.1	53.2		mg/kg	5.8	30	09-MAY-18
Zirconium (Zr)		1.5	1.5		mg/kg	0.7	30	09-MAY-18
WG2768129-3 LCS								
Aluminum (Al)			99.4		%		80-120	09-MAY-18
Antimony (Sb)			102.5		%		80-120	09-MAY-18
Arsenic (As)			98.2		%		80-120	09-MAY-18
Barium (Ba)			104.0		%		80-120	09-MAY-18
Beryllium (Be)			100.6		%		80-120	09-MAY-18
Bismuth (Bi)			95.0		%		80-120	09-MAY-18
Boron (B)			93.0		%		80-120	09-MAY-18
Cadmium (Cd)			103.4		%		80-120	09-MAY-18
Calcium (Ca)			89.1		%		80-120	09-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4039135								
WG2768129-3 LCS								
Chromium (Cr)			96.5		%		80-120	09-MAY-18
Cobalt (Co)			97.8		%		80-120	09-MAY-18
Copper (Cu)			96.7		%		80-120	09-MAY-18
Iron (Fe)			98.5		%		80-120	09-MAY-18
Lead (Pb)			94.0		%		80-120	09-MAY-18
Lithium (Li)			97.8		%		80-120	09-MAY-18
Magnesium (Mg)			102.1		%		80-120	09-MAY-18
Manganese (Mn)			98.4		%		80-120	09-MAY-18
Molybdenum (Mo)			96.8		%		80-120	09-MAY-18
Nickel (Ni)			96.4		%		80-120	09-MAY-18
Potassium (K)			95.9		%		80-120	09-MAY-18
Selenium (Se)			99.4		%		80-120	09-MAY-18
Silver (Ag)			99.96		%		80-120	09-MAY-18
Sodium (Na)			97.4		%		80-120	09-MAY-18
Strontium (Sr)			98.3		%		80-120	09-MAY-18
Sulfur (S)			87.7		%		80-120	09-MAY-18
Thallium (Tl)			91.5		%		80-120	09-MAY-18
Tin (Sn)			100.6		%		80-120	09-MAY-18
Titanium (Ti)			107.0		%		80-120	09-MAY-18
Tungsten (W)			95.5		%		80-120	09-MAY-18
Uranium (U)			96.1		%		80-120	09-MAY-18
Vanadium (V)			100.3		%		80-120	09-MAY-18
Zinc (Zn)			86.6		%		80-120	09-MAY-18
Zirconium (Zr)			94.8		%		80-120	09-MAY-18
WG2768129-1 MB								
Aluminum (Al)			<50		mg/kg		50	09-MAY-18
Antimony (Sb)			<0.10		mg/kg		0.1	09-MAY-18
Arsenic (As)			<0.10		mg/kg		0.1	09-MAY-18
Barium (Ba)			<0.50		mg/kg		0.5	09-MAY-18
Beryllium (Be)			<0.10		mg/kg		0.1	09-MAY-18
Bismuth (Bi)			<0.20		mg/kg		0.2	09-MAY-18
Boron (B)			<5.0		mg/kg		5	09-MAY-18
Cadmium (Cd)			<0.020		mg/kg		0.02	09-MAY-18
Calcium (Ca)			<50		mg/kg		50	09-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4039135								
WG2768129-1 MB								
Chromium (Cr)			<0.50		mg/kg		0.5	09-MAY-18
Cobalt (Co)			<0.10		mg/kg		0.1	09-MAY-18
Copper (Cu)			<0.50		mg/kg		0.5	09-MAY-18
Iron (Fe)			<50		mg/kg		50	09-MAY-18
Lead (Pb)			<0.50		mg/kg		0.5	09-MAY-18
Lithium (Li)			<2.0		mg/kg		2	09-MAY-18
Magnesium (Mg)			<20		mg/kg		20	09-MAY-18
Manganese (Mn)			<1.0		mg/kg		1	09-MAY-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	09-MAY-18
Nickel (Ni)			<0.50		mg/kg		0.5	09-MAY-18
Phosphorus (P)			<50		mg/kg		50	09-MAY-18
Potassium (K)			<100		mg/kg		100	09-MAY-18
Selenium (Se)			<0.20		mg/kg		0.2	09-MAY-18
Silver (Ag)			<0.10		mg/kg		0.1	09-MAY-18
Sodium (Na)			<50		mg/kg		50	09-MAY-18
Strontium (Sr)			<0.50		mg/kg		0.5	09-MAY-18
Sulfur (S)			<1000		mg/kg		1000	09-MAY-18
Thallium (Tl)			<0.050		mg/kg		0.05	09-MAY-18
Tin (Sn)			<2.0		mg/kg		2	09-MAY-18
Titanium (Ti)			<1.0		mg/kg		1	09-MAY-18
Tungsten (W)			<0.50		mg/kg		0.5	09-MAY-18
Uranium (U)			<0.050		mg/kg		0.05	09-MAY-18
Vanadium (V)			<0.20		mg/kg		0.2	09-MAY-18
Zinc (Zn)			<2.0		mg/kg		2	09-MAY-18
Zirconium (Zr)			<1.0		mg/kg		1	09-MAY-18
MOISTURE-CL	**Soil**							
Batch R4038658								
WG2767007-2 LCS								
Moisture			106.9		%		90-110	08-MAY-18
WG2767007-1 MB								
Moisture			<0.25		%		0.25	08-MAY-18
PAH-TMB-D/A-MS-CL	**Soil**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4035894								
WG2766584-13 DUP		**L2089149-1**						
Acenaphthene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	08-MAY-18
Acenaphthylene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	08-MAY-18
Acridine		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Anthracene		<0.0040	<0.0040	RPD-NA	mg/kg	N/A	50	08-MAY-18
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Benzo(a)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Benzo(b&j)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Benzo(g,h,i)perylene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Benzo(k)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Benzo(e)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Chrysene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Dibenz(a,h)anthracene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	08-MAY-18
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Fluorene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
1-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
2-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Perylene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Phenanthrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
Quinoline		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	08-MAY-18
WG2766584-1 LCS								
Acenaphthene			71.7		%		60-130	07-MAY-18
Acenaphthylene			75.4		%		60-130	07-MAY-18
Acridine			103.5		%		50-150	07-MAY-18
Anthracene			88.7		%		60-130	07-MAY-18
Benz(a)anthracene			100.8		%		60-130	07-MAY-18
Benzo(a)pyrene			100.1		%		60-130	07-MAY-18
Benzo(b&j)fluoranthene			94.0		%		60-130	07-MAY-18
Benzo(g,h,i)perylene			100.9		%		60-130	07-MAY-18
Benzo(k)fluoranthene			101.5		%		60-130	07-MAY-18
Benzo(e)pyrene			98.6		%		50-150	07-MAY-18
Chrysene			101.7		%		60-130	07-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4035894								
WG2766584-1 LCS								
Dibenz(a,h)anthracene			97.7		%		60-130	07-MAY-18
Fluoranthene			94.4		%		60-130	07-MAY-18
Fluorene			77.8		%		60-130	07-MAY-18
Indeno(1,2,3-c,d)pyrene			83.9		%		60-130	07-MAY-18
1-Methylnaphthalene			70.2		%		50-150	07-MAY-18
2-Methylnaphthalene			69.7		%		60-130	07-MAY-18
Naphthalene			71.3		%		50-130	07-MAY-18
Perylene			106.0		%		50-150	07-MAY-18
Phenanthrene			80.4		%		60-130	07-MAY-18
Pyrene			96.8		%		60-130	07-MAY-18
Quinoline			78.7		%		50-150	07-MAY-18
WG2766584-10 LCS								
Acenaphthene			77.7		%		60-130	08-MAY-18
Acenaphthylene			79.0		%		60-130	08-MAY-18
Acridine			104.6		%		50-150	08-MAY-18
Anthracene			95.9		%		60-130	08-MAY-18
Benz(a)anthracene			110.5		%		60-130	08-MAY-18
Benzo(a)pyrene			120.9		%		60-130	08-MAY-18
Benzo(b&j)fluoranthene			112.7		%		60-130	08-MAY-18
Benzo(g,h,i)perylene			97.5		%		60-130	08-MAY-18
Benzo(k)fluoranthene			113.0		%		60-130	08-MAY-18
Benzo(e)pyrene			109.0		%		50-150	08-MAY-18
Chrysene			99.7		%		60-130	08-MAY-18
Dibenz(a,h)anthracene			98.7		%		60-130	08-MAY-18
Fluoranthene			91.6		%		60-130	08-MAY-18
Fluorene			85.6		%		60-130	08-MAY-18
Indeno(1,2,3-c,d)pyrene			94.8		%		60-130	08-MAY-18
1-Methylnaphthalene			75.4		%		50-150	08-MAY-18
2-Methylnaphthalene			75.0		%		60-130	08-MAY-18
Naphthalene			73.8		%		50-130	08-MAY-18
Perylene			116.7		%		50-150	08-MAY-18
Phenanthrene			86.3		%		60-130	08-MAY-18
Pyrene			95.5		%		60-130	08-MAY-18
Quinoline			83.2		%		50-150	08-MAY-18
WG2766584-15 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4035894								
WG2766584-15 LCS								
Acenaphthene			73.1		%		60-130	08-MAY-18
Acenaphthylene			74.4		%		60-130	08-MAY-18
Acridine			94.6		%		50-150	08-MAY-18
Anthracene			78.6		%		60-130	08-MAY-18
Benz(a)anthracene			101.2		%		60-130	08-MAY-18
Benzo(a)pyrene			112.2		%		60-130	08-MAY-18
Benzo(b&j)fluoranthene			103.8		%		60-130	08-MAY-18
Benzo(g,h,i)perylene			87.6		%		60-130	08-MAY-18
Benzo(k)fluoranthene			104.2		%		60-130	08-MAY-18
Benzo(e)pyrene			100.6		%		50-150	08-MAY-18
Chrysene			90.2		%		60-130	08-MAY-18
Dibenz(a,h)anthracene			90.0		%		60-130	08-MAY-18
Fluoranthene			79.3		%		60-130	08-MAY-18
Fluorene			71.2		%		60-130	08-MAY-18
Indeno(1,2,3-c,d)pyrene			86.1		%		60-130	08-MAY-18
1-Methylnaphthalene			68.3		%		50-150	08-MAY-18
2-Methylnaphthalene			71.2		%		60-130	08-MAY-18
Naphthalene			71.6		%		50-130	08-MAY-18
Perylene			110.8		%		50-150	08-MAY-18
Phenanthrene			68.3		%		60-130	08-MAY-18
Pyrene			83.0		%		60-130	08-MAY-18
Quinoline			80.2		%		50-150	08-MAY-18
WG2766584-11 MB								
Acenaphthene			<0.0050		mg/kg		0.005	08-MAY-18
Acenaphthylene			<0.0050		mg/kg		0.005	08-MAY-18
Acridine			<0.010		mg/kg		0.01	08-MAY-18
Anthracene			<0.0040		mg/kg		0.004	08-MAY-18
Benz(a)anthracene			<0.010		mg/kg		0.01	08-MAY-18
Benzo(a)pyrene			<0.010		mg/kg		0.01	08-MAY-18
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	08-MAY-18
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	08-MAY-18
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	08-MAY-18
Benzo(e)pyrene			<0.010		mg/kg		0.01	08-MAY-18
Chrysene			<0.010		mg/kg		0.01	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4035894								
WG2766584-11 MB								
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	08-MAY-18
Fluoranthene			<0.010		mg/kg		0.01	08-MAY-18
Fluorene			<0.010		mg/kg		0.01	08-MAY-18
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	08-MAY-18
1-Methylnaphthalene			<0.010		mg/kg		0.01	08-MAY-18
2-Methylnaphthalene			<0.010		mg/kg		0.01	08-MAY-18
Naphthalene			<0.010		mg/kg		0.01	08-MAY-18
Perylene			<0.010		mg/kg		0.01	08-MAY-18
Phenanthrene			<0.010		mg/kg		0.01	08-MAY-18
Pyrene			<0.010		mg/kg		0.01	08-MAY-18
Quinoline			<0.010		mg/kg		0.01	08-MAY-18
Surrogate: d8-Naphthalene			67.9		%		50-130	08-MAY-18
Surrogate: d10-Acenaphthene			69.5		%		50-150	08-MAY-18
Surrogate: d10-Phenanthrene			72.1		%		60-130	08-MAY-18
Surrogate: d12-Chrysene			92.0		%		50-150	08-MAY-18
WG2766584-17 MB								
Acenaphthene			<0.0050		mg/kg		0.005	09-MAY-18
Acenaphthylene			<0.0050		mg/kg		0.005	09-MAY-18
Acridine			<0.010		mg/kg		0.01	09-MAY-18
Anthracene			<0.0040		mg/kg		0.004	09-MAY-18
Benz(a)anthracene			<0.010		mg/kg		0.01	09-MAY-18
Benzo(a)pyrene			<0.010		mg/kg		0.01	09-MAY-18
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	09-MAY-18
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	09-MAY-18
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	09-MAY-18
Benzo(e)pyrene			<0.010		mg/kg		0.01	09-MAY-18
Chrysene			<0.010		mg/kg		0.01	09-MAY-18
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	09-MAY-18
Fluoranthene			<0.010		mg/kg		0.01	09-MAY-18
Fluorene			<0.010		mg/kg		0.01	09-MAY-18
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	09-MAY-18
1-Methylnaphthalene			<0.010		mg/kg		0.01	09-MAY-18
2-Methylnaphthalene			<0.010		mg/kg		0.01	09-MAY-18
Naphthalene			<0.010		mg/kg		0.01	09-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4035894								
WG2766584-17 MB								
Perylene			<0.010		mg/kg		0.01	09-MAY-18
Phenanthrene			<0.010		mg/kg		0.01	09-MAY-18
Pyrene			<0.010		mg/kg		0.01	09-MAY-18
Quinoline			<0.010		mg/kg		0.01	09-MAY-18
Surrogate: d8-Naphthalene			76.0		%		50-130	09-MAY-18
Surrogate: d10-Acenaphthene			76.2		%		50-150	09-MAY-18
Surrogate: d10-Phenanthrene			80.4		%		60-130	09-MAY-18
Surrogate: d12-Chrysene			92.8		%		50-150	09-MAY-18
WG2766584-2 MB								
Acenaphthene			<0.0050		mg/kg		0.005	07-MAY-18
Acenaphthylene			<0.0050		mg/kg		0.005	07-MAY-18
Acridine			<0.010		mg/kg		0.01	07-MAY-18
Anthracene			<0.0040		mg/kg		0.004	07-MAY-18
Benz(a)anthracene			<0.010		mg/kg		0.01	07-MAY-18
Benzo(a)pyrene			<0.010		mg/kg		0.01	07-MAY-18
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	07-MAY-18
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	07-MAY-18
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	07-MAY-18
Benzo(e)pyrene			<0.010		mg/kg		0.01	07-MAY-18
Chrysene			<0.010		mg/kg		0.01	07-MAY-18
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	07-MAY-18
Fluoranthene			<0.010		mg/kg		0.01	07-MAY-18
Fluorene			<0.010		mg/kg		0.01	07-MAY-18
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	07-MAY-18
1-Methylnaphthalene			<0.010		mg/kg		0.01	07-MAY-18
2-Methylnaphthalene			<0.010		mg/kg		0.01	07-MAY-18
Naphthalene			<0.010		mg/kg		0.01	07-MAY-18
Perylene			<0.010		mg/kg		0.01	07-MAY-18
Phenanthrene			<0.010		mg/kg		0.01	07-MAY-18
Pyrene			<0.010		mg/kg		0.01	07-MAY-18
Quinoline			<0.010		mg/kg		0.01	07-MAY-18
Surrogate: d8-Naphthalene			78.8		%		50-130	07-MAY-18
Surrogate: d10-Acenaphthene			79.9		%		50-150	07-MAY-18
Surrogate: d10-Phenanthrene			86.3		%		60-130	07-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4035894								
WG2766584-2 MB								
Surrogate: d12-Chrysene			87.0		%		50-150	07-MAY-18
WG2766584-7 MB								
Acenaphthene			<0.0050		mg/kg		0.005	08-MAY-18
Acenaphthylene			<0.0050		mg/kg		0.005	08-MAY-18
Acridine			<0.010		mg/kg		0.01	08-MAY-18
Anthracene			<0.0040		mg/kg		0.004	08-MAY-18
Benz(a)anthracene			<0.010		mg/kg		0.01	08-MAY-18
Benzo(a)pyrene			<0.010		mg/kg		0.01	08-MAY-18
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	08-MAY-18
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	08-MAY-18
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	08-MAY-18
Benzo(e)pyrene			<0.010		mg/kg		0.01	08-MAY-18
Chrysene			<0.010		mg/kg		0.01	08-MAY-18
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	08-MAY-18
Fluoranthene			<0.010		mg/kg		0.01	08-MAY-18
Fluorene			<0.010		mg/kg		0.01	08-MAY-18
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	08-MAY-18
1-Methylnaphthalene			<0.010		mg/kg		0.01	08-MAY-18
2-Methylnaphthalene			<0.010		mg/kg		0.01	08-MAY-18
Naphthalene			<0.010		mg/kg		0.01	08-MAY-18
Perylene			<0.010		mg/kg		0.01	08-MAY-18
Phenanthrene			<0.010		mg/kg		0.01	08-MAY-18
Pyrene			<0.010		mg/kg		0.01	08-MAY-18
Quinoline			<0.010		mg/kg		0.01	08-MAY-18
Surrogate: d8-Naphthalene			97.9		%		50-130	08-MAY-18
Surrogate: d10-Acenaphthene			97.6		%		50-150	08-MAY-18
Surrogate: d10-Phenanthrene			90.5		%		60-130	08-MAY-18
Surrogate: d12-Chrysene			98.3		%		50-150	08-MAY-18
WG2766584-16 MS		**L2089149-2**						
Acenaphthene			65.4		%		50-150	08-MAY-18
Acenaphthylene			69.1		%		50-150	08-MAY-18
Acridine			90.5		%		50-150	08-MAY-18
Anthracene			78.9		%		50-150	08-MAY-18
Benz(a)anthracene			99.1		%		50-150	08-MAY-18
Benzo(a)pyrene			106.7		%		50-150	08-MAY-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4035894								
WG2766584-16 MS		**L2089149-2**						
Benzo(b&j)fluoranthene			100.6		%		50-150	08-MAY-18
Benzo(g,h,i)perylene			85.4		%		50-150	08-MAY-18
Benzo(k)fluoranthene			99.7		%		50-150	08-MAY-18
Benzo(e)pyrene			97.1		%		50-150	08-MAY-18
Chrysene			90.0		%		50-150	08-MAY-18
Dibenz(a,h)anthracene			86.1		%		50-150	08-MAY-18
Fluoranthene			79.1		%		50-150	08-MAY-18
Fluorene			70.0		%		50-150	08-MAY-18
Indeno(1,2,3-c,d)pyrene			80.3		%		50-150	08-MAY-18
1-Methylnaphthalene			62.9		%		50-150	08-MAY-18
2-Methylnaphthalene			65.6		%		50-150	08-MAY-18
Naphthalene			62.6		%		50-150	08-MAY-18
Perylene			106.4		%		50-150	08-MAY-18
Phenanthrene			71.8		%		50-150	08-MAY-18
Pyrene			83.4		%		50-150	08-MAY-18
Quinoline			69.9		%		50-150	08-MAY-18
PH-1:2-CL	**Soil**							
Batch R4039107								
WG2768503-2 DUP		**L2089149-8**						
pH (1:2 soil:water)		8.35	8.37	J	pH	0.02	0.2	09-MAY-18
WG2768503-1 IRM		**SAL-STD9**						
pH (1:2 soil:water)			7.94		pH		7.7-8.3	09-MAY-18
PSA-PIPET-DETAIL-SK	**Soil**							
Batch R4038134								
WG2766112-1 DUP		**L2089149-8**						
% Gravel (>2mm)		<1.0	<1.0	RPD-NA	%	N/A	25	08-MAY-18
% Sand (2.00mm - 1.00mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-MAY-18
% Sand (1.00mm - 0.50mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-MAY-18
% Sand (0.50mm - 0.25mm)		3.1	3.0	J	%	0.1	5	08-MAY-18
% Sand (0.25mm - 0.125mm)		22.3	24.3	J	%	2.0	5	08-MAY-18
% Sand (0.125mm - 0.063mm)		28.1	26.4	J	%	1.7	5	08-MAY-18
% Silt (0.063mm - 0.0312mm)		20.8	20.7	J	%	0.1	5	08-MAY-18
% Silt (0.0312mm - 0.004mm)		21.1	21.1	J	%	0.0	5	08-MAY-18
% Clay (<4um)		4.6	4.4	J	%	0.2	5	08-MAY-18
WG2766112-2 IRM		**2017-PSA**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PSA-PIPET-DETAIL-SK	**Soil**							
Batch R4038134								
WG2766112-2 IRM		**2017-PSA**						
% Sand (2.00mm - 1.00mm)			2.6		%		0-7.6	08-MAY-18
% Sand (1.00mm - 0.50mm)			3.7		%		0-8.9	08-MAY-18
% Sand (0.50mm - 0.25mm)			10.1		%		5.3-15.3	08-MAY-18
% Sand (0.25mm - 0.125mm)			14.0		%		10-20	08-MAY-18
% Sand (0.125mm - 0.063mm)			12.7		%		7.3-17.3	08-MAY-18
% Silt (0.063mm - 0.0312mm)			14.8		%		9.9-19.9	08-MAY-18
% Silt (0.0312mm - 0.004mm)			23.2		%		17.6-27.6	08-MAY-18
% Clay (<4um)			19.0		%		13.4-23.4	08-MAY-18

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: REP-2018-05-01

TURNAROUND TIME:

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program		
Project Manager	Lee Wilm		
Email	lee.wilm@teck.com		
Address	PO Box 1777, 124B Aspen Drive		
City	Sparwood	Province	BC
Postal Code	V0B 2G0	Country	Canada
Phone Number	250-865-5289		

LABORATORY

Lab Name	ALS Calgary		
Lab Contact	Lyudmyla Shvets		
Email	lyudmyla.shvets@alsglobal.com		
Address	2559 29 Street NE		
City	Calgary	Province	AB
Postal Code	T1Y 7B5	Country	Canada
Phone Number	1 403 407 1794		

	Excel	PDF	EDD
lee.wilm@teck.com	x	x	x
teckcoal@equisonline.com	x		x
carla.fraser@teck.com	x	x	x
andrew.wright@teck.com	x	x	x
jwilson@minnow.ca	x	x	x

SAMPLE DETAILS

L2089149-COFC

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	* # Of Cont.
RG_SC-01-SS_20180427-1300	RG-SC-01	Sediment	NO	Apr.27.18	1300	G	2
RG_SC-02-SS_20180427-1345	RG-SC-02	Sediment	NO	Apr.27.18	1345	G	2
RG-SC-03-SS_20180427-1430	RG-SC-03	Sediment		Apr.27.18	1430	G	2
RG-SC-04-SS-20180427-1545	RG-SC-04	Sediment		Apr.27.18	1545	G	2
RG-SC-05-SS-20180428-1230	RG-SC-05	Sediment		April 28.18	1230	G	2
RG_ER-01-SS_20180427-1200	RG_ER-01	Sediment		Apr.27.18	1200	G	2
RG_ER-02-SS_20180427-1300	RG_ER-02	Sediment		Apr.27.18	1300	G	2
RG-ER-03-SS_20180427-1310	RG_ER-03	Sediment		Apr.27.18	1310	G	2
RG-ER-04-SS_20180427-1430	RG-ER-04	Sediment		Apr.27.18	1430	G	2
RG-ER-05-SS_20180427-1530	RG-ER-05	Sediment		Apr.27.18	1530	G	2
RG-GC-01-SS-20180427-1245	RG-GC-01	Sediment		Apr.27.18	1245	G	2

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

	ANALYSIS: TECKCOAL-ROUTINE-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-T-U-CVAF-VA	HG-D-CVAF-VA	TECKCOAL-MET-T-VA	TECKCOAL-MET-D-VA Toc	PAHs	Metals (incl. Hg)	Moisture	Particle Size
PRESERVE			x			x					
FIL											
1 RG_SC-01-SS_20180427-1300							✓	✓	✓	✓	✓
2 RG_SC-02-SS_20180427-1345							✓	✓	✓	✓	✓
3 RG-SC-03-SS_20180427-1430							✓	✓	✓	✓	✓
4 RG-SC-04-SS-20180427-1545							✓	✓	✓	✓	✓
5 RG-SC-05-SS-20180428-1230							✓	✓	✓	✓	✓
6 RG_ER-01-SS_20180427-1200							✓	✓	✓	✓	✓
7 RG_ER-02-SS_20180427-1300							✓	✓	✓	✓	✓
8 RG-ER-03-SS_20180427-1310							✓	✓	✓	✓	✓
9 RG-ER-04-SS_20180427-1430							✓	✓	✓	✓	✓
10 RG-ER-05-SS_20180427-1530							✓	✓	✓	✓	✓
11 RG-GC-01-SS-20180427-1245							✓	✓	✓	✓	✓

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

All metals samples must be shipped to ALS Burnaby for analysis

RELINQUISHED BY/AFFILIATION

DATE/TIME

ACCEPTED BY/AFFILIATION

5/2 9:25

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	x
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	JUSTIN WILSON	Mobile #	519-803-3923
Sampler's Signature		Date/Time	May 1, 2018 / 11:30 am

* 1 jar & ~~1 plastic bag~~ for PAH + 1 plastic bag for everything else.

Page 2072

Teck

COC ID: REP-2018-05-01

TURNAROUND TIME:

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program		
Project Manager	Lee Wilm		
Email	lee.wilm@teck.com		
Address	PO Box 1777, 124B Aspen Drive		
City	Sparwood	Province	BC
Postal Code	V0B 2G0	Country	Canada
Phone Number	250-865-5289		

LABORATORY

Lab Name	ALS Calgary		
Lab Contact	Lyudmyla Shvets		
Email	lyudmyla.shvets@alsglobal.com		
Address	2559 29 Street NE		
City	Calgary	Province	AB
Postal Code	T1Y 7B5	Country	Canada
Phone Number	1 403 407 1794		

	Excel	PDF	EDD
lee.wilm@teck.com	x	x	x
teckcoal@equisonline.com			
carla.fraser@teck.com	x	x	x
andrew.wright@teck.com	x	x	x
justin.wilson@teck.com	x	x	x

SAMPLE DETAILS

L2089149-COFC

ANALYSIS REQUESTED

Filtered - F; Field, T; Lab, FL; Field & Lab, N; None

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PH	PRESERV	ANALYSIS: TECKCOAL-ROUTINE-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-T-U-CVAF-VA	HG-D-CVAF-VA	TECKCOAL-MET-T-VA	TECKCOAL-MET-D-VA TOC	PAHs	Metals (Circled Hg)	Moisture	Particle Size
12	RG-GC-02-SS-20180427-1300	RG-GC-02	Sediment	NO	April 27.18	1300	G	2					x			x	✓	✓	✓	✓	✓
13	RG-GC-03-SS-20180427-1315	RG-GC-03	Sediment	NO	April 27.18	1315	G	2									✓	✓	✓	✓	✓
14	RG-GC-03-SS-20180427-1316	RG-GC-03	Sediment		April 27.18	1316	G	2									✓	✓	✓	✓	✓
15	RG-GC-04-SS-20180428-1330	RG-GC-04	Sediment		April 28.18	1330	G	2									✓	✓	✓	✓	✓
16	RG-GC-05-SS-20180428-1345	RG-GC-05	Sediment		April 28.18	1345	G	2									✓	✓	✓	✓	✓

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

All metals samples must be shipped to ALS Burnaby for analysis

RELINQUISHED BY/AFFILIATION

DATE/TIME

ACCEPTED BY/AFFILIATION

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	x
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Justin Wilson	Mobile #	519-803-3923
Sampler's Signature		Date/Time	April May 1, 2018 / 11:30 am

* 1 jar for PAH & 1 plastic bag for everything else

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 31-AUG-18
Report Date: 11-SEP-18 13:59 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2157301

Project P.O. #:	VPO00563596
Job Reference:	REGIONAL KOOCANUSA
C of C Numbers:	Regional Koocanusa
Legal Site Desc:	

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2157301-1 Sediment 29-AUG-18 15:15 RG_TN_1_SED_20180829-1515	L2157301-2 Sediment 29-AUG-18 14:45 RG_TN_2_SED_20180829-1445	L2157301-3 Sediment 29-AUG-18 11:30 RG_TN_3_SED_20180829-1130	L2157301-4 Sediment 29-AUG-18 12:30 RG_TN_4_SED_20180829-1230	L2157301-5 Sediment 29-AUG-18 14:00 RG_TN_5_SED_20180829-1400
SOIL						
Physical Tests	Moisture (%)	41.5	38.7	41.6	33.2	35.8
	pH (1:2 soil:water) (pH)	8.40	8.59	8.35	8.83	8.77
Particle Size	% Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (2.00mm - 1.00mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (1.00mm - 0.50mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.50mm - 0.25mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.25mm - 0.125mm) (%)	<1.0	<1.0	<1.0	15.3	2.7
	% Sand (0.125mm - 0.063mm) (%)	<1.0	6.7	2.0	29.6	28.0
	% Silt (0.063mm - 0.0312mm) (%)	30.1	29.5	34.1	19.4	26.8
	% Silt (0.0312mm - 0.004mm) (%)	57.1	52.1	53.8	28.0	35.0
	% Clay (<4um) (%)	12.5	11.6	10.1	7.4	7.4
	Texture	Silt	Silt	Silt	Sandy loam	Silt loam
Organic / Inorganic Carbon	Total Organic Carbon (%)	2.00	1.99	2.4	1.83	1.91
Metals	Aluminum (Al) (mg/kg)	12100	12300	12100	9220	9860
	Antimony (Sb) (mg/kg)	0.29	0.30	0.34	0.26	0.29
	Arsenic (As) (mg/kg)	7.13	6.77	7.23	6.33	6.76
	Barium (Ba) (mg/kg)	71.1	71.7	73.8	57.3	59.5
	Beryllium (Be) (mg/kg)	0.37	0.35	0.37	0.27	0.32
	Bismuth (Bi) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Boron (B) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Cadmium (Cd) (mg/kg)	0.176	0.171	0.202	0.144	0.138
	Calcium (Ca) (mg/kg)	106000	115000	103000	111000	114000
	Chromium (Cr) (mg/kg)	17.1	16.8	18.0	15.1	15.9
	Cobalt (Co) (mg/kg)	8.98	8.88	9.52	7.98	8.40
	Copper (Cu) (mg/kg)	16.3	15.2	17.5	12.1	13.1
	Iron (Fe) (mg/kg)	22000	21900	22500	19700	20900
	Lead (Pb) (mg/kg)	16.5	15.5	18.0	14.2	14.7
	Lithium (Li) (mg/kg)	25.1	24.5	24.5	20.1	22.5
	Magnesium (Mg) (mg/kg)	22200	24600	23500	24900	26100
	Manganese (Mn) (mg/kg)	423	430	429	382	402
	Mercury (Hg) (mg/kg)	0.0196	0.0150	0.0202	0.0141	0.0126
	Molybdenum (Mo) (mg/kg)	0.58	0.61	0.65	0.55	0.59
	Nickel (Ni) (mg/kg)	18.9	19.0	20.2	16.8	17.9
	Phosphorus (P) (mg/kg)	617	641	675	633	682
	Potassium (K) (mg/kg)	800	740	800	610	630
	Selenium (Se) (mg/kg)	<0.20	<0.20	0.23	<0.20	<0.20
	Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2157301-6 Sediment 28-AUG-18 10:00 RG_T4_1_SED_20 180828-1000	L2157301-7 Sediment 28-AUG-18 12:00 RG_T4_2_SED_20 180828-1200	L2157301-8 Sediment 28-AUG-18 13:30 RG_T4_3_SED_20 180828-1330	L2157301-9 Sediment 28-AUG-18 14:30 RG_T4_4_SED_20 180828-1430	L2157301-10 Sediment 28-AUG-18 15:30 RG_T4_5_SED_20 180828-1530
SOIL						
Physical Tests	Moisture (%)	40.0	42.3	41.0	43.3	39.2
	pH (1:2 soil:water) (pH)	8.53	8.42	8.42	8.43	8.49
Particle Size	% Gravel (>2mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (2.00mm - 1.00mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (1.00mm - 0.50mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.50mm - 0.25mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.25mm - 0.125mm) (%)	<1.0	<1.0	<1.0	<1.0	<1.0
	% Sand (0.125mm - 0.063mm) (%)	<1.0	<1.0	2.2	1.9	2.9
	% Silt (0.063mm - 0.0312mm) (%)	19.4	18.5	21.6	14.8	16.0
	% Silt (0.0312mm - 0.004mm) (%)	60.8	62.2	58.8	62.8	61.2
	% Clay (<4um) (%)	19.7	19.1	17.2	20.5	19.8
	Texture	Silt	Silt	Silt	Silt	Silt
Organic / Inorganic Carbon	Total Organic Carbon (%)	2.15	2.19	2.20	2.2	1.94
Metals	Aluminum (Al) (mg/kg)	10500	13200	12000	13500	13400
	Antimony (Sb) (mg/kg)	0.46	0.48	0.41	0.42	0.42
	Arsenic (As) (mg/kg)	7.25	7.69	7.17	7.59	7.14
	Barium (Ba) (mg/kg)	161	166	135	141	116
	Beryllium (Be) (mg/kg)	0.50	0.55	0.47	0.48	0.45
	Bismuth (Bi) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Boron (B) (mg/kg)	5.0	<5.0	<5.0	<5.0	<5.0
	Cadmium (Cd) (mg/kg)	0.586	0.573	0.486	0.462	0.336
	Calcium (Ca) (mg/kg)	117000	119000	115000	122000	120000
	Chromium (Cr) (mg/kg)	17.6	20.0	18.7	20.4	19.6
	Cobalt (Co) (mg/kg)	9.08	10.3	9.45	10.2	9.83
	Copper (Cu) (mg/kg)	16.4	18.0	16.4	17.5	16.1
	Iron (Fe) (mg/kg)	22200	24500	22800	24700	23900
	Lead (Pb) (mg/kg)	14.0	15.4	15.0	15.9	15.8
	Lithium (Li) (mg/kg)	24.1	26.1	24.2	25.6	24.8
	Magnesium (Mg) (mg/kg)	24100	26700	24000	26200	24300
	Manganese (Mn) (mg/kg)	589	596	539	568	528
	Mercury (Hg) (mg/kg)	0.0323	0.0336	0.0286	0.0291	0.0208
	Molybdenum (Mo) (mg/kg)	1.03	1.01	0.94	0.94	0.85
	Nickel (Ni) (mg/kg)	22.4	24.8	22.5	23.9	22.0
	Phosphorus (P) (mg/kg)	912	979	812	830	734
	Potassium (K) (mg/kg)	950	1110	1020	1160	1010
	Selenium (Se) (mg/kg)	0.61	0.53	0.47	0.51	0.40
	Silver (Ag) (mg/kg)	0.11	0.11	<0.10	<0.10	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-11				
	Description	Sediment				
	Sampled Date	28-AUG-18				
	Sampled Time	14:35				
	Client ID	RG_T4_4_SED_20180828-1435				
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	42.3				
	pH (1:2 soil:water) (pH)	8.45				
Particle Size	% Gravel (>2mm) (%)	<1.0				
	% Sand (2.00mm - 1.00mm) (%)	<1.0				
	% Sand (1.00mm - 0.50mm) (%)	<1.0				
	% Sand (0.50mm - 0.25mm) (%)	<1.0				
	% Sand (0.25mm - 0.125mm) (%)	<1.0				
	% Sand (0.125mm - 0.063mm) (%)	1.4				
	% Silt (0.063mm - 0.0312mm) (%)	17.4				
	% Silt (0.0312mm - 0.004mm) (%)	61.6				
	% Clay (<4um) (%)	19.6				
	Texture	Silt				
Organic / Inorganic Carbon	Total Organic Carbon (%)	2.3				
Metals	Aluminum (Al) (mg/kg)	14700				
	Antimony (Sb) (mg/kg)	0.44				
	Arsenic (As) (mg/kg)	8.24				
	Barium (Ba) (mg/kg)	142				
	Beryllium (Be) (mg/kg)	0.50				
	Bismuth (Bi) (mg/kg)	0.21				
	Boron (B) (mg/kg)	<5.0				
	Cadmium (Cd) (mg/kg)	0.454				
	Calcium (Ca) (mg/kg)	140000				
	Chromium (Cr) (mg/kg)	21.8				
	Cobalt (Co) (mg/kg)	11.2				
	Copper (Cu) (mg/kg)	19.2				
	Iron (Fe) (mg/kg)	26900				
	Lead (Pb) (mg/kg)	17.8				
	Lithium (Li) (mg/kg)	27.7				
	Magnesium (Mg) (mg/kg)	28400				
	Manganese (Mn) (mg/kg)	629				
	Mercury (Hg) (mg/kg)	0.0462				
	Molybdenum (Mo) (mg/kg)	1.05				
	Nickel (Ni) (mg/kg)	25.6				
	Phosphorus (P) (mg/kg)	876				
	Potassium (K) (mg/kg)	1110				
	Selenium (Se) (mg/kg)	0.52				
	Silver (Ag) (mg/kg)	<0.10				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-1	L2157301-2	L2157301-3	L2157301-4	L2157301-5
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	15:15	14:45	11:30	12:30	14:00
	Client ID	RG_TN_1_SED_20180829-1515	RG_TN_2_SED_20180829-1445	RG_TN_3_SED_20180829-1130	RG_TN_4_SED_20180829-1230	RG_TN_5_SED_20180829-1400
Grouping	**Analyte**					
SOIL						
Metals	Sodium (Na) (mg/kg)	81	84	89	81	82
	Strontium (Sr) (mg/kg)	238	250	229	231	237
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.087	0.078	0.085	0.066	0.067
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	142	140	143	129	123
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.794	0.729	0.881	0.582	0.576
	Vanadium (V) (mg/kg)	13.4	13.4	13.9	12.0	12.5
	Zinc (Zn) (mg/kg)	69.4	66.9	73.6	61.8	64.0
	Zirconium (Zr) (mg/kg)	<1.0	<1.0	1.5	1.3	1.4
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acridine (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(e)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	0.022	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	1-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.010	0.011	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Quinoline (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: d10-Acenaphthene (%)	94.4	91.6	85.2	73.8	82.5
	Surrogate: d12-Chrysene (%)	103.9	104.2	105.8	101.4	104.4
	Surrogate: d8-Naphthalene (%)	92.6	88.9	80.5	69.6	79.5

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID / Description / Sampled Date / Sampled Time / Client ID				
		L2157301-6 Sediment 28-AUG-18 10:00 RG_T4_1_SED_20 180828-1000	L2157301-7 Sediment 28-AUG-18 12:00 RG_T4_2_SED_20 180828-1200	L2157301-8 Sediment 28-AUG-18 13:30 RG_T4_3_SED_20 180828-1330	L2157301-9 Sediment 28-AUG-18 14:30 RG_T4_4_SED_20 180828-1430	L2157301-10 Sediment 28-AUG-18 15:30 RG_T4_5_SED_20 180828-1530
SOIL						
Metals	Sodium (Na) (mg/kg)	92	100	91	100	103
	Strontium (Sr) (mg/kg)	216	227	226	250	263
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.136	0.144	0.128	0.131	0.113
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	54.8	76.9	84.1	99.6	102
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.758	0.788	0.850	0.811	0.784
	Vanadium (V) (mg/kg)	18.0	20.2	17.9	19.3	17.2
	Zinc (Zn) (mg/kg)	81.6	88.7	79.8	84.4	77.2
	Zirconium (Zr) (mg/kg)	1.7	1.7	1.5	1.3	1.4
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acridine (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	0.012	0.013	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	0.020	0.020	0.014	0.015	<0.010
	Benzo(e)pyrene (mg/kg)	0.013	0.013	<0.010	0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.010	0.014	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	0.025	0.026	0.018	0.018	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	0.0057	<0.0050
	Fluoranthene (mg/kg)	0.017	0.019	0.014	0.014	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	1-Methylnaphthalene (mg/kg)	0.026	0.023	0.025	0.016	<0.010
	2-Methylnaphthalene (mg/kg)	0.047	0.041	0.040	0.030	0.016
	Naphthalene (mg/kg)	0.019	0.016	0.014	0.010	<0.010
	Perylene (mg/kg)	0.015	0.015	<0.010	0.011	<0.010
	Phenanthrene (mg/kg)	0.045	0.039	0.041	0.027	0.017
	Pyrene (mg/kg)	0.013	0.014	0.011	0.011	<0.010
	Quinoline (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: d10-Acenaphthene (%)	87.8	88.0	87.2	84.2	79.8
	Surrogate: d12-Chrysene (%)	106.7	116.9	104.8	104.9	104.2
	Surrogate: d8-Naphthalene (%)	84.1	84.5	84.9	81.4	75.3

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-11				
	Description	Sediment				
	Sampled Date	28-AUG-18				
	Sampled Time	14:35				
	Client ID	RG_T4_4_SED_20180828-1435				
Grouping	**Analyte**					
SOIL						
Metals	Sodium (Na) (mg/kg)	105				
	Strontium (Sr) (mg/kg)	288				
	Sulfur (S) (mg/kg)	<1000				
	Thallium (Tl) (mg/kg)	0.132				
	Tin (Sn) (mg/kg)	<2.0				
	Titanium (Ti) (mg/kg)	101				
	Tungsten (W) (mg/kg)	<0.50				
	Uranium (U) (mg/kg)	0.907				
	Vanadium (V) (mg/kg)	19.6				
	Zinc (Zn) (mg/kg)	88.7				
	Zirconium (Zr) (mg/kg)	1.8				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050				
	Acenaphthylene (mg/kg)	<0.0050				
	Acridine (mg/kg)	<0.010				
	Anthracene (mg/kg)	<0.0040				
	Benz(a)anthracene (mg/kg)	<0.010				
	Benzo(a)pyrene (mg/kg)	<0.010				
	Benzo(b&j)fluoranthene (mg/kg)	0.015				
	Benzo(e)pyrene (mg/kg)	<0.010				
	Benzo(g,h,i)perylene (mg/kg)	<0.010				
	Benzo(k)fluoranthene (mg/kg)	<0.010				
	Chrysene (mg/kg)	0.015				
	Dibenz(a,h)anthracene (mg/kg)	<0.0050				
	Fluoranthene (mg/kg)	0.013				
	Fluorene (mg/kg)	<0.010				
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010				
	1-Methylnaphthalene (mg/kg)	0.019				
	2-Methylnaphthalene (mg/kg)	0.029				
	Naphthalene (mg/kg)	0.013				
	Perylene (mg/kg)	0.011				
	Phenanthrene (mg/kg)	0.028				
	Pyrene (mg/kg)	<0.010				
	Quinoline (mg/kg)	<0.010				
	Surrogate: d10-Acenaphthene (%)	90.4				
	Surrogate: d12-Chrysene (%)	109.9				
	Surrogate: d8-Naphthalene (%)	89.5				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-1	L2157301-2	L2157301-3	L2157301-4	L2157301-5
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
	Sampled Time	15:15	14:45	11:30	12:30	14:00
	Client ID	RG_TN_1_SED_20180829-1515	RG_TN_2_SED_20180829-1445	RG_TN_3_SED_20180829-1130	RG_TN_4_SED_20180829-1230	RG_TN_5_SED_20180829-1400
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: d10-Phenanthrene (%)	95.9	93.9	92.5	84.5	88.6
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	IACR (CCME) (mg/kg)	<0.15	<0.15	<0.15	<0.15	<0.15

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-6	L2157301-7	L2157301-8	L2157301-9	L2157301-10
	Description	Sediment	Sediment	Sediment	Sediment	Sediment
	Sampled Date	28-AUG-18	28-AUG-18	28-AUG-18	28-AUG-18	28-AUG-18
	Sampled Time	10:00	12:00	13:30	14:30	15:30
	Client ID	RG_T4_1_SED_20180828-1000	RG_T4_2_SED_20180828-1200	RG_T4_3_SED_20180828-1330	RG_T4_4_SED_20180828-1430	RG_T4_5_SED_20180828-1530
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: d10-Phenanthrene (%)	94.7	94.7	91.4	90.2	87.7
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	IACR (CCME) (mg/kg)	0.23	0.23	0.17	0.19	<0.15

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2157301-11				
	Description	Sediment				
	Sampled Date	28-AUG-18				
	Sampled Time	14:35				
	Client ID	RG_T4_4_SED_20180828-1435				
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Surrogate: d10-Phenanthrene (%)	94.6				
	B(a)P Total Potency Equivalent (mg/kg)	<0.020				
	IACR (CCME) (mg/kg)	0.17				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Certified Reference Material	Phosphorus (P)	MES	L2157301-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217

A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.

C-TOC-CALC-SK	Soil	Total Organic Carbon Calculation	CSSS (2008) 21.2

Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon. (TIC)

C-TOT-LECO-SK	Soil	Total Carbon by combustion method	CSSS (2008) 21.2

The sample is ignited in a combustion analyzer where carbon in the reduced CO2 gas is determined using a thermal conductivity detector.

HG-200.2-CVAA-CL	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
MET-200.2-CCMS-CL	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CRC ICPMS.

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. This method does not dissolve all silicate materials and may result in a partial extraction. depending on the sample matrix, for some metals, including, but not limited to Al, Ba, Be, Cr, Sr, Ti, Tl, and V.

MOISTURE-CL	Soil	% Moisture	CWS for PHC in Soil - Tier 1

This analysis is carried out gravimetrically by drying the sample at 105 C

PAH-TMB-D/A-MS-CL	Soil	PAH by Tumbler Extraction (DCM/Acetone)	EPA 3570/8270

Polycyclic Aromatic Hydrocarbons in Sediment/Soil
This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of DCM and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

PH-1:2-CL	Soil	pH in soil (1:2 Soil:Water Extraction)	CSSS Ch. 16

Soil and de-ionized water (by volume) are mixed in a defined ratio. The slurry is allowed to stand, shaken, and then allowed to stand again prior to taking measurements. After equilibration, the pH of the liquid portion of the extract is measured by a pH meter. Field Measurement is recommended where accurate pH measurements are required, due to the 15 minute recommended hold time.

PSA-PIPET-DETAIL-SK	Soil	Particle size - Sieve and Pipette	SSIR-51 METHOD 3.2.1

Particle size distribution is determined by a combination of techniques. Dry sieving is performed for coarse particles, wet sieving for sand particles and the pipette sedimentation method for clay particles.

Reference:

Burt, R. (2009). Soil Survey Field and Laboratory Methods Manual. Soil Survey Investigations Report No. 5. Method 3.2.1.2.2. United States Department of Agriculture Natural Resources Conservation Service.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA

Reference Information

CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

Regional Koocanusa

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TIC-PCT-SK	**Soil**							
Batch R4207675								
WG2869426-2 LCS								
Inorganic Carbon			97.8		%		80-120	10-SEP-18
WG2869426-3 MB								
Inorganic Carbon			<0.050		%		0.05	10-SEP-18
Batch R4210968								
WG2869424-1 DUP		**L2157301-6**						
Inorganic Carbon		2.73	2.69		%	1.4	20	11-SEP-18
WG2869424-2 LCS								
Inorganic Carbon			96.9		%		80-120	11-SEP-18
WG2869424-3 MB								
Inorganic Carbon			<0.050		%		0.05	11-SEP-18
C-TOT-LECO-SK	**Soil**							
Batch R4205562								
WG2867622-2 IRM		**08-109_SOIL**						
Total Carbon by Combustion			106.5		%		80-120	07-SEP-18
WG2867622-4 LCS		**SULFADIAZINE**						
Total Carbon by Combustion			101.0		%		90-110	07-SEP-18
WG2867622-3 MB								
Total Carbon by Combustion			<0.05		%		0.05	07-SEP-18
Batch R4205816								
WG2868854-2 IRM		**08-109_SOIL**						
Total Carbon by Combustion			97.8		%		80-120	08-SEP-18
WG2868854-4 LCS		**SULFADIAZINE**						
Total Carbon by Combustion			100.0		%		90-110	08-SEP-18
WG2868854-3 MB								
Total Carbon by Combustion			<0.05		%		0.05	08-SEP-18
HG-200.2-CVAA-CL	**Soil**							
Batch R4204124								
WG2869457-9 CRM		**TILL-1**						
Mercury (Hg)			109.2		%		70-130	07-SEP-18
WG2869457-8 LCS								
Mercury (Hg)			103.0		%		80-120	07-SEP-18
WG2869457-6 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	07-SEP-18
MET-200.2-CCMS-CL	**Soil**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4204992								
WG2869457-9 CRM		**TILL-1**						
Aluminum (Al)			129.0		%		70-130	07-SEP-18
Antimony (Sb)			120.4		%		70-130	07-SEP-18
Arsenic (As)			122.1		%		70-130	07-SEP-18
Barium (Ba)			114.7		%		70-130	07-SEP-18
Beryllium (Be)			117.4		%		70-130	07-SEP-18
Bismuth (Bi)			98.6		%		70-130	07-SEP-18
Boron (B)			3.4		mg/kg		0-8.2	07-SEP-18
Cadmium (Cd)			121.6		%		70-130	07-SEP-18
Calcium (Ca)			122.7		%		70-130	07-SEP-18
Chromium (Cr)			118.6		%		70-130	07-SEP-18
Cobalt (Co)			119.5		%		70-130	07-SEP-18
Copper (Cu)			114.1		%		70-130	07-SEP-18
Iron (Fe)			120.0		%		70-130	07-SEP-18
Lead (Pb)			117.5		%		70-130	07-SEP-18
Lithium (Li)			120.3		%		70-130	07-SEP-18
Magnesium (Mg)			127.0		%		70-130	07-SEP-18
Manganese (Mn)			127.8		%		70-130	07-SEP-18
Molybdenum (Mo)			128.8		%		70-130	07-SEP-18
Nickel (Ni)			117.3		%		70-130	07-SEP-18
Phosphorus (P)			130.2	MES	%		70-130	07-SEP-18
Potassium (K)			110.0		%		70-130	07-SEP-18
Selenium (Se)			0.36		mg/kg		0.11-0.51	07-SEP-18
Silver (Ag)			0.24		mg/kg		0.13-0.33	07-SEP-18
Sodium (Na)			109.4		%		70-130	07-SEP-18
Strontium (Sr)			109.1		%		70-130	07-SEP-18
Thallium (Tl)			0.131		mg/kg		0.077-0.18	07-SEP-18
Tin (Sn)			1.2		mg/kg		0-3.1	07-SEP-18
Titanium (Ti)			121.8		%		70-130	07-SEP-18
Tungsten (W)			0.18		mg/kg		0-0.66	07-SEP-18
Uranium (U)			103.2		%		70-130	07-SEP-18
Vanadium (V)			116.7		%		70-130	07-SEP-18
Zinc (Zn)			116.2		%		70-130	07-SEP-18
Zirconium (Zr)			0.8		mg/kg		0-1.8	07-SEP-18
WG2869457-6 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4204992								
WG2869457-6 MB								
Aluminum (Al)			<50		mg/kg		50	07-SEP-18
Antimony (Sb)			<0.10		mg/kg		0.1	07-SEP-18
Arsenic (As)			<0.10		mg/kg		0.1	07-SEP-18
Barium (Ba)			<0.50		mg/kg		0.5	07-SEP-18
Beryllium (Be)			<0.10		mg/kg		0.1	07-SEP-18
Bismuth (Bi)			<0.20		mg/kg		0.2	07-SEP-18
Boron (B)			<5.0		mg/kg		5	07-SEP-18
Cadmium (Cd)			<0.020		mg/kg		0.02	07-SEP-18
Calcium (Ca)			<50		mg/kg		50	07-SEP-18
Chromium (Cr)			<0.50		mg/kg		0.5	07-SEP-18
Cobalt (Co)			<0.10		mg/kg		0.1	07-SEP-18
Copper (Cu)			<0.50		mg/kg		0.5	07-SEP-18
Iron (Fe)			<50		mg/kg		50	07-SEP-18
Lead (Pb)			<0.50		mg/kg		0.5	07-SEP-18
Lithium (Li)			<2.0		mg/kg		2	07-SEP-18
Magnesium (Mg)			<20		mg/kg		20	07-SEP-18
Manganese (Mn)			<1.0		mg/kg		1	07-SEP-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	07-SEP-18
Nickel (Ni)			<0.50		mg/kg		0.5	07-SEP-18
Phosphorus (P)			<50		mg/kg		50	07-SEP-18
Potassium (K)			<100		mg/kg		100	07-SEP-18
Selenium (Se)			<0.20		mg/kg		0.2	07-SEP-18
Silver (Ag)			<0.10		mg/kg		0.1	07-SEP-18
Sodium (Na)			<50		mg/kg		50	07-SEP-18
Strontium (Sr)			<0.50		mg/kg		0.5	07-SEP-18
Sulfur (S)			<1000		mg/kg		1000	07-SEP-18
Thallium (Tl)			<0.050		mg/kg		0.05	07-SEP-18
Tin (Sn)			<2.0		mg/kg		2	07-SEP-18
Titanium (Ti)			<1.0		mg/kg		1	07-SEP-18
Tungsten (W)			<0.50		mg/kg		0.5	07-SEP-18
Uranium (U)			<0.050		mg/kg		0.05	07-SEP-18
Vanadium (V)			<0.20		mg/kg		0.2	07-SEP-18
Zinc (Zn)			<2.0		mg/kg		2	07-SEP-18
Zirconium (Zr)			<1.0		mg/kg		1	07-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-CL	**Soil**							
Batch R4201553								
WG2867497-2 LCS								
Moisture			105.3		%		90-110	04-SEP-18
WG2867497-1 MB								
Moisture			<0.25		%		0.25	04-SEP-18
Batch R4203606								
WG2868175-3 DUP		**L2157301-3**						
Moisture		41.6	43.5		%	4.4	20	05-SEP-18
WG2868175-2 LCS								
Moisture			104.8		%		90-110	05-SEP-18
WG2868175-1 MB								
Moisture			<0.25		%		0.25	05-SEP-18
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4204772								
WG2870492-3 DUP		**L2157301-3**						
Acenaphthene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	06-SEP-18
Acenaphthylene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	06-SEP-18
Acridine		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Anthracene		<0.0040	<0.0040	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benzo(a)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benzo(b&j)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benzo(g,h,i)perylene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benzo(k)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Benzo(e)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Chrysene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Dibenz(a,h)anthracene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	06-SEP-18
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Fluorene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
1-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
2-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Perylene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Phenanthrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18
Quinoline		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	06-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4204772								
WG2870492-1 LCS								
Acenaphthene			95.2		%		60-130	06-SEP-18
Acenaphthylene			91.4		%		60-130	06-SEP-18
Acridine			103.3		%		60-130	06-SEP-18
Anthracene			92.6		%		60-130	06-SEP-18
Benz(a)anthracene			95.2		%		60-130	06-SEP-18
Benzo(a)pyrene			93.6		%		60-130	06-SEP-18
Benzo(b&j)fluoranthene			95.9		%		60-130	06-SEP-18
Benzo(g,h,i)perylene			103.3		%		60-130	06-SEP-18
Benzo(k)fluoranthene			99.1		%		60-130	06-SEP-18
Benzo(e)pyrene			104.9		%		60-130	06-SEP-18
Chrysene			101.1		%		60-130	06-SEP-18
Dibenz(a,h)anthracene			101.4		%		60-130	06-SEP-18
Fluoranthene			90.1		%		60-130	06-SEP-18
Fluorene			95.2		%		60-130	06-SEP-18
Indeno(1,2,3-c,d)pyrene			100.4		%		60-130	06-SEP-18
1-Methylnaphthalene			105.7		%		60-130	06-SEP-18
2-Methylnaphthalene			95.7		%		60-130	06-SEP-18
Naphthalene			95.7		%		50-130	06-SEP-18
Perylene			107.1		%		60-130	06-SEP-18
Phenanthrene			94.5		%		60-130	06-SEP-18
Pyrene			91.3		%		60-130	06-SEP-18
Quinoline			97.4		%		60-130	06-SEP-18
WG2870492-5 LCS								
Acenaphthene			83.0		%		60-130	06-SEP-18
Acenaphthylene			82.3		%		60-130	06-SEP-18
Acridine			99.9		%		60-130	06-SEP-18
Anthracene			85.0		%		60-130	06-SEP-18
Benz(a)anthracene			100.4		%		60-130	06-SEP-18
Benzo(a)pyrene			98.9		%		60-130	06-SEP-18
Benzo(b&j)fluoranthene			100.7		%		60-130	06-SEP-18
Benzo(g,h,i)perylene			100.6		%		60-130	06-SEP-18
Benzo(k)fluoranthene			105.4		%		60-130	06-SEP-18
Benzo(e)pyrene			113.0		%		60-130	06-SEP-18
Chrysene			110.8		%		60-130	06-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4204772								
WG2870492-5 LCS								
Dibenz(a,h)anthracene			97.7		%		60-130	06-SEP-18
Fluoranthene			96.6		%		60-130	06-SEP-18
Fluorene			83.8		%		60-130	06-SEP-18
Indeno(1,2,3-c,d)pyrene			100.0		%		60-130	06-SEP-18
1-Methylnaphthalene			91.8		%		60-130	06-SEP-18
2-Methylnaphthalene			82.9		%		60-130	06-SEP-18
Naphthalene			83.7		%		50-130	06-SEP-18
Perylene			113.3		%		60-130	06-SEP-18
Phenanthrene			85.9		%		60-130	06-SEP-18
Pyrene			98.1		%		60-130	06-SEP-18
Quinoline			84.8		%		60-130	06-SEP-18
WG2870492-2 MB								
Acenaphthene			<0.0050		mg/kg		0.005	06-SEP-18
Acenaphthylene			<0.0050		mg/kg		0.005	06-SEP-18
Acridine			<0.010		mg/kg		0.01	06-SEP-18
Anthracene			<0.0040		mg/kg		0.004	06-SEP-18
Benz(a)anthracene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(a)pyrene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(e)pyrene			<0.010		mg/kg		0.01	06-SEP-18
Chrysene			<0.010		mg/kg		0.01	06-SEP-18
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	06-SEP-18
Fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Fluorene			<0.010		mg/kg		0.01	06-SEP-18
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	06-SEP-18
1-Methylnaphthalene			<0.010		mg/kg		0.01	06-SEP-18
2-Methylnaphthalene			<0.010		mg/kg		0.01	06-SEP-18
Naphthalene			<0.010		mg/kg		0.01	06-SEP-18
Perylene			<0.010		mg/kg		0.01	06-SEP-18
Phenanthrene			<0.010		mg/kg		0.01	06-SEP-18
Pyrene			<0.010		mg/kg		0.01	06-SEP-18
Quinoline			<0.010		mg/kg		0.01	06-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4204772								
WG2870492-2 MB								
Surrogate: d8-Naphthalene			102.6		%		50-130	06-SEP-18
Surrogate: d10-Acenaphthene			106.0		%		60-130	06-SEP-18
Surrogate: d10-Phenanthrene			102.4		%		60-130	06-SEP-18
Surrogate: d12-Chrysene			123.2		%		60-130	06-SEP-18
WG2870492-6 MB								
Acenaphthene			<0.0050		mg/kg		0.005	06-SEP-18
Acenaphthylene			<0.0050		mg/kg		0.005	06-SEP-18
Acridine			<0.010		mg/kg		0.01	06-SEP-18
Anthracene			<0.0040		mg/kg		0.004	06-SEP-18
Benz(a)anthracene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(a)pyrene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Benzo(e)pyrene			<0.010		mg/kg		0.01	06-SEP-18
Chrysene			<0.010		mg/kg		0.01	06-SEP-18
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	06-SEP-18
Fluoranthene			<0.010		mg/kg		0.01	06-SEP-18
Fluorene			<0.010		mg/kg		0.01	06-SEP-18
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	06-SEP-18
1-Methylnaphthalene			<0.010		mg/kg		0.01	06-SEP-18
2-Methylnaphthalene			<0.010		mg/kg		0.01	06-SEP-18
Naphthalene			<0.010		mg/kg		0.01	06-SEP-18
Perylene			<0.010		mg/kg		0.01	06-SEP-18
Phenanthrene			<0.010		mg/kg		0.01	06-SEP-18
Pyrene			<0.010		mg/kg		0.01	06-SEP-18
Quinoline			<0.010		mg/kg		0.01	06-SEP-18
Surrogate: d8-Naphthalene			82.5		%		50-130	06-SEP-18
Surrogate: d10-Acenaphthene			84.7		%		60-130	06-SEP-18
Surrogate: d10-Phenanthrene			83.1		%		60-130	06-SEP-18
Surrogate: d12-Chrysene			113.0		%		60-130	06-SEP-18
WG2870492-4 MS		**L2157301-4**						
Acenaphthene			81.0		%		50-150	06-SEP-18
Acenaphthylene			77.0		%		50-150	06-SEP-18
Acridine			100.9		%		50-150	06-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4204772								
WG2870492-4 MS		**L2157301-4**						
Anthracene			88.7		%		50-150	06-SEP-18
Benz(a)anthracene			103.1		%		50-150	06-SEP-18
Benzo(a)pyrene			98.3		%		50-150	06-SEP-18
Benzo(b&j)fluoranthene			102.0		%		50-150	06-SEP-18
Benzo(g,h,i)perylene			97.4		%		50-150	06-SEP-18
Benzo(k)fluoranthene			106.5		%		50-150	06-SEP-18
Benzo(e)pyrene			112.9		%		50-150	06-SEP-18
Chrysene			109.1		%		50-150	06-SEP-18
Dibenz(a,h)anthracene			100.1		%		50-150	06-SEP-18
Fluoranthene			100.9		%		50-150	06-SEP-18
Fluorene			85.5		%		50-150	06-SEP-18
Indeno(1,2,3-c,d)pyrene			97.9		%		50-150	06-SEP-18
1-Methylnaphthalene			87.3		%		50-150	06-SEP-18
2-Methylnaphthalene			79.8		%		50-150	06-SEP-18
Naphthalene			78.2		%		50-150	06-SEP-18
Perylene			107.5		%		50-150	06-SEP-18
Phenanthrene			92.4		%		50-150	06-SEP-18
Pyrene			102.5		%		50-150	06-SEP-18
Quinoline			79.3		%		50-150	06-SEP-18
PH-1:2-CL	**Soil**							
Batch R4205885								
WG2871863-2 DUP		**L2157301-1**						
pH (1:2 soil:water)		8.40	8.37	J	pH	0.03	0.2	09-SEP-18
PSA-PIPET-DETAIL-SK	**Soil**							
Batch R4205718								
WG2869283-1 DUP		**L2157301-6**						
% Gravel (>2mm)		<1.0	<1.0	RPD-NA	%	N/A	25	08-SEP-18
% Sand (2.00mm - 1.00mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-SEP-18
% Sand (1.00mm - 0.50mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-SEP-18
% Sand (0.50mm - 0.25mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-SEP-18
% Sand (0.25mm - 0.125mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-SEP-18
% Sand (0.125mm - 0.063mm)		<1.0	<1.0	RPD-NA	%	N/A	5	08-SEP-18
% Silt (0.063mm - 0.0312mm)		19.4	18.9	J	%	0.5	5	08-SEP-18
% Silt (0.0312mm - 0.004mm)		60.8	60.5	J	%	0.4	5	08-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PSA-PIPET-DETAIL-SK	**Soil**							
Batch	**R4205718**							
WG2869283-1	**DUP**	**L2157301-6**						
% Clay (<4um)		19.7	20.4	J	%	0.7	5	08-SEP-18
WG2869283-2	**IRM**	**2017-PSA**						
% Sand (2.00mm - 1.00mm)			3.0		%		0-7.6	08-SEP-18
% Sand (1.00mm - 0.50mm)			3.8		%		0-8.9	08-SEP-18
% Sand (0.50mm - 0.25mm)			9.0		%		5.3-15.3	08-SEP-18
% Sand (0.25mm - 0.125mm)			14.7		%		10-20	08-SEP-18
% Sand (0.125mm - 0.063mm)			14.7		%		7.3-17.3	08-SEP-18
% Silt (0.063mm - 0.0312mm)			13.5		%		9.9-19.9	08-SEP-18
% Silt (0.0312mm - 0.004mm)			22.5		%		17.6-27.6	08-SEP-18
% Clay (<4um)			18.9		%		13.4-23.4	08-SEP-18

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: REGIONAL Koocanusa Reservoir | TURNAROUND TIME: Regular

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Koocanusa			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Lyudmyla Shvets			Email 1:		X	X	X
Email				Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	2559 29 Street NE			Email 3:				
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:	jwilson@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y7B5	Country	Canada					
Phone Number	250-425-8202			Phone Number	14034071794			PO number	VPO00563596			

L2157301-COFC

SAMPLE DETAILS								ANALYSIS REQUESTED												
								Filtered - F: Field, L: Lab, FL: Field & Lab, N: None												
								FIL	N	N	N	N	N	N	N					
								PRESERV	NONE	NONE	NONE	NONE	NONE	HNO3	NONE					
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Particle Size	TOC	PAH	Total Metals (including Hg)	Moisture							
RG_TN_1_SED_20180829-1515	RG_TN_1	Sediment		29-Aug-18	3:15:00 PM	G	2		X	X	X	X	X							
RG_TN_2_SED_20180829-1445	RG_TN_2	Sediment		29-Aug-18	2:45:00 PM	G	2		X	X	X	X	X							
RG_TN_3_SED_20180829-1130	RG_TN_3	Sediment		29-Aug-18	11:30:00 AM	G	2		X	X	X	X	X							
RG_TN_4_SED_20180829-1230	RG_TN_4	Sediment		29-Aug-18	12:30:00 PM	G	2		X	X	X	X	X							
RG_TN_5_SED_20180829-1400	RG_TN_5	Sediment		29-Aug-18	2:00:00 PM	G	2		X	X	X	X	X							
RG_T4_1_SED_20180828-1000	RG_T4_1	Sediment		28-Aug-18	10:00:00 AM	G	2		X	X	X	X	X							
RG_T4_2_SED_20180828-1200	RG_T4_2	Sediment		28-Aug-18	12:00:00 PM	G	2		X	X	X	X	X							
RG_T4_3_SED_20180828-1330	RG_T4_3	Sediment		28-Aug-18	1:30:00 PM	G	2		X	X	X	X	X							
RG_T4_4_SED_20180828-1430	RG_T4_4	Sediment		28-Aug-18	2:30:00 PM	G	2		X	X	X	X	X							
RG_T4_5_SED_20180828-1530	RG_T4_5	Sediment		28-Aug-18	3:30:00 PM	G	2		X	X	X	X	X							
RG_T4_4_SED_20180828-1435	RG_T4_4	Sediment		28-Aug-18	2:35:00 PM	G	2		X	X	X	X	X							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Koocanusa - VPO00563596 1 jar for PAHs and 1 bag for everything else				8/31 10:10

SERVICE REQUEST (rush = subject to availability)					
Regular (default)	X	Sampler's Name	Justin Wilson	Mobile #	519-803-3923
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	August 30, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

50

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 25-APR-19
Report Date: 29-MAY-19 12:05 (MT)
Version: FINAL REV. 2

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2263352

Project P.O. #: VPO00616180
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: regional effects
Legal Site Desc:

Comments: ADDITIONAL 03-MAY-19 16:50

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2263352-1	L2263352-2	L2263352-3	L2263352-4	L2263352-5
	Description	W	W	W	W	W
	Sampled Date	25-APR-19	25-APR-19	25-APR-19	25-APR-19	25-APR-19
	Sampled Time	11:40	11:40	11:35	11:35	11:30
	Client ID	RG_T4U1_WS_20190425-1140	RG_T4U1_WS_20190425-1140_FB-HG	RG_T4U2_WS_20190425-1135	RG_T4U2_WS_20190425-1135_FB-HG	RG_T4U3_WS_20190425-1130
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	293		306		305
	Hardness (as CaCO3) (mg/L)	149		154		158
	pH (pH)	8.30		8.30		8.32
	ORP (mV)	422		341		331
	Total Suspended Solids (mg/L)	8.6		7.6		6.2
	Total Dissolved Solids (mg/L)	180		177		180
	Turbidity (NTU)	8.23		7.83		6.55
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	122		122		121
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0		4.2		5.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	122		126		126
	Ammonia, Total (as N) (mg/L)	0.0077		0.0099		0.0088
	Bromide (Br) (mg/L)	<0.050		<0.050		<0.050
	Chloride (Cl) (mg/L)	3.84		3.92		3.86
	Fluoride (F) (mg/L)	0.099		0.095		0.101
	Nitrate (as N) (mg/L)	0.243		0.255		0.322
	Nitrite (as N) (mg/L)	<0.0010		<0.0010		<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.105		0.107		0.118
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010		<0.0010		<0.0010
	Phosphorus (P)-Total (mg/L)	0.0116		0.0124		0.0124
	Sulfate (SO4) (mg/L)	34.8		35.5		36.8
	Anion Sum (meq/L)	3.29		3.39		3.42
	Cation Sum (meq/L)	3.21		3.29		3.38
	Cation - Anion Balance (%)	-1.2		-1.4		-0.5
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.04		2.05		2.30
	Total Organic Carbon (mg/L)	2.03		1.91		2.17
Total Metals	Aluminum (Al)-Total (mg/L)	0.237		0.228		0.205
	Antimony (Sb)-Total (mg/L)	<0.00010		<0.00010		0.00010
	Arsenic (As)-Total (mg/L)	0.00054		0.00052		0.00048
	Barium (Ba)-Total (mg/L)	0.0537		0.0547		0.0582
	Beryllium (Be)-Total (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Total (mg/L)	<0.010		<0.010		0.011
	Cadmium (Cd)-Total (ug/L)	0.0114		0.0130		0.0142
	Calcium (Ca)-Total (mg/L)	42.6		41.6		42.7

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2263352-6	L2263352-7	L2263352-8	L2263352-9	L2263352-10
	Description	W	W	W	W	W
	Sampled Date	25-APR-19	25-APR-19	25-APR-19	25-APR-19	25-APR-19
	Sampled Time	11:30	11:20	11:20	11:15	11:15
	Client ID	RG_T4U3_WS_20190425-1130_FB-HG	RG_GCU1_WS_20190425-1120	RG_GCU1_WS_20190425-1120_FB-HG	RG_GCU2_WS_20190425-1115	RG_GCU2_WS_20190425-1115_FB-HG
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)		303		307	
	Hardness (as CaCO3) (mg/L)		158		158	
	pH (pH)		8.27		8.34	
	ORP (mV)		287		286	
	Total Suspended Solids (mg/L)		5.5		5.7	
	Total Dissolved Solids (mg/L)		190		182	
	Turbidity (NTU)		5.96		6.24	
Anions and Nutrients	Acidity (as CaCO3) (mg/L)		<1.0		<1.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)		121		119	
	Alkalinity, Carbonate (as CaCO3) (mg/L)		4.0		4.6	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)		<1.0		<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)		125		124	
	Ammonia, Total (as N) (mg/L)		<0.0050		<0.0050	
	Bromide (Br) (mg/L)		<0.050		<0.050	
	Chloride (Cl) (mg/L)		4.26		4.21	
	Fluoride (F) (mg/L)		0.100		0.096	
	Nitrate (as N) (mg/L)		0.256		0.256	
	Nitrite (as N) (mg/L)		0.0010		<0.0010	
	Total Kjeldahl Nitrogen (mg/L)		0.113		0.123	
	Orthophosphate-Dissolved (as P) (mg/L)		<0.0010		<0.0010	
	Phosphorus (P)-Total (mg/L)		0.0107		0.0112	
	Sulfate (SO4) (mg/L)		37.8		37.3	
	Anion Sum (meq/L)		3.43		3.39	
	Cation Sum (meq/L)		3.40		3.41	
	Cation - Anion Balance (%)		-0.4		0.2	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		1.88		2.05	
	Total Organic Carbon (mg/L)		2.16		2.13	
Total Metals	Aluminum (Al)-Total (mg/L)		0.163		0.210	
	Antimony (Sb)-Total (mg/L)		<0.00010		<0.00010	
	Arsenic (As)-Total (mg/L)		0.00048		0.00046	
	Barium (Ba)-Total (mg/L)		0.0536		0.0548	
	Beryllium (Be)-Total (ug/L)		<0.020		<0.020	
	Bismuth (Bi)-Total (mg/L)		<0.000050		<0.000050	
	Boron (B)-Total (mg/L)		0.011		0.010	
	Cadmium (Cd)-Total (ug/L)		0.0121		0.0143	
	Calcium (Ca)-Total (mg/L)		41.2		43.8	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2263352-11	L2263352-12	L2263352-13	L2263352-14	L2263352-15
	Description	W	W	W	W	W
	Sampled Date	25-APR-19	25-APR-19	25-APR-19	25-APR-19	25-APR-19
	Sampled Time	11:10	11:10	11:30	11:30	11:45
	Client ID	RG_GCU3_WS_20190425-1110	RG_GCU3_WS_20190425-1110_FB-HG	RG_TNU1_WS_20190425-1130	RG_TNU1_WS_20190425-1130_FB-HG	RG_ERU1_WS_20190425-1045
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	314		252		267
	Hardness (as CaCO3) (mg/L)	159		123		133
	pH (pH)	8.33		8.24		8.28
	ORP (mV)	301		322		297
	Total Suspended Solids (mg/L)	5.0		13.7		14.1
	Total Dissolved Solids (mg/L)	189		161		162
	Turbidity (NTU)	4.41		8.63		12.9
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	124		106		113
	Alkalinity, Carbonate (as CaCO3) (mg/L)	5.0		<1.0		<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0		<1.0		<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	129		106		113
	Ammonia, Total (as N) (mg/L)	0.0087		<0.0050		0.0072
	Bromide (Br) (mg/L)	<0.050		<0.050		<0.050
	Chloride (Cl) (mg/L)	4.05		3.71		3.15
	Fluoride (F) (mg/L)	0.100		0.078		0.093
	Nitrate (as N) (mg/L)	0.308		0.143		0.268
	Nitrite (as N) (mg/L)	0.0011		<0.0010		<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.438		0.079		0.108
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010		<0.0010		<0.0010
	Phosphorus (P)-Total (mg/L)	0.0081		0.0106		0.0156
	Sulfate (SO4) (mg/L)	37.2		27.5		28.7
	Anion Sum (meq/L)	3.50		2.81		2.97
	Cation Sum (meq/L)	3.40		2.65		2.85
	Cation - Anion Balance (%)	-1.5		-2.8		-2.0
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.94		2.00		2.12
	Total Organic Carbon (mg/L)	1.80		1.84		2.18
Total Metals	Aluminum (Al)-Total (mg/L)	0.117		0.148		0.341
	Antimony (Sb)-Total (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Total (mg/L)	0.00041		0.00054		0.00053
	Barium (Ba)-Total (mg/L)	0.0602		0.0334		0.0520
	Beryllium (Be)-Total (ug/L)	<0.020		<0.020		0.022
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Total (mg/L)	0.010		<0.010		<0.010
	Cadmium (Cd)-Total (ug/L)	0.0117		0.0087		0.0166
	Calcium (Ca)-Total (mg/L)	41.0		35.3		36.3

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2263352-17	L2263352-18	L2263352-19	L2263352-20	L2263352-21
	Description	W	W	W	W	W
	Sampled Date	25-APR-19	25-APR-19	24-APR-19	24-APR-19	24-APR-19
	Sampled Time		11:35	15:55	15:55	15:40
	Client ID	RG_BLANK_WS_20190425	RG_TRIP_WS_20190425	RG_SCU1_WS_20190424-1555	RG_SCU1_WS_20190424-1555_FB-HG	RG_SCU2_WS_20190424-1540
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	<2.0	247		246
	Hardness (as CaCO3) (mg/L)	<0.50	<0.50 HTC	126		128
	pH (pH)	5.81	6.04	8.22		8.26
	ORP (mV)	397	396	298		297
	Total Suspended Solids (mg/L)	<1.0	<1.0	27.0		26.4
	Total Dissolved Solids (mg/L)	<3.0	<3.0	151		152
	Turbidity (NTU)	<0.10	<0.10	12.0		14.4
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	2.1 RRV	2.0 RRV	<1.0		<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	<1.0	107		111
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	<1.0	107		111
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0121 RRV	0.0051		0.0064
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050		<0.050
	Chloride (Cl) (mg/L)	<0.10	<0.10	3.62		3.47
	Fluoride (F) (mg/L)	<0.020	<0.020	0.076		0.075
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.152		0.144
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010		<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	0.103		0.095
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010		<0.0010
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	0.0171		0.0170
	Sulfate (SO4) (mg/L)	<0.30	<0.30	26.5		24.7
	Anion Sum (meq/L)	<0.10	<0.10	2.80		2.84
	Cation Sum (meq/L)	<0.10	<0.10	2.72		2.76
	Cation - Anion Balance (%)	0.0	0.0	-1.4		-1.4
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50		1.98		1.98
	Total Organic Carbon (mg/L)	<0.50	<0.50	1.96		1.96
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030	<0.0030	0.263		0.266
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010		<0.00010
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	0.00059		0.00058
	Barium (Ba)-Total (mg/L)	<0.00010	<0.00010	0.0346		0.0350
	Beryllium (Be)-Total (ug/L)	<0.020	<0.020	<0.020		<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050		<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010		<0.010
	Cadmium (Cd)-Total (ug/L)	<0.0050	<0.0050	0.0083		0.0101
	Calcium (Ca)-Total (mg/L)	<0.050	<0.050	36.0		35.1

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2263352-22				
	Description	W				
	Sampled Date	24-APR-19				
	Sampled Time	15:40				
	Client ID	RG_SCU2_WS_20190424-1540_FB-HG				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
	ORP (mV)					
	Total Suspended Solids (mg/L)					
	Total Dissolved Solids (mg/L)					
	Turbidity (NTU)					
Anions and Nutrients	Acidity (as CaCO3) (mg/L)					
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)					
	Alkalinity, Carbonate (as CaCO3) (mg/L)					
	Alkalinity, Hydroxide (as CaCO3) (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)					
	Ammonia, Total (as N) (mg/L)					
	Bromide (Br) (mg/L)					
	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Orthophosphate-Dissolved (as P) (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Sulfate (SO4) (mg/L)					
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (ug/L)					
	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (ug/L)					
	Calcium (Ca)-Total (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2263352-1 W 25-APR-19 11:40 RG_T4U1_WS_20190425-1140	L2263352-2 W 25-APR-19 11:40 RG_T4U1_WS_20190425-1140_FB-HG	L2263352-3 W 25-APR-19 11:35 RG_T4U2_WS_20190425-1135	L2263352-4 W 25-APR-19 11:35 RG_T4U2_WS_20190425-1135_FB-HG	L2263352-5 W 25-APR-19 11:30 RG_T4U3_WS_20190425-1130
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00042		0.00040		0.00046
	Cobalt (Co)-Total (ug/L)	0.15		0.16		0.12
	Copper (Cu)-Total (mg/L)	0.00236		0.00097		0.00073
	Iron (Fe)-Total (mg/L)	0.232		0.225		0.173
	Lead (Pb)-Total (mg/L)	0.000325		0.000296		0.000241
	Lithium (Li)-Total (mg/L)	0.0029		0.0029		0.0035
	Magnesium (Mg)-Total (mg/L)	13.0		13.1		13.1
	Manganese (Mn)-Total (mg/L)	0.0165		0.0164		0.0132
	Mercury (Hg)-Total (ug/L)	0.00135	<0.00050	0.00133	<0.00050	0.00145
	Molybdenum (Mo)-Total (mg/L)	0.000690		0.000665		0.000725
	Nickel (Ni)-Total (mg/L)	<0.00050		<0.00050		<0.00050
	Potassium (K)-Total (mg/L)	0.703		0.707		0.689
	Selenium (Se)-Total (ug/L)	1.13		1.27		1.64
	Silicon (Si)-Total (mg/L)	2.75		2.66		2.60
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Sodium (Na)-Total (mg/L)	4.86		4.89		4.68
	Strontium (Sr)-Total (mg/L)	0.145		0.142		0.150
	Thallium (Tl)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Tin (Sn)-Total (mg/L)	0.00016		<0.00010		<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010		<0.010		<0.010
	Uranium (U)-Total (mg/L)	0.000746		0.000731		0.000725
	Vanadium (V)-Total (mg/L)	0.00059		0.00062		0.00064
	Zinc (Zn)-Total (mg/L)	<0.0030		<0.0030		<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	LAB		LAB		LAB
	Dissolved Metals Filtration Location	LAB		LAB		LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0098		0.0109		0.0131
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00041		0.00042		0.00038
	Barium (Ba)-Dissolved (mg/L)	0.0527		0.0543		0.0617
	Beryllium (Be)-Dissolved (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Dissolved (ug/L)	0.0061		<0.0050		0.0054
	Calcium (Ca)-Dissolved (mg/L)	39.1		41.0		41.8
	Chromium (Cr)-Dissolved (mg/L)	0.00011		0.00012		0.00012
	Cobalt (Co)-Dissolved (ug/L)	<0.10		<0.10		<0.10
	Copper (Cu)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2263352-6 W 25-APR-19 11:30 RG_T4U3_WS_20190425-1130_FB-HG	L2263352-7 W 25-APR-19 11:20 RG_GCU1_WS_20190425-1120	L2263352-8 W 25-APR-19 11:20 RG_GCU1_WS_20190425-1120_FB-HG	L2263352-9 W 25-APR-19 11:15 RG_GCU2_WS_20190425-1115	L2263352-10 W 25-APR-19 11:15 RG_GCU2_WS_20190425-1115_FB-HG
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)		0.00033		0.00039	
	Cobalt (Co)-Total (ug/L)		0.11		0.12	
	Copper (Cu)-Total (mg/L)		0.00062		0.00066	
	Iron (Fe)-Total (mg/L)		0.141		0.170	
	Lead (Pb)-Total (mg/L)		0.000229		0.000242	
	Lithium (Li)-Total (mg/L)		0.0031		0.0032	
	Magnesium (Mg)-Total (mg/L)		13.2		13.4	
	Manganese (Mn)-Total (mg/L)		0.0126		0.0131	
	Mercury (Hg)-Total (ug/L)	<0.00050	0.00126	<0.00050	0.00122	<0.00050
	Molybdenum (Mo)-Total (mg/L)		0.000667		0.000621	
	Nickel (Ni)-Total (mg/L)		<0.00050		<0.00050	
	Potassium (K)-Total (mg/L)		0.725		0.753	
	Selenium (Se)-Total (ug/L)		1.34		1.19	
	Silicon (Si)-Total (mg/L)		2.50		2.69	
	Silver (Ag)-Total (mg/L)		<0.000010		<0.000010	
	Sodium (Na)-Total (mg/L)		5.26		5.49	
	Strontium (Sr)-Total (mg/L)		0.150		0.150	
	Thallium (Tl)-Total (mg/L)		<0.000010		<0.000010	
	Tin (Sn)-Total (mg/L)		<0.00010		<0.00010	
	Titanium (Ti)-Total (mg/L)		<0.010		<0.010	
	Uranium (U)-Total (mg/L)		0.000771		0.000774	
	Vanadium (V)-Total (mg/L)		0.00054		0.00061	
	Zinc (Zn)-Total (mg/L)		<0.0030		<0.0030	
Dissolved Metals	Dissolved Mercury Filtration Location		LAB		LAB	
	Dissolved Metals Filtration Location		LAB		LAB	
	Aluminum (Al)-Dissolved (mg/L)		0.0091		0.0101	
	Antimony (Sb)-Dissolved (mg/L)		<0.00010		<0.00010	
	Arsenic (As)-Dissolved (mg/L)		0.00039		0.00041	
	Barium (Ba)-Dissolved (mg/L)		0.0553		0.0579	
	Beryllium (Be)-Dissolved (ug/L)		<0.020		<0.020	
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050		<0.000050	
	Boron (B)-Dissolved (mg/L)		<0.010		<0.010	
	Cadmium (Cd)-Dissolved (ug/L)		<0.0050		0.0054	
	Calcium (Ca)-Dissolved (mg/L)		41.5		41.5	
	Chromium (Cr)-Dissolved (mg/L)		0.00011		0.00011	
	Cobalt (Co)-Dissolved (ug/L)		<0.10		<0.10	
	Copper (Cu)-Dissolved (mg/L)		<0.00050		<0.00050	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2263352-11 W 25-APR-19 11:10 RG_GCU3_WS_20190425-1110	L2263352-12 W 25-APR-19 11:10 RG_GCU3_WS_20190425-1110_FB-HG	L2263352-13 W 25-APR-19 11:30 RG_TNU1_WS_20190425-1130	L2263352-14 W 25-APR-19 11:30 RG_TNU1_WS_20190425-1130_FB-HG	L2263352-15 W 25-APR-19 11:45 RG_ERU1_WS_20190425-1045
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	0.00026		0.00029		0.00055
	Cobalt (Co)-Total (ug/L)	<0.10		0.14		0.20
	Copper (Cu)-Total (mg/L)	0.00058		0.00075		0.00086
	Iron (Fe)-Total (mg/L)	0.107		0.194		0.338
	Lead (Pb)-Total (mg/L)	0.000138		0.000366		0.000506
	Lithium (Li)-Total (mg/L)	0.0034		0.0017		0.0028
	Magnesium (Mg)-Total (mg/L)	14.1		10.5		11.4
	Manganese (Mn)-Total (mg/L)	0.0114		0.0171		0.0191
	Mercury (Hg)-Total (ug/L)	0.00092	<0.00050	0.00896	<0.00050	0.0136
	Molybdenum (Mo)-Total (mg/L)	0.000676		0.000522		0.000620
	Nickel (Ni)-Total (mg/L)	<0.00050		<0.00050		0.00064
	Potassium (K)-Total (mg/L)	0.736		0.648		0.704
	Selenium (Se)-Total (ug/L)	1.69		0.145		1.25
	Silicon (Si)-Total (mg/L)	2.58		2.74		3.01
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Sodium (Na)-Total (mg/L)	5.06		4.41		3.98
	Strontium (Sr)-Total (mg/L)	0.150		0.122		0.126
	Thallium (Tl)-Total (mg/L)	<0.000010		<0.000010		<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010		<0.00010		<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010		<0.010		<0.010
	Uranium (U)-Total (mg/L)	0.000782		0.000679		0.000657
	Vanadium (V)-Total (mg/L)	<0.00050		<0.00050		0.00081
	Zinc (Zn)-Total (mg/L)	<0.0030		<0.0030		0.0046
Dissolved Metals	Dissolved Mercury Filtration Location	LAB		LAB		LAB
	Dissolved Metals Filtration Location	LAB		LAB		LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0066		0.0068		0.0140
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00037		0.00045		0.00041
	Barium (Ba)-Dissolved (mg/L)	0.0634		0.0345		0.0504
	Beryllium (Be)-Dissolved (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Dissolved (ug/L)	0.0058		<0.0050		0.0080
	Calcium (Ca)-Dissolved (mg/L)	41.7		32.7		35.2
	Chromium (Cr)-Dissolved (mg/L)	0.00010		<0.00010		0.00011
	Cobalt (Co)-Dissolved (ug/L)	<0.10		<0.10		<0.10
	Copper (Cu)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2263352-17	L2263352-18	L2263352-19	L2263352-20	L2263352-21
	Description	W	W	W	W	W
	Sampled Date	25-APR-19	25-APR-19	24-APR-19	24-APR-19	24-APR-19
	Sampled Time		11:35	15:55	15:55	15:40
	Client ID	RG_BLANK_WS_20190425	RG_TRIP_WS_20190425	RG_SCU1_WS_20190424-1555	RG_SCU1_WS_20190424-1555_FB-HG	RG_SCU2_WS_20190424-1540
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	0.00047		0.00049
	Cobalt (Co)-Total (ug/L)	<0.10	<0.10	0.21		0.23
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	0.00093		0.00108
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	0.393		0.426
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	0.000745		0.00114
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	0.0019		0.0018
	Magnesium (Mg)-Total (mg/L)	<0.10	<0.10	10.8		10.9
	Manganese (Mn)-Total (mg/L)	<0.00010	<0.00010	0.0223		0.0238
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050	0.0110	<0.00050	0.021
	Molybdenum (Mo)-Total (mg/L)	<0.000050	<0.000050	0.000562		0.000542
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	0.00057		0.00092
	Potassium (K)-Total (mg/L)	<0.050	<0.050	0.653		0.654
	Selenium (Se)-Total (ug/L)	<0.050	<0.050	0.118		0.127
	Silicon (Si)-Total (mg/L)	<0.10	<0.10	2.83		2.82
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010		<0.000010
	Sodium (Na)-Total (mg/L)	<0.050	<0.050	4.25		4.46
	Strontium (Sr)-Total (mg/L)	<0.00020	<0.00020	0.127		0.124
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010		<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010		<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010		<0.010
	Uranium (U)-Total (mg/L)	<0.000010	<0.000010	0.000671		0.000658
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050		0.00051
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	0.0053		0.0159
Dissolved Metals	Dissolved Mercury Filtration Location	LAB		LAB		LAB
	Dissolved Metals Filtration Location	LAB		LAB		LAB
	Aluminum (Al)-Dissolved (mg/L)	<0.0030		0.0077		0.0111
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Arsenic (As)-Dissolved (mg/L)	<0.00010		0.00043		0.00044
	Barium (Ba)-Dissolved (mg/L)	<0.00010		0.0329		0.0330
	Beryllium (Be)-Dissolved (ug/L)	<0.020		<0.020		<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050		<0.0050		<0.0050
	Calcium (Ca)-Dissolved (mg/L)	<0.050		33.2		34.1
	Chromium (Cr)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10		<0.10		<0.10
	Copper (Cu)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2263352-22				
	Description	W				
	Sampled Date	24-APR-19				
	Sampled Time	15:40				
	Client ID	RG_SCU2_WS_20190424-1540_FB-HG				
Grouping	**Analyte**					
WATER						
Total Metals	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (ug/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (ug/L)	<0.00050				
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (ug/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (ug/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (ug/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (ug/L)					
	Copper (Cu)-Dissolved (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2263352-1	L2263352-2	L2263352-3	L2263352-4	L2263352-5
Description	W	W	W	W	W
Sampled Date	25-APR-19	25-APR-19	25-APR-19	25-APR-19	25-APR-19
Sampled Time	11:40	11:40	11:35	11:35	11:30
Client ID	RG_T4U1_WS_20190425-1140	RG_T4U1_WS_20190425-1140_FB-HG	RG_T4U2_WS_20190425-1135	RG_T4U2_WS_20190425-1135_FB-HG	RG_T4U3_WS_20190425-1130
Grouping **Analyte**					
WATER					
Dissolved Metals Iron (Fe)-Dissolved (mg/L)	0.014		0.014		0.013
Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050
Lithium (Li)-Dissolved (mg/L)	0.0023		0.0024		0.0029
Magnesium (Mg)-Dissolved (mg/L)	12.6		12.5		13.1
Manganese (Mn)-Dissolved (mg/L)	0.00511		0.00484		0.00353
Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000639		0.000650		0.000703
Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Potassium (K)-Dissolved (mg/L)	0.618		0.619		0.625
Selenium (Se)-Dissolved (ug/L)	1.36		1.46		1.97
Silicon (Si)-Dissolved (mg/L)	2.33		2.28		2.21
Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Sodium (Na)-Dissolved (mg/L)	4.79		4.71		4.63
Strontium (Sr)-Dissolved (mg/L)	0.152		0.155		0.161
Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		<0.010
Uranium (U)-Dissolved (mg/L)	0.000737		0.000782		0.000768
Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2263352-6 W 25-APR-19 11:30 RG_T4U3_WS_20190425-1130_FB-HG	L2263352-7 W 25-APR-19 11:20 RG_GCU1_WS_20190425-1120	L2263352-8 W 25-APR-19 11:20 RG_GCU1_WS_20190425-1120_FB-HG	L2263352-9 W 25-APR-19 11:15 RG_GCU2_WS_20190425-1115	L2263352-10 W 25-APR-19 11:15 RG_GCU2_WS_20190425-1115_FB-HG
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)		0.010		0.011	
	Lead (Pb)-Dissolved (mg/L)		<0.000050		<0.000050	
	Lithium (Li)-Dissolved (mg/L)		0.0026		0.0026	
	Magnesium (Mg)-Dissolved (mg/L)		13.2		13.3	
	Manganese (Mn)-Dissolved (mg/L)		0.00133		0.00123	
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050		<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)		0.000665		0.000668	
	Nickel (Ni)-Dissolved (mg/L)		<0.00050		<0.00050	
	Potassium (K)-Dissolved (mg/L)		0.647		0.664	
	Selenium (Se)-Dissolved (ug/L)		1.53		1.47	
	Silicon (Si)-Dissolved (mg/L)		2.27		2.27	
	Silver (Ag)-Dissolved (mg/L)		<0.000010		<0.000010	
	Sodium (Na)-Dissolved (mg/L)		5.19		5.18	
	Strontium (Sr)-Dissolved (mg/L)		0.164		0.164	
	Thallium (Tl)-Dissolved (mg/L)		<0.000010		<0.000010	
	Tin (Sn)-Dissolved (mg/L)		<0.00010		<0.00010	
	Titanium (Ti)-Dissolved (mg/L)		<0.010		<0.010	
	Uranium (U)-Dissolved (mg/L)		0.000782		0.000800	
	Vanadium (V)-Dissolved (mg/L)		<0.00050		<0.00050	
	Zinc (Zn)-Dissolved (mg/L)		<0.0010		<0.0010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2263352-11	L2263352-12	L2263352-13	L2263352-14	L2263352-15
	Description	W	W	W	W	W
	Sampled Date	25-APR-19	25-APR-19	25-APR-19	25-APR-19	25-APR-19
	Sampled Time	11:10	11:10	11:30	11:30	11:45
	Client ID	RG_GCU3_WS_20190425-1110	RG_GCU3_WS_20190425-1110_FB-HG	RG_TNU1_WS_20190425-1130	RG_TNU1_WS_20190425-1130_FB-HG	RG_ERU1_WS_20190425-1045
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)	<0.010		0.015		0.018
	Lead (Pb)-Dissolved (mg/L)	<0.000050		0.000054		0.000052
	Lithium (Li)-Dissolved (mg/L)	0.0029		0.0014		0.0022
	Magnesium (Mg)-Dissolved (mg/L)	13.3		9.97		11.1
	Manganese (Mn)-Dissolved (mg/L)	0.00065		0.00796		0.00721
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000676		0.000584		0.000608
	Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
	Potassium (K)-Dissolved (mg/L)	0.660		0.578		0.578
	Selenium (Se)-Dissolved (ug/L)	2.02		0.131		1.30
	Silicon (Si)-Dissolved (mg/L)	2.25		2.51		2.37
	Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
	Sodium (Na)-Dissolved (mg/L)	4.80		4.23		3.88
	Strontium (Sr)-Dissolved (mg/L)	0.166		0.135		0.133
	Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		<0.010
	Uranium (U)-Dissolved (mg/L)	0.000854		0.000722		0.000642
	Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2263352-17	L2263352-18	L2263352-19	L2263352-20	L2263352-21
Description	W	W	W	W	W
Sampled Date	25-APR-19	25-APR-19	24-APR-19	24-APR-19	24-APR-19
Sampled Time		11:35	15:55	15:55	15:40
Client ID	RG_BLANK_WS_20190425	RG_TRIP_WS_20190425	RG_SCU1_WS_20190424-1555	RG_SCU1_WS_20190424-1555_FB-HG	RG_SCU2_WS_20190424-1540
Grouping / **Analyte**					
WATER					
Dissolved Metals Iron (Fe)-Dissolved (mg/L)	<0.010		0.014		0.015
Lead (Pb)-Dissolved (mg/L)	<0.000050		0.000055		0.000089
Lithium (Li)-Dissolved (mg/L)	<0.0010		0.0014		0.0014
Magnesium (Mg)-Dissolved (mg/L)	<0.10		10.5		10.4
Manganese (Mn)-Dissolved (mg/L)	<0.00010		0.00723		0.00842
Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		0.0000064
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050		0.000536		0.000512
Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Potassium (K)-Dissolved (mg/L)	<0.050		0.583		0.573
Selenium (Se)-Dissolved (ug/L)	<0.050		0.142		0.128
Silicon (Si)-Dissolved (mg/L)	<0.050		2.49		2.49
Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Sodium (Na)-Dissolved (mg/L)	<0.050		4.28		4.34
Strontium (Sr)-Dissolved (mg/L)	<0.00020		0.132		0.127
Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		<0.010
Uranium (U)-Dissolved (mg/L)	<0.000010		0.000682		0.000646
Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		0.0054

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2263352-22				
	Description	W				
	Sampled Date	24-APR-19				
	Sampled Time	15:40				
	Client ID	RG_SCU2_WS_20190424-1540_FB-HG				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (ug/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Strontium (Sr)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Thallium (Tl)-Total	B	L2263352-1, -11, -13, -15, -17, -18, -19, -21, -3, -5, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2263352-1, -11, -13, -15, -17, -19, -21, -3, -5, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2263352-17
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2263352-1, -11, -13, -15, -17, -19, -21, -3, -5, -7, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2263352-17
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2263352-1, -11, -13, -15, -17, -19, -21, -3, -5, -7, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2263352-17
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2263352-1, -11, -13, -15, -17, -19, -21, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2263352-17
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2263352-1, -11, -13, -15, -17, -19, -21, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2263352-17
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2263352-17
Matrix Spike	Aluminum (Al)-Total	MS-B	L2263352-1, -11, -13, -15, -17, -18, -19, -21, -3, -5, -7, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2263352-1, -11, -13, -15, -17, -18, -19, -21, -3, -5, -7, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2263352-1, -11, -13, -15, -17, -18, -19, -21, -3, -5, -7, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2263352-1, -11, -13, -15, -17, -18, -19, -21, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2263352-1, -11, -13, -15, -17, -18, -19, -21, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2263352-1, -11, -13, -15, -17, -18, -19, -21, -3, -5, -7, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-L-IC-N-VA	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)

Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA	Water	Total Mercury in Water by CVAFS (Ultra)	EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-VA	Water	Oxidation reduction potential by Elect.	ASTM D1498-14

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498-14 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM), 2014. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are

Reference Information

available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-LOW-VA Water Low Level TDS (3.0mg/L) by Gravimetric APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L) APHA 2540D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

regional effects

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4615455								
WG3036014-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			112.0		%		85-115	26-APR-19
WG3036014-5 DUP		**L2263352-1**						
Acidity (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	26-APR-19
WG3036014-1 MB								
Acidity (as CaCO3)			1.8		mg/L		2	26-APR-19
Batch R4618181								
WG3037211-3 CRM		**VA-ACY-CONTROL**						
Acidity (as CaCO3)			106.7		%		85-115	30-APR-19
WG3037211-1 MB								
Acidity (as CaCO3)			1.7		mg/L		2	30-APR-19
ALK-TITR-VA	**Water**							
Batch R4615790								
WG3035910-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			102.7		%		85-115	27-APR-19
WG3035910-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	27-APR-19
BE-D-L-CCMS-VA	**Water**							
Batch R4616186								
WG3035949-2 LCS								
Beryllium (Be)-Dissolved			94.6		%		80-120	27-APR-19
WG3035949-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	27-APR-19
WG3035949-4 MS		**L2263352-1**						
Beryllium (Be)-Dissolved			97.7		%		70-130	27-APR-19
BE-T-L-CCMS-VA	**Water**							
Batch R4615906								
WG3036124-3 DUP		**L2263352-1**						
Beryllium (Be)-Total		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	27-APR-19
WG3036124-2 LCS								
Beryllium (Be)-Total			98.6		%		80-120	27-APR-19
WG3036124-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	27-APR-19
WG3036124-4 MS		**L2263352-3**						
Beryllium (Be)-Total			102.8		%		70-130	27-APR-19
BR-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-VA	**Water**							
Batch R4614630								
WG3036010-3 DUP		**L2263352-3**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	26-APR-19
WG3036010-2 LCS								
Bromide (Br)			104.7		%		85-115	26-APR-19
WG3036010-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	26-APR-19
WG3036010-4 MS		**L2263352-1**						
Bromide (Br)			109.0		%		75-125	26-APR-19
CARBONS-DOC-VA	**Water**							
Batch R4616486								
WG3036207-3 DUP		**L2263352-1**						
Dissolved Organic Carbon		2.04	2.21		mg/L	7.9	20	28-APR-19
WG3036207-2 LCS								
Dissolved Organic Carbon			105.8		%		80-120	28-APR-19
WG3036207-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	28-APR-19
WG3036207-4 MS		**L2263352-3**						
Dissolved Organic Carbon			101.9		%		70-130	28-APR-19
CARBONS-TOC-VA	**Water**							
Batch R4619726								
WG3038211-3 DUP		**L2263352-1**						
Total Organic Carbon		2.03	1.95		mg/L	3.9	20	30-APR-19
WG3038211-2 LCS								
Total Organic Carbon			101.1		%		80-120	30-APR-19
WG3038290-10 LCS								
Total Organic Carbon			104.4		%		80-120	30-APR-19
WG3038290-6 LCS								
Total Organic Carbon			100.8		%		80-120	30-APR-19
WG3038211-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-APR-19
WG3038290-9 MB								
Total Organic Carbon			<0.50		mg/L		0.5	30-APR-19
WG3038211-4 MS		**L2263352-3**						
Total Organic Carbon			109.3		%		70-130	30-APR-19
CL-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-L-IC-N-VA	**Water**							
Batch R4614630								
WG3036010-3 DUP		**L2263352-3**						
Chloride (Cl)		3.92	3.90		mg/L	0.5	20	26-APR-19
WG3036010-2 LCS								
Chloride (Cl)			102.3		%		90-110	26-APR-19
WG3036010-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	26-APR-19
WG3036010-4 MS		**L2263352-1**						
Chloride (Cl)			101.5		%		75-125	26-APR-19
EC-PCT-VA	**Water**							
Batch R4615455								
WG3036014-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			98.3		%		90-110	26-APR-19
WG3036014-5 DUP		**L2263352-1**						
Conductivity		293	294		uS/cm	0.3	10	26-APR-19
WG3036014-1 MB								
Conductivity			<2.0		uS/cm		2	26-APR-19
F-IC-N-VA	**Water**							
Batch R4614630								
WG3036010-3 DUP		**L2263352-3**						
Fluoride (F)		0.095	0.094		mg/L	0.7	20	26-APR-19
WG3036010-2 LCS								
Fluoride (F)			97.4		%		90-110	26-APR-19
WG3036010-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-APR-19
WG3036010-4 MS		**L2263352-1**						
Fluoride (F)			96.6		%		75-125	26-APR-19
HG-D-CVAA-VA	**Water**							
Batch R4616373								
WG3037077-7 DUP		**L2263352-13**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	29-APR-19
WG3037077-2 LCS								
Mercury (Hg)-Dissolved			97.0		%		80-120	29-APR-19
WG3037077-6 LCS								
Mercury (Hg)-Dissolved			97.0		%		80-120	29-APR-19
WG3037077-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	29-APR-19
WG3037077-5 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	29-APR-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-VA	**Water**							
Batch R4616373								
WG3037077-8 MS		**L2263352-7**						
Mercury (Hg)-Dissolved			88.9		%		70-130	29-APR-19
HG-T-U-CVAF-VA	**Water**							
Batch R4619643								
WG3039115-2 LCS								
Mercury (Hg)-Total			110.8		%		80-120	01-MAY-19
WG3039115-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	01-MAY-19
Batch R4620995								
WG3040217-2 LCS								
Mercury (Hg)-Total			98.4		%		80-120	02-MAY-19
WG3040217-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	02-MAY-19
Batch R4621694								
WG3040423-3 DUP		**L2263352-1**						
Mercury (Hg)-Total		0.00135	0.00139		ug/L	2.9	20	02-MAY-19
WG3040423-2 LCS								
Mercury (Hg)-Total			102.6		%		80-120	02-MAY-19
WG3040423-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	02-MAY-19
MET-D-CCMS-VA	**Water**							
Batch R4616186								
WG3035949-2 LCS								
Aluminum (Al)-Dissolved			99.2		%		80-120	27-APR-19
Antimony (Sb)-Dissolved			95.9		%		80-120	27-APR-19
Arsenic (As)-Dissolved			99.7		%		80-120	27-APR-19
Barium (Ba)-Dissolved			100.6		%		80-120	27-APR-19
Bismuth (Bi)-Dissolved			98.2		%		80-120	27-APR-19
Boron (B)-Dissolved			92.6		%		80-120	27-APR-19
Cadmium (Cd)-Dissolved			100.1		%		80-120	27-APR-19
Calcium (Ca)-Dissolved			94.4		%		80-120	27-APR-19
Chromium (Cr)-Dissolved			98.4		%		80-120	27-APR-19
Cobalt (Co)-Dissolved			96.3		%		80-120	27-APR-19
Copper (Cu)-Dissolved			96.8		%		80-120	27-APR-19
Iron (Fe)-Dissolved			91.2		%		80-120	27-APR-19
Lead (Pb)-Dissolved			95.8		%		80-120	27-APR-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4616186								
WG3035949-2 LCS								
Lithium (Li)-Dissolved			116.8		%		80-120	27-APR-19
Magnesium (Mg)-Dissolved			105.6		%		80-120	27-APR-19
Manganese (Mn)-Dissolved			98.5		%		80-120	27-APR-19
Molybdenum (Mo)-Dissolved			93.2		%		80-120	27-APR-19
Nickel (Ni)-Dissolved			95.7		%		80-120	27-APR-19
Potassium (K)-Dissolved			93.9		%		80-120	27-APR-19
Selenium (Se)-Dissolved			105.1		%		80-120	27-APR-19
Silicon (Si)-Dissolved			102.5		%		60-140	27-APR-19
Silver (Ag)-Dissolved			96.6		%		80-120	27-APR-19
Sodium (Na)-Dissolved			102.4		%		80-120	27-APR-19
Strontium (Sr)-Dissolved			102.2		%		80-120	27-APR-19
Thallium (Tl)-Dissolved			95.9		%		80-120	27-APR-19
Tin (Sn)-Dissolved			96.1		%		80-120	27-APR-19
Titanium (Ti)-Dissolved			94.3		%		80-120	27-APR-19
Uranium (U)-Dissolved			98.6		%		80-120	27-APR-19
Vanadium (V)-Dissolved			99.0		%		80-120	27-APR-19
Zinc (Zn)-Dissolved			96.5		%		80-120	27-APR-19
WG3035949-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	27-APR-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	27-APR-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	27-APR-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	27-APR-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	27-APR-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	27-APR-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	27-APR-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	27-APR-19
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	27-APR-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	27-APR-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	27-APR-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	27-APR-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	27-APR-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	27-APR-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	27-APR-19
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	27-APR-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4616186								
WG3035949-1 MB		**LF**						
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	27-APR-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	27-APR-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	27-APR-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	27-APR-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	27-APR-19
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	27-APR-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	27-APR-19
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	27-APR-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	27-APR-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	27-APR-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	27-APR-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	27-APR-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	27-APR-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	27-APR-19
WG3035949-4 MS		**L2263352-1**						
Aluminum (Al)-Dissolved			102.1		%		70-130	27-APR-19
Antimony (Sb)-Dissolved			101.8		%		70-130	27-APR-19
Arsenic (As)-Dissolved			105.1		%		70-130	27-APR-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	27-APR-19
Bismuth (Bi)-Dissolved			94.7		%		70-130	27-APR-19
Boron (B)-Dissolved			98.8		%		70-130	27-APR-19
Cadmium (Cd)-Dissolved			107.2		%		70-130	27-APR-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	27-APR-19
Chromium (Cr)-Dissolved			100.1		%		70-130	27-APR-19
Cobalt (Co)-Dissolved			95.8		%		70-130	27-APR-19
Copper (Cu)-Dissolved			96.3		%		70-130	27-APR-19
Iron (Fe)-Dissolved			95.8		%		70-130	27-APR-19
Lead (Pb)-Dissolved			98.2		%		70-130	27-APR-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	27-APR-19
Manganese (Mn)-Dissolved			96.4		%		70-130	27-APR-19
Molybdenum (Mo)-Dissolved			100.4		%		70-130	27-APR-19
Nickel (Ni)-Dissolved			96.3		%		70-130	27-APR-19
Potassium (K)-Dissolved			94.7		%		70-130	27-APR-19
Selenium (Se)-Dissolved			114.5		%		70-130	27-APR-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4616186								
WG3035949-4 MS		**L2263352-1**						
Silicon (Si)-Dissolved			96.4		%		70-130	27-APR-19
Silver (Ag)-Dissolved			104.9		%		70-130	27-APR-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	27-APR-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	27-APR-19
Thallium (Tl)-Dissolved			97.0		%		70-130	27-APR-19
Tin (Sn)-Dissolved			102.4		%		70-130	27-APR-19
Titanium (Ti)-Dissolved			96.8		%		70-130	27-APR-19
Uranium (U)-Dissolved			104.0		%		70-130	27-APR-19
Vanadium (V)-Dissolved			99.9		%		70-130	27-APR-19
Zinc (Zn)-Dissolved			100.1		%		70-130	27-APR-19
Batch R4617146								
WG3035949-4 MS		**L2263352-1**						
Lithium (Li)-Dissolved			89.9		%		70-130	29-APR-19
Batch R4618350								
WG3037613-2 LCS								
Aluminum (Al)-Dissolved			103.6		%		80-120	30-APR-19
Antimony (Sb)-Dissolved			100.3		%		80-120	30-APR-19
Arsenic (As)-Dissolved			100.1		%		80-120	30-APR-19
Barium (Ba)-Dissolved			107.0		%		80-120	30-APR-19
Bismuth (Bi)-Dissolved			98.0		%		80-120	30-APR-19
Boron (B)-Dissolved			105.9		%		80-120	30-APR-19
Cadmium (Cd)-Dissolved			104.0		%		80-120	30-APR-19
Calcium (Ca)-Dissolved			106.4		%		80-120	30-APR-19
Chromium (Cr)-Dissolved			100.5		%		80-120	30-APR-19
Cobalt (Co)-Dissolved			99.1		%		80-120	30-APR-19
Copper (Cu)-Dissolved			98.0		%		80-120	30-APR-19
Iron (Fe)-Dissolved			94.7		%		80-120	30-APR-19
Lead (Pb)-Dissolved			101.9		%		80-120	30-APR-19
Lithium (Li)-Dissolved			102.4		%		80-120	30-APR-19
Magnesium (Mg)-Dissolved			103.3		%		80-120	30-APR-19
Manganese (Mn)-Dissolved			101.3		%		80-120	30-APR-19
Molybdenum (Mo)-Dissolved			107.4		%		80-120	30-APR-19
Nickel (Ni)-Dissolved			99.6		%		80-120	30-APR-19
Potassium (K)-Dissolved			98.0		%		80-120	30-APR-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4618350								
WG3037613-2 LCS								
Selenium (Se)-Dissolved			104.7		%		80-120	30-APR-19
Silicon (Si)-Dissolved			103.0		%		60-140	30-APR-19
Silver (Ag)-Dissolved			101.7		%		80-120	30-APR-19
Sodium (Na)-Dissolved			101.6		%		80-120	30-APR-19
Strontium (Sr)-Dissolved			110.0		%		80-120	30-APR-19
Thallium (Tl)-Dissolved			99.6		%		80-120	30-APR-19
Tin (Sn)-Dissolved			98.6		%		80-120	30-APR-19
Titanium (Ti)-Dissolved			95.7		%		80-120	30-APR-19
Uranium (U)-Dissolved			103.0		%		80-120	30-APR-19
Vanadium (V)-Dissolved			101.1		%		80-120	30-APR-19
Zinc (Zn)-Dissolved			103.2		%		80-120	30-APR-19
WG3037613-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	30-APR-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	30-APR-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	30-APR-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	30-APR-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	30-APR-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	30-APR-19
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	30-APR-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	30-APR-19
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	30-APR-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	30-APR-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	30-APR-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	30-APR-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	30-APR-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	30-APR-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	30-APR-19
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	30-APR-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	30-APR-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	30-APR-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	30-APR-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	30-APR-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	30-APR-19
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	30-APR-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4618350								
WG3037613-1 MB		**LF**						
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	30-APR-19
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	30-APR-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	30-APR-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	30-APR-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	30-APR-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	30-APR-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	30-APR-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	30-APR-19
MET-T-CCMS-VA	**Water**							
Batch R4615906								
WG3036124-3 DUP		**L2263352-1**						
Aluminum (Al)-Total		0.237	0.238		mg/L	0.5	20	27-APR-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	27-APR-19
Arsenic (As)-Total		0.00054	0.00049		mg/L	8.5	20	27-APR-19
Barium (Ba)-Total		0.0537	0.0511		mg/L	4.9	20	27-APR-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	27-APR-19
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	27-APR-19
Cadmium (Cd)-Total		0.0000114	0.0000178	J	mg/L	0.000006	0.00001	27-APR-19
Calcium (Ca)-Total		42.6	41.3		mg/L	3.0	20	27-APR-19
Chromium (Cr)-Total		0.00042	0.00043		mg/L	2.8	20	27-APR-19
Cobalt (Co)-Total		0.00015	0.00016		mg/L	4.6	20	27-APR-19
Copper (Cu)-Total		0.00236	0.00167	J	mg/L	0.00069	0.001	27-APR-19
Iron (Fe)-Total		0.232	0.236		mg/L	2.1	20	27-APR-19
Lead (Pb)-Total		0.000325	0.000310		mg/L	4.8	20	27-APR-19
Lithium (Li)-Total		0.0029	0.0028		mg/L	2.3	20	27-APR-19
Magnesium (Mg)-Total		13.0	12.5		mg/L	4.5	20	27-APR-19
Manganese (Mn)-Total		0.0165	0.0162		mg/L	2.2	20	27-APR-19
Molybdenum (Mo)-Total		0.000690	0.000626		mg/L	9.7	20	27-APR-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	27-APR-19
Potassium (K)-Total		0.703	0.690		mg/L	1.9	20	27-APR-19
Selenium (Se)-Total		0.00113	0.00112		mg/L	1.3	20	27-APR-19
Silicon (Si)-Total		2.75	2.65		mg/L	3.8	20	27-APR-19
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	27-APR-19
Sodium (Na)-Total		4.86	4.85		mg/L	0.1	20	27-APR-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4615906								
WG3036124-3 DUP		**L2263352-1**						
Strontium (Sr)-Total		0.145	0.141		mg/L	2.8	20	27-APR-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	27-APR-19
Tin (Sn)-Total		0.00016	<0.00010	RPD-NA	mg/L	N/A	20	27-APR-19
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	27-APR-19
Uranium (U)-Total		0.000746	0.000719		mg/L	3.8	20	27-APR-19
Vanadium (V)-Total		0.00059	0.00063		mg/L	6.1	20	27-APR-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	27-APR-19
WG3036124-2 LCS								
Aluminum (Al)-Total			102.1		%		80-120	27-APR-19
Antimony (Sb)-Total			103.2		%		80-120	27-APR-19
Arsenic (As)-Total			100.3		%		80-120	27-APR-19
Barium (Ba)-Total			95.8		%		80-120	27-APR-19
Bismuth (Bi)-Total			97.9		%		80-120	27-APR-19
Boron (B)-Total			95.1		%		80-120	27-APR-19
Cadmium (Cd)-Total			99.8		%		80-120	27-APR-19
Calcium (Ca)-Total			96.0		%		80-120	27-APR-19
Chromium (Cr)-Total			101.2		%		80-120	27-APR-19
Cobalt (Co)-Total			100.7		%		80-120	27-APR-19
Copper (Cu)-Total			101.8		%		80-120	27-APR-19
Iron (Fe)-Total			96.3		%		80-120	27-APR-19
Lead (Pb)-Total			101.4		%		80-120	27-APR-19
Lithium (Li)-Total			102.5		%		80-120	27-APR-19
Magnesium (Mg)-Total			110.4		%		80-120	27-APR-19
Manganese (Mn)-Total			103.7		%		80-120	27-APR-19
Molybdenum (Mo)-Total			97.5		%		80-120	27-APR-19
Nickel (Ni)-Total			99.7		%		80-120	27-APR-19
Potassium (K)-Total			104.9		%		80-120	27-APR-19
Selenium (Se)-Total			97.2		%		80-120	27-APR-19
Silicon (Si)-Total			99.5		%		80-120	27-APR-19
Silver (Ag)-Total			98.9		%		80-120	27-APR-19
Sodium (Na)-Total			101.7		%		80-120	27-APR-19
Strontium (Sr)-Total			95.6		%		80-120	27-APR-19
Thallium (Tl)-Total			101.2		%		80-120	27-APR-19
Tin (Sn)-Total			96.8		%		80-120	27-APR-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4615906								
WG3036124-2 LCS								
Titanium (Ti)-Total			96.2		%		80-120	27-APR-19
Uranium (U)-Total			97.1		%		80-120	27-APR-19
Vanadium (V)-Total			102.7		%		80-120	27-APR-19
Zinc (Zn)-Total			99.3		%		80-120	27-APR-19
WG3036124-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	27-APR-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	27-APR-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	27-APR-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	27-APR-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	27-APR-19
Boron (B)-Total			<0.010		mg/L		0.01	27-APR-19
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	27-APR-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	27-APR-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	27-APR-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	27-APR-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	27-APR-19
Iron (Fe)-Total			<0.010		mg/L		0.01	27-APR-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	27-APR-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	27-APR-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	27-APR-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	27-APR-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	27-APR-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	27-APR-19
Potassium (K)-Total			<0.050		mg/L		0.05	27-APR-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	27-APR-19
Silicon (Si)-Total			<0.10		mg/L		0.1	27-APR-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	27-APR-19
Sodium (Na)-Total			<0.050		mg/L		0.05	27-APR-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	27-APR-19
Thallium (Tl)-Total			0.000014	B	mg/L		0.00001	27-APR-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	27-APR-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	27-APR-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	27-APR-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	27-APR-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4615906								
WG3036124-1 MB								
Zinc (Zn)-Total			<0.0030		mg/L		0.003	27-APR-19
WG3036124-4 MS		**L2263352-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	27-APR-19
Antimony (Sb)-Total			102.2		%		70-130	27-APR-19
Arsenic (As)-Total			102.7		%		70-130	27-APR-19
Barium (Ba)-Total			N/A	MS-B	%		-	27-APR-19
Bismuth (Bi)-Total			102.7		%		70-130	27-APR-19
Boron (B)-Total			100.9		%		70-130	27-APR-19
Cadmium (Cd)-Total			103.0		%		70-130	27-APR-19
Calcium (Ca)-Total			N/A	MS-B	%		-	27-APR-19
Chromium (Cr)-Total			100.3		%		70-130	27-APR-19
Cobalt (Co)-Total			100.3		%		70-130	27-APR-19
Copper (Cu)-Total			100.2		%		70-130	27-APR-19
Iron (Fe)-Total			101.8		%		70-130	27-APR-19
Lead (Pb)-Total			101.6		%		70-130	27-APR-19
Lithium (Li)-Total			107.6		%		70-130	27-APR-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	27-APR-19
Manganese (Mn)-Total			99.0		%		70-130	27-APR-19
Molybdenum (Mo)-Total			100.8		%		70-130	27-APR-19
Nickel (Ni)-Total			98.9		%		70-130	27-APR-19
Potassium (K)-Total			104.0		%		70-130	27-APR-19
Selenium (Se)-Total			100.2		%		70-130	27-APR-19
Silicon (Si)-Total			96.8		%		70-130	27-APR-19
Silver (Ag)-Total			104.3		%		70-130	27-APR-19
Sodium (Na)-Total			N/A	MS-B	%		-	27-APR-19
Strontium (Sr)-Total			N/A	MS-B	%		-	27-APR-19
Thallium (Tl)-Total			99.9		%		70-130	27-APR-19
Tin (Sn)-Total			99.9		%		70-130	27-APR-19
Titanium (Ti)-Total			97.2		%		70-130	27-APR-19
Uranium (U)-Total			96.8		%		70-130	27-APR-19
Vanadium (V)-Total			104.2		%		70-130	27-APR-19
Zinc (Zn)-Total			99.7		%		70-130	27-APR-19
NH3-F-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R4619879								
WG3038607-3 DUP		**L2263352-1**						
Ammonia, Total (as N)		0.0077	0.0075		mg/L	3.2	20	01-MAY-19
WG3038607-2 LCS								
Ammonia, Total (as N)			97.0		%		85-115	01-MAY-19
WG3038607-1 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	01-MAY-19
WG3038607-4 MS		**L2263352-3**						
Ammonia, Total (as N)			100.1		%		75-125	01-MAY-19
NO2-L-IC-N-VA	**Water**							
Batch R4614630								
WG3036010-3 DUP		**L2263352-3**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-APR-19
WG3036010-2 LCS								
Nitrite (as N)			103.2		%		90-110	26-APR-19
WG3036010-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-APR-19
WG3036010-4 MS		**L2263352-1**						
Nitrite (as N)			99.7		%		75-125	26-APR-19
NO3-L-IC-N-VA	**Water**							
Batch R4614630								
WG3036010-3 DUP		**L2263352-3**						
Nitrate (as N)		0.255	0.253		mg/L	0.7	20	26-APR-19
WG3036010-2 LCS								
Nitrate (as N)			103.3		%		90-110	26-APR-19
WG3036010-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-APR-19
WG3036010-4 MS		**L2263352-1**						
Nitrate (as N)			101.3		%		75-125	26-APR-19
ORP-VA	**Water**							
Batch R4617982								
WG3037582-1 CRM		**VA-ORP**						
ORP			221		mV		210-230	30-APR-19
WG3037582-2 DUP		**L2263352-9**						
ORP		286	284	J	mV	2.9	15	30-APR-19
P-T-PRES-COL-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-PRES-COL-VA	**Water**							
Batch R4619114								
WG3038130-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			100.0		%		80-120	01-MAY-19
WG3038254-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			103.1		%		80-120	01-MAY-19
WG3038254-3 DUP		**L2263352-9**						
Phosphorus (P)-Total		0.0112	0.0107		mg/L	5.2	20	01-MAY-19
WG3038130-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	01-MAY-19
WG3038254-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	01-MAY-19
WG3038254-4 MS		**L2263352-11**						
Phosphorus (P)-Total			99.4		%		70-130	01-MAY-19
Batch R4621226								
WG3039681-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			99.9		%		80-120	02-MAY-19
WG3039681-3 DUP		**L2263352-17**						
Phosphorus (P)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	02-MAY-19
WG3039681-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	02-MAY-19
PH-PCT-VA	**Water**							
Batch R4615455								
WG3036014-2 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	26-APR-19
WG3036014-5 DUP		**L2263352-1**						
pH		8.30	8.31	J	pH	0.01	0.3	26-APR-19
PO4-DO-COL-VA	**Water**							
Batch R4614411								
WG3035816-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			105.6		%		80-120	26-APR-19
WG3035900-2 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			105.6		%		80-120	26-APR-19
WG3035816-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	26-APR-19
WG3035900-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	26-APR-19
SO4-IC-N-VA	**Water**							

Quality Control Report

Workorder: L2263352 Report Date: 29-MAY-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-VA	**Water**							
Batch R4614630								
WG3036010-3 DUP		**L2263352-3**						
Sulfate (SO4)		35.5	35.5		mg/L	0.3	20	26-APR-19
WG3036010-2 LCS								
Sulfate (SO4)			103.0		%		90-110	26-APR-19
WG3036010-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	26-APR-19
WG3036010-4 MS		**L2263352-1**						
Sulfate (SO4)			96.9		%		75-125	26-APR-19
TDS-LOW-VA	**Water**							
Batch R4620116								
WG3038569-3 DUP		**L2263352-1**						
Total Dissolved Solids		180	179		mg/L	0.6	20	01-MAY-19
WG3038569-2 LCS								
Total Dissolved Solids			99.2		%		85-115	01-MAY-19
WG3038569-1 MB								
Total Dissolved Solids			<3.0		mg/L		3	01-MAY-19
TKN-F-VA	**Water**							
Batch R4619873								
WG3038111-10 LCS								
Total Kjeldahl Nitrogen			104.7		%		75-125	01-MAY-19
WG3038111-6 LCS								
Total Kjeldahl Nitrogen			106.6		%		75-125	01-MAY-19
WG3038111-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	01-MAY-19
WG3038111-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	01-MAY-19
TSS-LOW-VA	**Water**							
Batch R4619587								
WG3038075-2 LCS								
Total Suspended Solids			97.2		%		85-115	30-APR-19
WG3038075-1 MB								
Total Suspended Solids			<1.0		mg/L		1	30-APR-19
Batch R4620066								
WG3039270-2 LCS								
Total Suspended Solids			100.8		%		85-115	01-MAY-19
WG3039270-1 MB								
Total Suspended Solids			<1.0		mg/L		1	01-MAY-19
TURBIDITY-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-VA	**Water**							
Batch R4614502								
WG3036284-2 CRM		**VA-FORM-40**						
Turbidity			107.9		%		85-115	27-APR-19
WG3036284-1 MB								
Turbidity			<0.10		NTU		0.1	27-APR-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation reduction potential by Elect.							
	1	25-APR-19 11:40	30-APR-19 05:30	0.25	114	hours	EHTR-FM
	3	25-APR-19 11:35	30-APR-19 05:30	0.25	114	hours	EHTR-FM
	5	25-APR-19 11:30	30-APR-19 05:30	0.25	114	hours	EHTR-FM
	7	25-APR-19 11:20	30-APR-19 05:30	0.25	114	hours	EHTR-FM
	9	25-APR-19 11:15	30-APR-19 05:30	0.25	114	hours	EHTR-FM
	11	25-APR-19 11:10	30-APR-19 05:30	0.25	114	hours	EHTR-FM
	13	25-APR-19 11:30	30-APR-19 05:30	0.25	114	hours	EHTR-FM
	15	25-APR-19 11:45	30-APR-19 05:30	0.25	114	hours	EHTR-FM
	17	25-APR-19	30-APR-19 05:30	0.25	114	hours	EHTR-FM
	18	25-APR-19 11:35	30-APR-19 05:30	0.25	114	hours	EHTR-FM
	19	24-APR-19 15:55	30-APR-19 05:30	0.25	134	hours	EHTR-FM
	21	24-APR-19 15:40	30-APR-19 05:30	0.25	134	hours	EHTR-FM
pH by Meter (Automated)							
	1	25-APR-19 11:40	26-APR-19 10:29	0.25	23	hours	EHTR-FM
	3	25-APR-19 11:35	26-APR-19 10:29	0.25	23	hours	EHTR-FM
	5	25-APR-19 11:30	26-APR-19 10:29	0.25	23	hours	EHTR-FM
	7	25-APR-19 11:20	26-APR-19 10:29	0.25	23	hours	EHTR-FM
	9	25-APR-19 11:15	26-APR-19 10:29	0.25	23	hours	EHTR-FM
	11	25-APR-19 11:10	26-APR-19 10:29	0.25	23	hours	EHTR-FM
	13	25-APR-19 11:30	26-APR-19 10:29	0.25	23	hours	EHTR-FM
	15	25-APR-19 11:45	26-APR-19 10:29	0.25	23	hours	EHTR-FM
	17	25-APR-19	26-APR-19 10:29	0.25	23	hours	EHTR-FM
	18	25-APR-19 11:35	26-APR-19 10:29	0.25	23	hours	EHTR-FM
	19	24-APR-19 15:55	26-APR-19 10:29	0.25	42	hours	EHTR-FM
	21	24-APR-19 15:40	26-APR-19 10:29	0.25	43	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2263352 were received on 25-APR-19 20:35.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

Page 1 of 3

COC ID: Regional Effects Program | TURNAROUND TIME: Regular

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Effects Program/Koocanusa			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Can Dang			Email 1:	cait.good@teck.com	X	X	X
Email	cait.good@teck.com			Email	can.dang@ALSGlobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	8081 Lougheed Hwy			Email 3:	colleen.mooney@teck.com	X	X	X
					Suite 100			Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	hcurrier@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-425-8202			Phone Number	604-253-4188			PO number	VPO00616180			

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F, Field, L, Lab, FL, Field & Lab, N, None)

Sample ID	Sample Location (sys loc code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont	FIELD									
								N	N	N	N	N	N	N			
								PRESERVES: NONE	NONE	H2SO4	NONE	NONE	HNO3	NONE			
								ANALYSIS: HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA			
RG_T4U1_WS_20190425-1140	RG_T4	W	N	Apr 25/19	1140	G	7	X	X	X	X	X	X	X			
RG_T4U1_WS_20190425-1140-FB-HG	RG_T4	W	N	Apr 25/19	1140	G	1	X									
RG_T4U2_WS_20190425-1135	RG_T4	W	N	Apr 25/19	1135	G	7	X	X	X	X	X	X	X			
RG_T4U2_WS_20190425-1135-FB-HG	RG_T4	W	N	Apr 25/19	1135	G	1	X									
RG_T4U3_WS_20190425-1130	RG_T4	W	N	Apr 25/19	1130	G	7	X	X	X	X	X	X	X			
RG_T4U3_WS_20190425-1130FB-HG	RG_T4	W	N	Apr 25/19	1130	G	1	X									
RG_GCU1_WS_20190425-1120	RG_GC	W	N	Apr 25/19	1120	G	7	X	X	X	X	X	X	X			
RG_GCU1_WS_20190425-1120FB-HG	RG_GC	W	N	Apr 25/19	1120	G	1	X									
RG_GCU2_WS_20190425-1115	RG_GC	W	N	Apr 25/19	1115	G	7	X	X	X	X	X	X	X			
RG_GCU2_WS_20190425_1115-FB-HG	RG_GC	W	N	Apr 25/19	1115	G	1	X									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
VPO00616180			HA GC (+2)	4/25 8135P

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Heidi Currier	Mobile #	905-691-6183
Sampler's Signature		Date/Time	Apr 25/19

L2263352-COFC

Teck

COC ID: **Regional Effects Program** | TURNAROUND TIME: Regular

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Effects Program/Koocanusa			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Can Dang			Email 1:	cait.good@teck.com	X	X	X
Email	cait.good@teck.com			Email	can.dang@ALSGlobal.com			Email 2:	carla.fraser@teck.com	X	X	X
Address	421 Pine Avenue			Address	8081 Lougheed Hwy			Email 3:	colleen.mooney@teck.com	X	X	X
					Suite 100			Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	hcurrier@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 1W9	Country	Canada					
Phone Number	250-425-8202			Phone Number	604-253-4188			PO number	VPO00616180			

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: No...)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
								N	NONE							
								N	NONE			H2SO4			HNO3	
								N	NONE							
RG_SCU2_WS_20190424-1540	RG_SC	W	N	Apr 24/19	1540	G	7	N	NONE	X	X	X	X	X	X	X
RG_SCU2_WS_20190424-1540-FB-HG	RG_SC	W	N	Apr 24/19	1540	G	1	N	NONE	X						

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
VPO00616180				

SERVICE REQUEST (rush - subject to availability)					
Regular (default) X	Sampler's Name	Heidi Cumer	Mobile #	905-691-6183
Priority (2-3 business days) - 50% surcharge				
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	Apr 25/19
For Emergency <1 Day, ASAP or Weekend - Contact ALS				

L2263352-COFC

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 13-JUN-19
Report Date: 23-JUL-19 09:17 (MT)
Version: FINAL REV. 2

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2291233

Project P.O. #: VPO00616180
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: Regional Effects
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2291233-1	L2291233-2	L2291233-3	L2291233-4	L2291233-5
		Description	WS	WS	WS	WS	WS
		Sampled Date	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19
		Sampled Time	13:30	13:15	12:10	12:00	10:00
		Client ID	RG_SC_U1_WS_20190612	RG_SC_U2_WS_20190612	RG_ER_U1_WS_20190612	RG_ER_U2_WS_20190612	RG_GC_U1_WS_20190612
Grouping	**Analyte**						
WATER							
Physical Tests	Conductivity (@ 25C) (uS/cm)		214	213	201	205	206
	Hardness (as CaCO3) (mg/L)		106	108	103	106	108
	pH (pH)		8.21	8.16	8.15	8.20	8.19
	ORP (mV)		456	430	393	438	403
	Total Suspended Solids (mg/L)		10.4	11.0	6.8	9.3	2.9
	Total Dissolved Solids (mg/L)		125 DLHC	116 DLHC	122 DLHC	104 DLHC	117 DLHC
	Turbidity (NTU)		5.94	4.34	5.22	7.69	3.49
Anions and Nutrients	Acidity (as CaCO3) (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)		90.9	90.1	85.6	82.7	88.5
	Alkalinity, Carbonate (as CaCO3) (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)		90.9	90.1	85.6	82.7	88.5
	Ammonia as N (mg/L)		0.0100	0.0054	0.0056	0.0071	0.0193
	Bromide (Br) (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)		1.94	1.96	1.68	1.79	1.56
	Fluoride (F) (mg/L)		0.069	0.071	0.067	0.068	0.072
	Ion Balance (%)		97.6	99.2	101	106	103
	Nitrate (as N) (mg/L)		0.128	0.126	0.148	0.137	0.208
	Nitrite (as N) (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)		0.051	0.079	0.108	<0.050	0.113
	Orthophosphate-Dissolved (as P) (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)		0.0053	0.0050	0.0026	0.0062	0.0040
	Sulfate (SO4) (mg/L)		19.8	19.9	17.9	18.7	17.3
	Anion Sum (meq/L)		2.30	2.28	2.14	2.11	2.19
	Cation Sum (meq/L)		2.24	2.26	2.16	2.23	2.26
	Cation - Anion Balance (%)		-1.2	-0.4	0.5	2.9	1.5
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		1.00	1.10	0.93	0.89	1.45
	Total Organic Carbon (mg/L)		0.95	1.05	1.06	1.21	1.51
Total Metals	Aluminum (Al)-Total (mg/L)		0.0803	0.0663	0.0529	0.0857	0.0456
	Antimony (Sb)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)		0.00036	0.00035	0.00035	0.00032	0.00035
	Barium (Ba)-Total (mg/L)		0.0265	0.0266	0.0244	0.0253	0.0346
	Beryllium (Be)-Total (ug/L)		<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Total (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (ug/L)		<0.0050	0.0067	<0.0050	0.0066	0.0056

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2291233-6	L2291233-7	L2291233-8	L2291233-9	L2291233-11
	Description	WS	WS	WS	WS	WS
	Sampled Date	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19
	Sampled Time	09:40	09:30	14:15	14:00	11:20
	Client ID	RG_GC_U2_WS_2 0190612	RG_GC_U3_WS_2 0190612	RG_TN_U1_WS_2 0190612	RG_TN_U2_WS_2 0190612	RG_T4_U1_WS_2 0190612
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	203	209	210	213	210
	Hardness (as CaCO3) (mg/L)	104	107	108	111	109
	pH (pH)	8.12	8.16	8.15	8.17	8.20
	ORP (mV)	394	448	393	432	420
	Total Suspended Solids (mg/L)	3.8	17.1	10.4	10.9	2.6
	Total Dissolved Solids (mg/L)	114 DLHC	118 DLHC	123 DLHC	119 DLHC	123 DLHC
	Turbidity (NTU)	4.72	15.6	8.49	9.04	3.49
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	88.4	90.2	89.1	88.8	90.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	88.4	90.2	89.1	88.8	90.0
	Ammonia as N (mg/L)	0.0234	0.0101	0.0070	0.0111	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	1.45	1.39	1.96	1.94	1.69
	Fluoride (F) (mg/L)	0.071	0.077	0.070	0.069	0.076
	Ion Balance (%)	100	98.5	100	103	101
	Nitrate (as N) (mg/L)	0.207	0.269	0.130	0.127	0.301
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0012
	Total Kjeldahl Nitrogen (mg/L)	0.077	0.071	<0.050	0.093	0.076
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0039	0.0089	0.0055	0.0050	0.0065
	Sulfate (SO4) (mg/L)	16.1	18.6	19.8	19.8	18.2
	Anion Sum (meq/L)	2.16	2.25	2.26	2.25	2.25
	Cation Sum (meq/L)	2.17	2.22	2.27	2.33	2.28
	Cation - Anion Balance (%)	0.2	-0.7	0.1	1.7	0.5
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.24	1.09	0.90	0.86	1.61
	Total Organic Carbon (mg/L)	1.48	1.26	1.00	1.04	1.52
Total Metals	Aluminum (Al)-Total (mg/L)	0.0560	0.175	0.0752	0.0830	0.0385
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00033	0.00040	0.00032	0.00034	0.00039
	Barium (Ba)-Total (mg/L)	0.0356	0.0333	0.0271	0.0278	0.0352
	Beryllium (Be)-Total (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (ug/L)	<0.0050	0.0085	<0.0050	0.0053	0.0051

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2291233-12 WS 12-JUN-19 11:10 RG_T4_U2_WS_20190612	L2291233-13 WS 12-JUN-19 11:00 RG_T4_U3_WS_20190612	L2291233-14 WS 12-JUN-19 10:00 RG_DUP_WS_20190612	L2291233-15 WS 12-JUN-19 12:00 RG_BLANK_WS_20190612	L2291233-16 WS 12-JUN-19 12:00 RG_TRIP_WS_20190612
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	205	215	208	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	104	103	97.6	<0.50	<0.50
	pH (pH)	8.17	8.18	8.20	5.59	5.54
	ORP (mV)	412	439	420	451	451
	Total Suspended Solids (mg/L)	8.0	15.0	2.0	<1.0	<3.0 HTD
	Total Dissolved Solids (mg/L)	119 DLHC	125 DLHC	126 DLHC	<10	<10
	Turbidity (NTU)	10.4	13.4	3.13	0.12 RRV	<0.10
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	1.4	<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	85.3	92.4	88.9	<1.0	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	85.3	92.4	88.9	<1.0	<1.0
	Ammonia as N (mg/L)	0.0094	0.0153	0.0066	<0.0050	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	1.40	1.46	1.58	<0.50	<0.50
	Fluoride (F) (mg/L)	0.066	0.075	0.073	<0.020	<0.020
	Ion Balance (%)	104	93.2	93.3	0.0	0.0
	Nitrate (as N) (mg/L)	0.177	0.251	0.200	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	0.0011	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.133	0.280	0.121	<0.050	<0.050
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0060	0.0081	0.0055	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	15.8	18.3	17.1	<0.30	<0.30
	Anion Sum (meq/L)	2.09	2.29	2.20	<0.10	<0.10
	Cation Sum (meq/L)	2.18	2.13	2.05	<0.10	<0.10
	Cation - Anion Balance (%)	2.1	-3.5	-3.5	0.0	0.0
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.97	0.72	0.93	<0.50	
	Total Organic Carbon (mg/L)	1.18	0.83	1.55	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0970	0.116	0.0355	<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00035	0.00037	0.00035	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	0.0294	0.0318	0.0346	<0.00010	<0.00010
	Beryllium (Be)-Total (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (ug/L)	0.0056	0.0069	0.0050	<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2291233-1	L2291233-2	L2291233-3	L2291233-4	L2291233-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19
	Sampled Time	13:30	13:15	12:10	12:00	10:00
	Client ID	RG_SC_U1_WS_20190612	RG_SC_U2_WS_20190612	RG_ER_U1_WS_20190612	RG_ER_U2_WS_20190612	RG_GC_U1_WS_20190612
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	30.0	30.2	28.6	29.5	28.1
	Chromium (Cr)-Total (mg/L)	0.00017	0.00036	0.00014	0.00017	0.00013
	Cobalt (Co)-Total (ug/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.109	0.109	0.058	0.098	0.036
	Lead (Pb)-Total (mg/L)	0.000185	0.000192	0.000147	0.000175	0.000068
	Lithium (Li)-Total (mg/L)	0.0010	<0.0010	<0.0010	<0.0010	0.0013
	Magnesium (Mg)-Total (mg/L)	8.49	8.06	7.75	7.69	7.83
	Manganese (Mn)-Total (mg/L)	0.00788	0.00785	0.00669	0.00793	0.00443
	Mercury (Hg)-Total (ug/L)	0.00055	0.00055	0.00055	0.00056	0.00052
	Molybdenum (Mo)-Total (mg/L)	0.000548	0.000532	0.000539	0.000509	0.000522
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Total (mg/L)	0.424	0.411	0.390	0.400	0.435
	Selenium (Se)-Total (ug/L)	0.130	0.120	0.200	0.154	0.624
	Silicon (Si)-Total (mg/L)	2.27	2.34	2.13	2.18	2.22
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	2.57	2.36	2.14	2.25	2.11
	Strontium (Sr)-Total (mg/L)	0.126	0.128	0.116	0.117	0.103
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.000627	0.000629	0.000593	0.000596	0.000581
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0092	0.0091	0.0104	0.0104	0.0090
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00027	0.00030	0.00028	0.00027	0.00033
	Barium (Ba)-Dissolved (mg/L)	0.0249	0.0253	0.0238	0.0243	0.0336
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Calcium (Ca)-Dissolved (mg/L)	29.3	29.5	28.7	29.7	29.7
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2291233-6	L2291233-7	L2291233-8	L2291233-9	L2291233-11
	Description	WS	WS	WS	WS	WS
	Sampled Date	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19
	Sampled Time	09:40	09:30	14:15	14:00	11:20
	Client ID	RG_GC_U2_WS_2 0190612	RG_GC_U3_WS_2 0190612	RG_TN_U1_WS_2 0190612	RG_TN_U2_WS_2 0190612	RG_T4_U1_WS_2 0190612
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	28.3	30.1	30.2	30.7	30.0
	Chromium (Cr)-Total (mg/L)	0.00015	0.00030	0.00018	0.00026	0.00011
	Cobalt (Co)-Total (ug/L)	<0.10	0.15	<0.10	<0.10	<0.10
	Copper (Cu)-Total (mg/L)	<0.00050	0.00051	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.051	0.201	0.104	0.115	0.031
	Lead (Pb)-Total (mg/L)	0.000100	0.000297	0.000209	0.000209	0.000066
	Lithium (Li)-Total (mg/L)	0.0012	0.0015	<0.0010	0.0010	0.0014
	Magnesium (Mg)-Total (mg/L)	7.60	8.15	8.13	8.47	8.33
	Manganese (Mn)-Total (mg/L)	0.00524	0.0133	0.00818	0.00867	0.00376
	Mercury (Hg)-Total (ug/L)	0.00061	0.00065	<0.00050	0.00055	<0.00050
	Molybdenum (Mo)-Total (mg/L)	0.000481	0.000497	0.000533	0.000558	0.000556
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Total (mg/L)	0.447	0.424	0.410	0.428	0.445
	Selenium (Se)-Total (ug/L)	0.498	0.751	0.105	0.083	0.782
	Silicon (Si)-Total (mg/L)	2.60	2.45	2.24	2.34	2.19
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	2.00	1.77	2.48	2.53	2.33
	Strontium (Sr)-Total (mg/L)	0.0988	0.112	0.124	0.123	0.113
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.000574	0.000604	0.000660	0.000630	0.000602
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0080	0.0107	0.0092	0.0091	0.0098
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00032	0.00027	0.00028	0.00030	0.00032
	Barium (Ba)-Dissolved (mg/L)	0.0355	0.0300	0.0247	0.0245	0.0332
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Calcium (Ca)-Dissolved (mg/L)	28.8	29.7	29.7	30.7	30.3
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2291233-12	L2291233-13	L2291233-14	L2291233-15	L2291233-16
	Description	WS	WS	WS	WS	WS
	Sampled Date	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19
	Sampled Time	11:10	11:00	10:00	12:00	12:00
	Client ID	RG_T4_U2_WS_20190612	RG_T4_U3_WS_20190612	RG_DUP_WS_20190612	RG_BLANK_WS_20190612	RG_TRIP_WS_20190612
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	30.4	30.5	29.6	<0.050	<0.050
	Chromium (Cr)-Total (mg/L)	0.00022	0.00024	0.00011	<0.00010	<0.00010
	Cobalt (Co)-Total (ug/L)	<0.10	0.12	<0.10	<0.10	<0.10
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.101	0.158	0.029	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	0.000180	0.000259	0.000062	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.0012	0.0015	0.0014	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	7.72	8.32	8.01	<0.10	<0.10
	Manganese (Mn)-Total (mg/L)	0.00785	0.0119	0.00362	<0.00010	<0.00010
	Mercury (Hg)-Total (ug/L)	0.00064	0.00075	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)-Total (mg/L)	0.000549	0.000547	0.000502	<0.000050	<0.000050
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Total (mg/L)	0.412	0.416	0.428	<0.050	<0.050
	Selenium (Se)-Total (ug/L)	0.507	0.789	0.617	<0.050	<0.050
	Silicon (Si)-Total (mg/L)	2.29	2.34	2.26	<0.10	<0.10
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	2.03	1.94	2.24	<0.050	<0.050
	Strontium (Sr)-Total (mg/L)	0.114	0.120	0.106	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.000592	0.000610	0.000591	<0.000010	<0.000010
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB	LAB	
	Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0098	0.0102	0.0098	<0.0030	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.00030	0.00024	0.00030	<0.00010	
	Barium (Ba)-Dissolved (mg/L)	0.0275	0.0320	0.0351	<0.00010	
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Calcium (Ca)-Dissolved (mg/L)	29.0	28.4	26.8	<0.050	<0.050
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2291233-1 WS 12-JUN-19 13:30 RG_SC_U1_WS_20190612	L2291233-2 WS 12-JUN-19 13:15 RG_SC_U2_WS_20190612	L2291233-3 WS 12-JUN-19 12:10 RG_ER_U1_WS_20190612	L2291233-4 WS 12-JUN-19 12:00 RG_ER_U2_WS_20190612	L2291233-5 WS 12-JUN-19 10:00 RG_GC_U1_WS_20190612
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0013
	Magnesium (Mg)-Dissolved (mg/L)	8.08	8.27	7.70	7.79	8.19
	Manganese (Mn)-Dissolved (mg/L)	0.00128	0.00143	0.00224	0.00261	0.00011
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000529	0.000517	0.000518	0.000519	0.000491
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Dissolved (mg/L)	0.389	0.399	0.368	0.382	0.414
	Selenium (Se)-Dissolved (ug/L)	0.089	0.129	0.190	0.149	0.657
	Silicon (Si)-Dissolved (mg/L)	2.18	2.28	2.01	2.08	2.20
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.36	2.36	2.02	2.24	2.08
	Strontium (Sr)-Dissolved (mg/L)	0.118	0.117	0.111	0.117	0.106
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000610	0.000611	0.000578	0.000579	0.000590
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2291233-6	L2291233-7	L2291233-8	L2291233-9	L2291233-11
Description	WS	WS	WS	WS	WS
Sampled Date	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19
Sampled Time	09:40	09:30	14:15	14:00	11:20
Client ID	RG_GC_U2_WS_20190612	RG_GC_U3_WS_20190612	RG_TN_U1_WS_20190612	RG_TN_U2_WS_20190612	RG_T4_U1_WS_20190612
Grouping / **Analyte**					
WATER					
Dissolved Metals Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	0.0012	0.0014	<0.0010	<0.0010	0.0014
Magnesium (Mg)-Dissolved (mg/L)	7.67	7.91	8.13	8.35	8.01
Manganese (Mn)-Dissolved (mg/L)	0.00015	0.00051	0.00151	0.00157	0.00018
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000463	0.000540	0.000524	0.000544	0.000532
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium (K)-Dissolved (mg/L)	0.415	0.363	0.388	0.399	0.412
Selenium (Se)-Dissolved (ug/L)	0.599	0.829	0.099	0.114	0.769
Silicon (Si)-Dissolved (mg/L)	2.41	2.03	2.17	2.18	2.10
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	1.98	1.68	2.37	2.37	2.18
Strontium (Sr)-Dissolved (mg/L)	0.0950	0.108	0.116	0.119	0.106
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved (mg/L)	0.000564	0.000568	0.000614	0.000604	0.000582
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2291233-12	L2291233-13	L2291233-14	L2291233-15	L2291233-16
Description	WS	WS	WS	WS	WS
Sampled Date	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19	12-JUN-19
Sampled Time	11:10	11:00	10:00	12:00	12:00
Client ID	RG_T4_U2_WS_20190612	RG_T4_U3_WS_20190612	RG_DUP_WS_20190612	RG_BLANK_WS_20190612	RG_TRIP_WS_20190612
Grouping **Analyte**					
WATER					
Dissolved Metals Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium (Li)-Dissolved (mg/L)	0.0012	0.0014	0.0013	<0.0010	
Magnesium (Mg)-Dissolved (mg/L)	7.69	7.71	7.44	<0.10	<0.0050
Manganese (Mn)-Dissolved (mg/L)	0.00027	0.00121	0.00010	<0.00010	
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum (Mo)-Dissolved (mg/L)	0.000528	0.000575	0.000514	<0.000050	
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Potassium (K)-Dissolved (mg/L)	0.372	0.364	0.401	<0.050	<0.050
Selenium (Se)-Dissolved (ug/L)	0.506	0.736	0.667	<0.050	
Silicon (Si)-Dissolved (mg/L)	2.05	2.04	2.18	<0.050	
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Dissolved (mg/L)	1.94	1.69	1.99	<0.050	<0.050
Strontium (Sr)-Dissolved (mg/L)	0.105	0.111	0.101	<0.00020	
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Uranium (U)-Dissolved (mg/L)	0.000580	0.000524	0.000532	<0.000010	
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC/D-METAL/D-HG FILTERED AND PRESERVED AT THE LAB

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Copper (Cu)-Dissolved	B	L2291233-13, -14, -15
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2291233-1, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2291233-1, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2291233-1, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2291233-1, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2291233-1, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L2291233-16
Matrix Spike	Barium (Ba)-Total	MS-B	L2291233-1, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2291233-16
Matrix Spike	Calcium (Ca)-Total	MS-B	L2291233-1, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2291233-16
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2291233-1, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2291233-1, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2291233-1, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon

Reference Information

and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL Water Total Organic Carbon APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-CL Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

Reference Information

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

Regional Effects

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4677928								
WG3082902-11 LCS								
Acidity (as CaCO3)			103.3		%		85-115	19-JUN-19
WG3082902-14 LCS								
Acidity (as CaCO3)			103.0		%		85-115	19-JUN-19
WG3082902-10 MB								
Acidity (as CaCO3)			<1.0		mg/L		2	19-JUN-19
WG3082902-13 MB								
Acidity (as CaCO3)			<1.0		mg/L		2	19-JUN-19
ALK-MAN-CL	**Water**							
Batch R4677888								
WG3082781-11 LCS								
Alkalinity, Total (as CaCO3)			96.0		%		85-115	19-JUN-19
WG3082781-14 LCS								
Alkalinity, Total (as CaCO3)			96.7		%		85-115	19-JUN-19
WG3082781-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	19-JUN-19
WG3082781-13 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	19-JUN-19
BE-D-L-CCMS-VA	**Water**							
Batch R4671854								
WG3078791-3 DUP		**L2291233-14**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	17-JUN-19
WG3078791-2 LCS								
Beryllium (Be)-Dissolved			92.7		%		80-120	17-JUN-19
WG3078791-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	17-JUN-19
WG3078791-4 MS		**L2291233-15**						
Beryllium (Be)-Dissolved			96.7		%		70-130	17-JUN-19
Batch R4672960								
WG3079762-3 DUP		**L2291233-2**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3079762-2 LCS								
Beryllium (Be)-Dissolved			109.6		%		80-120	18-JUN-19
WG3079762-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	18-JUN-19
WG3079762-4 MS		**L2291233-1**						
Beryllium (Be)-Dissolved			106.4		%		70-130	18-JUN-19
BE-T-L-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BE-T-L-CCMS-VA	**Water**							
Batch R4672026								
WG3078683-3 DUP		**L2291233-1**						
Beryllium (Be)-Total		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	17-JUN-19
WG3078683-2 LCS								
Beryllium (Be)-Total			103.7		%		80-120	17-JUN-19
WG3078683-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	17-JUN-19
WG3078683-4 MS		**L2291233-2**						
Beryllium (Be)-Total			98.9		%		70-130	17-JUN-19
Batch R4672767								
WG3078717-2 LCS								
Beryllium (Be)-Total			104.6		%		80-120	18-JUN-19
WG3078717-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	18-JUN-19
BR-L-IC-N-CL	**Water**							
Batch R4672521								
WG3080454-7 DUP		**L2291233-15**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	14-JUN-19
WG3080454-2 LCS								
Bromide (Br)			108.5		%		85-115	14-JUN-19
WG3080454-6 LCS								
Bromide (Br)			108.1		%		85-115	14-JUN-19
WG3080454-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	14-JUN-19
WG3080454-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	14-JUN-19
WG3080454-8 MS		**L2291233-15**						
Bromide (Br)			110.8		%		75-125	14-JUN-19
C-DIS-ORG-LOW-CL	**Water**							
Batch R4673969								
WG3081710-7 DUP		**L2291233-14**						
Dissolved Organic Carbon		0.93	0.95		mg/L	2.3	20	18-JUN-19
WG3081710-2 LCS								
Dissolved Organic Carbon			93.8		%		80-120	18-JUN-19
WG3081710-6 LCS								
Dissolved Organic Carbon			85.6		%		80-120	18-JUN-19
WG3081710-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	18-JUN-19
WG3081710-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4673969								
WG3081710-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	18-JUN-19
WG3081710-8 MS		**L2291233-15**						
Dissolved Organic Carbon			84.1		%		70-130	18-JUN-19
C-TOT-ORG-LOW-CL	**Water**							
Batch R4673969								
WG3081710-7 DUP		**L2291233-14**						
Total Organic Carbon		1.55	1.56		mg/L	0.7	20	18-JUN-19
WG3081710-2 LCS								
Total Organic Carbon			91.8		%		80-120	18-JUN-19
WG3081710-6 LCS								
Total Organic Carbon			87.1		%		80-120	18-JUN-19
WG3081710-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	18-JUN-19
WG3081710-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	18-JUN-19
WG3081710-8 MS		**L2291233-15**						
Total Organic Carbon			90.4		%		70-130	18-JUN-19
CL-IC-N-CL	**Water**							
Batch R4672521								
WG3080454-7 DUP		**L2291233-15**						
Chloride (Cl)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	14-JUN-19
WG3080454-2 LCS								
Chloride (Cl)			109.8		%		90-110	14-JUN-19
WG3080454-6 LCS								
Chloride (Cl)			109.7		%		90-110	14-JUN-19
WG3080454-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	14-JUN-19
WG3080454-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	14-JUN-19
WG3080454-8 MS		**L2291233-15**						
Chloride (Cl)			109.1		%		75-125	14-JUN-19
EC-L-PCT-CL	**Water**							
Batch R4677888								
WG3082781-11 LCS								
Conductivity (@ 25C)			103.6		%		90-110	19-JUN-19
WG3082781-14 LCS								
Conductivity (@ 25C)			103.6		%		90-110	19-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-L-PCT-CL	**Water**							
Batch R4677888								
WG3082781-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	19-JUN-19
WG3082781-13 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	19-JUN-19
F-IC-N-CL	**Water**							
Batch R4672521								
WG3080454-7 DUP		**L2291233-15**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	14-JUN-19
WG3080454-2 LCS								
Fluoride (F)			108.8		%		90-110	14-JUN-19
WG3080454-6 LCS								
Fluoride (F)			107.5		%		90-110	14-JUN-19
WG3080454-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	14-JUN-19
WG3080454-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	14-JUN-19
WG3080454-8 MS		**L2291233-15**						
Fluoride (F)			115.2		%		75-125	14-JUN-19
HG-D-CVAA-VA	**Water**							
Batch R4677175								
WG3082243-2 LCS								
Mercury (Hg)-Dissolved			93.5		%		80-120	20-JUN-19
WG3082243-6 LCS								
Mercury (Hg)-Dissolved			94.6		%		80-120	20-JUN-19
WG3082243-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	20-JUN-19
WG3082243-5 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	20-JUN-19
HG-T-U-CVAF-VA	**Water**							
Batch R4674405								
WG3081825-3 DUP		**L2291233-9**						
Mercury (Hg)-Total		0.00055	0.00056	RPD-NA	ug/L	N/A	20	19-JUN-19
WG3081825-2 LCS								
Mercury (Hg)-Total			94.7		%		80-120	19-JUN-19
WG3081825-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	19-JUN-19
WG3081825-4 MS		**L2291233-14**						
Mercury (Hg)-Total			86.6		%		70-130	19-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R4678048								
WG3082731-2 LCS		**TMRM**						
Calcium (Ca)-Dissolved			99.6		%		80-120	19-JUN-19
Magnesium (Mg)-Dissolved			102.5		%		80-120	19-JUN-19
Potassium (K)-Dissolved			98.5		%		80-120	19-JUN-19
Sodium (Na)-Dissolved			106.8		%		80-120	19-JUN-19
WG3082731-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	19-JUN-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	19-JUN-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	19-JUN-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	19-JUN-19
MET-D-CCMS-VA	**Water**							
Batch R4671854								
WG3078791-3 DUP		**L2291233-14**						
Aluminum (Al)-Dissolved		0.0098	0.0085		mg/L	13	20	17-JUN-19
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-JUN-19
Arsenic (As)-Dissolved		0.00030	0.00027		mg/L	12	20	17-JUN-19
Barium (Ba)-Dissolved		0.0351	0.0357		mg/L	1.5	20	17-JUN-19
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	17-JUN-19
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	17-JUN-19
Cadmium (Cd)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	17-JUN-19
Calcium (Ca)-Dissolved		26.8	28.6		mg/L	6.4	20	17-JUN-19
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-JUN-19
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-JUN-19
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-JUN-19
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	17-JUN-19
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	17-JUN-19
Lithium (Li)-Dissolved		0.0013	0.0013		mg/L	0.6	20	17-JUN-19
Magnesium (Mg)-Dissolved		7.44	7.42		mg/L	0.3	20	17-JUN-19
Manganese (Mn)-Dissolved		0.00010	0.00014	J	mg/L	0.00004	0.0002	17-JUN-19
Molybdenum (Mo)-Dissolved		0.000514	0.000496		mg/L	3.6	20	17-JUN-19
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-JUN-19
Potassium (K)-Dissolved		0.401	0.404		mg/L	0.6	20	17-JUN-19
Selenium (Se)-Dissolved		0.000667	0.000609		mg/L	9.0	20	17-JUN-19
Silicon (Si)-Dissolved		2.18	2.15		mg/L	1.3	20	17-JUN-19
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	17-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4671854								
WG3078791-3 DUP		**L2291233-14**						
Sodium (Na)-Dissolved		1.99	1.96		mg/L	1.5	20	17-JUN-19
Strontium (Sr)-Dissolved		0.101	0.100		mg/L	1.1	20	17-JUN-19
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	17-JUN-19
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-JUN-19
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	17-JUN-19
Uranium (U)-Dissolved		0.000532	0.000533		mg/L	0.2	20	17-JUN-19
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-JUN-19
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	17-JUN-19
WG3078791-2 LCS								
Aluminum (Al)-Dissolved			100.8		%		80-120	17-JUN-19
Antimony (Sb)-Dissolved			96.4		%		80-120	17-JUN-19
Arsenic (As)-Dissolved			90.7		%		80-120	17-JUN-19
Barium (Ba)-Dissolved			103.4		%		80-120	17-JUN-19
Bismuth (Bi)-Dissolved			87.9		%		80-120	17-JUN-19
Boron (B)-Dissolved			92.9		%		80-120	17-JUN-19
Cadmium (Cd)-Dissolved			95.5		%		80-120	17-JUN-19
Calcium (Ca)-Dissolved			97.0		%		80-120	17-JUN-19
Chromium (Cr)-Dissolved			97.4		%		80-120	17-JUN-19
Cobalt (Co)-Dissolved			96.5		%		80-120	17-JUN-19
Copper (Cu)-Dissolved			90.5		%		80-120	17-JUN-19
Iron (Fe)-Dissolved			95.3		%		80-120	17-JUN-19
Lead (Pb)-Dissolved			92.5		%		80-120	17-JUN-19
Lithium (Li)-Dissolved			94.1		%		80-120	17-JUN-19
Magnesium (Mg)-Dissolved			95.5		%		80-120	17-JUN-19
Manganese (Mn)-Dissolved			92.8		%		80-120	17-JUN-19
Molybdenum (Mo)-Dissolved			100.3		%		80-120	17-JUN-19
Nickel (Ni)-Dissolved			91.7		%		80-120	17-JUN-19
Potassium (K)-Dissolved			92.8		%		80-120	17-JUN-19
Selenium (Se)-Dissolved			96.2		%		80-120	17-JUN-19
Silicon (Si)-Dissolved			98.9		%		60-140	17-JUN-19
Silver (Ag)-Dissolved			97.8		%		80-120	17-JUN-19
Sodium (Na)-Dissolved			95.0		%		80-120	17-JUN-19
Strontium (Sr)-Dissolved			98.2		%		80-120	17-JUN-19
Thallium (Tl)-Dissolved			96.0		%		80-120	17-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4671854								
WG3078791-2 LCS								
Tin (Sn)-Dissolved			95.4		%		80-120	17-JUN-19
Titanium (Ti)-Dissolved			85.4		%		80-120	17-JUN-19
Uranium (U)-Dissolved			85.9		%		80-120	17-JUN-19
Vanadium (V)-Dissolved			94.7		%		80-120	17-JUN-19
Zinc (Zn)-Dissolved			93.7		%		80-120	17-JUN-19
WG3078791-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	17-JUN-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	17-JUN-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	17-JUN-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	17-JUN-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	17-JUN-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	17-JUN-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	17-JUN-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	17-JUN-19
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	17-JUN-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	17-JUN-19
Copper (Cu)-Dissolved			0.00149	B	mg/L		0.0002	17-JUN-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	17-JUN-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	17-JUN-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	17-JUN-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	17-JUN-19
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	17-JUN-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	17-JUN-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	17-JUN-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	17-JUN-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	17-JUN-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	17-JUN-19
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	17-JUN-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	17-JUN-19
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	17-JUN-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	17-JUN-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	17-JUN-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	17-JUN-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	17-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4671854								
WG3078791-1 MB		**LF**						
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	17-JUN-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	17-JUN-19
WG3078791-4 MS		**L2291233-15**						
Aluminum (Al)-Dissolved			97.7		%		70-130	17-JUN-19
Antimony (Sb)-Dissolved			98.8		%		70-130	17-JUN-19
Arsenic (As)-Dissolved			95.6		%		70-130	17-JUN-19
Barium (Ba)-Dissolved			98.7		%		70-130	17-JUN-19
Bismuth (Bi)-Dissolved			90.2		%		70-130	17-JUN-19
Boron (B)-Dissolved			98.2		%		70-130	17-JUN-19
Cadmium (Cd)-Dissolved			98.4		%		70-130	17-JUN-19
Calcium (Ca)-Dissolved			92.6		%		70-130	17-JUN-19
Chromium (Cr)-Dissolved			99.5		%		70-130	17-JUN-19
Cobalt (Co)-Dissolved			100.3		%		70-130	17-JUN-19
Copper (Cu)-Dissolved			98.1		%		70-130	17-JUN-19
Iron (Fe)-Dissolved			97.5		%		70-130	17-JUN-19
Lead (Pb)-Dissolved			95.1		%		70-130	17-JUN-19
Lithium (Li)-Dissolved			103.1		%		70-130	17-JUN-19
Magnesium (Mg)-Dissolved			97.2		%		70-130	17-JUN-19
Manganese (Mn)-Dissolved			96.2		%		70-130	17-JUN-19
Molybdenum (Mo)-Dissolved			97.5		%		70-130	17-JUN-19
Nickel (Ni)-Dissolved			97.3		%		70-130	17-JUN-19
Potassium (K)-Dissolved			94.2		%		70-130	17-JUN-19
Selenium (Se)-Dissolved			99.4		%		70-130	17-JUN-19
Silicon (Si)-Dissolved			95.6		%		70-130	17-JUN-19
Silver (Ag)-Dissolved			100.3		%		70-130	17-JUN-19
Sodium (Na)-Dissolved			95.6		%		70-130	17-JUN-19
Strontium (Sr)-Dissolved			94.9		%		70-130	17-JUN-19
Thallium (Tl)-Dissolved			97.3		%		70-130	17-JUN-19
Tin (Sn)-Dissolved			97.4		%		70-130	17-JUN-19
Titanium (Ti)-Dissolved			95.3		%		70-130	17-JUN-19
Uranium (U)-Dissolved			92.1		%		70-130	17-JUN-19
Vanadium (V)-Dissolved			98.9		%		70-130	17-JUN-19
Zinc (Zn)-Dissolved			100.8		%		70-130	17-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4672960								
WG3079762-3 DUP		**L2291233-2**						
Aluminum (Al)-Dissolved		0.0091	0.0084		mg/L	7.4	20	18-JUN-19
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Arsenic (As)-Dissolved		0.00030	0.00028		mg/L	5.7	20	18-JUN-19
Barium (Ba)-Dissolved		0.0253	0.0253		mg/L	0.0	20	18-JUN-19
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-19
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	18-JUN-19
Cadmium (Cd)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	18-JUN-19
Calcium (Ca)-Dissolved		29.5	29.0		mg/L	1.6	20	18-JUN-19
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-JUN-19
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	18-JUN-19
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-19
Lithium (Li)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	18-JUN-19
Magnesium (Mg)-Dissolved		8.27	8.28		mg/L	0.2	20	18-JUN-19
Manganese (Mn)-Dissolved		0.00143	0.00139		mg/L	2.8	20	18-JUN-19
Molybdenum (Mo)-Dissolved		0.000517	0.000543		mg/L	4.8	20	18-JUN-19
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-JUN-19
Potassium (K)-Dissolved		0.399	0.395		mg/L	0.9	20	18-JUN-19
Selenium (Se)-Dissolved		0.000129	0.000130		mg/L	0.7	20	18-JUN-19
Silicon (Si)-Dissolved		2.28	2.16		mg/L	5.6	20	18-JUN-19
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	18-JUN-19
Sodium (Na)-Dissolved		2.36	2.35		mg/L	0.1	20	18-JUN-19
Strontium (Sr)-Dissolved		0.117	0.120		mg/L	2.4	20	18-JUN-19
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	18-JUN-19
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	18-JUN-19
Uranium (U)-Dissolved		0.000611	0.000576		mg/L	5.9	20	18-JUN-19
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-JUN-19
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3079762-2 LCS								
Aluminum (Al)-Dissolved			98.3		%		80-120	18-JUN-19
Antimony (Sb)-Dissolved			100.0		%		80-120	18-JUN-19
Arsenic (As)-Dissolved			100.0		%		80-120	18-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4672960								
WG3079762-2 LCS								
Barium (Ba)-Dissolved			102.0		%		80-120	18-JUN-19
Bismuth (Bi)-Dissolved			99.7		%		80-120	18-JUN-19
Boron (B)-Dissolved			105.1		%		80-120	18-JUN-19
Cadmium (Cd)-Dissolved			102.5		%		80-120	18-JUN-19
Calcium (Ca)-Dissolved			104.9		%		80-120	18-JUN-19
Chromium (Cr)-Dissolved			101.6		%		80-120	18-JUN-19
Cobalt (Co)-Dissolved			100.3		%		80-120	18-JUN-19
Copper (Cu)-Dissolved			101.5		%		80-120	18-JUN-19
Iron (Fe)-Dissolved			97.4		%		80-120	18-JUN-19
Lead (Pb)-Dissolved			99.4		%		80-120	18-JUN-19
Lithium (Li)-Dissolved			104.1		%		80-120	18-JUN-19
Magnesium (Mg)-Dissolved			103.4		%		80-120	18-JUN-19
Manganese (Mn)-Dissolved			99.8		%		80-120	18-JUN-19
Molybdenum (Mo)-Dissolved			105.2		%		80-120	18-JUN-19
Nickel (Ni)-Dissolved			99.3		%		80-120	18-JUN-19
Potassium (K)-Dissolved			99.5		%		80-120	18-JUN-19
Selenium (Se)-Dissolved			99.5		%		80-120	18-JUN-19
Silicon (Si)-Dissolved			106.8		%		60-140	18-JUN-19
Silver (Ag)-Dissolved			100.2		%		80-120	18-JUN-19
Sodium (Na)-Dissolved			105.7		%		80-120	18-JUN-19
Strontium (Sr)-Dissolved			103.1		%		80-120	18-JUN-19
Thallium (Tl)-Dissolved			101.5		%		80-120	18-JUN-19
Tin (Sn)-Dissolved			102.1		%		80-120	18-JUN-19
Titanium (Ti)-Dissolved			93.9		%		80-120	18-JUN-19
Uranium (U)-Dissolved			102.0		%		80-120	18-JUN-19
Vanadium (V)-Dissolved			101.0		%		80-120	18-JUN-19
Zinc (Zn)-Dissolved			100.4		%		80-120	18-JUN-19
WG3079762-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	18-JUN-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	18-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4672960								
WG3079762-1 MB		**LF**						
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	18-JUN-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	18-JUN-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	18-JUN-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	18-JUN-19
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	18-JUN-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	18-JUN-19
WG3079762-4 MS		**L2291233-1**						
Aluminum (Al)-Dissolved			96.0		%		70-130	18-JUN-19
Antimony (Sb)-Dissolved			98.9		%		70-130	18-JUN-19
Arsenic (As)-Dissolved			104.1		%		70-130	18-JUN-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Bismuth (Bi)-Dissolved			96.9		%		70-130	18-JUN-19
Boron (B)-Dissolved			104.6		%		70-130	18-JUN-19
Cadmium (Cd)-Dissolved			100.2		%		70-130	18-JUN-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Chromium (Cr)-Dissolved			99.1		%		70-130	18-JUN-19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4672960								
WG3079762-4 MS		**L2291233-1**						
Cobalt (Co)-Dissolved			96.8		%		70-130	18-JUN-19
Copper (Cu)-Dissolved			97.2		%		70-130	18-JUN-19
Iron (Fe)-Dissolved			98.5		%		70-130	18-JUN-19
Lead (Pb)-Dissolved			95.0		%		70-130	18-JUN-19
Lithium (Li)-Dissolved			103.8		%		70-130	18-JUN-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Manganese (Mn)-Dissolved			96.8		%		70-130	18-JUN-19
Molybdenum (Mo)-Dissolved			100.7		%		70-130	18-JUN-19
Nickel (Ni)-Dissolved			96.3		%		70-130	18-JUN-19
Potassium (K)-Dissolved			107.2		%		70-130	18-JUN-19
Selenium (Se)-Dissolved			107.9		%		70-130	18-JUN-19
Silicon (Si)-Dissolved			93.4		%		70-130	18-JUN-19
Silver (Ag)-Dissolved			97.3		%		70-130	18-JUN-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Thallium (Tl)-Dissolved			97.9		%		70-130	18-JUN-19
Tin (Sn)-Dissolved			99.1		%		70-130	18-JUN-19
Titanium (Ti)-Dissolved			97.7		%		70-130	18-JUN-19
Uranium (U)-Dissolved			96.4		%		70-130	18-JUN-19
Vanadium (V)-Dissolved			99.8		%		70-130	18-JUN-19
Zinc (Zn)-Dissolved			102.0		%		70-130	18-JUN-19
MET-T-CCMS-VA	**Water**							
Batch R4672026								
WG3078683-3 DUP		**L2291233-1**						
Aluminum (Al)-Total		0.0803	0.0832		mg/L	3.6	20	17-JUN-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-JUN-19
Arsenic (As)-Total		0.00036	0.00031		mg/L	16	20	17-JUN-19
Barium (Ba)-Total		0.0265	0.0251		mg/L	5.6	20	17-JUN-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	17-JUN-19
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	17-JUN-19
Cadmium (Cd)-Total		<0.0000050	0.0000065	RPD-NA	mg/L	N/A	20	17-JUN-19
Calcium (Ca)-Total		30.0	29.3		mg/L	2.2	20	17-JUN-19
Chromium (Cr)-Total		0.00017	0.00017		mg/L	1.3	20	17-JUN-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4672026								
WG3078683-3 DUP		**L2291233-1**						
Copper (Cu)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-JUN-19
Iron (Fe)-Total		0.109	0.113		mg/L	3.5	20	17-JUN-19
Lead (Pb)-Total		0.000185	0.000180		mg/L	2.5	20	17-JUN-19
Lithium (Li)-Total		0.0010	<0.0010	RPD-NA	mg/L	N/A	20	17-JUN-19
Magnesium (Mg)-Total		8.49	8.24		mg/L	3.0	20	17-JUN-19
Manganese (Mn)-Total		0.00788	0.00755		mg/L	4.2	20	17-JUN-19
Molybdenum (Mo)-Total		0.000548	0.000551		mg/L	0.5	20	17-JUN-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-JUN-19
Potassium (K)-Total		0.424	0.415		mg/L	2.2	20	17-JUN-19
Selenium (Se)-Total		0.000130	0.000143		mg/L	9.6	20	17-JUN-19
Silicon (Si)-Total		2.27	2.26		mg/L	0.6	20	17-JUN-19
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	17-JUN-19
Sodium (Na)-Total		2.57	2.49		mg/L	3.2	20	17-JUN-19
Strontium (Sr)-Total		0.126	0.122		mg/L	2.7	20	17-JUN-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	17-JUN-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-JUN-19
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	17-JUN-19
Uranium (U)-Total		0.000627	0.000609		mg/L	2.9	20	17-JUN-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-JUN-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	17-JUN-19
WG3078683-2 LCS								
Aluminum (Al)-Total			109.6		%		80-120	17-JUN-19
Antimony (Sb)-Total			108.3		%		80-120	17-JUN-19
Arsenic (As)-Total			105.4		%		80-120	17-JUN-19
Barium (Ba)-Total			107.3		%		80-120	17-JUN-19
Bismuth (Bi)-Total			105.4		%		80-120	17-JUN-19
Boron (B)-Total			106.5		%		80-120	17-JUN-19
Cadmium (Cd)-Total			103.3		%		80-120	17-JUN-19
Calcium (Ca)-Total			105.2		%		80-120	17-JUN-19
Chromium (Cr)-Total			103.9		%		80-120	17-JUN-19
Cobalt (Co)-Total			105.0		%		80-120	17-JUN-19
Copper (Cu)-Total			103.4		%		80-120	17-JUN-19
Iron (Fe)-Total			99.4		%		80-120	17-JUN-19
Lead (Pb)-Total			102.6		%		80-120	17-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4672026								
WG3078683-2 LCS								
Lithium (Li)-Total			98.1		%		80-120	17-JUN-19
Magnesium (Mg)-Total			107.5		%		80-120	17-JUN-19
Manganese (Mn)-Total			108.4		%		80-120	17-JUN-19
Molybdenum (Mo)-Total			101.5		%		80-120	17-JUN-19
Nickel (Ni)-Total			103.9		%		80-120	17-JUN-19
Potassium (K)-Total			107.7		%		80-120	17-JUN-19
Selenium (Se)-Total			104.2		%		80-120	17-JUN-19
Silicon (Si)-Total			111.1		%		80-120	17-JUN-19
Silver (Ag)-Total			98.3		%		80-120	17-JUN-19
Sodium (Na)-Total			111.2		%		80-120	17-JUN-19
Strontium (Sr)-Total			103.9		%		80-120	17-JUN-19
Thallium (Tl)-Total			99.1		%		80-120	17-JUN-19
Tin (Sn)-Total			102.3		%		80-120	17-JUN-19
Titanium (Ti)-Total			102.3		%		80-120	17-JUN-19
Uranium (U)-Total			109.6		%		80-120	17-JUN-19
Vanadium (V)-Total			105.9		%		80-120	17-JUN-19
Zinc (Zn)-Total			101.9		%		80-120	17-JUN-19
WG3078683-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	17-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	17-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	17-JUN-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	17-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	17-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	17-JUN-19
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	17-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	17-JUN-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	17-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	17-JUN-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	17-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	17-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	17-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	17-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	17-JUN-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	17-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4672026								
WG3078683-1 MB								
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	17-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	17-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	17-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	17-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	17-JUN-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	17-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	17-JUN-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	17-JUN-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	17-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	17-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	17-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	17-JUN-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	17-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	17-JUN-19
WG3078683-4 MS		**L2291233-2**						
Aluminum (Al)-Total			100.8		%		70-130	17-JUN-19
Antimony (Sb)-Total			100.2		%		70-130	17-JUN-19
Arsenic (As)-Total			102.5		%		70-130	17-JUN-19
Barium (Ba)-Total			N/A	MS-B	%		-	17-JUN-19
Bismuth (Bi)-Total			101.8		%		70-130	17-JUN-19
Boron (B)-Total			104.1		%		70-130	17-JUN-19
Cadmium (Cd)-Total			99.1		%		70-130	17-JUN-19
Calcium (Ca)-Total			N/A	MS-B	%		-	17-JUN-19
Chromium (Cr)-Total			99.3		%		70-130	17-JUN-19
Cobalt (Co)-Total			99.3		%		70-130	17-JUN-19
Copper (Cu)-Total			98.4		%		70-130	17-JUN-19
Iron (Fe)-Total			97.7		%		70-130	17-JUN-19
Lead (Pb)-Total			99.2		%		70-130	17-JUN-19
Lithium (Li)-Total			94.6		%		70-130	17-JUN-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	17-JUN-19
Manganese (Mn)-Total			102.0		%		70-130	17-JUN-19
Molybdenum (Mo)-Total			102.5		%		70-130	17-JUN-19
Nickel (Ni)-Total			97.2		%		70-130	17-JUN-19
Potassium (K)-Total			101.4		%		70-130	17-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4672026								
WG3078683-4 MS		**L2291233-2**						
Selenium (Se)-Total			97.1		%		70-130	17-JUN-19
Silicon (Si)-Total			93.4		%		70-130	17-JUN-19
Silver (Ag)-Total			99.98		%		70-130	17-JUN-19
Sodium (Na)-Total			N/A	MS-B	%		-	17-JUN-19
Strontium (Sr)-Total			N/A	MS-B	%		-	17-JUN-19
Thallium (Tl)-Total			96.1		%		70-130	17-JUN-19
Tin (Sn)-Total			99.9		%		70-130	17-JUN-19
Titanium (Ti)-Total			99.3		%		70-130	17-JUN-19
Uranium (U)-Total			102.7		%		70-130	17-JUN-19
Vanadium (V)-Total			100.4		%		70-130	17-JUN-19
Zinc (Zn)-Total			98.2		%		70-130	17-JUN-19
Batch R4672767								
WG3078717-2 LCS								
Aluminum (Al)-Total			108.1		%		80-120	18-JUN-19
Antimony (Sb)-Total			103.3		%		80-120	18-JUN-19
Arsenic (As)-Total			100.2		%		80-120	18-JUN-19
Barium (Ba)-Total			101.2		%		80-120	18-JUN-19
Bismuth (Bi)-Total			104.3		%		80-120	18-JUN-19
Boron (B)-Total			101.6		%		80-120	18-JUN-19
Cadmium (Cd)-Total			96.3		%		80-120	18-JUN-19
Calcium (Ca)-Total			102.6		%		80-120	18-JUN-19
Chromium (Cr)-Total			99.9		%		80-120	18-JUN-19
Cobalt (Co)-Total			100.1		%		80-120	18-JUN-19
Copper (Cu)-Total			98.5		%		80-120	18-JUN-19
Iron (Fe)-Total			91.2		%		80-120	18-JUN-19
Lead (Pb)-Total			105.2		%		80-120	18-JUN-19
Lithium (Li)-Total			102.2		%		80-120	18-JUN-19
Magnesium (Mg)-Total			102.0		%		80-120	18-JUN-19
Manganese (Mn)-Total			100.6		%		80-120	18-JUN-19
Molybdenum (Mo)-Total			103.2		%		80-120	18-JUN-19
Nickel (Ni)-Total			99.8		%		80-120	18-JUN-19
Potassium (K)-Total			99.1		%		80-120	18-JUN-19
Selenium (Se)-Total			102.2		%		80-120	18-JUN-19
Silicon (Si)-Total			105.3		%		80-120	18-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4672767								
WG3078717-2 LCS								
Silver (Ag)-Total			100.0		%		80-120	18-JUN-19
Sodium (Na)-Total			101.6		%		80-120	18-JUN-19
Strontium (Sr)-Total			101.4		%		80-120	18-JUN-19
Thallium (Tl)-Total			104.6		%		80-120	18-JUN-19
Tin (Sn)-Total			97.6		%		80-120	18-JUN-19
Titanium (Ti)-Total			99.97		%		80-120	18-JUN-19
Uranium (U)-Total			106.9		%		80-120	18-JUN-19
Vanadium (V)-Total			99.4		%		80-120	18-JUN-19
Zinc (Zn)-Total			98.7		%		80-120	18-JUN-19
WG3078717-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	18-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	18-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	18-JUN-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	18-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	18-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	18-JUN-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	18-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	18-JUN-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	18-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	18-JUN-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	18-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	18-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	18-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	18-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	18-JUN-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	18-JUN-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	18-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	18-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	18-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	18-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	18-JUN-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	18-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	18-JUN-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	18-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4672767								
WG3078717-1 MB								
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	18-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	18-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	18-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	18-JUN-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	18-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	18-JUN-19
NH3-L-F-CL	**Water**							
Batch R4676326								
WG3081824-11 DUP		**L2291233-11**						
Ammonia as N		<0.0050	0.0089	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3081824-10 LCS								
Ammonia as N			112.6		%		85-115	18-JUN-19
WG3081824-14 LCS								
Ammonia as N			111.6		%		85-115	18-JUN-19
WG3081824-13 MB								
Ammonia as N			<0.0050		mg/L		0.005	18-JUN-19
WG3081824-9 MB								
Ammonia as N			<0.0050		mg/L		0.005	18-JUN-19
WG3081824-12 MS		**L2291233-11**						
Ammonia as N			96.3		%		75-125	18-JUN-19
NO2-L-IC-N-CL	**Water**							
Batch R4672521								
WG3080454-7 DUP		**L2291233-15**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	14-JUN-19
WG3080454-2 LCS								
Nitrite (as N)			109.2		%		90-110	14-JUN-19
WG3080454-6 LCS								
Nitrite (as N)			109.6		%		90-110	14-JUN-19
WG3080454-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	14-JUN-19
WG3080454-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	14-JUN-19
WG3080454-8 MS		**L2291233-15**						
Nitrite (as N)			110.3		%		75-125	14-JUN-19
NO3-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4672521								
WG3080454-7 DUP		**L2291233-15**						
Nitrate (as N)		<0.0050	0.0086	RPD-NA	mg/L	N/A	20	14-JUN-19
WG3080454-2 LCS								
Nitrate (as N)			109.9		%		90-110	14-JUN-19
WG3080454-6 LCS								
Nitrate (as N)			107.6		%		90-110	14-JUN-19
WG3080454-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	14-JUN-19
WG3080454-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	14-JUN-19
WG3080454-8 MS		**L2291233-15**						
Nitrate (as N)			109.7		%		75-125	14-JUN-19
ORP-CL	**Water**							
Batch R4673389								
WG3081363-3 CRM		**CL-ORP**						
ORP			224		mV		210-230	18-JUN-19
WG3081363-4 DUP		**L2291233-13**						
ORP		439	448	J	mV	8.2	15	18-JUN-19
P-T-L-COL-CL	**Water**							
Batch R4671930								
WG3079667-6 LCS								
Phosphorus (P)-Total			99.8		%		80-120	17-JUN-19
WG3079667-8 LCS								
Phosphorus (P)-Total			101.0		%		80-120	17-JUN-19
WG3079667-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	17-JUN-19
WG3079667-7 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	17-JUN-19
PH-CL	**Water**							
Batch R4677888								
WG3082781-11 LCS								
pH			7.00		pH		6.9-7.1	19-JUN-19
WG3082781-14 LCS								
pH			7.00		pH		6.9-7.1	19-JUN-19
PO4-DO-L-COL-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-CL	**Water**							
Batch R4671777								
WG3078103-6 LCS								
Orthophosphate-Dissolved (as P)			93.0		%		80-120	14-JUN-19
WG3078103-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	14-JUN-19
SO4-IC-N-CL	**Water**							
Batch R4672521								
WG3080454-7 DUP		**L2291233-15**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	14-JUN-19
WG3080454-2 LCS								
Sulfate (SO4)			109.6		%		90-110	14-JUN-19
WG3080454-6 LCS								
Sulfate (SO4)			109.9		%		90-110	14-JUN-19
WG3080454-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	14-JUN-19
WG3080454-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	14-JUN-19
WG3080454-8 MS		**L2291233-15**						
Sulfate (SO4)			108.0		%		75-125	14-JUN-19
SOLIDS-TDS-CL	**Water**							
Batch R4678527								
WG3081471-9 DUP		**L2291233-1**						
Total Dissolved Solids		125	125		mg/L	0.0	20	19-JUN-19
WG3081471-8 LCS								
Total Dissolved Solids			104.7		%		85-115	19-JUN-19
WG3081471-7 MB								
Total Dissolved Solids			<10		mg/L		10	19-JUN-19
TKN-L-F-CL	**Water**							
Batch R4678328								
WG3083285-13 LCS								
Total Kjeldahl Nitrogen			100.2		%		75-125	20-JUN-19
WG3083285-17 LCS								
Total Kjeldahl Nitrogen			100.2		%		75-125	20-JUN-19
WG3083285-2 LCS								
Total Kjeldahl Nitrogen			104.4		%		75-125	20-JUN-19
WG3083285-21 LCS								
Total Kjeldahl Nitrogen			101.6		%		75-125	20-JUN-19
WG3083285-25 LCS								
Total Kjeldahl Nitrogen			97.4		%		75-125	20-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R4678328								
WG3083285-6 LCS								
Total Kjeldahl Nitrogen			104.6		%		75-125	20-JUN-19
WG3083285-9 LCS								
Total Kjeldahl Nitrogen			103.6		%		75-125	20-JUN-19
WG3083285-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	20-JUN-19
WG3083285-12 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	20-JUN-19
WG3083285-16 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	20-JUN-19
WG3083285-20 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	20-JUN-19
WG3083285-24 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	20-JUN-19
WG3083285-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	20-JUN-19
WG3083285-8 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	20-JUN-19
TSS-L-CL	**Water**							
Batch R4677728								
WG3081473-4 LCS								
Total Suspended Solids			97.1		%		85-115	19-JUN-19
WG3081473-6 LCS								
Total Suspended Solids			93.0		%		85-115	19-JUN-19
WG3081473-3 MB								
Total Suspended Solids			<1.0		mg/L		1	19-JUN-19
WG3081473-5 MB								
Total Suspended Solids			<1.0		mg/L		1	19-JUN-19
TURBIDITY-CL	**Water**							
Batch R4670712								
WG3077894-12 DUP		**L2291233-11**						
Turbidity		3.49	3.47		NTU	0.6	15	14-JUN-19
WG3077894-11 LCS								
Turbidity			96.0		%		85-115	14-JUN-19
WG3077894-8 LCS								
Turbidity			95.5		%		85-115	14-JUN-19
WG3077894-10 MB								
Turbidity			<0.10		NTU		0.1	14-JUN-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-CL	**Water**							
Batch R4670712								
WG3077894-7 MB								
Turbidity			<0.10		NTU		0.1	14-JUN-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	12-JUN-19 13:30	18-JUN-19 09:55	0.25	140	hours	EHTR-FM
	2	12-JUN-19 13:15	18-JUN-19 09:55	0.25	141	hours	EHTR-FM
	3	12-JUN-19 12:10	18-JUN-19 09:55	0.25	142	hours	EHTR-FM
	4	12-JUN-19 12:00	18-JUN-19 09:55	0.25	142	hours	EHTR-FM
	5	12-JUN-19 10:00	18-JUN-19 09:55	0.25	144	hours	EHTR-FM
	6	12-JUN-19 09:40	18-JUN-19 09:55	0.25	144	hours	EHTR-FM
	7	12-JUN-19 09:30	18-JUN-19 09:55	0.25	144	hours	EHTR-FM
	8	12-JUN-19 14:15	18-JUN-19 09:55	0.25	140	hours	EHTR-FM
	9	12-JUN-19 14:00	18-JUN-19 09:55	0.25	140	hours	EHTR-FM
	11	12-JUN-19 11:20	18-JUN-19 09:55	0.25	143	hours	EHTR-FM
	12	12-JUN-19 11:10	18-JUN-19 10:37	0.25	144	hours	EHTR-FM
	13	12-JUN-19 11:00	18-JUN-19 10:37	0.25	144	hours	EHTR-FM
	14	12-JUN-19 10:00	18-JUN-19 10:37	0.25	145	hours	EHTR-FM
	15	12-JUN-19 12:00	18-JUN-19 10:37	0.25	143	hours	EHTR-FM
	16	12-JUN-19 12:00	18-JUN-19 10:37	0.25	143	hours	EHTR-FM
Total Suspended Solids							
	16	12-JUN-19 12:00	20-JUN-19 11:00	7	8	days	EHT
pH							
	1	12-JUN-19 13:30	19-JUN-19 12:00	0.25	167	hours	EHTR-FM
	2	12-JUN-19 13:15	19-JUN-19 12:00	0.25	167	hours	EHTR-FM
	3	12-JUN-19 12:10	19-JUN-19 12:00	0.25	168	hours	EHTR-FM
	4	12-JUN-19 12:00	19-JUN-19 12:00	0.25	168	hours	EHTR-FM
	5	12-JUN-19 10:00	19-JUN-19 12:00	0.25	170	hours	EHTR-FM
	6	12-JUN-19 09:40	19-JUN-19 12:00	0.25	170	hours	EHTR-FM
	7	12-JUN-19 09:30	19-JUN-19 12:00	0.25	170	hours	EHTR-FM
	8	12-JUN-19 14:15	19-JUN-19 12:00	0.25	166	hours	EHTR-FM
	9	12-JUN-19 14:00	19-JUN-19 12:00	0.25	166	hours	EHTR-FM
	11	12-JUN-19 11:20	19-JUN-19 12:00	0.25	169	hours	EHTR-FM
	12	12-JUN-19 11:10	19-JUN-19 12:00	0.25	169	hours	EHTR-FM
	13	12-JUN-19 11:00	19-JUN-19 12:00	0.25	169	hours	EHTR-FM
	14	12-JUN-19 10:00	19-JUN-19 12:00	0.25	170	hours	EHTR-FM
	15	12-JUN-19 12:00	19-JUN-19 12:00	0.25	168	hours	EHTR-FM
	16	12-JUN-19 12:00	19-JUN-19 12:00	0.25	168	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2291233 were received on 13-JUN-19 09:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

Quality Control Report

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: Regional Effects Program

TURNAROUND TIME: Regular

PROJECT INFORMATION				LABORATORY				DELIVERY			
Facility Name / Job#	Regional Effects Program/Koocanusa			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Lyuda Shvets			Email 1:	cait.good@teck.com	X	X	X
Email	cait.good@teck.com			Email	lyudmyla.shvets@ALSGlobal.com			Email 2:	carlie.meyer@teck.com	X	X	X
Address	421 Pine Avenue			Address	2559 29 Street NE			Email 3:	colleen.mooney@teck.com	X	X	X
					Suite 100			Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:	hcurrier@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	250-425-8202			Phone Number	403-407-1800			PO number	VPO00616180			

L2291233-COFC

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
									N	N	N	N	N	N	N
									NONE	NONE	H2SO4	NONE	NONE	HNO3	NONE
1	RG_SC_U1_WS_20190612 13:30	RG_SC	WS	no	20190612		G	7	X	X	X	X	X	X	X
2	RG_SC_U2_WS_20190612 13:15	RG_SC	WS	no	20190612		G	7	X	X	X	X	X	X	X
3	RG_ER_U1_WS_20190612 12:10	RG_ER	WS	no	20190612		G	7	X	X	X	X	X	X	X
4	RG_ER_U2_WS_20190612 12:00	RG_ER	WS	no	20190612		G	7	X	X	X	X	X	X	X
5	RG_GC_U1_WS_20190612 10:00	RG_GC	WS	no	20190612		G	7	X	X	X	X	X	X	X
6	RG_GC_U2_WS_20190612 ~~09:30~~ 09:40	RG_GC	WS	no	20190612		G	7	X	X	X	X	X	X	X
7	RG_GC_U3_WS_20190612 09:30	RG_GC	WS	no	20190612		G	7	X	X	X	X	X	X	X
8	RG_TN_U1_WS_20190612 14:15	RG_TN	WS	no	20190612		G	7	X	X	X	X	X	X	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
VPO00616180	Minnow Environmental	June 12, 2019	NK	6/13 0900

SERVICE REQUEST (rush is subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	905-691-6183
Sampler's Signature		Date/Time	June 12/2019

8°C

Teck

COC ID: Regional Effects Program | **TURNAROUND TIME:** Regular

PROJECT INFORMATION				ALS LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Effects Program/Koocanusa			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Lyuda Shvets			Email 1:	cait.good@teck.com	X	X	X
Email	cait.good@teck.com			Email	lyudmyla.shvets@ALSGlobal.com			Email 2:	carlie.meyer@teck.com	X	X	X
Address	421 Pine Avenue			Address	2559 29 Street NE			Email 3:	colleen.mooney@teck.com	X	X	X
					Suite 100			Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:	rhcurrier@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada					
Phone Number	250-425-8202			Phone Number	403-407-1800			PO number	VPO00616180			

L2291233-COFC

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
									N	N	N	N	N	N	N
									NONE	NONE	H2SO4	NONE	NONE	HNO3	NONE
9	RG_TN_U2_WS_20190612 14:00	RG_TN	WS	no	20190612		G	7	X	X	X	X	X	X	X
10	RG_TN_U3_WS_20190612	RG_TN	WS	no	20190612		G	7	X	X	X	X	X	X	X
11	RG_T4_U1_WS_20190612 11:20	RG_T4	WS	no	20190612		G	7	X	X	X	X	X	X	X
12	RG_T4_U2_WS_20190612 11:10	RG_T4	WS	no	20190612		G	7	X	X	X	X	X	X	X
13	RG_T4_U3_WS_20190612 11:00	RG_T4	WS	no	20190612		G	7	X	X	X	X	X	X	X
14	RG_DUP_WS_20190612 10:00	RG_DUP	WS	no	20190612		G	7	X	X	X	X	X	X	X
15	RG_BLANK_WS_20190612	RG_FBLANK	WS	no	20190612		G	7	X	X	X	X	X	X	X
16	RG_TRIP_WS_20190612	RG_TRIP	WS	no	20190612		G	7	X	X	X	X	X	X	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
VPO00616180	Minnow Environmental	June 12, 2019	DK	6/13

SERVICE REQUEST (rush subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	905-691-6183
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	June 12/2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

0900

Teck

COC ID: L2291233-COFC | **Regional Effects Program** | **TURNAROUND TIME:** Regular

REQUESTED BY

Facility Name / Job#	Regional Effects Program/Koocanusa
Project Manager	Cait Good
Email	cait.good@teck.com
Address	421 Pine Avenue
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-425-8202

LABORATORY

Lab Name	ALS Calgary
Lab Contact	Lyuda Shvets
Email	lyudmyla.shvets@ALSGlobal.com
Address	2559 29 Street NE
	Suite 100
City	Calgary
Province	AB
Postal Code	T1Y 7B5
Country	Canada
Phone Number	403-407-1800

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	cait.good@teck.com	X	X	X
Email 2:	carlie.meyer@teck.com	X	X	X
Email 3:	colleen.mooney@teck.com	X	X	X
Email 4:	teckcoal@equisonline.com			X
Email 5:	hcurrier@minnow.ca	X	X	X

PO number: VPO00616180

SAMPLE DETAILS

L2291233-COFC

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.
1	RG_SC_U1_WS_20190612 13:30	RG_SC	WS	no	20190612		G	7
2	RG_SC_U2_WS_20190612 13:15	RG_SC	WS	no	20190612		G	7
3	RG_ER_U1_WS_20190612 12:10	RG_ER	WS	no	20190612		G	7
4	RG_ER_U2_WS_20190612 12:00	RG_ER	WS	no	20190612		G	7
5	RG_GC_U1_WS_20190612 10:00	RG_GC	WS	no	20190612		G	7
6	RG_GC_U2_WS_20190612 ~~09:30~~ 09:40	RG_GC	WS	no	20190612		G	7
7	RG_GC_U3_WS_20190612 09:30	RG_GC	WS	no	20190612		G	7
8	RG_TN_U1_WS_20190612 14:15	RG_TN	WS	no	20190612		G	7

ANALYSIS REQUESTED

	HG-T-U-CVAF-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-D-CVAF-VA	TECKCOAL-MET-D-VA	TECKCOAL-MET-T-VA	TECKCOAL-ROUTINE-VA
CONTAINER	NONE	NONE	H2SO4	NONE	NONE	HNO3	NONE
1	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X
3	X	X	X	X	X	X	X
4	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X
7	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

VPO00616180

RELINQUISHED BY/AFFILIATION

Minnow Environmental

DATE/TIME

June 12, 2019

ACCEPTED BY/AFFILIATION

NK

TIME

6/13 0900

SERVICE REQUEST (rush subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	905-691-6183
Sampler's Signature		Date/Time	June 12/2019

8 C

Teck

COC ID: | **Regional Effects Program** | **TURNAROUND TIME:** Regular

REPORTING INFO

Facility Name / Job#	Regional Effects Program/Koocanusa
Project Manager	Cait Good
Email	cait.good@teck.com
Address	421 Pine Avenue
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-425-8202

LABORATORY

Lab Name	ALS Calgary
Lab Contact	Lyuda Shvets
Email	lyudmyla.shvets@ALSGlobal.com
Address	2559 29 Street NE
	Suite 100
City	Calgary
Province	AB
Postal Code	T1Y 7B5
Country	Canada
Phone Number	403-407-1800

COMMENTS

Report Format / Distribution		Excel	PDF	EDD
Email 1:	cait.good@teck.com	X	X	X
Email 2:	carlie.meyer@teck.com	X	X	X
Email 3:	colleen.mooney@teck.com	X	X	X
Email 4:	teckcoal@equisonline.com			X
Email 5:	hcurrier@minnow.ca	X	X	X

PO number: VPO00616180

SAMPLE DETAILS

L2291233-COFC

ANALYSIS REQUESTED

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	HG-T-U-CVAF-VA (NONE)	ALS_Package-DOC (NONE)	ALS_Package-TKN/TOC (H2SO4)	HG-D-CVAF-VA (NONE)	TECKCOAL-MET-D-VA (NONE)	TECKCOAL-MET-T-VA (HNO3)	TECKCOAL-ROUTINE-VA (NONE)
9	RG_TN_U2_WS_20190612 14:00	RG_TN	WS	no	20190612		G	7	X	X	X	X	X	X	X
10	RG_TN_U3_WS_20190612	RG_TN	WS	no	20190612		G	7	X	X	X	X	X	X	X
11	RG_T4_U1_WS_20190612 11:20	RG_T4	WS	no	20190612		G	7	X	X	X	X	X	X	X
12	RG_T4_U2_WS_20190612 11:10	RG_T4	WS	no	20190612		G	7	X	X	X	X	X	X	X
13	RG_T4_U3_WS_20190612 11:00	RG_T4	WS	no	20190612		G	7	X	X	X	X	X	X	X
14	RG_DUP_WS_20190612 10:00	RG_DUP	WS	no	20190612		G	7	X	X	X	X	X	X	X
15	RG_BLANK_WS_20190612	RG_FBLANK	WS	no	20190612		G	7	X	X	X	X	X	X	X
16	RG_TRIP_WS_20190612	RG_TRIP	WS	no	20190612		G	7	X	X	X	X	X	X	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS
VPO00616180

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Minnow Environmental	June 12, 2019	DK	6/13

SERVICE REQUEST (Rush subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	905-691-6183
Sampler's Signature		Date/Time	June 12/2019

0900

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 20-AUG-19
Report Date: 27-AUG-19 11:12 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2332094

Project P.O. #: VPO00616180
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers: REP-Koocanusa 19-08
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332094-1	L2332094-2	L2332094-3	L2332094-4	L2332094-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	19-AUG-19	19-AUG-19	19-AUG-19	19-AUG-19	19-AUG-19
	Sampled Time	13:50	14:00	14:15	15:20	15:30
	Client ID	RG_T4_U3_WS_20190819_1350_NP_MD	RG_T4_U2_WS_20190819_1400_NP_MD	RG_T4_U1_WS_20190819_1415_NP_MD	RG_ER_U3_WS_20190819_1520_NP_MD	RG_ER_U2_WS_20190819_1530_NP_MD
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	276	260	244	250	244
	Hardness (as CaCO3) (mg/L)	133	126	123	119	119
	pH (pH)	8.21	8.26	8.31	8.30	8.32
	ORP (mV)	435	444	407	467	398
	Total Suspended Solids (mg/L)	3.9	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	159 DLHC	220 DLHC	199 DLHC	202 DLHC	206 DLHC
	Turbidity (NTU)	2.72	0.74	0.70	0.84	0.69
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	115	113	105	110	105
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	1.8	<1.0	2.4
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	115	113	107	110	108
	Ammonia as N (mg/L)	0.0154	0.0082	0.0054	0.0062	0.0077
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	2.70	2.25	1.97	2.27	2.03
	Fluoride (F) (mg/L)	0.105	0.099	0.091	0.092	0.093
	Ion Balance (%)	93.5	91.8	96.3	89.8	92.4
	Nitrate (as N) (mg/L)	0.251	0.209	0.143	0.139	0.147
	Nitrite (as N) (mg/L)	0.0027	0.0021	0.0021	0.0015	0.0023
	Total Kjeldahl Nitrogen (mg/L)	0.095	0.065	0.158	0.107	0.141
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0033	<0.0020	<0.0020	0.0031	<0.0020
	Sulfate (SO4) (mg/L)	29.8	26.6	23.1	24.8	23.8
	Anion Sum (meq/L)	3.01	2.89	2.69	2.80	2.72
	Cation Sum (meq/L)	2.82	2.65	2.59	2.51	2.51
	Cation - Anion Balance (%)	-3.4	-4.3	-1.9	-5.4	-3.9
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.81	0.98	1.18	1.15	1.05
	Total Organic Carbon (mg/L)	0.84	0.99	1.24	1.47	1.10
Total Metals	Aluminum (Al)-Total (mg/L)	0.0443	0.0165	0.0116	0.0122	0.0101
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00012
	Arsenic (As)-Total (mg/L)	0.00039	0.00037	0.00033	0.00033	0.00033
	Barium (Ba)-Total (mg/L)	0.0437	0.0435	0.0415	0.0399	0.0413
	Beryllium (Be)-Total (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (ug/L)	0.0057	<0.0050	<0.0050	<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332094-6				
	Description	WS				
	Sampled Date	19-AUG-19				
	Sampled Time	15:40				
	Client ID	RG_ER_U1_WS_20190819_1540_NP_MD				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	242				
	Hardness (as CaCO3) (mg/L)	117				
	pH (pH)	8.33				
	ORP (mV)	436				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	206 DLHC				
	Turbidity (NTU)	0.63				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	104				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	2.8				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	107				
	Ammonia as N (mg/L)	0.0055				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	2.39				
	Fluoride (F) (mg/L)	0.087				
	Ion Balance (%)	90.9				
	Nitrate (as N) (mg/L)	0.161				
	Nitrite (as N) (mg/L)	0.0020				
	Total Kjeldahl Nitrogen (mg/L)	0.098				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	23.7				
	Anion Sum (meq/L)	2.71				
	Cation Sum (meq/L)	2.47				
	Cation - Anion Balance (%)	-4.8				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.95				
	Total Organic Carbon (mg/L)	1.11				
Total Metals	Aluminum (Al)-Total (mg/L)	0.0115				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	0.00032				
	Barium (Ba)-Total (mg/L)	0.0406				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	<0.0050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332094-1	L2332094-2	L2332094-3	L2332094-4	L2332094-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	19-AUG-19	19-AUG-19	19-AUG-19	19-AUG-19	19-AUG-19
	Sampled Time	13:50	14:00	14:15	15:20	15:30
	Client ID	RG_T4_U3_WS_2 0190819_1350_NP _MD	RG_T4_U2_WS_2 0190819_1400_NP _MD	RG_T4_U1_WS_2 0190819_1415_NP _MD	RG_ER_U3_WS_2 0190819_1520_NP _MD	RG_ER_U2_WS_2 0190819_1530_NP _MD
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	34.8	34.3	33.0	32.2	32.2
	Chromium (Cr)-Total (mg/L)	0.00026	0.00014	0.00010	0.00013	0.00010
	Cobalt (Co)-Total (ug/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.064	0.012	<0.010	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	0.000092	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.0023	0.0022	0.0018	0.0018	0.0019
	Magnesium (Mg)-Total (mg/L)	11.8	11.0	10.1	11.0	10.1
	Manganese (Mn)-Total (mg/L)	0.00588	0.00196	0.00120	0.00140	0.00109
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)-Total (mg/L)	0.000749	0.000698	0.000636	0.000660	0.000656
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Total (mg/L)	0.505	0.472	0.468	0.470	0.455
	Selenium (Se)-Total (ug/L)	1.31	1.21	0.937	0.853	1.02
	Silicon (Si)-Total (mg/L)	1.97	1.55	1.36	1.41	1.29
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	3.48	3.00	2.71	3.01	2.71
	Strontium (Sr)-Total (mg/L)	0.155	0.142	0.128	0.137	0.130
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	0.00014	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.000674	0.000609	0.000577	0.000598	0.000565
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0035	0.0033	0.0037	0.0033	0.0040
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00033	0.00031	0.00029	0.00030	0.00032
	Barium (Ba)-Dissolved (mg/L)	0.0423	0.0429	0.0396	0.0372	0.0388
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Calcium (Ca)-Dissolved (mg/L)	36.2	34.0	33.9	32.5	32.6
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332094-6				
	Description	WS				
	Sampled Date	19-AUG-19				
	Sampled Time	15:40				
	Client ID	RG_ER_U1_WS_20190819_1540_NP_MD				
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	32.4				
	Chromium (Cr)-Total (mg/L)	0.00011				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	0.0019				
	Magnesium (Mg)-Total (mg/L)	10.3				
	Manganese (Mn)-Total (mg/L)	0.00110				
	Mercury (Hg)-Total (ug/L)	<0.00050				
	Molybdenum (Mo)-Total (mg/L)	0.000636				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Potassium (K)-Total (mg/L)	0.464				
	Selenium (Se)-Total (ug/L)	0.989				
	Silicon (Si)-Total (mg/L)	1.28				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	2.66				
	Strontium (Sr)-Total (mg/L)	0.128				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	0.000582				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
Dissolved Metals	Dissolved Mercury Filtration Location	LAB				
	Dissolved Metals Filtration Location	LAB				
	Aluminum (Al)-Dissolved (mg/L)	0.0039				
	Antimony (Sb)-Dissolved (mg/L)	<0.00010				
	Arsenic (As)-Dissolved (mg/L)	0.00030				
	Barium (Ba)-Dissolved (mg/L)	0.0395				
	Beryllium (Be)-Dissolved (ug/L)	<0.020				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	<0.010				
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050				
	Calcium (Ca)-Dissolved (mg/L)	31.6				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (ug/L)	<0.10				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332094-1	L2332094-2	L2332094-3	L2332094-4	L2332094-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	19-AUG-19	19-AUG-19	19-AUG-19	19-AUG-19	19-AUG-19
	Sampled Time	13:50	14:00	14:15	15:20	15:30
	Client ID	RG_T4_U3_WS_20190819_1350_NP_MD	RG_T4_U2_WS_20190819_1400_NP_MD	RG_T4_U1_WS_20190819_1415_NP_MD	RG_ER_U3_WS_20190819_1520_NP_MD	RG_ER_U2_WS_20190819_1530_NP_MD
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0023	0.0022	0.0019	0.0018	0.0018
	Magnesium (Mg)-Dissolved (mg/L)	10.5	9.97	9.39	9.25	9.27
	Manganese (Mn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000702	0.000650	0.000593	0.000590	0.000604
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Dissolved (mg/L)	0.479	0.455	0.438	0.431	0.444
	Selenium (Se)-Dissolved (ug/L)	1.35	1.29	1.01	0.871	1.01
	Silicon (Si)-Dissolved (mg/L)	1.81	1.42	1.22	1.28	1.13
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	3.23	2.83	2.58	2.81	2.56
	Strontium (Sr)-Dissolved (mg/L)	0.145	0.135	0.129	0.133	0.123
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000719	0.000682	0.000626	0.000653	0.000626
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332094-6				
	Description	WS				
	Sampled Date	19-AUG-19				
	Sampled Time	15:40				
	Client ID	RG_ER_U1_WS_20190819_1540_NP_MD				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	<0.00050				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0018				
	Magnesium (Mg)-Dissolved (mg/L)	9.39				
	Manganese (Mn)-Dissolved (mg/L)	<0.00010				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000599				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050				
	Potassium (K)-Dissolved (mg/L)	0.431				
	Selenium (Se)-Dissolved (ug/L)	0.979				
	Silicon (Si)-Dissolved (mg/L)	1.13				
	Silver (Ag)-Dissolved (mg/L)	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	2.45				
	Strontium (Sr)-Dissolved (mg/L)	0.129				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.000662				
	Vanadium (V)-Dissolved (mg/L)	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	<0.0010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC, dissolved metals and dissolved mercury must be filtered and preserved; appropriate codes added.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2332094-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2332094-1, -2, -3, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2332094-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2332094-1, -2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2332094-1, -2, -3, -4, -5, -6
Matrix Spike	Barium (Ba)-Total	MS-B	L2332094-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Total	MS-B	L2332094-1, -2, -3, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2332094-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Total	MS-B	L2332094-1, -2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Total	MS-B	L2332094-1, -2, -3, -4, -5, -6

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

Reference Information

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Reference Information

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

REP-Koocanusa 19-08

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4763736								
WG3140066-5 LCS								
Acidity (as CaCO3)			102.5		%		85-115	21-AUG-19
WG3140066-4 MB								
Acidity (as CaCO3)			<1.0		mg/L		2	21-AUG-19
ALK-MAN-CL	**Water**							
Batch R4763718								
WG3140072-9 DUP		**L2332094-4**						
Alkalinity, Total (as CaCO3)		110	108		mg/L	1.9	20	21-AUG-19
WG3140072-8 LCS								
Alkalinity, Total (as CaCO3)			99.9		%		85-115	21-AUG-19
WG3140072-7 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-AUG-19
BE-D-L-CCMS-VA	**Water**							
Batch R4765206								
WG3139722-2 LCS								
Beryllium (Be)-Dissolved			99.5		%		80-120	22-AUG-19
WG3139722-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	22-AUG-19
BE-T-L-CCMS-VA	**Water**							
Batch R4765303								
WG3139859-3 DUP		**L2332094-2**						
Beryllium (Be)-Total		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	23-AUG-19
WG3139859-2 LCS								
Beryllium (Be)-Total			94.1		%		80-120	23-AUG-19
WG3139859-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	23-AUG-19
WG3139859-4 MS		**L2332094-1**						
Beryllium (Be)-Total			92.9		%		70-130	23-AUG-19
BR-L-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Bromide (Br)			108.6		%		85-115	20-AUG-19
WG3139061-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	20-AUG-19
C-DIS-ORG-LOW-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-LOW-CL	**Water**							
Batch R4767322								
WG3141597-19 DUP		**L2332094-2**						
Dissolved Organic Carbon		0.98	0.98		mg/L	0.7	20	22-AUG-19
WG3141597-18 LCS								
Dissolved Organic Carbon			109.9		%		80-120	22-AUG-19
WG3141597-17 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	22-AUG-19
WG3141597-20 MS		**L2332094-3**						
Dissolved Organic Carbon			89.7		%		70-130	22-AUG-19
C-TOT-ORG-LOW-CL	**Water**							
Batch R4767322								
WG3141597-19 DUP		**L2332094-2**						
Total Organic Carbon		0.99	0.95		mg/L	4.1	20	22-AUG-19
WG3141597-18 LCS								
Total Organic Carbon			116.5		%		80-120	22-AUG-19
WG3141597-17 MB								
Total Organic Carbon			<0.50		mg/L		0.5	22-AUG-19
WG3141597-20 MS		**L2332094-3**						
Total Organic Carbon			93.5		%		70-130	22-AUG-19
CL-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Chloride (Cl)			103.0		%		90-110	20-AUG-19
WG3139061-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	20-AUG-19
EC-L-PCT-CL	**Water**							
Batch R4763718								
WG3140072-9 DUP		**L2332094-4**						
Conductivity (@ 25C)		250	250		uS/cm	0.0	10	21-AUG-19
WG3140072-8 LCS								
Conductivity (@ 25C)			100.6		%		90-110	21-AUG-19
WG3140072-7 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	21-AUG-19
F-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Fluoride (F)			108.9		%		90-110	20-AUG-19
WG3139061-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	20-AUG-19
HG-D-CVAA-VA	**Water**							
Batch R4767842								
WG3141526-3 DUP		**L2332094-6**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	24-AUG-19
WG3141526-2 LCS								
Mercury (Hg)-Dissolved			93.2		%		80-120	24-AUG-19
WG3141526-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	24-AUG-19
HG-T-U-CVAF-VA	**Water**							
Batch R4768565								
WG3143342-2 LCS								
Mercury (Hg)-Total			80.6		%		80-120	24-AUG-19
WG3143342-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	24-AUG-19
MET-D-CCMS-VA	**Water**							
Batch R4765206								
WG3139722-2 LCS								
Aluminum (Al)-Dissolved			96.4		%		80-120	22-AUG-19
Antimony (Sb)-Dissolved			93.8		%		80-120	22-AUG-19
Arsenic (As)-Dissolved			93.4		%		80-120	22-AUG-19
Barium (Ba)-Dissolved			95.6		%		80-120	22-AUG-19
Bismuth (Bi)-Dissolved			92.0		%		80-120	22-AUG-19
Boron (B)-Dissolved			96.2		%		80-120	22-AUG-19
Cadmium (Cd)-Dissolved			93.2		%		80-120	22-AUG-19
Calcium (Ca)-Dissolved			96.5		%		80-120	22-AUG-19
Chromium (Cr)-Dissolved			94.7		%		80-120	22-AUG-19
Cobalt (Co)-Dissolved			92.4		%		80-120	22-AUG-19
Copper (Cu)-Dissolved			92.2		%		80-120	22-AUG-19
Iron (Fe)-Dissolved			94.7		%		80-120	22-AUG-19
Lead (Pb)-Dissolved			97.4		%		80-120	22-AUG-19
Lithium (Li)-Dissolved			99.4		%		80-120	22-AUG-19
Magnesium (Mg)-Dissolved			97.0		%		80-120	22-AUG-19
Manganese (Mn)-Dissolved			94.9		%		80-120	22-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4765206								
WG3139722-2 LCS								
Molybdenum (Mo)-Dissolved			96.3		%		80-120	22-AUG-19
Nickel (Ni)-Dissolved			95.1		%		80-120	22-AUG-19
Potassium (K)-Dissolved			98.9		%		80-120	22-AUG-19
Selenium (Se)-Dissolved			93.6		%		80-120	22-AUG-19
Silicon (Si)-Dissolved			95.4		%		60-140	22-AUG-19
Silver (Ag)-Dissolved			93.3		%		80-120	22-AUG-19
Sodium (Na)-Dissolved			97.1		%		80-120	22-AUG-19
Strontium (Sr)-Dissolved			100.6		%		80-120	22-AUG-19
Thallium (Tl)-Dissolved			98.3		%		80-120	22-AUG-19
Tin (Sn)-Dissolved			96.4		%		80-120	22-AUG-19
Titanium (Ti)-Dissolved			95.8		%		80-120	22-AUG-19
Uranium (U)-Dissolved			100.9		%		80-120	22-AUG-19
Vanadium (V)-Dissolved			96.8		%		80-120	22-AUG-19
Zinc (Zn)-Dissolved			97.8		%		80-120	22-AUG-19
WG3139722-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	22-AUG-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	22-AUG-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	22-AUG-19
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	22-AUG-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	22-AUG-19
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	22-AUG-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	22-AUG-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	22-AUG-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	22-AUG-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	22-AUG-19
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	22-AUG-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	22-AUG-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	22-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4765206								
WG3139722-1 MB		**LF**						
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	22-AUG-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	22-AUG-19
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	22-AUG-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	22-AUG-19
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	22-AUG-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	22-AUG-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	22-AUG-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	22-AUG-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	22-AUG-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	22-AUG-19
MET-T-CCMS-VA	**Water**							
Batch R4765303								
WG3139859-3 DUP		**L2332094-2**						
Aluminum (Al)-Total		0.0165	0.0196		mg/L	17	20	23-AUG-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-AUG-19
Arsenic (As)-Total		0.00037	0.00038		mg/L	2.1	20	23-AUG-19
Barium (Ba)-Total		0.0435	0.0425		mg/L	2.2	20	23-AUG-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-AUG-19
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-AUG-19
Cadmium (Cd)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	23-AUG-19
Calcium (Ca)-Total		34.3	35.8		mg/L	4.2	20	23-AUG-19
Chromium (Cr)-Total		0.00014	0.00015		mg/L	5.5	20	23-AUG-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-AUG-19
Copper (Cu)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-AUG-19
Iron (Fe)-Total		0.012	0.015		mg/L	18	20	23-AUG-19
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-AUG-19
Lithium (Li)-Total		0.0022	0.0022		mg/L	3.3	20	23-AUG-19
Magnesium (Mg)-Total		11.0	10.9		mg/L	1.3	20	23-AUG-19
Manganese (Mn)-Total		0.00196	0.00196		mg/L	0.2	20	23-AUG-19
Molybdenum (Mo)-Total		0.000698	0.000719		mg/L	3.0	20	23-AUG-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-AUG-19
Potassium (K)-Total		0.472	0.484		mg/L	2.6	20	23-AUG-19
Selenium (Se)-Total		0.00121	0.00116		mg/L	4.6	20	23-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4765303								
WG3139859-3 DUP		**L2332094-2**						
Silicon (Si)-Total		1.55	1.57		mg/L	1.3	20	23-AUG-19
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	23-AUG-19
Sodium (Na)-Total		3.00	3.01		mg/L	0.5	20	23-AUG-19
Strontium (Sr)-Total		0.142	0.139		mg/L	2.2	20	23-AUG-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	23-AUG-19
Tin (Sn)-Total		0.00014	0.00014		mg/L	2.0	20	23-AUG-19
Titanium (Ti)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-AUG-19
Uranium (U)-Total		0.000609	0.000607		mg/L	0.2	20	23-AUG-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-AUG-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	23-AUG-19
WG3139859-2 LCS								
Aluminum (Al)-Total			101.2		%		80-120	23-AUG-19
Antimony (Sb)-Total			97.2		%		80-120	23-AUG-19
Arsenic (As)-Total			100.9		%		80-120	23-AUG-19
Barium (Ba)-Total			99.2		%		80-120	23-AUG-19
Bismuth (Bi)-Total			88.3		%		80-120	23-AUG-19
Boron (B)-Total			95.9		%		80-120	23-AUG-19
Cadmium (Cd)-Total			102.3		%		80-120	23-AUG-19
Calcium (Ca)-Total			97.0		%		80-120	23-AUG-19
Chromium (Cr)-Total			103.2		%		80-120	23-AUG-19
Cobalt (Co)-Total			98.9		%		80-120	23-AUG-19
Copper (Cu)-Total			99.5		%		80-120	23-AUG-19
Iron (Fe)-Total			101.4		%		80-120	23-AUG-19
Lead (Pb)-Total			93.1		%		80-120	23-AUG-19
Lithium (Li)-Total			97.0		%		80-120	23-AUG-19
Magnesium (Mg)-Total			101.2		%		80-120	23-AUG-19
Manganese (Mn)-Total			102.4		%		80-120	23-AUG-19
Molybdenum (Mo)-Total			101.2		%		80-120	23-AUG-19
Nickel (Ni)-Total			100.0		%		80-120	23-AUG-19
Potassium (K)-Total			103.9		%		80-120	23-AUG-19
Selenium (Se)-Total			98.9		%		80-120	23-AUG-19
Silicon (Si)-Total			105.4		%		80-120	23-AUG-19
Silver (Ag)-Total			102.4		%		80-120	23-AUG-19
Sodium (Na)-Total			101.0		%		80-120	23-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4765303								
WG3139859-2 LCS								
Strontium (Sr)-Total			101.1		%		80-120	23-AUG-19
Thallium (Tl)-Total			88.8		%		80-120	23-AUG-19
Tin (Sn)-Total			101.4		%		80-120	23-AUG-19
Titanium (Ti)-Total			93.7		%		80-120	23-AUG-19
Uranium (U)-Total			88.4		%		80-120	23-AUG-19
Vanadium (V)-Total			100.9		%		80-120	23-AUG-19
Zinc (Zn)-Total			100.0		%		80-120	23-AUG-19
WG3139859-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	23-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	23-AUG-19
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	23-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	23-AUG-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	23-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	23-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	23-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	23-AUG-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	23-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	23-AUG-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	23-AUG-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	23-AUG-19
Sodium (Na)-Total			<0.050		mg/L		0.05	23-AUG-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	23-AUG-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	23-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	23-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4765303								
WG3139859-1 MB								
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	23-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	23-AUG-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	23-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	23-AUG-19
WG3139859-4 MS		**L2332094-1**						
Aluminum (Al)-Total			99.0		%		70-130	23-AUG-19
Antimony (Sb)-Total			99.7		%		70-130	23-AUG-19
Arsenic (As)-Total			101.8		%		70-130	23-AUG-19
Barium (Ba)-Total			N/A	MS-B	%		-	23-AUG-19
Bismuth (Bi)-Total			93.4		%		70-130	23-AUG-19
Boron (B)-Total			90.4		%		70-130	23-AUG-19
Cadmium (Cd)-Total			105.1		%		70-130	23-AUG-19
Calcium (Ca)-Total			N/A	MS-B	%		-	23-AUG-19
Chromium (Cr)-Total			102.5		%		70-130	23-AUG-19
Cobalt (Co)-Total			98.4		%		70-130	23-AUG-19
Copper (Cu)-Total			99.2		%		70-130	23-AUG-19
Iron (Fe)-Total			98.3		%		70-130	23-AUG-19
Lead (Pb)-Total			94.2		%		70-130	23-AUG-19
Lithium (Li)-Total			98.1		%		70-130	23-AUG-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	23-AUG-19
Manganese (Mn)-Total			98.7		%		70-130	23-AUG-19
Molybdenum (Mo)-Total			102.1		%		70-130	23-AUG-19
Nickel (Ni)-Total			98.5		%		70-130	23-AUG-19
Potassium (K)-Total			101.6		%		70-130	23-AUG-19
Selenium (Se)-Total			98.6		%		70-130	23-AUG-19
Silicon (Si)-Total			95.9		%		70-130	23-AUG-19
Silver (Ag)-Total			106.1		%		70-130	23-AUG-19
Sodium (Na)-Total			N/A	MS-B	%		-	23-AUG-19
Strontium (Sr)-Total			N/A	MS-B	%		-	23-AUG-19
Thallium (Tl)-Total			89.7		%		70-130	23-AUG-19
Tin (Sn)-Total			103.5		%		70-130	23-AUG-19
Titanium (Ti)-Total			95.8		%		70-130	23-AUG-19
Uranium (U)-Total			89.8		%		70-130	23-AUG-19
Vanadium (V)-Total			101.3		%		70-130	23-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4765303								
WG3139859-4 MS		**L2332094-1**						
Zinc (Zn)-Total			97.8		%		70-130	23-AUG-19
NH3-L-F-CL	**Water**							
Batch R4768758								
WG3141851-10 LCS								
Ammonia as N			102.6		%		85-115	23-AUG-19
WG3141851-9 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-AUG-19
NO2-L-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Nitrite (as N)			105.3		%		90-110	20-AUG-19
WG3139061-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	20-AUG-19
NO3-L-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Nitrate (as N)			101.6		%		90-110	20-AUG-19
WG3139061-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	20-AUG-19
ORP-CL	**Water**							
Batch R4768422								
WG3143171-1 CRM		**CL-ORP**						
ORP			220		mV		210-230	24-AUG-19
WG3143171-2 DUP		**L2332094-1**						
ORP		435	432	J	mV	3.5	15	24-AUG-19
P-T-L-COL-CL	**Water**							
Batch R4765058								
WG3140294-14 LCS								
Phosphorus (P)-Total			102.2		%		80-120	22-AUG-19
WG3140294-4 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	22-AUG-19
PH-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-CL	**Water**							
Batch R4763718								
WG3140072-9 DUP		**L2332094-4**						
pH		8.30	8.30	J	pH	0.00	0.2	21-AUG-19
WG3140072-8 LCS								
pH			7.01		pH		6.9-7.1	21-AUG-19
PO4-DO-L-COL-CL	**Water**							
Batch R4759717								
WG3137802-6 LCS								
Orthophosphate-Dissolved (as P)			101.4		%		80-120	20-AUG-19
WG3137802-9 LCS								
Orthophosphate-Dissolved (as P)			102.4		%		80-120	20-AUG-19
WG3137802-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	19-AUG-19
WG3137802-2 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	20-AUG-19
SO4-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Sulfate (SO4)			103.1		%		90-110	20-AUG-19
WG3139061-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	20-AUG-19
SOLIDS-TDS-CL	**Water**							
Batch R4768900								
WG3141391-8 LCS								
Total Dissolved Solids			95.1		%		85-115	23-AUG-19
WG3141391-7 MB								
Total Dissolved Solids			<10		mg/L		10	23-AUG-19
TKN-L-F-CL	**Water**							
Batch R4768755								
WG3143573-10 LCS								
Total Kjeldahl Nitrogen			105.7		%		75-125	26-AUG-19
WG3143573-14 LCS								
Total Kjeldahl Nitrogen			100.6		%		75-125	26-AUG-19
WG3143573-2 LCS								
Total Kjeldahl Nitrogen			109.3		%		75-125	26-AUG-19
WG3143573-6 LCS								
Total Kjeldahl Nitrogen			105.2		%		75-125	26-AUG-19
WG3143573-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R4768755								
WG3143573-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	26-AUG-19
WG3143573-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	26-AUG-19
WG3143573-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	26-AUG-19
WG3143573-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	26-AUG-19
TSS-L-CL	**Water**							
Batch R4768742								
WG3140730-6 LCS								
Total Suspended Solids			91.8		%		85-115	23-AUG-19
WG3140730-5 MB								
Total Suspended Solids			<1.0		mg/L		1	23-AUG-19
TURBIDITY-CL	**Water**							
Batch R4761731								
WG3138445-9 DUP		**L2332094-2**						
Turbidity		0.74	0.76		NTU	2.0	15	20-AUG-19
WG3138445-5 LCS								
Turbidity			94.5		%		85-115	20-AUG-19
WG3138445-8 LCS								
Turbidity			95.5		%		85-115	20-AUG-19
WG3138445-4 MB								
Turbidity			<0.10		NTU		0.1	20-AUG-19
WG3138445-7 MB								
Turbidity			<0.10		NTU		0.1	20-AUG-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	19-AUG-19 13:50	24-AUG-19 09:00	0.25	115	hours	EHTR-FM
	2	19-AUG-19 14:00	24-AUG-19 09:00	0.25	115	hours	EHTR-FM
	3	19-AUG-19 14:15	24-AUG-19 09:00	0.25	115	hours	EHTR-FM
	4	19-AUG-19 15:20	24-AUG-19 09:00	0.25	114	hours	EHTR-FM
	5	19-AUG-19 15:30	24-AUG-19 09:00	0.25	114	hours	EHTR-FM
	6	19-AUG-19 15:40	24-AUG-19 09:00	0.25	113	hours	EHTR-FM
pH							
	1	19-AUG-19 13:50	21-AUG-19 09:00	0.25	43	hours	EHTR-FM
	2	19-AUG-19 14:00	21-AUG-19 09:00	0.25	43	hours	EHTR-FM
	3	19-AUG-19 14:15	21-AUG-19 09:00	0.25	43	hours	EHTR-FM
	4	19-AUG-19 15:20	21-AUG-19 09:00	0.25	42	hours	EHTR-FM
	5	19-AUG-19 15:30	21-AUG-19 09:00	0.25	42	hours	EHTR-FM
	6	19-AUG-19 15:40	21-AUG-19 09:00	0.25	41	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2332094 were received on 20-AUG-19 09:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: REP-Koocanusa 19-08 | TURNAROUND TIME:

PROJECT/CLIENT INFO				LABORATORY			
Facility Name / Job#	Regional Effects Program/Koocanusa			Lab Name	ALS Calgary		
Project Manager	Cait Good			Lab Contact	Lyudmyla Shvets		
Email	cait.good@teck.com			Email	lyudmyla.shvets@alsglobal.com		
Address	421 Pine Avenue			Address	2559 29 Street NE		
City	Sparwood	Province	BC	City	Calgary	Province	AB
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada
Phone Number	250-425-8202			Phone Number	1 403 407 1794		

	Excel	PDF	EDD
cait.good@teck.com	x	x	x
teckcoal@ecuisonline.com			x
hcurrier@minnow.ca	x	x	x
carlie.meyer@teck.com	x	x	x

PO Number VPO00616180

L2332094-COFC

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS FILTERED	N	N	N	N	N	N	N
									PRESERVED			H2SO4			HNO3	
									ANALYSIS	TECKCOAL-ROUTINE-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-T-U-CVAF-VA	HG-D-CVAF-VA	TECKCOAL-MET-T-VA	TECKCOAL-MET-D-VA
1	RG-T4-U3-WS-20190819-1350-NP-MD	RG-T4	WS	No	20190819	1350	G	7		X	X	X	X	X	X	X
2	RG-T4-U2-WS-20190819-1400-NP-MD	RG-T4	WS	No	20190819	1400	G	7		X	X	X	X	X	X	X
3	RG-T4-U1-WS-20190819-1415-NP-MD	RG-T4	WS	No	20190819	1415	G	7		X	X	X	X	X	X	X
4	RG-ER-U3-WS-20190819-1520-NP-MD	RG-ER	WS	No	20190819	1520	G	7		X	X	X	X	X	X	X
5	RG-ER-U2-WS-20190819-1530-NP-MD	RG-ER	WS	No	20190819	1530	G	7		X	X	X	X	X	X	X
6	RG-ER-U1-WS-20190819-1540-NP-MD	RG-ER	WS	No	20190819	1540	G	7		X	X	X	X	X	X	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			VK	8/20 0900

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	x
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Marc Giorgio	Mobile #	(519) 641 9249
Sampler's Signature		Date/Time	19-AUG-19

7°C

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 20-AUG-19
Report Date: 27-AUG-19 15:53 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2332191

Project P.O. #: VPO00616180
Job Reference: REGIONAL EFFECTS PROGRAM/KOOCANUSA
C of C Numbers: REP-Koocanusa 19-08
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332191-1	L2332191-2	L2332191-3	L2332191-4	L2332191-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	19-AUG-19	19-AUG-19	19-AUG-19	19-AUG-19	19-AUG-19
	Sampled Time	11:42	12:00	12:10	12:20	12:15
	Client ID	RG_GC_U3_WS_20190819_1142_NP_MD	RG_GC_U2_WS_20190819_1200_NP_MD	RG_GC_U1_WS_20190819_1210_NP_MD	RG_DUP_WS_20190819_1220_NP_MD	RG_BLANK_WS_20190819_1215_NP_MD
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	258	255	236	237	<2.0
	Hardness (as CaCO3) (mg/L)	130	128	118	121	<0.50
	pH (pH)	8.10	8.26	8.33	8.34	5.56
	ORP (mV)	313	485	364	399	496
	Total Suspended Solids (mg/L)	9.7	1.5	<1.0	1.7	<1.0
	Total Dissolved Solids (mg/L)	148 DLHC	141 DLHC	125 DLHC	129 DLHC	<10
	Turbidity (NTU)	6.41	0.81	0.90	0.89	<0.10
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	1.7	<1.0	<1.0	<1.0	1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	113	112	102	98.3	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	3.0	3.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	113	112	105	101	<1.0
	Ammonia as N (mg/L)	0.0102	0.0119	0.0103	0.0061	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	2.08	2.25	1.87	1.90	<0.50
	Fluoride (F) (mg/L)	0.101	0.094	0.088	0.090	<0.020
	Ion Balance (%)	94.6	94.2	94.2	99.0	0.0
	Nitrate (as N) (mg/L)	0.318	0.192	0.139	0.140	<0.0050
	Nitrite (as N) (mg/L)	0.0036	0.0024	0.0020	0.0021	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.101	0.077	0.114	0.094	<0.050
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0035	<0.0020	<0.0020	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	25.7	25.4	21.9	21.8	<0.30
	Anion Sum (meq/L)	2.88	2.86	2.63	2.55	<0.10
	Cation Sum (meq/L)	2.73	2.69	2.48	2.52	<0.10
	Cation - Anion Balance (%)	-2.8	-3.0	-3.0	-0.5	0.0
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.85	0.90	1.04	1.14	<0.50
	Total Organic Carbon (mg/L)	0.85	1.12	1.24	1.19	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.131	0.0171	0.0198	0.0165	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00042	0.00032	0.00035	0.00031	<0.00010
	Barium (Ba)-Total (mg/L)	0.0447	0.0433	0.0398	0.0392	<0.00010
	Beryllium (Be)-Total (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (ug/L)	0.0071	<0.0050	<0.0050	<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332191-6				
	Description	WS				
	Sampled Date	19-AUG-19				
	Sampled Time					
	Client ID	RG_TRIP_WS_20190819_0000_NP_MD				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	<2.0				
	Hardness (as CaCO3) (mg/L)	<0.50				
	pH (pH)	5.37				
	ORP (mV)	414				
	Total Suspended Solids (mg/L)	<1.0				
	Total Dissolved Solids (mg/L)	<10				
	Turbidity (NTU)	<0.10				
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	1.9				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0				
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0				
	Ammonia as N (mg/L)	<0.0050				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	<0.50				
	Fluoride (F) (mg/L)	<0.020				
	Ion Balance (%)	0.0				
	Nitrate (as N) (mg/L)	<0.0050				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	<0.050				
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	<0.0020				
	Sulfate (SO4) (mg/L)	<0.30				
	Anion Sum (meq/L)	<0.10				
	Cation Sum (meq/L)	<0.10				
	Cation - Anion Balance (%)	0.0				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)					
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030				
	Antimony (Sb)-Total (mg/L)	<0.00010				
	Arsenic (As)-Total (mg/L)	<0.00010				
	Barium (Ba)-Total (mg/L)	<0.00010				
	Beryllium (Be)-Total (ug/L)	<0.020				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (ug/L)	<0.0050				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332191-1	L2332191-2	L2332191-3	L2332191-4	L2332191-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	19-AUG-19	19-AUG-19	19-AUG-19	19-AUG-19	19-AUG-19
	Sampled Time	11:42	12:00	12:10	12:20	12:15
	Client ID	RG_GC_U3_WS_20190819_1142_NP_MD	RG_GC_U2_WS_20190819_1200_NP_MD	RG_GC_U1_WS_20190819_1210_NP_MD	RG_DUP_WS_20190819_1220_NP_MD	RG_BLANK_WS_20190819_1215_NP_MD
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	33.9	35.5	31.0	32.3	<0.050
	Chromium (Cr)-Total (mg/L)	0.00028	0.00012	0.00013	0.00012	<0.00010
	Cobalt (Co)-Total (ug/L)	0.11	<0.10	<0.10	<0.10	<0.10
	Copper (Cu)-Total (mg/L)	0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.184	0.017	0.013	0.012	<0.010
	Lead (Pb)-Total (mg/L)	0.000187	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.0022	0.0020	0.0017	0.0018	<0.0010
	Magnesium (Mg)-Total (mg/L)	10.7	10.5	9.73	10.1	<0.10
	Manganese (Mn)-Total (mg/L)	0.0169	0.00281	0.00119	0.00111	<0.00010
	Mercury (Hg)-Total (ug/L)	0.00066	<0.00050	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)-Total (mg/L)	0.000698	0.000654	0.000610	0.000639	<0.000050
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Total (mg/L)	0.482	0.468	0.449	0.461	<0.050
	Selenium (Se)-Total (ug/L)	1.13	0.978	0.926	0.968	<0.050
	Silicon (Si)-Total (mg/L)	2.62	1.83	1.34	1.33	<0.10
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	2.61	3.06	2.48	2.51	<0.050
	Strontium (Sr)-Total (mg/L)	0.147	0.140	0.126	0.126	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	0.00052	0.00014	0.00017	0.00014	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.000626	0.000607	0.000571	0.000569	<0.000010
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0030	0.0032	0.0036	0.0045	<0.0030
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00030	0.00028	0.00033	0.00028	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.0412	0.0414	0.0394	0.0388	<0.00010
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Calcium (Ca)-Dissolved (mg/L)	35.4	34.7	32.2	33.6	<0.050
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332191-6				
	Description	WS				
	Sampled Date	19-AUG-19				
	Sampled Time					
	Client ID	RG_TRIP_WS_20190819_0000_NP_MD				
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	<0.050				
	Chromium (Cr)-Total (mg/L)	0.00013 RRV				
	Cobalt (Co)-Total (ug/L)	<0.10				
	Copper (Cu)-Total (mg/L)	<0.00050				
	Iron (Fe)-Total (mg/L)	<0.010				
	Lead (Pb)-Total (mg/L)	<0.000050				
	Lithium (Li)-Total (mg/L)	<0.0010				
	Magnesium (Mg)-Total (mg/L)	<0.10				
	Manganese (Mn)-Total (mg/L)	<0.00010				
	Mercury (Hg)-Total (ug/L)	<0.00050				
	Molybdenum (Mo)-Total (mg/L)	<0.000050				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Potassium (K)-Total (mg/L)	<0.050				
	Selenium (Se)-Total (ug/L)	<0.050				
	Silicon (Si)-Total (mg/L)	<0.10				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	<0.050				
	Strontium (Sr)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	0.00033 RRV				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	<0.000010				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (ug/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (ug/L)					
	Calcium (Ca)-Dissolved (mg/L)	<0.050				
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (ug/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2332191-1 WS 19-AUG-19 11:42 RG_GC_U3_WS_20190819_1142_NP_MD	L2332191-2 WS 19-AUG-19 12:00 RG_GC_U2_WS_20190819_1200_NP_MD	L2332191-3 WS 19-AUG-19 12:10 RG_GC_U1_WS_20190819_1210_NP_MD	L2332191-4 WS 19-AUG-19 12:20 RG_DUP_WS_20190819_1220_NP_MD	L2332191-5 WS 19-AUG-19 12:15 RG_BLANK_WS_20190819_1215_NP_MD
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0022	0.0020	0.0018	0.0019	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	10.1	10.0	9.19	8.97	<0.10
	Manganese (Mn)-Dissolved (mg/L)	0.00102	<0.00010	<0.00010	<0.00010	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000656	0.000615	0.000585	0.000602	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Dissolved (mg/L)	0.452	0.471	0.443	0.437	<0.050
	Selenium (Se)-Dissolved (ug/L)	1.31	0.935	0.949	0.924	<0.050
	Silicon (Si)-Dissolved (mg/L)	2.24	1.64	1.19	1.23	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.61	2.79	2.41	2.28	<0.050
	Strontium (Sr)-Dissolved (mg/L)	0.141	0.133	0.123	0.120	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	0.00034	0.00011	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000670	0.000670	0.000653	0.000607	<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0016	<0.0010	<0.0010	<0.0010	<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2332191-6				
	Description	WS				
	Sampled Date	19-AUG-19				
	Sampled Time					
	Client ID	RG_TRIP_WS_20190819_0000_NP_MD				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)	<0.0050				
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)	<0.050				
	Selenium (Se)-Dissolved (ug/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)	<0.050				
	Strontium (Sr)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC, dissolved metals and dissolved mercury must be filtered and preserved; appropriate codes added.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2332191-1, -2, -3, -4, -5
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2332191-1, -2, -3, -4, -5
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2332191-1, -2, -3, -4, -5
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2332191-1, -2, -3, -4, -5
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2332191-1, -2, -3, -4, -5
Matrix Spike	Barium (Ba)-Total	MS-B	L2332191-1, -2, -3, -4, -5, -6
Matrix Spike	Barium (Ba)-Total	MS-B	L2332191-6
Matrix Spike	Calcium (Ca)-Total	MS-B	L2332191-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Total	MS-B	L2332191-6
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2332191-1, -2, -3, -4, -5, -6
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2332191-6
Matrix Spike	Manganese (Mn)-Total	MS-B	L2332191-6
Matrix Spike	Selenium (Se)-Total	MS-B	L2332191-6
Matrix Spike	Sodium (Na)-Total	MS-B	L2332191-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Total	MS-B	L2332191-6
Matrix Spike	Strontium (Sr)-Total	MS-B	L2332191-1, -2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Total	MS-B	L2332191-6
Matrix Spike	Uranium (U)-Total	MS-B	L2332191-6

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

Reference Information

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL Water Total Organic Carbon APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

CL-IC-N-CL Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL Water Electrical Conductivity (EC) APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-CL Water Hardness APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA Water Total Mercury in Water by CVAFS (Ultra) EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-CL Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

Reference Information

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL Water Oxidation redution potential by elect. ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

REP-Koocanusa 19-08

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4763736								
WG3140066-6 DUP		**L2332191-1**						
Acidity (as CaCO3)		1.7	1.6		mg/L	4.8	20	21-AUG-19
WG3140066-5 LCS								
Acidity (as CaCO3)			102.5		%		85-115	21-AUG-19
WG3140066-4 MB								
Acidity (as CaCO3)			<1.0		mg/L		2	21-AUG-19
ALK-MAN-CL	**Water**							
Batch R4763718								
WG3140072-11 LCS								
Alkalinity, Total (as CaCO3)			101.7		%		85-115	21-AUG-19
WG3140072-8 LCS								
Alkalinity, Total (as CaCO3)			99.9		%		85-115	21-AUG-19
WG3140072-10 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-AUG-19
WG3140072-7 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-AUG-19
BE-D-L-CCMS-VA	**Water**							
Batch R4765206								
WG3139722-3 DUP		**L2332191-1**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	22-AUG-19
WG3139722-2 LCS								
Beryllium (Be)-Dissolved			99.5		%		80-120	22-AUG-19
WG3139722-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	22-AUG-19
WG3139722-4 MS		**L2332191-2**						
Beryllium (Be)-Dissolved			105.4		%		70-130	22-AUG-19
BE-T-L-CCMS-VA	**Water**							
Batch R4765303								
WG3139859-2 LCS								
Beryllium (Be)-Total			94.1		%		80-120	23-AUG-19
WG3139859-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	23-AUG-19
BR-L-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Bromide (Br)			108.6		%		85-115	20-AUG-19
WG3139061-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	20-AUG-19
C-DIS-ORG-LOW-CL	**Water**							
Batch R4767894								
WG3142479-3 DUP		**L2332191-4**						
Dissolved Organic Carbon		1.14	1.20		mg/L	5.2	20	23-AUG-19
WG3142479-2 LCS								
Dissolved Organic Carbon			90.5		%		80-120	23-AUG-19
WG3142479-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	23-AUG-19
WG3142479-4 MS		**L2332191-5**						
Dissolved Organic Carbon			92.9		%		70-130	23-AUG-19
C-TOT-ORG-LOW-CL	**Water**							
Batch R4767894								
WG3142479-3 DUP		**L2332191-4**						
Total Organic Carbon		1.19	1.09		mg/L	8.2	20	23-AUG-19
WG3142479-2 LCS								
Total Organic Carbon			86.6		%		80-120	23-AUG-19
WG3142479-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-AUG-19
WG3142479-4 MS		**L2332191-5**						
Total Organic Carbon			92.9		%		70-130	23-AUG-19
CL-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Chloride (Cl)			103.0		%		90-110	20-AUG-19
WG3139061-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	20-AUG-19
EC-L-PCT-CL	**Water**							
Batch R4763718								
WG3140072-11 LCS								
Conductivity (@ 25C)			101.8		%		90-110	21-AUG-19
WG3140072-8 LCS								
Conductivity (@ 25C)			100.6		%		90-110	21-AUG-19
WG3140072-10 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	21-AUG-19
WG3140072-7 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-L-PCT-CL	**Water**							
Batch R4763718								
WG3140072-7 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	21-AUG-19
F-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Fluoride (F)			108.9		%		90-110	20-AUG-19
WG3139061-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	20-AUG-19
HG-D-CVAA-VA	**Water**							
Batch R4765509								
WG3141688-3 DUP		**L2332191-2**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	23-AUG-19
WG3141688-2 LCS								
Mercury (Hg)-Dissolved			97.6		%		80-120	23-AUG-19
WG3141688-1 MB		**LF**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	23-AUG-19
HG-T-U-CVAF-VA	**Water**							
Batch R4768565								
WG3143342-2 LCS								
Mercury (Hg)-Total			80.6		%		80-120	24-AUG-19
WG3143342-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	24-AUG-19
WG3143342-4 MS		**L2332191-4**						
Mercury (Hg)-Total			87.5		%		70-130	24-AUG-19
MET-D-CCMS-CL	**Water**							
Batch R4769796								
WG3144714-2 LCS								
Calcium (Ca)-Dissolved			92.5		%		80-120	27-AUG-19
Magnesium (Mg)-Dissolved			102.1		%		80-120	27-AUG-19
Potassium (K)-Dissolved			103.7		%		80-120	27-AUG-19
Sodium (Na)-Dissolved			97.5		%		80-120	27-AUG-19
WG3144714-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	27-AUG-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	27-AUG-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	27-AUG-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	27-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4765206								
WG3139722-3 DUP		**L2332191-1**						
Aluminum (Al)-Dissolved		0.0030	0.0036		mg/L	17	20	22-AUG-19
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-AUG-19
Arsenic (As)-Dissolved		0.00030	0.00030		mg/L	1.4	20	22-AUG-19
Barium (Ba)-Dissolved		0.0412	0.0408		mg/L	1.1	20	22-AUG-19
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	22-AUG-19
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-AUG-19
Cadmium (Cd)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	22-AUG-19
Calcium (Ca)-Dissolved		35.4	34.8		mg/L	1.9	20	22-AUG-19
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-AUG-19
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-AUG-19
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	22-AUG-19
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-AUG-19
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	22-AUG-19
Lithium (Li)-Dissolved		0.0022	0.0021		mg/L	6.2	20	22-AUG-19
Magnesium (Mg)-Dissolved		10.1	9.66		mg/L	4.5	20	22-AUG-19
Manganese (Mn)-Dissolved		0.00102	0.00099		mg/L	3.2	20	22-AUG-19
Molybdenum (Mo)-Dissolved		0.000656	0.000662		mg/L	0.8	20	22-AUG-19
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	22-AUG-19
Potassium (K)-Dissolved		0.452	0.450		mg/L	0.5	20	22-AUG-19
Selenium (Se)-Dissolved		0.00131	0.00119		mg/L	9.8	20	22-AUG-19
Silicon (Si)-Dissolved		2.24	2.18		mg/L	2.9	20	22-AUG-19
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	22-AUG-19
Sodium (Na)-Dissolved		2.61	2.53		mg/L	3.2	20	22-AUG-19
Strontium (Sr)-Dissolved		0.141	0.137		mg/L	2.3	20	22-AUG-19
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	22-AUG-19
Tin (Sn)-Dissolved		0.00034	0.00032		mg/L	4.7	20	22-AUG-19
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-AUG-19
Uranium (U)-Dissolved		0.000670	0.000656		mg/L	2.2	20	22-AUG-19
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	22-AUG-19
Zinc (Zn)-Dissolved		0.0016	0.0016		mg/L	0.0	20	22-AUG-19
WG3139722-2 LCS								
Aluminum (Al)-Dissolved			96.4		%		80-120	22-AUG-19
Antimony (Sb)-Dissolved			93.8		%		80-120	22-AUG-19
Arsenic (As)-Dissolved			93.4		%		80-120	22-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4765206								
WG3139722-2 LCS								
Barium (Ba)-Dissolved			95.6		%		80-120	22-AUG-19
Bismuth (Bi)-Dissolved			92.0		%		80-120	22-AUG-19
Boron (B)-Dissolved			96.2		%		80-120	22-AUG-19
Cadmium (Cd)-Dissolved			93.2		%		80-120	22-AUG-19
Calcium (Ca)-Dissolved			96.5		%		80-120	22-AUG-19
Chromium (Cr)-Dissolved			94.7		%		80-120	22-AUG-19
Cobalt (Co)-Dissolved			92.4		%		80-120	22-AUG-19
Copper (Cu)-Dissolved			92.2		%		80-120	22-AUG-19
Iron (Fe)-Dissolved			94.7		%		80-120	22-AUG-19
Lead (Pb)-Dissolved			97.4		%		80-120	22-AUG-19
Lithium (Li)-Dissolved			99.4		%		80-120	22-AUG-19
Magnesium (Mg)-Dissolved			97.0		%		80-120	22-AUG-19
Manganese (Mn)-Dissolved			94.9		%		80-120	22-AUG-19
Molybdenum (Mo)-Dissolved			96.3		%		80-120	22-AUG-19
Nickel (Ni)-Dissolved			95.1		%		80-120	22-AUG-19
Potassium (K)-Dissolved			98.9		%		80-120	22-AUG-19
Selenium (Se)-Dissolved			93.6		%		80-120	22-AUG-19
Silicon (Si)-Dissolved			95.4		%		60-140	22-AUG-19
Silver (Ag)-Dissolved			93.3		%		80-120	22-AUG-19
Sodium (Na)-Dissolved			97.1		%		80-120	22-AUG-19
Strontium (Sr)-Dissolved			100.6		%		80-120	22-AUG-19
Thallium (Tl)-Dissolved			98.3		%		80-120	22-AUG-19
Tin (Sn)-Dissolved			96.4		%		80-120	22-AUG-19
Titanium (Ti)-Dissolved			95.8		%		80-120	22-AUG-19
Uranium (U)-Dissolved			100.9		%		80-120	22-AUG-19
Vanadium (V)-Dissolved			96.8		%		80-120	22-AUG-19
Zinc (Zn)-Dissolved			97.8		%		80-120	22-AUG-19
WG3139722-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	22-AUG-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	22-AUG-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	22-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4765206								
WG3139722-1 MB		**LF**						
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	22-AUG-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	22-AUG-19
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	22-AUG-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	22-AUG-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	22-AUG-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	22-AUG-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	22-AUG-19
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	22-AUG-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	22-AUG-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	22-AUG-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	22-AUG-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	22-AUG-19
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	22-AUG-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	22-AUG-19
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	22-AUG-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	22-AUG-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	22-AUG-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	22-AUG-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	22-AUG-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	22-AUG-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	22-AUG-19
WG3139722-4 MS		**L2332191-2**						
Aluminum (Al)-Dissolved			93.9		%		70-130	22-AUG-19
Antimony (Sb)-Dissolved			98.2		%		70-130	22-AUG-19
Arsenic (As)-Dissolved			98.0		%		70-130	22-AUG-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	22-AUG-19
Bismuth (Bi)-Dissolved			91.0		%		70-130	22-AUG-19
Boron (B)-Dissolved			104.6		%		70-130	22-AUG-19
Cadmium (Cd)-Dissolved			97.9		%		70-130	22-AUG-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	22-AUG-19
Chromium (Cr)-Dissolved			95.4		%		70-130	22-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4765206								
WG3139722-4 MS		**L2332191-2**						
Cobalt (Co)-Dissolved			93.4		%		70-130	22-AUG-19
Copper (Cu)-Dissolved			94.9		%		70-130	22-AUG-19
Iron (Fe)-Dissolved			97.3		%		70-130	22-AUG-19
Lead (Pb)-Dissolved			94.6		%		70-130	22-AUG-19
Lithium (Li)-Dissolved			114.2		%		70-130	22-AUG-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	22-AUG-19
Manganese (Mn)-Dissolved			94.6		%		70-130	22-AUG-19
Molybdenum (Mo)-Dissolved			97.0		%		70-130	22-AUG-19
Nickel (Ni)-Dissolved			94.6		%		70-130	22-AUG-19
Potassium (K)-Dissolved			100.3		%		70-130	22-AUG-19
Selenium (Se)-Dissolved			105.4		%		70-130	22-AUG-19
Silicon (Si)-Dissolved			91.8		%		70-130	22-AUG-19
Silver (Ag)-Dissolved			98.5		%		70-130	22-AUG-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	22-AUG-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	22-AUG-19
Thallium (Tl)-Dissolved			95.9		%		70-130	22-AUG-19
Tin (Sn)-Dissolved			98.6		%		70-130	22-AUG-19
Titanium (Ti)-Dissolved			96.2		%		70-130	22-AUG-19
Uranium (U)-Dissolved			99.0		%		70-130	22-AUG-19
Vanadium (V)-Dissolved			99.9		%		70-130	22-AUG-19
Zinc (Zn)-Dissolved			100.4		%		70-130	22-AUG-19
MET-T-CCMS-VA	**Water**							
Batch R4765303								
WG3139859-2 LCS								
Aluminum (Al)-Total			101.2		%		80-120	23-AUG-19
Antimony (Sb)-Total			97.2		%		80-120	23-AUG-19
Arsenic (As)-Total			100.9		%		80-120	23-AUG-19
Barium (Ba)-Total			99.2		%		80-120	23-AUG-19
Bismuth (Bi)-Total			88.3		%		80-120	23-AUG-19
Boron (B)-Total			95.9		%		80-120	23-AUG-19
Cadmium (Cd)-Total			102.3		%		80-120	23-AUG-19
Calcium (Ca)-Total			97.0		%		80-120	23-AUG-19
Chromium (Cr)-Total			103.2		%		80-120	23-AUG-19
Cobalt (Co)-Total			98.9		%		80-120	23-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4765303								
WG3139859-2 LCS								
Copper (Cu)-Total			99.5		%		80-120	23-AUG-19
Iron (Fe)-Total			101.4		%		80-120	23-AUG-19
Lead (Pb)-Total			93.1		%		80-120	23-AUG-19
Lithium (Li)-Total			97.0		%		80-120	23-AUG-19
Magnesium (Mg)-Total			101.2		%		80-120	23-AUG-19
Manganese (Mn)-Total			102.4		%		80-120	23-AUG-19
Molybdenum (Mo)-Total			101.2		%		80-120	23-AUG-19
Nickel (Ni)-Total			100.0		%		80-120	23-AUG-19
Potassium (K)-Total			103.9		%		80-120	23-AUG-19
Selenium (Se)-Total			98.9		%		80-120	23-AUG-19
Silicon (Si)-Total			105.4		%		80-120	23-AUG-19
Silver (Ag)-Total			102.4		%		80-120	23-AUG-19
Sodium (Na)-Total			101.0		%		80-120	23-AUG-19
Strontium (Sr)-Total			101.1		%		80-120	23-AUG-19
Thallium (Tl)-Total			88.8		%		80-120	23-AUG-19
Tin (Sn)-Total			101.4		%		80-120	23-AUG-19
Titanium (Ti)-Total			93.7		%		80-120	23-AUG-19
Uranium (U)-Total			88.4		%		80-120	23-AUG-19
Vanadium (V)-Total			100.9		%		80-120	23-AUG-19
Zinc (Zn)-Total			100.0		%		80-120	23-AUG-19
WG3139859-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	23-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	23-AUG-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	23-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	23-AUG-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	23-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	23-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	23-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4765303								
WG3139859-1 MB								
Lithium (Li)-Total			<0.0010		mg/L		0.001	23-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	23-AUG-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	23-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	23-AUG-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	23-AUG-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	23-AUG-19
Sodium (Na)-Total			<0.050		mg/L		0.05	23-AUG-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	23-AUG-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	23-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	23-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	23-AUG-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	23-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	23-AUG-19
Batch R4767864								
WG3142313-2 LCS								
Aluminum (Al)-Total			105.2		%		80-120	24-AUG-19
Antimony (Sb)-Total			108.2		%		80-120	24-AUG-19
Arsenic (As)-Total			103.2		%		80-120	24-AUG-19
Barium (Ba)-Total			105.1		%		80-120	24-AUG-19
Bismuth (Bi)-Total			99.1		%		80-120	24-AUG-19
Boron (B)-Total			109.9		%		80-120	24-AUG-19
Cadmium (Cd)-Total			100.8		%		80-120	24-AUG-19
Calcium (Ca)-Total			103.4		%		80-120	24-AUG-19
Chromium (Cr)-Total			106.0		%		80-120	24-AUG-19
Cobalt (Co)-Total			101.9		%		80-120	24-AUG-19
Copper (Cu)-Total			99.2		%		80-120	24-AUG-19
Iron (Fe)-Total			100.3		%		80-120	24-AUG-19
Lead (Pb)-Total			99.6		%		80-120	24-AUG-19
Lithium (Li)-Total			104.0		%		80-120	24-AUG-19
Magnesium (Mg)-Total			98.5		%		80-120	24-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4767864								
WG3142313-2 LCS								
Manganese (Mn)-Total			107.4		%		80-120	24-AUG-19
Molybdenum (Mo)-Total			108.9		%		80-120	24-AUG-19
Nickel (Ni)-Total			102.8		%		80-120	24-AUG-19
Potassium (K)-Total			106.0		%		80-120	24-AUG-19
Selenium (Se)-Total			97.7		%		80-120	24-AUG-19
Silicon (Si)-Total			103.0		%		80-120	24-AUG-19
Silver (Ag)-Total			104.5		%		80-120	24-AUG-19
Sodium (Na)-Total			107.7		%		80-120	24-AUG-19
Strontium (Sr)-Total			110.8		%		80-120	24-AUG-19
Thallium (Tl)-Total			102.8		%		80-120	24-AUG-19
Tin (Sn)-Total			102.8		%		80-120	24-AUG-19
Titanium (Ti)-Total			99.7		%		80-120	24-AUG-19
Uranium (U)-Total			101.3		%		80-120	24-AUG-19
Vanadium (V)-Total			103.6		%		80-120	24-AUG-19
Zinc (Zn)-Total			104.8		%		80-120	24-AUG-19
WG3142313-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	24-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	24-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	24-AUG-19
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	24-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	24-AUG-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	24-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	24-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	24-AUG-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	24-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	24-AUG-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	24-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	24-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4767864								
WG3142313-1 MB								
Potassium (K)-Total			<0.050		mg/L		0.05	24-AUG-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	24-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	24-AUG-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	24-AUG-19
Sodium (Na)-Total			<0.050		mg/L		0.05	24-AUG-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	24-AUG-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	24-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	24-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	24-AUG-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	24-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	24-AUG-19
NH3-L-F-CL	**Water**							
Batch R4768758								
WG3141851-11 DUP		**L2332191-5**						
Ammonia as N		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	23-AUG-19
WG3141851-10 LCS								
Ammonia as N			102.6		%		85-115	23-AUG-19
WG3141851-9 MB								
Ammonia as N			<0.0050		mg/L		0.005	23-AUG-19
WG3141851-12 MS		**L2332191-5**						
Ammonia as N			93.8		%		75-125	23-AUG-19
NO2-L-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Nitrite (as N)			105.3		%		90-110	20-AUG-19
WG3139061-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	20-AUG-19
NO3-L-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Nitrate (as N)			101.6		%		90-110	20-AUG-19
WG3139061-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	20-AUG-19
ORP-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ORP-CL	**Water**							
Batch R4768422								
WG3143171-1 CRM		**CL-ORP**						
ORP			220		mV		210-230	24-AUG-19
P-T-L-COL-CL	**Water**							
Batch R4767467								
WG3141919-2 LCS								
Phosphorus (P)-Total			112.9		%		80-120	23-AUG-19
WG3141919-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	23-AUG-19
PH-CL	**Water**							
Batch R4763718								
WG3140072-11 LCS								
pH			7.01		pH		6.9-7.1	21-AUG-19
WG3140072-8 LCS								
pH			7.01		pH		6.9-7.1	21-AUG-19
PO4-DO-L-COL-CL	**Water**							
Batch R4759717								
WG3137802-12 LCS								
Orthophosphate-Dissolved (as P)			102.5		%		80-120	20-AUG-19
WG3137802-3 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	20-AUG-19
SO4-IC-N-CL	**Water**							
Batch R4762165								
WG3139061-6 LCS								
Sulfate (SO4)			103.1		%		90-110	20-AUG-19
WG3139061-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	20-AUG-19
SOLIDS-TDS-CL	**Water**							
Batch R4768900								
WG3141391-11 LCS								
Total Dissolved Solids			96.6		%		85-115	23-AUG-19
WG3141391-10 MB								
Total Dissolved Solids			<10		mg/L		10	23-AUG-19
TKN-L-F-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-L-F-CL	**Water**							
Batch R4768639								
WG3143402-10 LCS								
Total Kjeldahl Nitrogen			98.6		%		75-125	24-AUG-19
WG3143402-2 LCS								
Total Kjeldahl Nitrogen			97.9		%		75-125	24-AUG-19
WG3143402-6 LCS								
Total Kjeldahl Nitrogen			96.6		%		75-125	24-AUG-19
WG3143402-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	24-AUG-19
WG3143402-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	24-AUG-19
WG3143402-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	24-AUG-19
TSS-L-CL	**Water**							
Batch R4768742								
WG3140730-6 LCS								
Total Suspended Solids			91.8		%		85-115	23-AUG-19
WG3140730-8 LCS								
Total Suspended Solids			95.7		%		85-115	23-AUG-19
WG3140730-5 MB								
Total Suspended Solids			<1.0		mg/L		1	23-AUG-19
WG3140730-7 MB								
Total Suspended Solids			<1.0		mg/L		1	23-AUG-19
TURBIDITY-CL	**Water**							
Batch R4763094								
WG3139691-9 LCS								
Turbidity			95.5		%		85-115	21-AUG-19
WG3139691-1 MB								
Turbidity			<0.10		NTU		0.1	21-AUG-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	19-AUG-19 11:42	24-AUG-19 09:00	0.25	117	hours	EHTR-FM
	2	19-AUG-19 12:00	24-AUG-19 09:00	0.25	117	hours	EHTR-FM
	3	19-AUG-19 12:10	24-AUG-19 09:00	0.25	117	hours	EHTR-FM
	4	19-AUG-19 12:20	24-AUG-19 09:00	0.25	117	hours	EHTR-FM
	5	19-AUG-19 12:15	24-AUG-19 09:00	0.25	117	hours	EHTR-FM
	6	19-AUG-19	24-AUG-19 09:00	0.25	117	hours	EHTR-FM
pH							
	1	19-AUG-19 11:42	21-AUG-19 09:00	0.25	45	hours	EHTR-FM
	2	19-AUG-19 12:00	21-AUG-19 09:00	0.25	45	hours	EHTR-FM
	3	19-AUG-19 12:10	21-AUG-19 09:00	0.25	45	hours	EHTR-FM
	4	19-AUG-19 12:20	21-AUG-19 09:00	0.25	45	hours	EHTR-FM
	5	19-AUG-19 12:15	21-AUG-19 09:00	0.25	45	hours	EHTR-FM
	6	19-AUG-19	21-AUG-19 09:00	0.25	45	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2332191 were received on 20-AUG-19 09:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: REP-Koocanusa 19-08 | TURNAROUND TIME:

PROJECT/CLIENT INFO

Facility Name / Job#	Regional Effects Program/Koocanusa
Project Manager	Cait Good
Email	cait.good@teck.com
Address	421 Pine Avenue
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-425-8202

LABORATORY

Lab Name	ALS Calgary
Lab Contact	Lyudmyla Shvets
Email	lyudmyla.shvets@alsglobal.com
Address	2559 29 Street NE
City	Calgary
Province	AB
Postal Code	T1Y 7B5
Country	Canada
Phone Number	1 403 407 1794

	Excel	PDF	EDD
cait.good@teck.com	x	x	x
teckcoal@equiborline.com	x		x
lhourrier@minnow.ca	x	x	x
carlie.meyer@teck.com	x	x	x

PO Number VPO00616180

SAMPLE DETAILS

L2332191-COFC

ANALYSIS REQUESTED

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	TECKCOAL-ROUTINE-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-T-U-CVAF-VA	HG-D-CVAF-VA	TECKCOAL-MET-T-VA	TECKCOAL-MET-D-VA
	FIELD FILTERED								N	N	N	N	N	N	N
	PRESERVE										H2SO4			HNO3	
1	RG.GC.03.WS.20190819-1142.NP-MD	RG-GC	WS	No	20190819	1142	G	7	x	x	x	x	x	x	x
2	RG.GC.02.WS.20190819-1200.NP-MD	RG-GC	WS	No	20190819	1200	G	7	x	x	x	x	x	x	x
3	RG.GC.01.WS.20190819-1210.NP-MD	RG-GC	WS	No	20190819	1210	G	7	x	x	x	x	x	x	x
4	RG.DUP.WS.20190819-1220.NP-MD	RG-GC-DUP	WS	No	20190819	1220	G	7	x	x	x	x	x	x	x
5	RG.BLANK.WS.20190819.1215.NP-MD	RG-GC-FBLANK	WS	No	20190819	1215		7	x	x	x	x	x	x	x
6	RG.TRIP.WS.20190819.0000.NP-MD	RG-GC-TripBlk	WS	No	20190819	0000		4	x		x	x		x	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION

DATE/TIME

ACCEPTED BY/AFFILIATION

DW 8/20 0900

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	x
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Mark Giorgi	Mobile #	(519) 641 9249
Sampler's Signature		Date/Time	19-AUG-19

SC

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 21-AUG-19
Report Date: 28-AUG-19 12:40 (MT)
Version: FINAL

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2333505

Project P.O. #: VPO00616180
Job Reference: REGIONAL EFFECTS PROGRAM/KOOCANUSA
C of C Numbers: REP-Koocanusa 19-08
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2333505-1	L2333505-2	L2333505-3	L2333505-4	L2333505-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	20-AUG-19	20-AUG-19	20-AUG-19	20-AUG-19	20-AUG-19
	Sampled Time	09:45	09:35	09:25	09:50	11:45
	Client ID	RG_TN_U1_WS_20190820_0945_NR_MD	RG_TN_U2_WS_20190820_0935_NR_MD	RG_TN_U3_WS_20190820_0925_NR_MD	RG_DUP_WS_20190820_0950_NR_MD	RG_SC_U1_WS_20190820_1145_NR_MD
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	217	225	240	228	235
	Hardness (as CaCO3) (mg/L)	128	128	132	124	129
	pH (pH)	8.29	8.26	8.17	8.28	8.28
	ORP (mV)	287	316	450	443	440
	Total Suspended Solids (mg/L)	<1.0	1.2	3.9	<1.0	<1.0
	Total Dissolved Solids (mg/L)	145 DLHC	143 DLHC	152 DLHC	139 DLHC	146 DLHC
	Turbidity (NTU)	0.52	1.0	5.41	0.49	0.68
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	105	112	112	107	112
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	105	112	112	107	112
	Ammonia as N (mg/L)	0.0137	0.0090	0.0150	0.0069	0.0134
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	1.97	2.24	2.90	1.93	2.36
	Fluoride (F) (mg/L)	0.063	0.059	0.057	0.060	0.060
	Ion Balance (%)	102	96.7	98.4	97.2	97.8
	Nitrate (as N) (mg/L)	0.126	0.0896	0.0831	0.133	0.0567
	Nitrite (as N) (mg/L)	0.0038	0.0031	0.0025	0.0036	0.0014
	Total Kjeldahl Nitrogen (mg/L)	0.085	0.057	0.054	0.077	0.070
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	0.0023	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	23.5	23.4	25.6	23.1	23.5
	Anion Sum (meq/L)	2.66	2.80	2.86	2.68	2.80
	Cation Sum (meq/L)	2.70	2.71	2.81	2.60	2.74
	Cation - Anion Balance (%)	0.8	-1.7	-0.8	-1.4	-1.1
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.11	1.04	0.88	1.05	1.03
	Total Organic Carbon (mg/L)	1.17	1.05	1.19	1.13	1.18
Total Metals	Aluminum (Al)-Total (mg/L)	0.0081	0.0148	0.0514	0.0093	0.0083
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00034	0.00034	0.00037	0.00032	0.00032
	Barium (Ba)-Total (mg/L)	0.0386	0.0365	0.0356	0.0380	0.0355
	Beryllium (Be)-Total (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (ug/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2333505-6	L2333505-7			
	Description	WS	WS			
	Sampled Date	20-AUG-19	20-AUG-19			
	Sampled Time	11:35	11:25			
	Client ID	RG_SC_U2_WS_20190820_1135_NR_MD	RG_SC_U3_WS_20190820_1125_NR_MD			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (@ 25C) (uS/cm)	242	248			
	Hardness (as CaCO3) (mg/L)	132	135			
	pH (pH)	8.23	8.18			
	ORP (mV)	285	426			
	Total Suspended Solids (mg/L)	<1.0	2.5			
	Total Dissolved Solids (mg/L)	153 DLHC	157 DLHC			
	Turbidity (NTU)	1.98	3.76			
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	112	112			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	112	112			
	Ammonia as N (mg/L)	0.0086	0.0126			
	Bromide (Br) (mg/L)	<0.050	<0.050			
	Chloride (Cl) (mg/L)	2.79	2.91			
	Fluoride (F) (mg/L)	0.058	0.063			
	Ion Balance (%)	98.8	101			
	Nitrate (as N) (mg/L)	0.0474	0.0705			
	Nitrite (as N) (mg/L)	0.0011	0.0012			
	Total Kjeldahl Nitrogen (mg/L)	0.104	0.052			
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010			
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020			
	Sulfate (SO4) (mg/L)	25.0	25.7			
	Anion Sum (meq/L)	2.85	2.86			
	Cation Sum (meq/L)	2.82	2.87			
	Cation - Anion Balance (%)	-0.6	0.3			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.93	0.88			
	Total Organic Carbon (mg/L)	0.97	0.85			
Total Metals	Aluminum (Al)-Total (mg/L)	0.0258	0.0381			
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Total (mg/L)	0.00037	0.00035			
	Barium (Ba)-Total (mg/L)	0.0357	0.0358			
	Beryllium (Be)-Total (ug/L)	<0.020	<0.020			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Total (ug/L)	<0.0050	0.0055			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2333505-1	L2333505-2	L2333505-3	L2333505-4	L2333505-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	20-AUG-19	20-AUG-19	20-AUG-19	20-AUG-19	20-AUG-19
	Sampled Time	09:45	09:35	09:25	09:50	11:45
	Client ID	RG_TN_U1_WS_20190820_0945_NR_MD	RG_TN_U2_WS_20190820_0935_NR_MD	RG_TN_U3_WS_20190820_0925_NR_MD	RG_DUP_WS_20190820_0950_NR_MD	RG_SC_U1_WS_20190820_1145_NR_MD
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	35.2	37.2	38.7	36.5	37.5
	Chromium (Cr)-Total (mg/L)	0.00012	<0.00010	0.00015	0.00012	0.00010
	Cobalt (Co)-Total (ug/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	<0.010	<0.010	0.038	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	0.000105	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.0017	0.0016	0.0014	0.0017	0.0015
	Magnesium (Mg)-Total (mg/L)	10.0	10.3	10.7	10.3	10.6
	Manganese (Mn)-Total (mg/L)	0.00093	0.00133	0.00517	0.00101	0.00133
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)-Total (mg/L)	0.000676	0.000634	0.000647	0.000634	0.000690
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Total (mg/L)	0.442	0.455	0.487	0.446	0.462
	Selenium (Se)-Total (ug/L)	0.938	0.565	0.172	0.941	0.423
	Silicon (Si)-Total (mg/L)	1.29	1.47	2.12	1.31	1.62
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	2.84	3.19	4.05	2.83	3.34
	Strontium (Sr)-Total (mg/L)	0.148	0.152	0.164	0.143	0.160
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.000658	0.000682	0.000696	0.000661	0.000654
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)	0.0034	0.0034	0.0056	0.0037	0.0031
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00036	0.00034	0.00034	0.00031	0.00035
	Barium (Ba)-Dissolved (mg/L)	0.0391	0.0370	0.0357	0.0386	0.0368
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Calcium (Ca)-Dissolved (mg/L)	33.7	33.6	34.3	32.6	33.4
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10	<0.10	<0.10	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2333505-6	L2333505-7			
	Description	WS	WS			
	Sampled Date	20-AUG-19	20-AUG-19			
	Sampled Time	11:35	11:25			
	Client ID	RG_SC_U2_WS_20190820_1135_NR_MD	RG_SC_U3_WS_20190820_1125_NR_MD			
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	39.1	38.2			
	Chromium (Cr)-Total (mg/L)	<0.00010	0.00015			
	Cobalt (Co)-Total (ug/L)	<0.10	<0.10			
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Total (mg/L)	0.017	0.030			
	Lead (Pb)-Total (mg/L)	<0.000050	0.000080			
	Lithium (Li)-Total (mg/L)	0.0014	0.0014			
	Magnesium (Mg)-Total (mg/L)	11.0	11.1			
	Manganese (Mn)-Total (mg/L)	0.00284	0.00452			
	Mercury (Hg)-Total (ug/L)	<0.00050	<0.00050			
	Molybdenum (Mo)-Total (mg/L)	0.000727	0.000620			
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050			
	Potassium (K)-Total (mg/L)	0.478	0.485			
	Selenium (Se)-Total (ug/L)	0.156	0.124			
	Silicon (Si)-Total (mg/L)	2.02	2.14			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	3.97	4.03			
	Strontium (Sr)-Total (mg/L)	0.170	0.171			
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010			
	Uranium (U)-Total (mg/L)	0.000701	0.000679			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030			
Dissolved Metals	Dissolved Mercury Filtration Location	LAB	LAB			
	Dissolved Metals Filtration Location	LAB	LAB			
	Aluminum (Al)-Dissolved (mg/L)	0.0041	0.0051			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00036	0.00034			
	Barium (Ba)-Dissolved (mg/L)	0.0362	0.0362			
	Beryllium (Be)-Dissolved (ug/L)	<0.020	<0.020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Dissolved (ug/L)	<0.0050	<0.0050			
	Calcium (Ca)-Dissolved (mg/L)	34.8	35.8			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010			
	Cobalt (Co)-Dissolved (ug/L)	<0.10	<0.10			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2333505-1	L2333505-2	L2333505-3	L2333505-4	L2333505-5
	Description	WS	WS	WS	WS	WS
	Sampled Date	20-AUG-19	20-AUG-19	20-AUG-19	20-AUG-19	20-AUG-19
	Sampled Time	09:45	09:35	09:25	09:50	11:45
	Client ID	RG_TN_U1_WS_20190820_0945_NR_MD	RG_TN_U2_WS_20190820_0935_NR_MD	RG_TN_U3_WS_20190820_0925_NR_MD	RG_DUP_WS_20190820_0950_NR_MD	RG_SC_U1_WS_20190820_1145_NR_MD
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0018	0.0016	0.0014	0.0017	0.0015
	Magnesium (Mg)-Dissolved (mg/L)	10.7	10.7	11.2	10.3	11.1
	Manganese (Mn)-Dissolved (mg/L)	<0.00010	<0.00010	0.00011	<0.00010	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000641	0.000645	0.000675	0.000626	0.000671
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)-Dissolved (mg/L)	0.480	0.481	0.492	0.470	0.486
	Selenium (Se)-Dissolved (ug/L)	1.03	0.720	0.173	0.976	0.508
	Silicon (Si)-Dissolved (mg/L)	1.25	1.47	2.00	1.22	1.59
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.75	3.17	3.80	2.74	3.28
	Strontium (Sr)-Dissolved (mg/L)	0.134	0.134	0.151	0.127	0.142
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000612	0.000619	0.000650	0.000630	0.000653
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2333505-6	L2333505-7			
	Description	WS	WS			
	Sampled Date	20-AUG-19	20-AUG-19			
	Sampled Time	11:35	11:25			
	Client ID	RG_SC_U2_WS_20190820_1135_NR_MD	RG_SC_U3_WS_20190820_1125_NR_MD			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050			
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	0.0014	0.0014			
	Magnesium (Mg)-Dissolved (mg/L)	11.0	11.1			
	Manganese (Mn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000663	0.000685			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050			
	Potassium (K)-Dissolved (mg/L)	0.511	0.504			
	Selenium (Se)-Dissolved (ug/L)	0.172	0.120			
	Silicon (Si)-Dissolved (mg/L)	1.91	2.02			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	3.69	3.77			
	Strontium (Sr)-Dissolved (mg/L)	0.150	0.157			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	0.00012	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.000667	0.000677			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
SFPL	Sample was Filtered and Preserved at the laboratory - DOC, dissolved metals and dissolved mercury must be filtered and preserved; appropriate codes added

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Bismuth (Bi)-Total	MES	L2333505-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2333505-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2333505-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2333505-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2333505-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2333505-1, -2, -3, -4, -5, -6, -7

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-PCT-CL	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-MAN-CL	Water	Alkalinity (Species) by Manual Titration	APHA 2320 ALKALINITY

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.

The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.

Reference Information

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-L-PCT-CL	Water	Electrical Conductivity (EC)	APHA 2510B

Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25C.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-U-CVAF-VA	Water	Total Mercury in Water by CVAFS (Ultra)	EPA 1631 REV. E

This analysis is carried out using procedures adapted from Method 1631 Rev. E. by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to a purge and trap concentration step and final reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry.

IONBALANCE-BC-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

ORP-CL	Water	Oxidation redution potential by elect.	ASTM D1498

This analysis is carried out in accordance with the procedure described in the "ASTM" method D1498 "Oxidation-Reduction Potential of Water" published by the American Society for Testing and Materials (ASTM). Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL	Water	pH	APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

Reference Information

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL	Water	Total Dissolved Solids	APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TECKCOAL-IONBAL-CL	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

TKN-L-F-CL	Water	Total Kjeldahl Nitrogen	APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL	Water	Turbidity	APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

REP-Koocanusa 19-08

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDITY-PCT-CL	**Water**							
Batch R4767011								
WG3141376-12 DUP		**L2333505-6**						
Acidity (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	22-AUG-19
WG3141376-11 LCS								
Acidity (as CaCO3)			102.2		%		85-115	22-AUG-19
WG3141376-10 MB								
Acidity (as CaCO3)			<1.0		mg/L		2	22-AUG-19
ALK-MAN-CL	**Water**							
Batch R4767327								
WG3141779-3 DUP		**L2333505-7**						
Alkalinity, Total (as CaCO3)		112	112		mg/L	0.3	20	23-AUG-19
WG3141779-2 LCS								
Alkalinity, Total (as CaCO3)			102.6		%		85-115	23-AUG-19
WG3141779-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	23-AUG-19
BE-D-L-CCMS-VA	**Water**							
Batch R4769674								
WG3142873-3 DUP		**L2333505-1**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	27-AUG-19
WG3142873-2 LCS								
Beryllium (Be)-Dissolved			102.3		%		80-120	27-AUG-19
WG3142873-1 MB		**LF**						
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	27-AUG-19
WG3142873-4 MS		**L2333505-2**						
Beryllium (Be)-Dissolved			101.9		%		70-130	27-AUG-19
BE-T-L-CCMS-VA	**Water**							
Batch R4768086								
WG3142162-2 LCS								
Beryllium (Be)-Total			101.0		%		80-120	24-AUG-19
WG3142162-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	24-AUG-19
BR-L-IC-N-CL	**Water**							
Batch R4767516								
WG3141969-2 LCS								
Bromide (Br)			99.0		%		85-115	22-AUG-19
WG3141969-6 LCS								
Bromide (Br)			108.4		%		85-115	22-AUG-19
WG3141969-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BR-L-IC-N-CL	**Water**							
Batch R4767516								
WG3141969-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	22-AUG-19
WG3141969-5 MB								
Bromide (Br)			<0.050		mg/L		0.05	22-AUG-19
C-DIS-ORG-LOW-CL	**Water**							
Batch R4767882								
WG3142472-7 DUP		**L2333505-6**						
Dissolved Organic Carbon		0.93	0.89		mg/L	4.9	20	23-AUG-19
WG3142472-6 LCS								
Dissolved Organic Carbon			99.5		%		80-120	23-AUG-19
WG3142472-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	23-AUG-19
WG3142472-8 MS		**L2333505-7**						
Dissolved Organic Carbon			90.3		%		70-130	23-AUG-19
C-TOT-ORG-LOW-CL	**Water**							
Batch R4767882								
WG3142472-7 DUP		**L2333505-6**						
Total Organic Carbon		0.97	0.95		mg/L	1.8	20	23-AUG-19
WG3142472-6 LCS								
Total Organic Carbon			99.9		%		80-120	23-AUG-19
WG3142472-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-AUG-19
WG3142472-8 MS		**L2333505-7**						
Total Organic Carbon			97.0		%		70-130	23-AUG-19
CL-IC-N-CL	**Water**							
Batch R4767516								
WG3141969-2 LCS								
Chloride (Cl)			101.6		%		90-110	22-AUG-19
WG3141969-6 LCS								
Chloride (Cl)			101.5		%		90-110	22-AUG-19
WG3141969-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	22-AUG-19
WG3141969-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	22-AUG-19
EC-L-PCT-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-L-PCT-CL	**Water**							
Batch R4767327								
WG3141779-3 DUP		**L2333505-7**						
Conductivity (@ 25C)		248	247		uS/cm	0.4	10	23-AUG-19
WG3141779-2 LCS								
Conductivity (@ 25C)			100.1		%		90-110	23-AUG-19
WG3141779-1 MB								
Conductivity (@ 25C)			<2.0		uS/cm		2	23-AUG-19
F-IC-N-CL	**Water**							
Batch R4767516								
WG3141969-2 LCS								
Fluoride (F)			98.7		%		90-110	22-AUG-19
WG3141969-6 LCS								
Fluoride (F)			102.5		%		90-110	22-AUG-19
WG3141969-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	22-AUG-19
WG3141969-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	22-AUG-19
HG-D-CVAA-VA	**Water**							
Batch R4771009								
WG3144756-2 LCS								
Mercury (Hg)-Dissolved			95.8		%		80-120	28-AUG-19
WG3144756-1 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	28-AUG-19
HG-T-U-CVAF-VA	**Water**							
Batch R4769434								
WG3144414-2 LCS								
Mercury (Hg)-Total			94.2		%		80-120	27-AUG-19
WG3144414-1 MB								
Mercury (Hg)-Total			<0.00050		ug/L		0.0005	27-AUG-19
MET-D-CCMS-VA	**Water**							
Batch R4769674								
WG3142873-3 DUP		**L2333505-1**						
Aluminum (Al)-Dissolved		0.0034	0.0040		mg/L	18	20	27-AUG-19
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	27-AUG-19
Arsenic (As)-Dissolved		0.00036	0.00034		mg/L	4.9	20	27-AUG-19
Barium (Ba)-Dissolved		0.0391	0.0388		mg/L	0.8	20	27-AUG-19
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	27-AUG-19
Boron (B)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	27-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4769674								
WG3142873-3 DUP		**L2333505-1**						
Cadmium (Cd)-Dissolved		<0.0000050	<0.0000050	RPD-NA	mg/L	N/A	20	27-AUG-19
Calcium (Ca)-Dissolved		33.7	33.4		mg/L	0.9	20	27-AUG-19
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	27-AUG-19
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	27-AUG-19
Copper (Cu)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	27-AUG-19
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	27-AUG-19
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	27-AUG-19
Lithium (Li)-Dissolved		0.0018	0.0017		mg/L	0.6	20	27-AUG-19
Magnesium (Mg)-Dissolved		10.7	10.8		mg/L	0.4	20	27-AUG-19
Manganese (Mn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	27-AUG-19
Molybdenum (Mo)-Dissolved		0.000641	0.000631		mg/L	1.5	20	27-AUG-19
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	27-AUG-19
Potassium (K)-Dissolved		0.480	0.471		mg/L	1.8	20	27-AUG-19
Selenium (Se)-Dissolved		0.00103	0.000965		mg/L	6.9	20	27-AUG-19
Silicon (Si)-Dissolved		1.25	1.22		mg/L	2.8	20	27-AUG-19
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	27-AUG-19
Sodium (Na)-Dissolved		2.75	2.78		mg/L	1.1	20	27-AUG-19
Strontium (Sr)-Dissolved		0.134	0.129		mg/L	3.7	20	27-AUG-19
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	27-AUG-19
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	27-AUG-19
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	27-AUG-19
Uranium (U)-Dissolved		0.000612	0.000639		mg/L	4.4	20	27-AUG-19
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	27-AUG-19
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	27-AUG-19
WG3142873-2 LCS								
Aluminum (Al)-Dissolved			105.9		%		80-120	27-AUG-19
Antimony (Sb)-Dissolved			94.2		%		80-120	27-AUG-19
Arsenic (As)-Dissolved			100.7		%		80-120	27-AUG-19
Barium (Ba)-Dissolved			100.6		%		80-120	27-AUG-19
Bismuth (Bi)-Dissolved			101.1		%		80-120	27-AUG-19
Boron (B)-Dissolved			100.5		%		80-120	27-AUG-19
Cadmium (Cd)-Dissolved			99.9		%		80-120	27-AUG-19
Calcium (Ca)-Dissolved			97.9		%		80-120	27-AUG-19
Chromium (Cr)-Dissolved			101.3		%		80-120	27-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4769674								
WG3142873-2 LCS								
Cobalt (Co)-Dissolved			99.6		%		80-120	27-AUG-19
Copper (Cu)-Dissolved			99.3		%		80-120	27-AUG-19
Iron (Fe)-Dissolved			100.2		%		80-120	27-AUG-19
Lead (Pb)-Dissolved			100.3		%		80-120	27-AUG-19
Lithium (Li)-Dissolved			100.2		%		80-120	27-AUG-19
Magnesium (Mg)-Dissolved			102.8		%		80-120	27-AUG-19
Manganese (Mn)-Dissolved			101.7		%		80-120	27-AUG-19
Molybdenum (Mo)-Dissolved			99.6		%		80-120	27-AUG-19
Nickel (Ni)-Dissolved			100.7		%		80-120	27-AUG-19
Potassium (K)-Dissolved			100.1		%		80-120	27-AUG-19
Selenium (Se)-Dissolved			103.8		%		80-120	27-AUG-19
Silicon (Si)-Dissolved			111.4		%		60-140	27-AUG-19
Silver (Ag)-Dissolved			92.9		%		80-120	27-AUG-19
Sodium (Na)-Dissolved			101.2		%		80-120	27-AUG-19
Strontium (Sr)-Dissolved			92.3		%		80-120	27-AUG-19
Thallium (Tl)-Dissolved			101.2		%		80-120	27-AUG-19
Tin (Sn)-Dissolved			97.2		%		80-120	27-AUG-19
Titanium (Ti)-Dissolved			99.95		%		80-120	27-AUG-19
Uranium (U)-Dissolved			96.5		%		80-120	27-AUG-19
Vanadium (V)-Dissolved			99.96		%		80-120	27-AUG-19
Zinc (Zn)-Dissolved			104.6		%		80-120	27-AUG-19
WG3142873-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	27-AUG-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	27-AUG-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	27-AUG-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	27-AUG-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	27-AUG-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	27-AUG-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	27-AUG-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	27-AUG-19
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	27-AUG-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	27-AUG-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	27-AUG-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	27-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4769674								
WG3142873-1 MB		**LF**						
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	27-AUG-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	27-AUG-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	27-AUG-19
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	27-AUG-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	27-AUG-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	27-AUG-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	27-AUG-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	27-AUG-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	27-AUG-19
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	27-AUG-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	27-AUG-19
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	27-AUG-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	27-AUG-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	27-AUG-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	27-AUG-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	27-AUG-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	27-AUG-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	27-AUG-19
WG3142873-4 MS		**L2333505-2**						
Aluminum (Al)-Dissolved			103.3		%		70-130	27-AUG-19
Antimony (Sb)-Dissolved			95.0		%		70-130	27-AUG-19
Arsenic (As)-Dissolved			103.2		%		70-130	27-AUG-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	27-AUG-19
Bismuth (Bi)-Dissolved			91.7		%		70-130	27-AUG-19
Boron (B)-Dissolved			102.4		%		70-130	27-AUG-19
Cadmium (Cd)-Dissolved			101.2		%		70-130	27-AUG-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	27-AUG-19
Chromium (Cr)-Dissolved			100.7		%		70-130	27-AUG-19
Cobalt (Co)-Dissolved			98.2		%		70-130	27-AUG-19
Copper (Cu)-Dissolved			97.4		%		70-130	27-AUG-19
Iron (Fe)-Dissolved			97.9		%		70-130	27-AUG-19
Lead (Pb)-Dissolved			98.0		%		70-130	27-AUG-19
Lithium (Li)-Dissolved			97.8		%		70-130	27-AUG-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	27-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4769674								
WG3142873-4 MS		**L2333505-2**						
Manganese (Mn)-Dissolved			98.2		%		70-130	27-AUG-19
Molybdenum (Mo)-Dissolved			102.2		%		70-130	27-AUG-19
Nickel (Ni)-Dissolved			97.4		%		70-130	27-AUG-19
Potassium (K)-Dissolved			98.7		%		70-130	27-AUG-19
Selenium (Se)-Dissolved			115.1		%		70-130	27-AUG-19
Silicon (Si)-Dissolved			100.6		%		70-130	27-AUG-19
Silver (Ag)-Dissolved			99.4		%		70-130	27-AUG-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	27-AUG-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	27-AUG-19
Thallium (Tl)-Dissolved			93.6		%		70-130	27-AUG-19
Tin (Sn)-Dissolved			99.7		%		70-130	27-AUG-19
Titanium (Ti)-Dissolved			100.4		%		70-130	27-AUG-19
Uranium (U)-Dissolved			96.4		%		70-130	27-AUG-19
Vanadium (V)-Dissolved			100.4		%		70-130	27-AUG-19
Zinc (Zn)-Dissolved			103.3		%		70-130	27-AUG-19
MET-T-CCMS-VA	**Water**							
Batch R4768086								
WG3142162-2 LCS								
Aluminum (Al)-Total			103.0		%		80-120	24-AUG-19
Antimony (Sb)-Total			106.0		%		80-120	24-AUG-19
Arsenic (As)-Total			100.9		%		80-120	24-AUG-19
Barium (Ba)-Total			104.9		%		80-120	24-AUG-19
Bismuth (Bi)-Total			123.6	MES	%		80-120	24-AUG-19
Boron (B)-Total			97.2		%		80-120	24-AUG-19
Cadmium (Cd)-Total			105.6		%		80-120	24-AUG-19
Calcium (Ca)-Total			99.7		%		80-120	24-AUG-19
Chromium (Cr)-Total			103.4		%		80-120	24-AUG-19
Cobalt (Co)-Total			102.7		%		80-120	24-AUG-19
Copper (Cu)-Total			102.7		%		80-120	24-AUG-19
Iron (Fe)-Total			91.6		%		80-120	24-AUG-19
Lead (Pb)-Total			100.3		%		80-120	24-AUG-19
Lithium (Li)-Total			102.8		%		80-120	24-AUG-19
Magnesium (Mg)-Total			102.4		%		80-120	24-AUG-19
Manganese (Mn)-Total			104.4		%		80-120	24-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4768086								
WG3142162-2 LCS								
Molybdenum (Mo)-Total			105.2		%		80-120	24-AUG-19
Nickel (Ni)-Total			101.4		%		80-120	24-AUG-19
Potassium (K)-Total			103.8		%		80-120	24-AUG-19
Selenium (Se)-Total			100.9		%		80-120	24-AUG-19
Silicon (Si)-Total			112.5		%		80-120	24-AUG-19
Silver (Ag)-Total			98.4		%		80-120	24-AUG-19
Sodium (Na)-Total			117.3		%		80-120	24-AUG-19
Strontium (Sr)-Total			99.7		%		80-120	24-AUG-19
Thallium (Tl)-Total			98.8		%		80-120	24-AUG-19
Tin (Sn)-Total			101.2		%		80-120	24-AUG-19
Titanium (Ti)-Total			95.8		%		80-120	24-AUG-19
Uranium (U)-Total			103.6		%		80-120	24-AUG-19
Vanadium (V)-Total			103.8		%		80-120	24-AUG-19
Zinc (Zn)-Total			103.0		%		80-120	24-AUG-19
WG3142162-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	24-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	24-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	24-AUG-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	24-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	24-AUG-19
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	24-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	24-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	24-AUG-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	24-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	24-AUG-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	24-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	24-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	24-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4768086								
WG3142162-1 MB								
Selenium (Se)-Total			<0.000050		mg/L		0.00005	24-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	24-AUG-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	24-AUG-19
Sodium (Na)-Total			<0.050		mg/L		0.05	24-AUG-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	24-AUG-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	24-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	24-AUG-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	24-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	24-AUG-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	24-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	24-AUG-19
NH3-L-F-CL	**Water**							
Batch R4769664								
WG3143694-18 LCS								
Ammonia as N			104.9		%		85-115	26-AUG-19
WG3143694-17 MB								
Ammonia as N			<0.0050		mg/L		0.005	26-AUG-19
NO2-L-IC-N-CL	**Water**							
Batch R4767516								
WG3141969-2 LCS								
Nitrite (as N)			102.5		%		90-110	22-AUG-19
WG3141969-6 LCS								
Nitrite (as N)			105.2		%		90-110	22-AUG-19
WG3141969-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	22-AUG-19
WG3141969-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	22-AUG-19
NO3-L-IC-N-CL	**Water**							
Batch R4767516								
WG3141969-2 LCS								
Nitrate (as N)			100.0		%		90-110	22-AUG-19
WG3141969-6 LCS								
Nitrate (as N)			102.9		%		90-110	22-AUG-19
WG3141969-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	22-AUG-19
WG3141969-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R4767516								
WG3141969-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	22-AUG-19
ORP-CL	**Water**							
Batch R4769169								
WG3143970-3 CRM		**CL-ORP**						
ORP			226		mV		210-230	26-AUG-19
WG3143970-5 CRM		**CL-ORP**						
ORP			227		mV		210-230	26-AUG-19
P-T-L-COL-CL	**Water**							
Batch R4767467								
WG3141919-12 LCS								
Phosphorus (P)-Total			107.9		%		80-120	23-AUG-19
WG3141919-14 LCS								
Phosphorus (P)-Total			106.8		%		80-120	23-AUG-19
WG3141919-11 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	23-AUG-19
WG3141919-13 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	23-AUG-19
PH-CL	**Water**							
Batch R4767327								
WG3141779-3 DUP		**L2333505-7**						
pH		8.18	8.17	J	pH	0.01	0.2	23-AUG-19
WG3141779-2 LCS								
pH			7.03		pH		6.9-7.1	23-AUG-19
PO4-DO-L-COL-CL	**Water**							
Batch R4765949								
WG3140634-19 LCS								
Orthophosphate-Dissolved (as P)			99.3		%		80-120	22-AUG-19
WG3140634-4 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	22-AUG-19
SO4-IC-N-CL	**Water**							
Batch R4767516								
WG3141969-2 LCS								
Sulfate (SO4)			101.1		%		90-110	22-AUG-19
WG3141969-6 LCS								
Sulfate (SO4)			101.2		%		90-110	22-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-CL	**Water**							
Batch R4767516								
WG3141969-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	22-AUG-19
WG3141969-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	22-AUG-19
SOLIDS-TDS-CL	**Water**							
Batch R4768912								
WG3143234-12 LCS								
Total Dissolved Solids			99.7		%		85-115	26-AUG-19
WG3143234-9 LCS								
Total Dissolved Solids			102.9		%		85-115	26-AUG-19
WG3143234-11 MB								
Total Dissolved Solids			<10		mg/L		10	26-AUG-19
WG3143234-8 MB								
Total Dissolved Solids			<10		mg/L		10	26-AUG-19
TKN-L-F-CL	**Water**							
Batch R4768022								
WG3142612-14 LCS								
Total Kjeldahl Nitrogen			97.9		%		75-125	24-AUG-19
WG3142612-18 LCS								
Total Kjeldahl Nitrogen			96.6		%		75-125	24-AUG-19
WG3142612-2 LCS								
Total Kjeldahl Nitrogen			103.0		%		75-125	24-AUG-19
WG3142612-22 LCS								
Total Kjeldahl Nitrogen			98.6		%		75-125	24-AUG-19
WG3142612-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	24-AUG-19
WG3142612-13 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	24-AUG-19
WG3142612-17 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	24-AUG-19
WG3142612-21 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	24-AUG-19
TSS-L-CL	**Water**							
Batch R4768837								
WG3143202-10 LCS								
Total Suspended Solids			94.7		%		85-115	26-AUG-19
WG3143202-9 MB								
Total Suspended Solids			<1.0		mg/L		1	26-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-CL	**Water**							
Batch R4765274								
WG3140978-5 LCS								
Turbidity			93.5		%		85-115	22-AUG-19
WG3140978-4 MB								
Turbidity			<0.10		NTU		0.1	22-AUG-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Oxidation redution potential by elect.							
	1	20-AUG-19 09:45	26-AUG-19 12:50	0.25	147	hours	EHTR-FM
	2	20-AUG-19 09:35	26-AUG-19 12:50	0.25	147	hours	EHTR-FM
	3	20-AUG-19 09:25	26-AUG-19 14:45	0.25	149	hours	EHTR-FM
	4	20-AUG-19 09:50	26-AUG-19 14:45	0.25	149	hours	EHTR-FM
	5	20-AUG-19 11:45	26-AUG-19 14:45	0.25	147	hours	EHTR-FM
	6	20-AUG-19 11:35	26-AUG-19 14:45	0.25	147	hours	EHTR-FM
	7	20-AUG-19 11:25	26-AUG-19 14:45	0.25	147	hours	EHTR-FM
pH							
	1	20-AUG-19 09:45	23-AUG-19 09:00	0.25	71	hours	EHTR-FM
	2	20-AUG-19 09:35	23-AUG-19 09:00	0.25	72	hours	EHTR-FM
	3	20-AUG-19 09:25	23-AUG-19 09:00	0.25	72	hours	EHTR-FM
	4	20-AUG-19 09:50	23-AUG-19 09:00	0.25	71	hours	EHTR-FM
	5	20-AUG-19 11:45	23-AUG-19 09:00	0.25	69	hours	EHTR-FM
	6	20-AUG-19 11:35	23-AUG-19 09:00	0.25	69	hours	EHTR-FM
	7	20-AUG-19 11:25	23-AUG-19 09:00	0.25	70	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2333505 were received on 21-AUG-19 09:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: REP-Koocanusa 19-08 | TURNAROUND TIME:

PROJECT/CLIENT INFO				LABORATORY			
Facility Name / Job#	Regional Effects Program/Koocanusa			Lab Name	ALS Calgary		
Project Manager	Cait Good			Lab Contact	Lyudmyla Shvets		
Email	cait.good@teck.com			Email	lyudmyla.shvets@alsglobal.com		
Address	421 Pine Avenue			Address	2559 29 Street NE		
City	Sparwood	Province	BC	City	Calgary	Province	AB
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada
Phone Number	250-425-8202			Phone Number	1 403 407 1794		

	Excel	PDF	EDD
cait.good@teck.com	x	x	x
teckcoal@golsonline.com			x
hcurrier@minnow.ca	x	x	x
carlie.meyer@teck.com	x	x	x

PO Number VPO00616180

L2333505-COFC

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	TECKCOAL-ROUTINE-VA	ALS_Package-DOC	ALS_Package-TKN/TOC	HG-T-U-CVAF-VA	HG-D-CVAF-VA	TECKCOAL-MET-T-VA	TECKCOAL-MET-D-VA
	FIELD FILTERED								N	N	N	N	N	N	N
	PRESERVATIVE										H2SO4			HNO3	
1	RG_TN_U1_WS_20190820-0945_NP-MD	RG_TN	WS	N	20 AUG 2019	09:45	G	7	✓	✓	✓	✓	✓	✓	✓
2	RG_TN_U2_WS_20190820-0935_NP-MD	RG_TN	WS	N		09:35		7	✓	✓	✓	✓	✓	✓	✓
3	RG_TN_U3_WS_20190820-0925_NP-MD	RG_TN	WS	N		09:25		7	✓	✓	✓	✓	✓	✓	✓
4	RG_DUP_WS_20190820-0950_NP_MD	RG_DUP	WS	N		09:50		7	✓	✓	✓	✓	✓	✓	✓
5	RG_SC_U1_WS_20190820-1145_NP-MD	RG_SC	WS	N		11:45		7	✓	✓	✓	✓	✓	✓	✓
6	RG_SC_U2_WS_20190820-1135_NP-MD	RG_SC	WS	N		11:35		7	✓	✓	✓	✓	✓	✓	✓
7	RG_SC_U3_WS_20190820-1125_NP-MD	RG_SC	WS	N		11:25		7	✓	✓		✓	✓	✓	✓

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	
	A. WIGHT	20 AUG '19	OK	8/21 0900

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	x
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	MARC G. / ANDY W	Mobile #	250-531-0036
Sampler's Signature	A. Wight	Date/Time	20 AUG 2019.

L

10°C

Teck Coal Ltd.
ATTN: Cait Good
421 Pine Avenue
Sparwood BC V0B 2G0

Date Received: 23-AUG-19
Report Date: 29-AUG-19 16:40 (MT)
Version: DRAFT

Client Phone: 250-425-8202

Certificate of Analysis

Lab Work Order #: L2334973

Project P.O. #: VPO00616180
Job Reference: REGIONAL EFFECTS PROGRAM
C of C Numbers:
Legal Site Desc:

Lyudmyla Shvets, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2334973-1	L2334973-2	L2334973-3	L2334973-4	L2334973-5
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	22-AUG-19	22-AUG-19	22-AUG-19	22-AUG-19	22-AUG-19
	Sampled Time	09:46	10:16	10:46	11:30	09:14
	Client ID	RG_TN_1_SE_201 90822-0946	RG_TN_2_SE_201 90822-1016	RG_TN_3_SE_201 90822-1046	RG_TN_4_SE_201 90822-1130	RG_TN_5_SE_201 90822-0914
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	36.6	37.0	35.2	34.4	34.2
	pH (1:2 soil:water) (pH)	8.26	8.23	8.34	8.30	8.36
Metals	Aluminum (Al) (mg/kg)	11900	12400	12000	11300	11400
	Antimony (Sb) (mg/kg)	0.27	0.26	0.25	0.24	0.27
	Arsenic (As) (mg/kg)	5.47	5.71	5.56	5.45	5.99
	Barium (Ba) (mg/kg)	72.4	76.0	70.5	71.2	64.0
	Beryllium (Be) (mg/kg)	0.39	0.42	0.38	0.36	0.36
	Bismuth (Bi) (mg/kg)	<0.20	0.20	<0.20	<0.20	<0.20
	Boron (B) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Cadmium (Cd) (mg/kg)	0.168	0.169	0.153	0.155	0.156
	Calcium (Ca) (mg/kg)	105000	112000	109000	112000	98200
	Chromium (Cr) (mg/kg)	17.8	18.8	18.3	16.8	17.5
	Cobalt (Co) (mg/kg)	8.49	8.68	8.49	8.05	8.21
	Copper (Cu) (mg/kg)	14.2	14.3	14.0	13.1	13.6
	Iron (Fe) (mg/kg)	22000	23100	22400	21500	21900
	Lead (Pb) (mg/kg)	15.3	15.0	14.6	14.0	15.3
	Lithium (Li) (mg/kg)	25.9	25.7	24.7	23.6	23.9
	Magnesium (Mg) (mg/kg)	23200	24600	24100	23800	23200
	Manganese (Mn) (mg/kg)	468	464	454	443	418
	Mercury (Hg) (mg/kg)	0.0231	0.0271	0.0216	0.0445	0.0165
	Molybdenum (Mo) (mg/kg)	0.57	0.57	0.54	0.53	0.52
	Nickel (Ni) (mg/kg)	19.6	20.1	19.7	18.5	19.2
	Phosphorus (P) (mg/kg)	532	594	557	606	559
	Potassium (K) (mg/kg)	920	1050	880	840	810
	Selenium (Se) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Sodium (Na) (mg/kg)	91	118	93	93	88
	Strontium (Sr) (mg/kg)	252	265	257	251	221
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.088	0.090	0.081	0.077	0.079
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	118	139	130	127	129
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.739	0.712	0.710	0.647	0.606
	Vanadium (V) (mg/kg)	13.8	14.8	13.9	13.6	13.7
	Zinc (Zn) (mg/kg)	61.9	64.1	61.6	58.7	63.6
	Zirconium (Zr) (mg/kg)	1.5	1.5	1.6	2.2	1.5

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2334973-6 SEDIMENT 21-AUG-19 10:27 RG_T4_1_SE_201 90821-1027	L2334973-7 SEDIMENT 21-AUG-19 14:30 RG_T4_2_SE_201 90821-1430	L2334973-8 SEDIMENT 21-AUG-19 13:30 RG_T4_3_SE_201 90821-1330	L2334973-9 SEDIMENT 21-AUG-19 12:30 RG_T4_4_SE_201 90821-1230	L2334973-10 SEDIMENT 21-AUG-19 11:30 RG_T4_5_SE_201 90821-1130
	Sample ID					
	Description					
	Sampled Date					
	Sampled Time					
	Client ID					
SOIL						
Physical Tests	Moisture (%)	40.8	40.9	38.6	37.6	39.0
	pH (1:2 soil:water) (pH)	8.14	8.18	8.20	8.10	8.21
Metals	Aluminum (Al) (mg/kg)	12200	12200	12700	12000	12300
	Antimony (Sb) (mg/kg)	0.40	0.40	0.39	0.38	0.33
	Arsenic (As) (mg/kg)	6.37	6.25	6.47	6.08	6.26
	Barium (Ba) (mg/kg)	151	148	134	120	115
	Beryllium (Be) (mg/kg)	0.54	0.57	0.54	0.51	0.48
	Bismuth (Bi) (mg/kg)	0.20	0.21	0.21	0.20	0.21
	Boron (B) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Cadmium (Cd) (mg/kg)	0.508	0.496	0.450	0.411	0.333
	Calcium (Ca) (mg/kg)	98800	100000	103000	96200	105000
	Chromium (Cr) (mg/kg)	18.9	18.7	20.8	18.6	18.6
	Cobalt (Co) (mg/kg)	8.40	8.44	8.95	8.69	8.64
	Copper (Cu) (mg/kg)	15.6	15.9	16.9	16.8	15.0
	Iron (Fe) (mg/kg)	22000	22100	23100	21700	22500
	Lead (Pb) (mg/kg)	14.2	14.5	16.0	16.0	15.2
	Lithium (Li) (mg/kg)	22.3	24.0	24.2	24.0	25.2
	Magnesium (Mg) (mg/kg)	22000	22200	23400	22500	22300
	Manganese (Mn) (mg/kg)	572	550	541	496	529
	Mercury (Hg) (mg/kg)	0.0382	0.0390	0.0320	0.0360	0.0233
	Molybdenum (Mo) (mg/kg)	0.83	0.83	0.84	0.73	0.71
	Nickel (Ni) (mg/kg)	21.8	22.0	23.1	21.6	21.1
	Phosphorus (P) (mg/kg)	724	752	753	690	625
	Potassium (K) (mg/kg)	1330	1360	1300	1160	1200
	Selenium (Se) (mg/kg)	0.68	0.69	0.65	0.56	0.46
	Silver (Ag) (mg/kg)	0.11	0.10	0.10	<0.10	<0.10
	Sodium (Na) (mg/kg)	100	102	99	91	97
	Strontium (Sr) (mg/kg)	201	197	216	202	234
	Sulfur (S) (mg/kg)	<1000	<1000	<1000	<1000	<1000
	Thallium (Tl) (mg/kg)	0.154	0.156	0.147	0.134	0.123
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	55.1	63.8	80.8	82.0	91.0
	Tungsten (W) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Uranium (U) (mg/kg)	0.760	0.755	0.822	0.821	0.770
	Vanadium (V) (mg/kg)	19.2	19.8	19.5	18.1	17.3
	Zinc (Zn) (mg/kg)	73.5	74.4	76.1	72.7	69.7
	Zirconium (Zr) (mg/kg)	1.5	1.5	1.5	1.5	1.3

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2334973-11				
	Description	SEDIMENT				
	Sampled Date	21-AUG-19				
	Sampled Time	10:27				
	Client ID	RG_DUP_SE_2019 0821-1027				
Grouping	**Analyte**					
SOIL						
Physical Tests	Moisture (%)	40.1				
	pH (1:2 soil:water) (pH)	8.18				
Metals	Aluminum (Al) (mg/kg)	12000				
	Antimony (Sb) (mg/kg)	0.40				
	Arsenic (As) (mg/kg)	6.48				
	Barium (Ba) (mg/kg)	149				
	Beryllium (Be) (mg/kg)	0.55				
	Bismuth (Bi) (mg/kg)	0.21				
	Boron (B) (mg/kg)	<5.0				
	Cadmium (Cd) (mg/kg)	0.490				
	Calcium (Ca) (mg/kg)	99200				
	Chromium (Cr) (mg/kg)	18.3				
	Cobalt (Co) (mg/kg)	8.49				
	Copper (Cu) (mg/kg)	15.9				
	Iron (Fe) (mg/kg)	22000				
	Lead (Pb) (mg/kg)	14.6				
	Lithium (Li) (mg/kg)	22.6				
	Magnesium (Mg) (mg/kg)	22300				
	Manganese (Mn) (mg/kg)	573				
	Mercury (Hg) (mg/kg)	0.0388				
	Molybdenum (Mo) (mg/kg)	0.83				
	Nickel (Ni) (mg/kg)	21.8				
	Phosphorus (P) (mg/kg)	754				
	Potassium (K) (mg/kg)	1320				
	Selenium (Se) (mg/kg)	0.72				
	Silver (Ag) (mg/kg)	0.11				
	Sodium (Na) (mg/kg)	100				
	Strontium (Sr) (mg/kg)	201				
	Sulfur (S) (mg/kg)	<1000				
	Thallium (Tl) (mg/kg)	0.153				
	Tin (Sn) (mg/kg)	<2.0				
	Titanium (Ti) (mg/kg)	57.6				
	Tungsten (W) (mg/kg)	<0.50				
	Uranium (U) (mg/kg)	0.786				
	Vanadium (V) (mg/kg)	19.5				
	Zinc (Zn) (mg/kg)	73.7				
	Zirconium (Zr) (mg/kg)	1.4				

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2334973-1	L2334973-2	L2334973-3	L2334973-4	L2334973-5
	Description	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	Sampled Date	22-AUG-19	22-AUG-19	22-AUG-19	22-AUG-19	22-AUG-19
	Sampled Time	09:46	10:16	10:46	11:30	09:14
	Client ID	RG_TN_1_SE_201 90822-0946	RG_TN_2_SE_201 90822-1016	RG_TN_3_SE_201 90822-1046	RG_TN_4_SE_201 90822-1130	RG_TN_5_SE_201 90822-0914
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acridine (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.015	<0.015	<0.015	<0.015	<0.015
	Benzo(e)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	1-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Quinoline (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: d10-Acenaphthene (%)	73.0	75.0	79.9	79.4	77.2
	Surrogate: d12-Chrysene (%)	88.7	89.2	92.9	92.3	89.4
	Surrogate: d8-Naphthalene (%)	69.8	73.3	78.2	78.2	77.3
	Surrogate: d10-Phenanthrene (%)	86.4	90.3	90.9	92.6	90.4
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	IACR (CCME)	<0.15	<0.15	<0.15	<0.15	<0.15

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2334973-6 SEDIMENT 21-AUG-19 10:27 RG_T4_1_SE_201 90821-1027	L2334973-7 SEDIMENT 21-AUG-19 14:30 RG_T4_2_SE_201 90821-1430	L2334973-8 SEDIMENT 21-AUG-19 13:30 RG_T4_3_SE_201 90821-1330	L2334973-9 SEDIMENT 21-AUG-19 12:30 RG_T4_4_SE_201 90821-1230	L2334973-10 SEDIMENT 21-AUG-19 11:30 RG_T4_5_SE_201 90821-1130
SOIL						
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acridine (mg/kg)	<0.010	<0.010	<0.010	<0.010	0.010
	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	0.011	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b&j)fluoranthene (mg/kg)	0.012	0.015	<0.010	0.011	<0.010
	Benzo(b+j+k)fluoranthene (mg/kg)	0.015	0.019	<0.015	<0.015	<0.015
	Benzo(e)pyrene (mg/kg)	<0.010	0.010	<0.010	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	0.016	0.019	0.010	0.011	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	0.013	0.014	<0.010	0.011	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	1-Methylnaphthalene (mg/kg)	0.026	0.030	0.018	0.017	0.016
	2-Methylnaphthalene (mg/kg)	0.045	0.050	0.029	0.027	0.027
	Naphthalene (mg/kg)	0.019	0.020	0.013	0.013	0.014
	Perylene (mg/kg)	<0.010	0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	0.037	0.042	0.023	0.022	0.025
	Pyrene (mg/kg)	0.011	0.012	<0.010	<0.010	<0.010
	Quinoline (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: d10-Acenaphthene (%)	82.5	81.6	77.0	80.3	85.0
	Surrogate: d12-Chrysene (%)	97.6	96.0	94.1	91.9	98.7
	Surrogate: d8-Naphthalene (%)	81.8	82.2	75.1	81.5	82.6
	Surrogate: d10-Phenanthrene (%)	91.8	90.2	92.9	88.9	100.3
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	IACR (CCME)	0.15	0.20	<0.15	<0.15	<0.15

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2334973-11				
	Description	SEDIMENT				
	Sampled Date	21-AUG-19				
	Sampled Time	10:27				
	Client ID	RG_DUP_SE_2019 0821-1027				
Grouping	**Analyte**					
SOIL						
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050				
	Acenaphthylene (mg/kg)	<0.0050				
	Acridine (mg/kg)	<0.010				
	Anthracene (mg/kg)	0.0045				
	Benz(a)anthracene (mg/kg)	0.010				
	Benzo(a)pyrene (mg/kg)	<0.010				
	Benzo(b&j)fluoranthene (mg/kg)	0.012				
	Benzo(b+j+k)fluoranthene (mg/kg)	0.016				
	Benzo(e)pyrene (mg/kg)	<0.010				
	Benzo(g,h,i)perylene (mg/kg)	<0.010				
	Benzo(k)fluoranthene (mg/kg)	<0.010				
	Chrysene (mg/kg)	0.017				
	Dibenz(a,h)anthracene (mg/kg)	<0.0050				
	Fluoranthene (mg/kg)	0.020				
	Fluorene (mg/kg)	<0.010				
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010				
	1-Methylnaphthalene (mg/kg)	0.022				
	2-Methylnaphthalene (mg/kg)	0.037				
	Naphthalene (mg/kg)	0.016				
	Perylene (mg/kg)	<0.010				
	Phenanthrene (mg/kg)	0.036				
	Pyrene (mg/kg)	0.016				
	Quinoline (mg/kg)	<0.010				
	Surrogate: d10-Acenaphthene (%)	74.7				
	Surrogate: d12-Chrysene (%)	85.9				
	Surrogate: d8-Naphthalene (%)	75.1				
	Surrogate: d10-Phenanthrene (%)	85.3				
	B(a)P Total Potency Equivalent (mg/kg)	<0.020				
	IACR (CCME)	0.17				

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C-TOT-LECO-SK	Soil	Total Carbon by combustion method	CSSS (2008) 21.2

The sample is ignited in a combustion analyzer where carbon in the reduced CO2 gas is determined using a thermal conductivity detector.

HG-200.2-CVAA-CL	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

MET-200.2-CCMS-CL	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

MOISTURE-CL	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)

This analysis is carried out gravimetrically by drying the sample at 105 C

PAH-TMB-D/A-MS-CL	Soil	PAH by Tumbler Extraction (DCM/Acetone)	EPA 3570/8270

Polycyclic Aromatic Hydrocarbons in Sediment/Soil
This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of DCM and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

PH-1:2-CL	Soil	pH in soil (1:2 Soil:Water Extraction)	CSSS Ch. 16

Soil and de-ionized water (by volume) are mixed in a defined ratio. The slurry is allowed to stand, shaken, and then allowed to stand again prior to taking measurements. After equilibration, the pH of the liquid portion of the extract is measured by a pH meter. Field Measurement is recommended where accurate pH measurements are required, due to the 15 minute recommended hold time.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2334973 Report Date: 29-AUG-19

Client: Teck Coal Ltd.
421 Pine Avenue
Sparwood BC V0B 2G0
Contact: Cait Good

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-LECO-SK	**Soil**							
Batch R4777551								
WG3142664-2 IRM		**08-109_SOIL**						
Total Carbon by Combustion			95.7		%		80-120	28-AUG-19
WG3142664-4 LCS		**SULFADIAZINE**						
Total Carbon by Combustion			102.4		%		90-110	28-AUG-19
WG3142664-3 MB								
Total Carbon by Combustion			<0.05		%		0.05	28-AUG-19
HG-200.2-CVAA-CL	**Soil**							
Batch R4769865								
WG3144533-4 CRM		**TILL-1**						
Mercury (Hg)			116.2		%		70-130	27-AUG-19
WG3144533-5 DUP		**L2334973-2**						
Mercury (Hg)		0.0271	0.0258		mg/kg	4.9	40	27-AUG-19
WG3144533-3 LCS								
Mercury (Hg)			105.0		%		80-120	27-AUG-19
WG3144533-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	27-AUG-19
MET-200.2-CCMS-CL	**Soil**							
Batch R4769796								
WG3144533-4 CRM		**TILL-1**						
Aluminum (Al)			102.8		%		70-130	27-AUG-19
Antimony (Sb)			104.5		%		70-130	27-AUG-19
Arsenic (As)			102.9		%		70-130	27-AUG-19
Barium (Ba)			112.0		%		70-130	27-AUG-19
Beryllium (Be)			104.5		%		70-130	27-AUG-19
Bismuth (Bi)			105.4		%		70-130	27-AUG-19
Boron (B)			2.6		mg/kg		0-8.2	27-AUG-19
Cadmium (Cd)			107.0		%		70-130	27-AUG-19
Calcium (Ca)			106.1		%		70-130	27-AUG-19
Chromium (Cr)			104.2		%		70-130	27-AUG-19
Cobalt (Co)			104.6		%		70-130	27-AUG-19
Copper (Cu)			106.9		%		70-130	27-AUG-19
Iron (Fe)			106.6		%		70-130	27-AUG-19
Lead (Pb)			104.0		%		70-130	27-AUG-19
Lithium (Li)			95.6		%		70-130	27-AUG-19
Magnesium (Mg)			104.7		%		70-130	27-AUG-19
Manganese (Mn)			109.0		%		70-130	27-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4769796								
WG3144533-4 CRM		**TILL-1**						
Molybdenum (Mo)			112.1		%		70-130	27-AUG-19
Nickel (Ni)			103.5		%		70-130	27-AUG-19
Phosphorus (P)			101.4		%		70-130	27-AUG-19
Potassium (K)			110.0		%		70-130	27-AUG-19
Selenium (Se)			0.31		mg/kg		0.11-0.51	27-AUG-19
Silver (Ag)			0.22		mg/kg		0.13-0.33	27-AUG-19
Sodium (Na)			108.9		%		70-130	27-AUG-19
Strontium (Sr)			107.7		%		70-130	27-AUG-19
Thallium (Tl)			0.120		mg/kg		0.077-0.18	27-AUG-19
Tin (Sn)			1.1		mg/kg		0-3.1	27-AUG-19
Titanium (Ti)			96.7		%		70-130	27-AUG-19
Tungsten (W)			0.12		mg/kg		0-0.66	27-AUG-19
Uranium (U)			100.4		%		70-130	27-AUG-19
Vanadium (V)			102.4		%		70-130	27-AUG-19
Zinc (Zn)			100.9		%		70-130	27-AUG-19
Zirconium (Zr)			0.9		mg/kg		0-1.8	27-AUG-19
WG3144533-3 LCS								
Aluminum (Al)			119.7		%		80-120	27-AUG-19
Antimony (Sb)			109.9		%		80-120	27-AUG-19
Arsenic (As)			108.9		%		80-120	27-AUG-19
Barium (Ba)			110.9		%		80-120	27-AUG-19
Beryllium (Be)			110.1		%		80-120	27-AUG-19
Bismuth (Bi)			111.5		%		80-120	27-AUG-19
Boron (B)			96.1		%		80-120	27-AUG-19
Cadmium (Cd)			113.1		%		80-120	27-AUG-19
Calcium (Ca)			109.7		%		80-120	27-AUG-19
Chromium (Cr)			114.8		%		80-120	27-AUG-19
Cobalt (Co)			109.9		%		80-120	27-AUG-19
Copper (Cu)			110.5		%		80-120	27-AUG-19
Iron (Fe)			113.2		%		80-120	27-AUG-19
Lead (Pb)			111.7		%		80-120	27-AUG-19
Lithium (Li)			111.1		%		80-120	27-AUG-19
Magnesium (Mg)			113.9		%		80-120	27-AUG-19
Manganese (Mn)			114.8		%		80-120	27-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4769796								
WG3144533-3 LCS								
Molybdenum (Mo)			110.1		%		80-120	27-AUG-19
Nickel (Ni)			112.3		%		80-120	27-AUG-19
Potassium (K)			115.7		%		80-120	27-AUG-19
Selenium (Se)			107.8		%		80-120	27-AUG-19
Silver (Ag)			109.5		%		80-120	27-AUG-19
Sodium (Na)			112.3		%		80-120	27-AUG-19
Strontium (Sr)			114.1		%		80-120	27-AUG-19
Sulfur (S)			115.4		%		80-120	27-AUG-19
Thallium (Tl)			111.8		%		80-120	27-AUG-19
Tin (Sn)			110.2		%		80-120	27-AUG-19
Titanium (Ti)			107.6		%		80-120	27-AUG-19
Tungsten (W)			107.1		%		80-120	27-AUG-19
Uranium (U)			107.0		%		80-120	27-AUG-19
Vanadium (V)			115.7		%		80-120	27-AUG-19
Zinc (Zn)			103.9		%		80-120	27-AUG-19
Zirconium (Zr)			111.4		%		80-120	27-AUG-19
WG3144533-1 MB								
Aluminum (Al)			<50		mg/kg		50	27-AUG-19
Antimony (Sb)			<0.10		mg/kg		0.1	27-AUG-19
Arsenic (As)			<0.10		mg/kg		0.1	27-AUG-19
Barium (Ba)			<0.50		mg/kg		0.5	27-AUG-19
Beryllium (Be)			<0.10		mg/kg		0.1	27-AUG-19
Bismuth (Bi)			<0.20		mg/kg		0.2	27-AUG-19
Boron (B)			<5.0		mg/kg		5	27-AUG-19
Cadmium (Cd)			<0.020		mg/kg		0.02	27-AUG-19
Calcium (Ca)			<50		mg/kg		50	27-AUG-19
Chromium (Cr)			<0.50		mg/kg		0.5	27-AUG-19
Cobalt (Co)			<0.10		mg/kg		0.1	27-AUG-19
Copper (Cu)			<0.50		mg/kg		0.5	27-AUG-19
Iron (Fe)			<50		mg/kg		50	27-AUG-19
Lead (Pb)			<0.50		mg/kg		0.5	27-AUG-19
Lithium (Li)			<2.0		mg/kg		2	27-AUG-19
Magnesium (Mg)			<20		mg/kg		20	27-AUG-19
Manganese (Mn)			<1.0		mg/kg		1	27-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4769796								
WG3144533-1 MB								
Molybdenum (Mo)			<0.10		mg/kg		0.1	27-AUG-19
Nickel (Ni)			<0.50		mg/kg		0.5	27-AUG-19
Phosphorus (P)			<50		mg/kg		50	27-AUG-19
Potassium (K)			<100		mg/kg		100	27-AUG-19
Selenium (Se)			<0.20		mg/kg		0.2	27-AUG-19
Silver (Ag)			<0.10		mg/kg		0.1	27-AUG-19
Sodium (Na)			<50		mg/kg		50	27-AUG-19
Strontium (Sr)			<0.50		mg/kg		0.5	27-AUG-19
Sulfur (S)			<1000		mg/kg		1000	27-AUG-19
Thallium (Tl)			<0.050		mg/kg		0.05	27-AUG-19
Tin (Sn)			<2.0		mg/kg		2	27-AUG-19
Titanium (Ti)			<1.0		mg/kg		1	27-AUG-19
Tungsten (W)			<0.50		mg/kg		0.5	27-AUG-19
Uranium (U)			<0.050		mg/kg		0.05	27-AUG-19
Vanadium (V)			<0.20		mg/kg		0.2	27-AUG-19
Zinc (Zn)			<2.0		mg/kg		2	27-AUG-19
Zirconium (Zr)			<1.0		mg/kg		1	27-AUG-19
Batch R4770790								
WG3144533-5 DUP		**L2334973-2**						
Aluminum (Al)		12400	12300		mg/kg	0.6	40	27-AUG-19
Antimony (Sb)		0.26	0.26		mg/kg	1.2	30	27-AUG-19
Arsenic (As)		5.71	5.54		mg/kg	3.0	30	27-AUG-19
Barium (Ba)		76.0	76.1		mg/kg	0.0	40	27-AUG-19
Beryllium (Be)		0.42	0.39		mg/kg	6.5	30	27-AUG-19
Bismuth (Bi)		0.20	<0.20	RPD-NA	mg/kg	N/A	30	27-AUG-19
Boron (B)		<5.0	<5.0	RPD-NA	mg/kg	N/A	30	27-AUG-19
Cadmium (Cd)		0.169	0.165		mg/kg	2.5	30	27-AUG-19
Calcium (Ca)		112000	110000		mg/kg	2.5	30	27-AUG-19
Chromium (Cr)		18.8	18.4		mg/kg	1.7	30	27-AUG-19
Cobalt (Co)		8.68	8.54		mg/kg	1.7	30	27-AUG-19
Copper (Cu)		14.3	14.0		mg/kg	1.8	30	27-AUG-19
Iron (Fe)		23100	22700		mg/kg	1.6	30	27-AUG-19
Lead (Pb)		15.0	14.9		mg/kg	0.9	40	27-AUG-19
Lithium (Li)		25.7	26.0		mg/kg	1.4	30	27-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-CL	**Soil**							
Batch R4770790								
WG3144533-5 DUP		**L2334973-2**						
Magnesium (Mg)		24600	24200		mg/kg	1.9	30	27-AUG-19
Manganese (Mn)		464	463		mg/kg	0.1	30	27-AUG-19
Molybdenum (Mo)		0.57	0.56		mg/kg	1.8	40	27-AUG-19
Nickel (Ni)		20.1	20.0		mg/kg	0.6	30	27-AUG-19
Phosphorus (P)		594	594		mg/kg	0.1	30	27-AUG-19
Potassium (K)		1050	990		mg/kg	6.1	40	27-AUG-19
Selenium (Se)		<0.20	<0.20	RPD-NA	mg/kg	N/A	30	27-AUG-19
Silver (Ag)		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	27-AUG-19
Sodium (Na)		118	99		mg/kg	17	40	27-AUG-19
Strontium (Sr)		265	260		mg/kg	1.7	40	27-AUG-19
Sulfur (S)		<1000	<1000	RPD-NA	mg/kg	N/A	30	27-AUG-19
Thallium (Tl)		0.090	0.087		mg/kg	4.2	30	27-AUG-19
Tin (Sn)		<2.0	<2.0	RPD-NA	mg/kg	N/A	40	27-AUG-19
Titanium (Ti)		139	138		mg/kg	0.9	40	27-AUG-19
Tungsten (W)		<0.50	<0.50	RPD-NA	mg/kg	N/A	30	27-AUG-19
Uranium (U)		0.712	0.697		mg/kg	2.1	30	27-AUG-19
Vanadium (V)		14.8	14.6		mg/kg	1.8	30	27-AUG-19
Zinc (Zn)		64.1	62.3		mg/kg	2.8	30	27-AUG-19
Zirconium (Zr)		1.5	1.4		mg/kg	8.1	30	27-AUG-19
MOISTURE-CL	**Soil**							
Batch R4770708								
WG3145049-3 DUP		**L2334973-1**						
Moisture		36.6	37.6		%	2.8	20	28-AUG-19
WG3145049-2 LCS								
Moisture			97.4		%		90-110	28-AUG-19
WG3145049-1 MB								
Moisture			<0.25		%		0.25	28-AUG-19
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4775795								
WG3147117-4 DUP		**L2334973-1**						
Acenaphthene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	28-AUG-19
Acenaphthylene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	28-AUG-19
Acridine		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Anthracene		<0.0040	<0.0040	RPD-NA	mg/kg	N/A	50	28-AUG-19
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4775795								
WG3147117-4 DUP		**L2334973-1**						
Benzo(a)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Benzo(b&j)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Benzo(g,h,i)perylene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Benzo(k)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Benzo(e)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Chrysene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Dibenz(a,h)anthracene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	28-AUG-19
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Fluorene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
1-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
2-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Perylene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Phenanthrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
Quinoline		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	28-AUG-19
WG3147117-2 IRM		**ALS PAH RM2**						
Acenaphthene			98.7		%		65-130	28-AUG-19
Acenaphthylene			93.9		%		65-130	28-AUG-19
Acridine			106.7		%		65-130	28-AUG-19
Anthracene			82.8		%		65-130	28-AUG-19
Benz(a)anthracene			95.8		%		65-130	28-AUG-19
Benzo(a)pyrene			100.6		%		65-130	28-AUG-19
Benzo(b&j)fluoranthene			92.6		%		65-130	28-AUG-19
Benzo(g,h,i)perylene			109.2		%		65-130	28-AUG-19
Benzo(k)fluoranthene			91.9		%		65-130	28-AUG-19
Benzo(e)pyrene			91.0		%		65-130	28-AUG-19
Chrysene			104.1		%		65-130	28-AUG-19
Dibenz(a,h)anthracene			104.9		%		65-130	28-AUG-19
Fluoranthene			110.4		%		65-130	28-AUG-19
Fluorene			94.2		%		65-130	28-AUG-19
Indeno(1,2,3-c,d)pyrene			114.2		%		65-130	28-AUG-19
1-Methylnaphthalene			95.5		%		65-130	28-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4775795								
WG3147117-2 IRM		**ALS PAH RM2**						
2-Methylnaphthalene			98.7		%		65-130	28-AUG-19
Naphthalene			103.5		%		65-130	28-AUG-19
Perylene			87.6		%		65-130	28-AUG-19
Phenanthrene			95.9		%		65-130	28-AUG-19
Pyrene			107.7		%		65-130	28-AUG-19
WG3147117-8 IRM		**ALS PAH RM2**						
Acenaphthene			92.6		%		65-130	29-AUG-19
Acenaphthylene			92.4		%		65-130	29-AUG-19
Acridine			106.0		%		65-130	29-AUG-19
Anthracene			79.7		%		65-130	29-AUG-19
Benz(a)anthracene			89.8		%		65-130	29-AUG-19
Benzo(a)pyrene			83.8		%		65-130	29-AUG-19
Benzo(b&j)fluoranthene			91.2		%		65-130	29-AUG-19
Benzo(g,h,i)perylene			105.6		%		65-130	29-AUG-19
Benzo(k)fluoranthene			91.4		%		65-130	29-AUG-19
Benzo(e)pyrene			90.0		%		65-130	29-AUG-19
Chrysene			98.4		%		65-130	29-AUG-19
Dibenz(a,h)anthracene			100.2		%		65-130	29-AUG-19
Fluoranthene			97.9		%		65-130	29-AUG-19
Fluorene			89.9		%		65-130	29-AUG-19
Indeno(1,2,3-c,d)pyrene			104.9		%		65-130	29-AUG-19
1-Methylnaphthalene			95.7		%		65-130	29-AUG-19
2-Methylnaphthalene			99.3		%		65-130	29-AUG-19
Naphthalene			109.0		%		65-130	29-AUG-19
Perylene			67.6		%		65-130	29-AUG-19
Phenanthrene			91.8		%		65-130	29-AUG-19
Pyrene			95.7		%		65-130	29-AUG-19
WG3147117-1 LCS								
Acenaphthene			84.9		%		60-130	28-AUG-19
Acenaphthylene			80.6		%		60-130	28-AUG-19
Acridine			92.2		%		60-130	28-AUG-19
Anthracene			86.9		%		60-130	28-AUG-19
Benz(a)anthracene			100.0		%		60-130	28-AUG-19
Benzo(a)pyrene			97.5		%		60-130	28-AUG-19
Benzo(b&j)fluoranthene			94.2		%		60-130	28-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4775795								
WG3147117-1 LCS								
Benzo(g,h,i)perylene			96.8		%		60-130	28-AUG-19
Benzo(k)fluoranthene			100.9		%		60-130	28-AUG-19
Benzo(e)pyrene			100.4		%		60-130	28-AUG-19
Chrysene			100.9		%		60-130	28-AUG-19
Dibenz(a,h)anthracene			98.3		%		60-130	28-AUG-19
Fluoranthene			100.3		%		60-130	28-AUG-19
Fluorene			87.8		%		60-130	28-AUG-19
Indeno(1,2,3-c,d)pyrene			99.9		%		60-130	28-AUG-19
1-Methylnaphthalene			80.1		%		60-130	28-AUG-19
2-Methylnaphthalene			84.5		%		60-130	28-AUG-19
Naphthalene			81.2		%		50-130	28-AUG-19
Perylene			102.7		%		60-130	28-AUG-19
Phenanthrene			92.7		%		60-130	28-AUG-19
Pyrene			101.8		%		60-130	28-AUG-19
Quinoline			90.7		%		60-130	28-AUG-19
WG3147117-7 LCS								
Acenaphthene			93.9		%		60-130	29-AUG-19
Acenaphthylene			86.8		%		60-130	29-AUG-19
Acridine			89.6		%		60-130	29-AUG-19
Anthracene			84.6		%		60-130	29-AUG-19
Benz(a)anthracene			95.6		%		60-130	29-AUG-19
Benzo(a)pyrene			94.8		%		60-130	29-AUG-19
Benzo(b&j)fluoranthene			91.6		%		60-130	29-AUG-19
Benzo(g,h,i)perylene			93.1		%		60-130	29-AUG-19
Benzo(k)fluoranthene			99.1		%		60-130	29-AUG-19
Benzo(e)pyrene			98.5		%		60-130	29-AUG-19
Chrysene			97.0		%		60-130	29-AUG-19
Dibenz(a,h)anthracene			94.0		%		60-130	29-AUG-19
Fluoranthene			92.3		%		60-130	29-AUG-19
Fluorene			89.4		%		60-130	29-AUG-19
Indeno(1,2,3-c,d)pyrene			90.0		%		60-130	29-AUG-19
1-Methylnaphthalene			90.1		%		60-130	29-AUG-19
2-Methylnaphthalene			88.8		%		60-130	29-AUG-19
Naphthalene			91.2		%		50-130	29-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4775795								
WG3147117-7 LCS								
Perylene			99.4		%		60-130	29-AUG-19
Phenanthrene			89.5		%		60-130	29-AUG-19
Pyrene			94.3		%		60-130	29-AUG-19
Quinoline			90.4		%		60-130	29-AUG-19
WG3147117-3 MB								
Acenaphthene			<0.0050		mg/kg		0.005	28-AUG-19
Acenaphthylene			<0.0050		mg/kg		0.005	28-AUG-19
Acridine			<0.010		mg/kg		0.01	28-AUG-19
Anthracene			<0.0040		mg/kg		0.004	28-AUG-19
Benz(a)anthracene			<0.010		mg/kg		0.01	28-AUG-19
Benzo(a)pyrene			<0.010		mg/kg		0.01	28-AUG-19
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	28-AUG-19
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	28-AUG-19
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	28-AUG-19
Benzo(e)pyrene			<0.010		mg/kg		0.01	28-AUG-19
Chrysene			<0.010		mg/kg		0.01	28-AUG-19
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	28-AUG-19
Fluoranthene			<0.010		mg/kg		0.01	28-AUG-19
Fluorene			<0.010		mg/kg		0.01	28-AUG-19
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	28-AUG-19
1-Methylnaphthalene			<0.010		mg/kg		0.01	28-AUG-19
2-Methylnaphthalene			<0.010		mg/kg		0.01	28-AUG-19
Naphthalene			<0.010		mg/kg		0.01	28-AUG-19
Perylene			<0.010		mg/kg		0.01	28-AUG-19
Phenanthrene			<0.010		mg/kg		0.01	28-AUG-19
Pyrene			<0.010		mg/kg		0.01	28-AUG-19
Quinoline			<0.010		mg/kg		0.01	28-AUG-19
Surrogate: d8-Naphthalene			78.1		%		50-130	28-AUG-19
Surrogate: d10-Acenaphthene			84.4		%		60-130	28-AUG-19
Surrogate: d10-Phenanthrene			94.7		%		60-130	28-AUG-19
Surrogate: d12-Chrysene			102.1		%		60-130	28-AUG-19
WG3147117-5 MB								
Acenaphthene			<0.0050		mg/kg		0.005	29-AUG-19
Acenaphthylene			<0.0050		mg/kg		0.005	29-AUG-19
Acridine			<0.010		mg/kg		0.01	29-AUG-19

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-D/A-MS-CL	**Soil**							
Batch R4775795								
WG3147117-5 MB								
Anthracene			<0.0040		mg/kg		0.004	29-AUG-19
Benz(a)anthracene			<0.010		mg/kg		0.01	29-AUG-19
Benzo(a)pyrene			<0.010		mg/kg		0.01	29-AUG-19
Benzo(b&j)fluoranthene			<0.010		mg/kg		0.01	29-AUG-19
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	29-AUG-19
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	29-AUG-19
Benzo(e)pyrene			<0.010		mg/kg		0.01	29-AUG-19
Chrysene			<0.010		mg/kg		0.01	29-AUG-19
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	29-AUG-19
Fluoranthene			<0.010		mg/kg		0.01	29-AUG-19
Fluorene			<0.010		mg/kg		0.01	29-AUG-19
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	29-AUG-19
1-Methylnaphthalene			<0.010		mg/kg		0.01	29-AUG-19
2-Methylnaphthalene			<0.010		mg/kg		0.01	29-AUG-19
Naphthalene			<0.010		mg/kg		0.01	29-AUG-19
Perylene			<0.010		mg/kg		0.01	29-AUG-19
Phenanthrene			<0.010		mg/kg		0.01	29-AUG-19
Pyrene			<0.010		mg/kg		0.01	29-AUG-19
Quinoline			<0.010		mg/kg		0.01	29-AUG-19
Surrogate: d8-Naphthalene			97.0		%		50-130	29-AUG-19
Surrogate: d10-Acenaphthene			96.2		%		60-130	29-AUG-19
Surrogate: d10-Phenanthrene			88.9		%		60-130	29-AUG-19
Surrogate: d12-Chrysene			100.8		%		60-130	29-AUG-19
PH-1:2-CL	**Soil**							
Batch R4769666								
WG3144646-2 DUP		**L2334973-1**						
pH (1:2 soil:water)		8.26	8.25	J	pH	0.01	0.2	27-AUG-19
WG3144646-1 IRM		**SAL-STD10**						
pH (1:2 soil:water)			7.74		pH		7.4-8	27-AUG-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Teck

COC ID: **REGIONAL Koocanusa Reservoir** | TURNAROUND TIME: Regular

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Regional Koocanusa			Lab Name	ALS Burnaby			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Cait Good			Lab Contact	Lyudmyla Shvets			Email 1:	cait.good@teck.com	X	X	X
Email	cait.good@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	colleen.mooney@teck.com	X	X	X
Address	421 Pine Avenue			Address	2559 29 Street NE			Email 3:	carlie.meyer@teck.com			
								Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:	heurrier@minnow.ca	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y7B5	Country	Canada					
Phone Number	250-425-8202			Phone Number	14034071794			PO number	VPO00616180			

L2334973-COFC

SAMPLE DETAILS								ANALYSIS REQUESTED												Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FIL	N	N	N	N	N	N	N					
								PRESERV.	NONE	NONE	NONE	NONE	NONE	HNO3	NONE					
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Particle Size	TOC	PAH	Total Metals (including Hg)	Moisture							
RG_TN_1_SE_20190822-0946	RG_TN_1	Sediment		22-Aug-19	946	G	2		X	X	X	X	X							
RG_TN_2_SE_20190822-1016	RG_TN_2	Sediment		22-Aug-19	1016	G	2		X	X	X	X	X							
RG_TN_3_SE_20190822-1046	RG_TN_3	Sediment		22-Aug-19	1046	G	2		X	X	X	X	X							
RG_TN_4_SE_20190822-1130	RG_TN_4	Sediment		22-Aug-19	1130	G	2		X	X	X	X	X							
RG_TN_5_SE_20190822-0914	RG_TN_5	Sediment		22-Aug-19	914	G	2		X	X	X	X	X							
RG_T4_1_SE_20190821-1027	RG_T4_1	Sediment		21-Aug-19	1027	G	2		X	X	X	X	X							
RG_T4_2_SE_20190821-1430	RG_T4_2	Sediment		21-Aug-19	1430	G	2		X	X	X	X	X							
RG_T4_3_SE_20190821-1330	RG_T4_3	Sediment		21-Aug-19	1330	G	2		X	X	X	X	X							
RG_T4_4_SE_20190821-1230	RG_T4_4	Sediment		21-Aug-19	1230	G	2		X	X	X	X	X							
RG_T4_5_SE_20190821-1130	RG_T4_5	Sediment		21-Aug-19	1130	G	2		X	X	X	X	X							
RG_DUP_SE_20190821-1027	RG_DUP	Sediment		21-Aug-19	1027	G	2		X	X	X	X	X							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Koocanusa - 19-08 1 jar for PAHs and 1 bag for everything else			Plc 8/23	0895

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Heidi Currier	Mobile #	905-691-6183
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	August 22, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

4 of 1

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Justin Wilson

Date Samples Received: Jul-10-2018 Client P.O.: VPO00555477 Ref# 18-07

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 2 authorized by Keith Gipman, Supervisor
Results from Lab Section 6 authorized by Marion McConnell, Supervisor

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Justin Wilson

Sample #: **2018026965**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_BT01M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	200	200	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	200	200	200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	1.3	0.8	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.7	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	79.02	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026966**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_BT02M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	1.9	1	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.0	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	75.25	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026967**
Date Sampled: **Apr 28, 2018**
Sample Matrix: **TISSUE**
Description: **04/28/2018 RG_GC_BT03M_20180428**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	1.8	0.9	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.9	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	76.97	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026968**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_WCT01M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	300	300	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	20	10	5
Iron	ug/g	300	200	200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.6	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	6	5	5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	74.92	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026969**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_WCT02M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.3	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	76.95	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026970**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_WCT03M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.5	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	66.83	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026971**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_WCT04M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	200	200	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	6	6	5
Iron	ug/g	200	200	200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.0	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	6	5	5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	75.00	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026972**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_WCT05M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	7.3	2	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	14.60	1	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026973**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_WCT06M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	6.3	2	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	21.13	2	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026974**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_WCT07M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	6	5	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	0.7	0.6	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	20.75	2	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026975**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_WCT08M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.9	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	5	5	5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	12.92	1	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026976**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_KO01M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.6	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	61.33	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026977**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_PCC01M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.7	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.1	0.7	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	<1		1
Mercury	ug/g	0.53	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.6	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	30	10	5
Lab Section 6				
Moisture	%	76.73	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026978**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_PCC01O_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.0	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	3.6	1	0.5
Iron	ug/g	40	30	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	5	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	4.5	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	90	20	5
Lab Section 6				
Moisture	%	62.19	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026979**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_PCC02M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.1	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	0.8	0.6	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.54	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.1	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	3	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	30	10	5
Lab Section 6				
Moisture	%	76.78	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026980**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_PCC02O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	3.3	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	4.1	1	0.5
Iron	ug/g	120	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	19	5	1
Mercury	ug/g	0.05	0.05	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	1.5	0.5	0.5
Selenium	ug/g	21	3	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	200	30	5
Lab Section 6				
Moisture	%	75.27	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026981**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_PCC04M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.9	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.6	0.9	0.5
Iron	ug/g	20	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	<1		1
Mercury	ug/g	0.69	0.2	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	4.5	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	26	10	5
Lab Section 6				
Moisture	%	77.15	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026982**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_PCC04O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	70	50	20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	2.1	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	2.5	1	0.5
Iron	ug/g	120	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	10	2	1
Mercury	ug/g	0.05	0.05	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	16	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	1.5	0.7	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	120	20	5
Lab Section 6				
Moisture	%	68.53	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026983**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_PCC08M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	40	30	20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.4	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.2	0.8	0.5
Iron	ug/g	40	30	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.39	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.3	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	3	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	32	10	5
Lab Section 6				
Moisture	%	75.09	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026984**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_PCC08O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.9	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	2.6	1	0.5
Iron	ug/g	40	30	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	5	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	4.7	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	80	20	5
Lab Section 6				
Moisture	%	62.66	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026985**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC09M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.0	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	0.7	0.6	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.42	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	3.3	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	3	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	21	10	5
Lab Section 6				
Moisture	%	77.78	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026986**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC09O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.9	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	0.1	0.1	0.1
Copper	ug/g	2.8	1	0.5
Iron	ug/g	90	40	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	10	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	22	3	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	120	20	5
Lab Section 6				
Moisture	%	68.00	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026987**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC11M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.4	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	0.9	0.7	0.5
Iron	ug/g	20	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.48	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	3.4	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	3	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	0.6	0.5	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	49	10	5
Lab Section 6				
Moisture	%	76.94	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026988**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC11O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.2	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	3.1	1	0.5
Iron	ug/g	60	30	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	6	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	9.9	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	110	20	5
Lab Section 6				
Moisture	%	67.06	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026989**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC14M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.8	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	0.9	0.7	0.5
Iron	ug/g	20	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	<1		1
Mercury	ug/g	0.89	0.2	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	23	10	5
Lab Section 6				
Moisture	%	74.40	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026990**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC14O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.9	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	3.7	1	0.5
Iron	ug/g	70	40	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	8	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	12	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	100	20	5
Lab Section 6				
Moisture	%	62.05	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026991**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC15M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.3	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	0.8	0.6	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.62	0.2	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.0	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	4	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	43	10	5
Lab Section 6				
Moisture	%	78.69	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026992**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC15O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.0	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	3.0	1	0.5
Iron	ug/g	60	30	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	5	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	6.6	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	100	20	5
Lab Section 6				
Moisture	%	65.13	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026993**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC17M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<50		50
Antimony	ug/g	<2		2
Arsenic	ug/g	<1		1
Barium	ug/g	1	1	1
Beryllium	ug/g	<0.2		0.2
Boron	ug/g	<20		20
Cadmium	ug/g	<0.2		0.2
Chromium	ug/g	<10		10
Cobalt	ug/g	<0.2		0.2
Copper	ug/g	1	1	1
Iron	ug/g	<50		50
Lead	ug/g	<0.2		0.2
Manganese	ug/g	<2		2
Mercury	ug/g	0.5	0.2	0.1
Molybdenum	ug/g	<2		2
Nickel	ug/g	<1		1
Selenium	ug/g	4.2	0.6	0.1
Silver	ug/g	<0.2		0.2
Strontium	ug/g	2	2	2
Thallium	ug/g	<1		1
Tin	ug/g	<1		1
Titanium	ug/g	<1		1
Uranium	ug/g	<0.1		0.1
Vanadium	ug/g	<2		2
Zinc	ug/g	20	10	10
Lab Section 6				
Moisture	%	74.77	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026994**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC17O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.5	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	4.0	1	0.5
Iron	ug/g	70	40	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	15	4	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	16	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	140	20	5
Lab Section 6				
Moisture	%	67.97	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026995**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC18M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.8	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.0	0.7	0.5
Iron	ug/g	20	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.68	0.2	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.5	0.8	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	3	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	29	10	5
Lab Section 6				
Moisture	%	75.18	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026996**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_PCC18O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	10	6	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.34	0.05	0.05
Barium	ug/g	0.53	0.1	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	3.0	0.4	0.05
Iron	ug/g	59	9	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	4.7	0.7	0.1
Mercury	ug/g	0.025	0.01	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	6.5	0.6	0.05
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.31	0.1	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	99	10	0.5
Lab Section 6				
Moisture	%	61.96	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026997**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_GC_RSC02M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.2	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.6	0.9	0.5
Iron	ug/g	30	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.39	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.3	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	81	20	5
Lab Section 6				
Moisture	%	68.96	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026998**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_GC_RSC02O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.1	0.7	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	5.7	1	0.5
Iron	ug/g	120	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	9	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	5.9	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	220	30	5
Lab Section 6				
Moisture	%	67.81	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018026999**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_GC_RSC04M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.9	1	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.8	0.9	0.5
Iron	ug/g	20	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.33	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.0	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	86	20	5
Lab Section 6				
Moisture	%	69.38	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027000**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_GC_RSC04O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	6	6	5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	9.2	2	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	270	100	50
Lab Section 6				
Moisture	%	67.93	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027001**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_RSC09M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.9	0.7	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	2.1	1	0.5
Iron	ug/g	30	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.44	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.4	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	60	20	5
Lab Section 6				
Moisture	%	76.89	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027002**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_RSC09O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	80	40	20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.4	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	0.2	0.1	0.1
Copper	ug/g	8.3	2	0.5
Iron	ug/g	200	50	20
Lead	ug/g	0.1	0.1	0.1
Manganese	ug/g	11	3	1
Mercury	ug/g	0.05	0.05	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	7.6	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	1.6	0.9	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	240	40	5
Lab Section 6				
Moisture	%	72.13	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027003**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_RSC16O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	20	20	20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.3	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	4.2	1	0.5
Iron	ug/g	130	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	9	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	8.6	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	0.5	0.5	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	220	30	5
Lab Section 6				
Moisture	%	68.19	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027004**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_GC_RSC16M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.9	1	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.8	0.9	0.5
Iron	ug/g	30	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	2	1	1
Mercury	ug/g	0.28	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.5	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	7	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	59	10	5
Lab Section 6				
Moisture	%	70.41	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027005**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC17M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.2	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.7	0.9	0.5
Iron	ug/g	20	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	2	1	1
Mercury	ug/g	0.46	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.7	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	4	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	33	10	5
Lab Section 6				
Moisture	%	76.55	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027006**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC17O_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	7.3	2	0.5
Iron	ug/g	120	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	8	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	12	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	210	30	5
Lab Section 6				
Moisture	%	65.63	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027007**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC18M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.1	0.7	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.3	0.8	0.5
Iron	ug/g	30	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	2	1	1
Mercury	ug/g	0.38	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.4	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	5	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	64	20	5
Lab Section 6				
Moisture	%	74.69	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027008**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC18O_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.1	0.7	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	5.4	1	0.5
Iron	ug/g	140	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	11	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	13	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	200	30	5
Lab Section 6				
Moisture	%	72.72	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027009**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC19M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.0	0.7	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.46	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.8	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	25	10	5
Lab Section 6				
Moisture	%	76.27	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027010**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC19O_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.2	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	0.2	0.1	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	6.6	2	0.5
Iron	ug/g	180	60	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	11	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	7.8	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	190	30	5
Lab Section 6				
Moisture	%	73.44	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027011**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC20M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	9	7	5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	0.1	0.1	0.1
Barium	ug/g	1.0	0.2	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	0.02	0.02	0.02
Copper	ug/g	1.6	0.4	0.1
Iron	ug/g	28	10	5
Lead	ug/g	0.03	0.02	0.02
Manganese	ug/g	1.7	0.6	0.2
Mercury	ug/g	0.42	0.06	0.01
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	2.6	0.4	0.1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	1.9	0.6	0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	0.6	0.2	0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	56	8	1
Lab Section 6				
Moisture	%	77.81	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027012**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC20O_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.6	0.6	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	6.4	2	0.5
Iron	ug/g	150	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	8	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	8.2	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	170	20	5
Lab Section 6				
Moisture	%	69.32	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027013**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC21M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	<0.1		0.1
Barium	ug/g	2.2	0.3	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	0.04	0.03	0.02
Copper	ug/g	2.6	0.4	0.1
Iron	ug/g	29	10	5
Lead	ug/g	0.04	0.03	0.02
Manganese	ug/g	1.7	0.6	0.2
Mercury	ug/g	0.50	0.08	0.01
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	2.1	0.3	0.1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	3.6	0.9	0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	0.2	0.1	0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	110	10	1
Lab Section 6				
Moisture	%	76.82	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027014**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC21O_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	0.1	0.1	0.1
Copper	ug/g	5.9	1	0.5
Iron	ug/g	130	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	12	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	20	3	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	200	30	5
Lab Section 6				
Moisture	%	72.45	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027015**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC24M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.2	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.6	0.9	0.5
Iron	ug/g	30	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	2	1	1
Mercury	ug/g	0.35	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.9	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	3	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	66	20	5
Lab Section 6				
Moisture	%	67.22	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027016**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_RSC24O_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	6.3	2	0.5
Iron	ug/g	120	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	13	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	17	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	180	30	5
Lab Section 6				
Moisture	%	72.78	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027017**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP01M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.10	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.93	0.2	0.05
Iron	ug/g	14	5	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.8	0.3	0.1
Mercury	ug/g	0.54	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	3.1	0.5	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.14	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	24	4	0.5
Lab Section 6				
Moisture	%	80.16	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027018**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP01O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.26	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	2.1	0.3	0.05
Iron	ug/g	34	8	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	2.1	0.3	0.1
Mercury	ug/g	0.018	0.009	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	3.6	0.5	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.4	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.07	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	74	7	0.5
Lab Section 6				
Moisture	%	81.39	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027019**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP02M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2	2	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.24	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.03	0.01	0.01
Copper	ug/g	0.80	0.2	0.05
Iron	ug/g	12	5	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	1.4	0.4	0.1
Mercury	ug/g	0.81	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	5.9	0.6	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.1	0.3	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.14	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	24	4	0.5
Lab Section 6				
Moisture	%	74.14	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027020**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP02O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.28	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.10	0.02	0.01
Copper	ug/g	2.2	0.3	0.05
Iron	ug/g	37	9	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	2.7	0.4	0.1
Mercury	ug/g	0.038	0.01	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	5.7	0.6	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.4	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	76	8	0.5
Lab Section 6				
Moisture	%	80.89	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027021**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP03M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.5	0.5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	0.7	0.6	0.5
Iron	ug/g	20	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	2	1	1
Mercury	ug/g	1.2	0.2	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	4.0	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	41	10	5
Lab Section 6				
Moisture	%	65.82	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027022**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP03O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.34	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.08	0.01	0.01
Copper	ug/g	2.3	0.3	0.05
Iron	ug/g	38	10	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	4.4	0.7	0.1
Mercury	ug/g	0.061	0.02	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	3.9	0.6	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.5	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	85	8	0.5
Lab Section 6				
Moisture	%	81.84	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027023**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP04M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	13	8	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.36	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.2	0.2	0.05
Iron	ug/g	23	6	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	1.2	0.3	0.1
Mercury	ug/g	0.54	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.7	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.3	0.3	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.35	0.1	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	34	5	0.5
Lab Section 6				
Moisture	%	79.27	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027024**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP04O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.06	0.05	0.05
Barium	ug/g	0.30	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	2.5	0.4	0.05
Iron	ug/g	33	8	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	2.3	0.3	0.1
Mercury	ug/g	0.025	0.01	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	3.2	0.5	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.4	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	85	8	0.5
Lab Section 6				
Moisture	%	82.50	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027025**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP05M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.59	0.1	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.0	0.2	0.05
Iron	ug/g	12	5	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	1.6	0.4	0.1
Mercury	ug/g	0.30	0.04	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.4	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	4.1	0.6	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.10	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	40	6	0.5
Lab Section 6				
Moisture	%	74.06	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027026**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP05O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.33	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	2.2	0.3	0.05
Iron	ug/g	33	8	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	4.1	0.6	0.1
Mercury	ug/g	0.011	0.007	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.9	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.5	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	81	8	0.5
Lab Section 6				
Moisture	%	83.75	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027027**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP06M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.30	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.86	0.2	0.05
Iron	ug/g	13	5	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.49	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.7	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.6	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.10	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	27	4	0.5
Lab Section 6				
Moisture	%	77.86	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027028**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP07M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	<0.1		0.1
Barium	ug/g	0.2	0.1	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	<0.02		0.02
Copper	ug/g	1.2	0.3	0.1
Iron	ug/g	13	8	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.0	0.4	0.2
Mercury	ug/g	0.64	0.1	0.01
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	3.1	0.5	0.1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	1.1	0.4	0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	0.1	0.1	0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	34	5	1
Lab Section 6				
Moisture	%	76.50	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027029**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP08M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	<0.1		0.1
Barium	ug/g	<0.1		0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	<0.02		0.02
Copper	ug/g	0.8	0.3	0.1
Iron	ug/g	14	8	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	0.6	0.3	0.2
Mercury	ug/g	0.31	0.05	0.01
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	2.7	0.4	0.1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	<0.2		0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	0.1	0.1	0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	21	3	1
Lab Section 6				
Moisture	%	74.92	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027030**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_GC_YP09M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.20	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.93	0.2	0.05
Iron	ug/g	14	5	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	1.0	0.2	0.1
Mercury	ug/g	0.62	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.9	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.7	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.12	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	29	4	0.5
Lab Section 6				
Moisture	%	79.18	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027031**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_WCT01M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.7	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	61.19	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027032**
Date Sampled: **Apr 30, 2018**
Sample Matrix: **TISSUE**
Description: **04/30/2018 RG_ER_WCT02M_20180430**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.4	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	54.49	5	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027033**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_MW01M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	3.5	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	57.94	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027034**
Date Sampled: **Apr 28, 2018**
Sample Matrix: **TISSUE**
Description: **04/28/2018 RG_ER_MW02M_20180428**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7	5	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.45	0.05	0.05
Barium	ug/g	0.10	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	1.4	0.2	0.05
Iron	ug/g	17	6	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.8	0.3	0.1
Mercury	ug/g	0.24	0.04	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.2	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.7	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.10	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	17	2	0.5
Lab Section 6				
Moisture	%	74.77	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027035**
Date Sampled: **Apr 29, 2018**
Sample Matrix: **TISSUE**
Description: **04/29/2018 RG_ER_MW03M_20180429**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	3.0	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	41.05	4	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027036**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_ER_BT01M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	1.1	0.7	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	19.34	2	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027037**
Date Sampled: **Apr 29, 2018**
Sample Matrix: **TISSUE**
Description: **04/29/2018 RG_ER_BT02M_20180429**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.4	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	73.82	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027038**
Date Sampled: **Apr 28, 2018**
Sample Matrix: **TISSUE**
Description: **04/28/2018 RG_ER_KO01M_20180428**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.0	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	56.16	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027039**
Date Sampled: **Apr 29, 2018**
Sample Matrix: **TISSUE**
Description: **04/29/2018 RG_ER_KO02M_20180429**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	20.70	2	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027040**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_PCC01M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.12	0.05	0.05
Barium	ug/g	1.3	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.67	0.2	0.05
Iron	ug/g	15	5	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	1.5	0.4	0.1
Mercury	ug/g	0.62	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.1	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	5.7	0.8	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.10	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	19	3	0.5
Lab Section 6				
Moisture	%	78.71	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027041**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_PCC01O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2	2	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.13	0.05	0.05
Barium	ug/g	0.91	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.04	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	4.1	0.6	0.05
Iron	ug/g	100	20	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	8.3	1	0.1
Mercury	ug/g	0.041	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	8.7	0.9	0.05
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.4	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.08	0.05	0.05
Uranium	ug/g	0.005	0.005	0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	110	10	0.5
Lab Section 6				
Moisture	%	66.13	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027042**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_PCC02M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.08	0.05	0.05
Barium	ug/g	1.1	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.68	0.2	0.05
Iron	ug/g	10	4	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	1.0	0.2	0.1
Mercury	ug/g	0.41	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.8	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	4.4	0.7	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.19	0.08	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	36	5	0.5
Lab Section 6				
Moisture	%	76.98	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027043**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_PCC02O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.24	0.05	0.05
Barium	ug/g	2.5	0.4	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	4.6	0.7	0.05
Iron	ug/g	110	20	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	16	2	0.1
Mercury	ug/g	0.034	0.01	0.005
Molybdenum	ug/g	0.2	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	16	2	0.5
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.7	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.09	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	160	20	0.5
Lab Section 6				
Moisture	%	72.36	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027044**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_PCC03M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.15	0.05	0.05
Barium	ug/g	1.0	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.4	0.2	0.05
Iron	ug/g	18	6	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.8	0.3	0.1
Mercury	ug/g	0.42	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	4.4	0.7	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	2.5	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.05	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	42	6	0.5
Lab Section 6				
Moisture	%	77.81	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027045**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_PCC03O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.18	0.05	0.05
Barium	ug/g	1.4	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	3.8	0.6	0.05
Iron	ug/g	54	8	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	4.4	0.7	0.1
Mercury	ug/g	0.024	0.01	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	18	3	0.5
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	64.24	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027046**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_PCC06M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.15	0.05	0.05
Barium	ug/g	0.96	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	1.5	0.2	0.05
Iron	ug/g	17	6	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	0.8	0.3	0.1
Mercury	ug/g	0.48	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.0	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	2.7	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.48	0.1	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	41	6	0.5
Lab Section 6				
Moisture	%	78.57	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027047**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_PCC06O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.37	0.05	0.05
Barium	ug/g	0.57	0.1	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	4.3	0.6	0.05
Iron	ug/g	63	9	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	11	1	0.1
Mercury	ug/g	0.035	0.01	0.005
Molybdenum	ug/g	0.2	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	10	2	0.5
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.10	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	140	10	0.5
Lab Section 6				
Moisture	%	67.87	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027048**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC08M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.10	0.05	0.05
Barium	ug/g	1.1	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	0.92	0.2	0.05
Iron	ug/g	12	5	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.52	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.6	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.7	0.6	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.16	0.07	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	27	4	0.5
Lab Section 6				
Moisture	%	79.63	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027049**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC08O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	5	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.12	0.05	0.05
Barium	ug/g	2.2	0.3	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	2.8	0.4	0.05
Iron	ug/g	110	20	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	14	1	0.1
Mercury	ug/g	0.060	0.02	0.005
Molybdenum	ug/g	0.2	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	20	3	0.5
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.25	0.09	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	160	20	0.5
Lab Section 6				
Moisture	%	76.89	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027050**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC09M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.10	0.05	0.05
Barium	ug/g	1.2	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	1.2	0.2	0.05
Iron	ug/g	13	5	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	1.0	0.2	0.1
Mercury	ug/g	0.67	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.7	0.4	0.05
Silver	ug/g	0.14	0.04	0.01
Strontium	ug/g	4.0	0.6	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.07	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	28	4	0.5
Lab Section 6				
Moisture	%	79.32	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027051**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC09O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	5	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.08	0.05	0.05
Barium	ug/g	0.75	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	2.8	0.4	0.05
Iron	ug/g	120	20	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	6.5	1	0.1
Mercury	ug/g	0.035	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	12	2	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.20	0.08	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	110	10	0.5
Lab Section 6				
Moisture	%	66.94	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027052**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC11M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	0.1	0.1	0.1
Barium	ug/g	0.5	0.2	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	<0.02		0.02
Copper	ug/g	1.3	0.3	0.1
Iron	ug/g	21	10	5
Lead	ug/g	0.03	0.02	0.02
Manganese	ug/g	0.4	0.3	0.2
Mercury	ug/g	0.6	0.2	0.1
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	2.4	0.4	0.1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.4	0.3	0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.1		0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	28	4	1
Lab Section 6				
Moisture	%	75.70	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027053**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC11O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.13	0.05	0.05
Barium	ug/g	0.59	0.1	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	4.2	0.6	0.05
Iron	ug/g	73	10	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	10	1	0.1
Mercury	ug/g	0.036	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	9.5	1	0.05
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.08	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	66.57	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027054**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC12M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.12	0.05	0.05
Barium	ug/g	1.1	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	1.2	0.2	0.05
Iron	ug/g	20	5	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	0.8	0.3	0.1
Mercury	ug/g	0.96	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.2	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.8	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.10	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	28	4	0.5
Lab Section 6				
Moisture	%	80.66	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027055**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC12O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.08	0.05	0.05
Barium	ug/g	0.54	0.1	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.03	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.08	0.01	0.01
Copper	ug/g	4.6	0.7	0.05
Iron	ug/g	98	10	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	13	1	0.1
Mercury	ug/g	0.077	0.02	0.005
Molybdenum	ug/g	0.2	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	10	2	0.5
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.7	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.10	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	150	20	0.5
Lab Section 6				
Moisture	%	71.47	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027056**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC16M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.21	0.05	0.05
Barium	ug/g	1.7	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.0	0.2	0.05
Iron	ug/g	23	6	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	1.3	0.3	0.1
Mercury	ug/g	1.2	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	5.0	0.5	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	6.7	1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.16	0.07	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	35	5	0.5
Lab Section 6				
Moisture	%	79.36	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027057**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC16O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.18	0.05	0.05
Barium	ug/g	0.86	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.06	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	4.5	0.7	0.05
Iron	ug/g	94	10	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	9.7	1	0.1
Mercury	ug/g	0.10	0.02	0.005
Molybdenum	ug/g	0.2	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	21	3	0.5
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.4	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.10	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	67.79	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027058**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC17M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.27	0.05	0.05
Barium	ug/g	1.1	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	2.8	0.4	0.05
Iron	ug/g	33	8	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.37	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.9	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.8	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.32	0.1	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	49	7	0.5
Lab Section 6				
Moisture	%	76.65	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027059**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_ER_PCC17O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.42	0.05	0.05
Barium	ug/g	1.7	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	4.5	0.7	0.05
Iron	ug/g	75	10	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	12	1	0.1
Mercury	ug/g	0.043	0.01	0.005
Molybdenum	ug/g	0.2	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	13	2	0.5
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.4	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.15	0.07	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	160	20	0.5
Lab Section 6				
Moisture	%	69.40	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027060**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC01O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	0.4	0.2	0.1
Barium	ug/g	0.9	0.3	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	0.09	0.04	0.02
Copper	ug/g	5.4	0.8	0.1
Iron	ug/g	120	20	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	7.4	1	0.2
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	22	2	0.1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.6	0.3	0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.1		0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	220	20	1
Lab Section 6				
Moisture	%	70.08	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027061**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC01M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.1	0.7	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.82	0.2	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.5	0.8	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	26	10	5
Lab Section 6				
Moisture	%	76.30	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027062**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC07O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.8	0.6	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	6.7	2	0.5
Iron	ug/g	130	50	20
Lead	ug/g	0.3	0.2	0.1
Manganese	ug/g	6	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	35	5	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	240	40	5
Lab Section 6				
Moisture	%	70.29	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027063**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC07M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.0	0.7	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.44	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.5	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	24	10	5
Lab Section 6				
Moisture	%	74.87	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027064**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC08O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.7	0.6	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	8.1	2	0.5
Iron	ug/g	140	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	6	2	1
Mercury	ug/g	0.08	0.06	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	29	4	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	240	40	5
Lab Section 6				
Moisture	%	71.43	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027065**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC08M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.1	0.7	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.84	0.2	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.7	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	3	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	23	10	5
Lab Section 6				
Moisture	%	77.14	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027066**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC09O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	2.2	1	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	0.1	0.1	0.1
Copper	ug/g	7.4	2	0.5
Iron	ug/g	130	50	20
Lead	ug/g	0.1	0.1	0.1
Manganese	ug/g	6	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	25	4	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	1.5	0.8	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	270	40	5
Lab Section 6				
Moisture	%	73.49	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027067**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC09M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	2.5	1	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.39	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.2	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	30	10	5
Lab Section 6				
Moisture	%	77.58	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027068**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC10O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	6	6	5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	15	2	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	290	100	50
Lab Section 6				
Moisture	%	54.60	5	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027069**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC10M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.7	0.6	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.7	0.9	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.28	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	63	20	5
Lab Section 6				
Moisture	%	76.40	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027070**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC11O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.1	0.7	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	6.3	2	0.5
Iron	ug/g	110	40	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	7	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	14	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	220	30	5
Lab Section 6				
Moisture	%	73.96	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027071**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC11M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.4	0.8	0.5
Iron	ug/g	20	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.54	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	22	10	5
Lab Section 6				
Moisture	%	71.25	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027072**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC12O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.2	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	0.2	0.1	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	7.1	2	0.5
Iron	ug/g	140	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	6	2	1
Mercury	ug/g	0.05	0.05	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	26	4	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	240	40	5
Lab Section 6				
Moisture	%	72.33	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027073**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC12M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	0.9	0.7	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.41	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	3	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	23	10	5
Lab Section 6				
Moisture	%	74.76	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027074**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC14O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.2	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	7.8	2	0.5
Iron	ug/g	130	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	7	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	12	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	230	30	5
Lab Section 6				
Moisture	%	74.62	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027075**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC14M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.2	0.8	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.37	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.2	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	26	10	5
Lab Section 6				
Moisture	%	78.01	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027076**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC15O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.3	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	5.1	1	0.5
Iron	ug/g	120	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	10	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	22	3	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	210	30	5
Lab Section 6				
Moisture	%	69.92	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027077**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC15M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.1	0.7	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	2.4	1	0.5
Iron	ug/g	30	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.26	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	3.5	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	85	20	5
Lab Section 6				
Moisture	%	76.27	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027078**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC16O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	16	2	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	350	100	50
Lab Section 6				
Moisture	%	82.15	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027079**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC16M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.2	0.8	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.37	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	3	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	26	10	5
Lab Section 6				
Moisture	%	78.14	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027080**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC19O_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.9	0.7	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	7.0	2	0.5
Iron	ug/g	150	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	10	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	9.6	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	210	30	5
Lab Section 6				
Moisture	%	75.19	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027081**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_ER_RSC19M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.1	0.7	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	<1		1
Mercury	ug/g	0.37	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.6	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	23	10	5
Lab Section 6				
Moisture	%	77.23	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027082**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_SC_KO01M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.2	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.0	0.7	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	<1		1
Mercury	ug/g	0.41	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	13	8	5
Lab Section 6				
Moisture	%	72.32	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027083**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_SC_KO02M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	5	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.08	0.05	0.05
Barium	ug/g	0.07	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	1.1	0.2	0.05
Iron	ug/g	19	6	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	0.5	0.2	0.1
Mercury	ug/g	0.31	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.0	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	0.08	0.06	0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.46	0.1	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	16	2	0.5
Lab Section 6				
Moisture	%	75.03	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027084**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_SC_KO03M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.9	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	71.47	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027085**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_SC_KO04M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.0	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	74.93	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027086**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_SC_BT01M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<1000		1000
Antimony	ug/g	<50		50
Arsenic	ug/g	<20		20
Barium	ug/g	<20		20
Beryllium	ug/g	<5		5
Boron	ug/g	<500		500
Cadmium	ug/g	<5		5
Chromium	ug/g	<200		200
Cobalt	ug/g	<5		5
Copper	ug/g	<20		20
Iron	ug/g	<1000		1000
Lead	ug/g	<5		5
Manganese	ug/g	<50		50
Mercury	ug/g	<2		2
Molybdenum	ug/g	<50		50
Nickel	ug/g	<20		20
Selenium	ug/g	2	2	2
Silver	ug/g	<5		5
Strontium	ug/g	<50		50
Thallium	ug/g	<20		20
Tin	ug/g	<20		20
Titanium	ug/g	<20		20
Uranium	ug/g	<2		2
Vanadium	ug/g	<50		50
Zinc	ug/g	<200		200
Lab Section 6				
Moisture	%	83.64	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Detection limits are influenced by several factors. "Less than" values reported above represent the lowest detection limits achievable for the sample due to insufficient sample size.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027087**
Date Sampled: **Apr 25, 2018**
Sample Matrix: **TISSUE**
Description: **04/25/2018 RG_SC_BT03M_20180425**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	0.8	0.6	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	74.10	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027088**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_BT04M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	24	5	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	300	200	200
Lead	ug/g	4	2	1
Manganese	ug/g	20	10	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	<0.5		0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	6	5	5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	39.41	4	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027089**
Date Sampled: **Apr 28, 2018**
Sample Matrix: **TISSUE**
Description: **04/28/2018 RG_SC_BT05M_20180428**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	1.1	0.7	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.0	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	78.74	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027090**
Date Sampled: **Apr 28, 2018**
Sample Matrix: **TISSUE**
Description: **04/28/2018 RG_SC_BT06M_20180428**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	1.4	0.8	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.3	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	76.11	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027091**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_RT01M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	81.54	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027092**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_RT02M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	10	6	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.17	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.2	0.2	0.05
Iron	ug/g	23	6	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.8	0.3	0.1
Mercury	ug/g	0.24	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.4	0.2	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.0	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.20	0.08	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	16	2	0.5
Lab Section 6				
Moisture	%	75.87	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027093**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_MW01M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	0.2	0.1	0.1
Barium	ug/g	0.1	0.1	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	0.03	0.02	0.02
Copper	ug/g	1.6	0.4	0.1
Iron	ug/g	18	9	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.0	0.4	0.2
Mercury	ug/g	0.1	0.1	0.1
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	6.0	0.9	0.1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.8	0.4	0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	0.1	0.1	0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	18	4	1
Lab Section 6				
Moisture	%	77.68	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027094**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_YP01M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.22	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.77	0.2	0.05
Iron	ug/g	11	4	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	1.2	0.3	0.1
Mercury	ug/g	0.82	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.8	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	2.5	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.09	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	32	5	0.5
Lab Section 6				
Moisture	%	79.90	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027095**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_YP01O_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.14	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	2.1	0.3	0.05
Iron	ug/g	29	7	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	2.8	0.4	0.1
Mercury	ug/g	0.042	0.01	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.4	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.8	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	79	8	0.5
Lab Section 6				
Moisture	%	83.37	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027096**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC01M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.16	0.05	0.05
Barium	ug/g	1.6	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.99	0.2	0.05
Iron	ug/g	23	6	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	1.1	0.3	0.1
Mercury	ug/g	0.71	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.2	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.4	0.5	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.42	0.1	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	32	5	0.5
Lab Section 6				
Moisture	%	80.39	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027097**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC01O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	23	6	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.15	0.05	0.05
Barium	ug/g	1.7	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.10	0.02	0.01
Copper	ug/g	4.5	0.7	0.05
Iron	ug/g	110	20	2
Lead	ug/g	0.09	0.03	0.01
Manganese	ug/g	6.7	1	0.1
Mercury	ug/g	0.032	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	0.07	0.05	0.05
Selenium	ug/g	11	2	0.5
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.45	0.1	0.05
Uranium	ug/g	0.007	0.006	0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	100	10	0.5
Lab Section 6				
Moisture	%	66.39	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027098**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC02M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	12	7	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.10	0.05	0.05
Barium	ug/g	1.0	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.1	0.2	0.05
Iron	ug/g	25	6	2
Lead	ug/g	0.09	0.03	0.01
Manganese	ug/g	1.3	0.3	0.1
Mercury	ug/g	0.80	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	0.16	0.05	0.05
Selenium	ug/g	1.4	0.2	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.2	0.5	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.40	0.1	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	22	3	0.5
Lab Section 6				
Moisture	%	79.17	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027099**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC02O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	24	6	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.08	0.05	0.05
Barium	ug/g	2.2	0.3	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	3.4	0.5	0.05
Iron	ug/g	69	10	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	11	1	0.1
Mercury	ug/g	0.041	0.01	0.005
Molybdenum	ug/g	0.2	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	11	2	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.47	0.1	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	67.38	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027100**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC03M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	18	9	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.27	0.05	0.05
Barium	ug/g	1.4	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	2.4	0.4	0.05
Iron	ug/g	53	8	2
Lead	ug/g	0.06	0.02	0.01
Manganese	ug/g	1.3	0.3	0.1
Mercury	ug/g	0.87	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.0	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.8	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.25	0.09	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	47	7	0.5
Lab Section 6				
Moisture	%	79.25	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027101**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC03O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	17	9	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.22	0.05	0.05
Barium	ug/g	1.0	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.08	0.01	0.01
Copper	ug/g	3.8	0.6	0.05
Iron	ug/g	100	20	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	6.6	1	0.1
Mercury	ug/g	0.044	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	9.0	0.9	0.05
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.26	0.09	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	110	10	0.5
Lab Section 6				
Moisture	%	66.31	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027102**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC06M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	19	10	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.13	0.05	0.05
Barium	ug/g	1.5	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.03	0.01	0.01
Copper	ug/g	1.1	0.2	0.05
Iron	ug/g	36	9	2
Lead	ug/g	0.08	0.03	0.01
Manganese	ug/g	1.6	0.4	0.1
Mercury	ug/g	0.53	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	0.06	0.05	0.05
Selenium	ug/g	2.2	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	4.3	0.6	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.32	0.1	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	34	5	0.5
Lab Section 6				
Moisture	%	79.38	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027103**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC06O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	10	6	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.10	0.05	0.05
Barium	ug/g	1.4	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	4.7	0.7	0.05
Iron	ug/g	65	10	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	14	1	0.1
Mercury	ug/g	0.030	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	0.05	0.05	0.05
Selenium	ug/g	15	2	0.5
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.22	0.08	0.05
Uranium	ug/g	0.008	0.006	0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	130	10	0.5
Lab Section 6				
Moisture	%	68.68	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027104**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC07M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.09	0.05	0.05
Barium	ug/g	0.56	0.1	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	1.1	0.2	0.05
Iron	ug/g	13	5	2
Lead	ug/g	0.06	0.02	0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.44	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.9	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	2.4	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.11	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	22	3	0.5
Lab Section 6				
Moisture	%	78.55	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027105**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC07O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7	5	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.23	0.05	0.05
Barium	ug/g	1.4	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.08	0.01	0.01
Copper	ug/g	4.1	0.6	0.05
Iron	ug/g	80	10	2
Lead	ug/g	0.06	0.02	0.01
Manganese	ug/g	14	1	0.1
Mercury	ug/g	0.038	0.01	0.005
Molybdenum	ug/g	0.2	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	12	2	0.5
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.12	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	150	20	0.5
Lab Section 6				
Moisture	%	72.05	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027106**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC08M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	5	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.19	0.05	0.05
Barium	ug/g	1.2	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.80	0.2	0.05
Iron	ug/g	25	6	2
Lead	ug/g	0.08	0.03	0.01
Manganese	ug/g	1.3	0.3	0.1
Mercury	ug/g	0.86	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	0.06	0.05	0.05
Selenium	ug/g	2.0	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.0	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.12	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	34	5	0.5
Lab Section 6				
Moisture	%	79.32	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027107**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC08O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.11	0.05	0.05
Barium	ug/g	0.93	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	2.1	0.3	0.05
Iron	ug/g	76	10	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	7.1	1	0.1
Mercury	ug/g	0.059	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	23	3	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.11	0.06	0.05
Uranium	ug/g	0.006	0.006	0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	130	10	0.5
Lab Section 6				
Moisture	%	67.82	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027108**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC10M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.19	0.05	0.05
Barium	ug/g	0.60	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.8	0.3	0.05
Iron	ug/g	18	6	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	0.6	0.2	0.1
Mercury	ug/g	0.55	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.7	0.2	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.09	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	33	5	0.5
Lab Section 6				
Moisture	%	78.63	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027109**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC10O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.39	0.05	0.05
Barium	ug/g	2.0	0.3	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	3.9	0.6	0.05
Iron	ug/g	54	8	2
Lead	ug/g	0.06	0.02	0.01
Manganese	ug/g	6.9	1	0.1
Mercury	ug/g	0.030	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	8.4	0.8	0.05
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.12	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	160	20	0.5
Lab Section 6				
Moisture	%	66.74	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027110**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC11M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7	5	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.10	0.05	0.05
Barium	ug/g	1.0	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.1	0.2	0.05
Iron	ug/g	22	6	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	1.2	0.3	0.1
Mercury	ug/g	0.53	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.9	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.2	0.5	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.12	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	24	4	0.5
Lab Section 6				
Moisture	%	79.00	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027111**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC11O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.12	0.05	0.05
Barium	ug/g	1.5	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.08	0.01	0.01
Copper	ug/g	3.9	0.6	0.05
Iron	ug/g	56	8	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	12	1	0.1
Mercury	ug/g	0.027	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	9.9	2	0.5
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.4	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.07	0.05	0.05
Uranium	ug/g	0.005	0.005	0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	65.36	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027112**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC13M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2	2	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.27	0.05	0.05
Barium	ug/g	0.78	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	2.6	0.4	0.05
Iron	ug/g	46	7	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	0.7	0.2	0.1
Mercury	ug/g	0.34	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.4	0.2	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	47	7	0.5
Lab Section 6				
Moisture	%	75.22	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027113**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC13O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.36	0.05	0.05
Barium	ug/g	0.95	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	3.4	0.5	0.05
Iron	ug/g	43	6	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	4.9	0.7	0.1
Mercury	ug/g	0.022	0.01	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	5.9	0.6	0.05
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.07	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	100	10	0.5
Lab Section 6				
Moisture	%	60.54	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027114**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC14M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.11	0.05	0.05
Barium	ug/g	0.60	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	0.83	0.2	0.05
Iron	ug/g	14	5	2
Lead	ug/g	0.06	0.02	0.01
Manganese	ug/g	1.0	0.2	0.1
Mercury	ug/g	0.46	0.1	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.7	0.2	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.2	0.5	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.12	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	23	3	0.5
Lab Section 6				
Moisture	%	77.91	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027115**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_PCC14O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.24	0.05	0.05
Barium	ug/g	0.40	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	3.2	0.5	0.05
Iron	ug/g	52	8	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	6.3	0.9	0.1
Mercury	ug/g	0.022	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	6.9	0.7	0.05
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	100	10	0.5
Lab Section 6				
Moisture	%	63.05	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027116**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC02M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.2	0.8	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.44	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.7	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	1.0	0.7	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	50	10	5
Lab Section 6				
Moisture	%	74.98	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027117**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC02O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.8	0.9	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	6.4	2	0.5
Iron	ug/g	120	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	7	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	11	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	1.2	0.8	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	280	40	5
Lab Section 6				
Moisture	%	73.09	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027118**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC04M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.3	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	2.5	1	0.5
Iron	ug/g	30	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.46	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.7	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	1.3	0.8	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	82	20	5
Lab Section 6				
Moisture	%	74.87	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027119**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC04O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	6	6	5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	21	3	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	360	100	50
Lab Section 6				
Moisture	%	73.65	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027120**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC05M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	20	20	20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.8	0.9	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.7	0.9	0.5
Iron	ug/g	40	30	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	3	2	1
Mercury	ug/g	0.31	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.1	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	9	3	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	74	20	5
Lab Section 6				
Moisture	%	76.89	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027121**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC05O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	20	20	20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.9	1	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	7.2	2	0.5
Iron	ug/g	140	50	20
Lead	ug/g	0.2	0.1	0.1
Manganese	ug/g	9	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	16	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	270	40	5
Lab Section 6				
Moisture	%	73.55	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027122**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC06M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.0	0.7	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	2.6	1	0.5
Iron	ug/g	20	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.45	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.3	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	70	20	5
Lab Section 6				
Moisture	%	78.66	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027123**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC06O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.6	0.9	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	3.9	1	0.5
Iron	ug/g	120	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	12	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	8.2	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	300	40	5
Lab Section 6				
Moisture	%	77.13	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027124**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC09M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.7	0.9	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	2.5	1	0.5
Iron	ug/g	30	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	1	1	1
Mercury	ug/g	0.29	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	3.3	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	78	20	5
Lab Section 6				
Moisture	%	76.41	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027125**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC09O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	6	6	5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	14	2	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	250	100	50
Lab Section 6				
Moisture	%	75.48	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027126**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC10M_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.6	0.9	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.4	0.8	0.5
Iron	ug/g	20	20	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	2	1	1
Mercury	ug/g	0.42	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	0.7	0.6	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	60	20	5
Lab Section 6				
Moisture	%	76.75	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027127**
Date Sampled: **Apr 24, 2018**
Sample Matrix: **TISSUE**
Description: **04/24/2018 RG_SC_RSC10O_20180424**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	5.8	1	0.5
Iron	ug/g	140	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	7	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	12	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	3.2	1	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	240	40	5
Lab Section 6				
Moisture	%	75.73	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027128**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_SC_RSC11M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.6	0.6	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.9	1	0.5
Iron	ug/g	30	20	20
Lead	ug/g	0.1	0.1	0.1
Manganese	ug/g	2	1	1
Mercury	ug/g	0.43	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	2	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	71	20	5
Lab Section 6				
Moisture	%	75.67	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027129**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_SC_RSC11O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	30	20	20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.3	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	6.8	2	0.5
Iron	ug/g	150	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	9	3	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	27	4	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	1	1	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	1.0	0.7	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	250	40	5
Lab Section 6				
Moisture	%	73.54	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027130**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_SC_RSC13M_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.6	0.6	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.2	0.8	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	2	1	1
Mercury	ug/g	0.42	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.2	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	3	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	0.7	0.6	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	38	10	5
Lab Section 6				
Moisture	%	76.01	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027131**
Date Sampled: **Apr 26, 2018**
Sample Matrix: **TISSUE**
Description: **04/26/2018 RG_SC_RSC13O_20180426**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	6	5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	0.5	0.2	0.1
Barium	ug/g	1.2	0.3	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	0.38	0.1	0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	0.12	0.05	0.02
Copper	ug/g	6.1	0.9	0.1
Iron	ug/g	130	20	5
Lead	ug/g	0.05	0.03	0.02
Manganese	ug/g	8.3	1	0.2
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	22	2	0.1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.6	0.3	0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.1		0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	240	20	1
Lab Section 6				
Moisture	%	71.34	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027132**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_RSC17M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.4	0.8	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	1.2	0.8	0.5
Iron	ug/g	<20		20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	3	2	1
Mercury	ug/g	0.49	0.1	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.6	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	12	3	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	0.6	0.6	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	55	10	5
Lab Section 6				
Moisture	%	74.70	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027133**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_RSC17O_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	0.8	0.6	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	6.2	2	0.5
Iron	ug/g	130	50	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	14	4	1
Mercury	ug/g	0.05	0.05	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	13	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	240	40	5
Lab Section 6				
Moisture	%	75.65	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027134**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_RSC18M_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	6	5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	<0.1		0.1
Barium	ug/g	2.0	0.3	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	<0.02		0.02
Copper	ug/g	2.2	0.3	0.1
Iron	ug/g	24	10	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	2.0	0.5	0.2
Mercury	ug/g	0.51	0.08	0.01
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	1.6	0.4	0.1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	4.4	0.7	0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.1		0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	51	8	1
Lab Section 6				
Moisture	%	77.56	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027135**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_RSC18O_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	2.2	1	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	5.1	1	0.5
Iron	ug/g	190	60	20
Lead	ug/g	<0.1		0.1
Manganese	ug/g	6	2	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	20	3	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	1.2	0.8	0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	280	40	5
Lab Section 6				
Moisture	%	74.62	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027136**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_ER_BI01_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<1000		1000
Antimony	ug/g	<50		50
Arsenic	ug/g	<20		20
Barium	ug/g	20	20	20
Beryllium	ug/g	<5		5
Boron	ug/g	<500		500
Cadmium	ug/g	<5		5
Chromium	ug/g	<200		200
Cobalt	ug/g	<5		5
Copper	ug/g	20	20	20
Iron	ug/g	<1000		1000
Lead	ug/g	<5		5
Manganese	ug/g	<50		50
Mercury	ug/g	<2		2
Molybdenum	ug/g	<50		50
Nickel	ug/g	<20		20
Selenium	ug/g	6	3	2
Silver	ug/g	<5		5
Strontium	ug/g	<50		50
Thallium	ug/g	<20		20
Tin	ug/g	<20		20
Titanium	ug/g	<20		20
Uranium	ug/g	<2		2
Vanadium	ug/g	<50		50
Zinc	ug/g	<200		200
Lab Section 6				
Moisture	%	66.38	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Detection limits are influenced by several factors. "Less than" values reported above represent the lowest detection limits achievable for the sample due to insufficient sample size.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027137**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_ER_BI02_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	900	600	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	12	5	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	20	10	5
Iron	ug/g	700	400	200
Lead	ug/g	<1		1
Manganese	ug/g	50	20	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	5.4	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	12	6	5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	150	80	50
Lab Section 6				
Moisture	%	71.29	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027138**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_ER_BI03_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2800	700	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	32	5	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	1	1	1
Chromium	ug/g	<50		50
Cobalt	ug/g	2	1	1
Copper	ug/g	15	8	5
Iron	ug/g	2100	500	200
Lead	ug/g	1	1	1
Manganese	ug/g	80	30	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	5.0	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	10	10	10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	34	10	5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	100	70	50
Lab Section 6				
Moisture	%	70.68	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027139**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_ER_BI04_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3000	2000	1000
Antimony	ug/g	<50		50
Arsenic	ug/g	<20		20
Barium	ug/g	80	20	20
Beryllium	ug/g	<5		5
Boron	ug/g	<500		500
Cadmium	ug/g	7	5	5
Chromium	ug/g	<200		200
Cobalt	ug/g	<5		5
Copper	ug/g	40	30	20
Iron	ug/g	2000	1000	1000
Lead	ug/g	<5		5
Manganese	ug/g	140	80	50
Mercury	ug/g	<2		2
Molybdenum	ug/g	<50		50
Nickel	ug/g	<20		20
Selenium	ug/g	10	4	2
Silver	ug/g	<5		5
Strontium	ug/g	<50		50
Thallium	ug/g	<20		20
Tin	ug/g	<20		20
Titanium	ug/g	60	30	20
Uranium	ug/g	<2		2
Vanadium	ug/g	<50		50
Zinc	ug/g	<200		200
Lab Section 6				
Moisture	%	91.11	9	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Detection limits are influenced by several factors. "Less than" values reported above represent the lowest detection limits achievable for the sample due to insufficient sample size.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027140**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_ER_BI05_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	9000	5000	1000
Antimony	ug/g	<50		50
Arsenic	ug/g	<20		20
Barium	ug/g	90	20	20
Beryllium	ug/g	<5		5
Boron	ug/g	<500		500
Cadmium	ug/g	9	5	5
Chromium	ug/g	<200		200
Cobalt	ug/g	<5		5
Copper	ug/g	<20		20
Iron	ug/g	6000	2000	1000
Lead	ug/g	<5		5
Manganese	ug/g	220	100	50
Mercury	ug/g	<2		2
Molybdenum	ug/g	<50		50
Nickel	ug/g	<20		20
Selenium	ug/g	12	5	2
Silver	ug/g	<5		5
Strontium	ug/g	70	60	50
Thallium	ug/g	<20		20
Tin	ug/g	<20		20
Titanium	ug/g	180	50	20
Uranium	ug/g	<2		2
Vanadium	ug/g	<50		50
Zinc	ug/g	<200		200
Lab Section 6				
Moisture	%	73.15	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Detection limits are influenced by several factors. "Less than" values reported above represent the lowest detection limits achievable for the sample due to insufficient sample size.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027141**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_BI01_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5000	3000	1000
Antimony	ug/g	<50		50
Arsenic	ug/g	<20		20
Barium	ug/g	30	20	20
Beryllium	ug/g	<5		5
Boron	ug/g	<500		500
Cadmium	ug/g	<5		5
Chromium	ug/g	<200		200
Cobalt	ug/g	<5		5
Copper	ug/g	30	20	20
Iron	ug/g	6000	2000	1000
Lead	ug/g	<5		5
Manganese	ug/g	230	100	50
Mercury	ug/g	<2		2
Molybdenum	ug/g	<50		50
Nickel	ug/g	<20		20
Selenium	ug/g	4	3	2
Silver	ug/g	<5		5
Strontium	ug/g	<50		50
Thallium	ug/g	<20		20
Tin	ug/g	<20		20
Titanium	ug/g	80	30	20
Uranium	ug/g	<2		2
Vanadium	ug/g	<50		50
Zinc	ug/g	<200		200
Lab Section 6				
Moisture	%	75.81	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Detection limits are influenced by several factors. "Less than" values reported above represent the lowest detection limits achievable for the sample due to insufficient sample size.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027142**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_BI02_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2200	600	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	34	5	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	2	1	1
Copper	ug/g	14	8	5
Iron	ug/g	1900	600	200
Lead	ug/g	<1		1
Manganese	ug/g	40	20	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.8	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	55	10	5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	90	70	50
Lab Section 6				
Moisture	%	49.01	5	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027143**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_GC_BI03_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	21	10	5
Iron	ug/g	300	200	200
Lead	ug/g	<1		1
Manganese	ug/g	10	10	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	3.9	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	80	60	50
Lab Section 6				
Moisture	%	72.85	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027144**
Date Sampled: **Apr 28, 2018**
Sample Matrix: **TISSUE**
Description: **04/28/2018 RG_GC_BI04_20180428**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6000	4000	1000
Antimony	ug/g	<50		50
Arsenic	ug/g	<20		20
Barium	ug/g	90	20	20
Beryllium	ug/g	<5		5
Boron	ug/g	<500		500
Cadmium	ug/g	<5		5
Chromium	ug/g	<200		200
Cobalt	ug/g	<5		5
Copper	ug/g	20	20	20
Iron	ug/g	5000	2000	1000
Lead	ug/g	<5		5
Manganese	ug/g	120	80	50
Mercury	ug/g	<2		2
Molybdenum	ug/g	<50		50
Nickel	ug/g	<20		20
Selenium	ug/g	2	2	2
Silver	ug/g	<5		5
Strontium	ug/g	<50		50
Thallium	ug/g	<20		20
Tin	ug/g	<20		20
Titanium	ug/g	450	70	20
Uranium	ug/g	<2		2
Vanadium	ug/g	<50		50
Zinc	ug/g	<200		200
Lab Section 6				
Moisture	%	94.02	9	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Detection limits are influenced by several factors. "Less than" values reported above represent the lowest detection limits achievable for the sample due to insufficient sample size.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027145**
Date Sampled: **Apr 28, 2018**
Sample Matrix: **TISSUE**
Description: **04/28/2018 RG_GC_BI05_20180428**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2700	300	20
Antimony	ug/g	<1		1
Arsenic	ug/g	1.0	0.7	0.5
Barium	ug/g	40	6	0.5
Beryllium	ug/g	0.1	0.1	0.1
Boron	ug/g	<10		10
Cadmium	ug/g	0.4	0.2	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	2.1	0.3	0.1
Copper	ug/g	15	2	0.5
Iron	ug/g	2300	200	20
Lead	ug/g	1.2	0.3	0.1
Manganese	ug/g	110	10	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	2.0	1	0.5
Selenium	ug/g	2.3	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	6	2	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	46	7	0.5
Uranium	ug/g	0.20	0.1	0.05
Vanadium	ug/g	3	2	1
Zinc	ug/g	100	20	5
Lab Section 6				
Moisture	%	83.79	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027146**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_BI01_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	1000	1000	1000
Antimony	ug/g	<50		50
Arsenic	ug/g	<20		20
Barium	ug/g	<20		20
Beryllium	ug/g	<5		5
Boron	ug/g	<500		500
Cadmium	ug/g	6	5	5
Chromium	ug/g	<200		200
Cobalt	ug/g	<5		5
Copper	ug/g	30	20	20
Iron	ug/g	2000	1000	1000
Lead	ug/g	<5		5
Manganese	ug/g	<50		50
Mercury	ug/g	<2		2
Molybdenum	ug/g	<50		50
Nickel	ug/g	<20		20
Selenium	ug/g	9	4	2
Silver	ug/g	<5		5
Strontium	ug/g	<50		50
Thallium	ug/g	<20		20
Tin	ug/g	<20		20
Titanium	ug/g	80	30	20
Uranium	ug/g	<2		2
Vanadium	ug/g	<50		50
Zinc	ug/g	<200		200
Lab Section 6				
Moisture	%	73.91	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Detection limits are influenced by several factors. "Less than" values reported above represent the lowest detection limits achievable for the sample due to insufficient sample size.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027147**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_BI02_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	15300	2000	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	120	20	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	6	1	1
Copper	ug/g	12	8	5
Iron	ug/g	14400	2000	200
Lead	ug/g	10	2	1
Manganese	ug/g	330	50	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	14	5	5
Selenium	ug/g	<0.5		0.5
Silver	ug/g	<1		1
Strontium	ug/g	180	40	10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	250	40	5
Uranium	ug/g	0.6	0.6	0.5
Vanadium	ug/g	20	10	10
Zinc	ug/g	80	60	50
Lab Section 6				
Moisture	%	52.63	5	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027148**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_BI03_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5200	800	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	36	5	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	3	1	1
Chromium	ug/g	<50		50
Cobalt	ug/g	2	1	1
Copper	ug/g	19	10	5
Iron	ug/g	6300	900	200
Lead	ug/g	5	2	1
Manganese	ug/g	120	30	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	5	5	5
Selenium	ug/g	3.8	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	60	20	10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	100	20	5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	130	80	50
Lab Section 6				
Moisture	%	71.87	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027149**
Date Sampled: **Apr 27, 2018**
Sample Matrix: **TISSUE**
Description: **04/27/2018 RG_SC_BI04_20180427**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5600	800	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	42	5	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	3	1	1
Chromium	ug/g	<50		50
Cobalt	ug/g	3	1	1
Copper	ug/g	16	9	5
Iron	ug/g	6300	900	200
Lead	ug/g	5	2	1
Manganese	ug/g	170	40	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	5	5	5
Selenium	ug/g	3.5	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	80	30	10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	81	20	5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	100	70	50
Lab Section 6				
Moisture	%	57.30	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027150**
Date Sampled: **Apr 28, 2018**
Sample Matrix: **TISSUE**
Description: **04/28/2018 RG_SC_BI05_20180428**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5100	800	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	40	5	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	3	1	1
Copper	ug/g	16	9	5
Iron	ug/g	5500	800	200
Lead	ug/g	4	2	1
Manganese	ug/g	120	30	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	6	5	5
Selenium	ug/g	6.3	2	0.5
Silver	ug/g	<1		1
Strontium	ug/g	70	20	10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	80	20	5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	120	80	50
Lab Section 6				
Moisture	%	62.54	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027151**
Date Sampled: **Apr 29, 2018**
Sample Matrix: **TISSUE**
Description: **04/29/2018 RG_T4_BI_20180429**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6900	1000	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	75	20	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	3	1	1
Chromium	ug/g	<50		50
Cobalt	ug/g	2	1	1
Copper	ug/g	22	10	5
Iron	ug/g	6700	1000	200
Lead	ug/g	6	2	1
Manganese	ug/g	140	40	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	6	5	5
Selenium	ug/g	8.5	2	0.5
Silver	ug/g	<1		1
Strontium	ug/g	60	20	10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	97	20	5
Uranium	ug/g	0.5	0.5	0.5
Vanadium	ug/g	10	10	10
Zinc	ug/g	160	90	50
Lab Section 6				
Moisture	%	91.57	9	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8314

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027152**
Date Sampled: **Apr 30, 2018**
Sample Matrix: **TISSUE**
Description: **04/30/2018 RG_TN_BI_20180430**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8000	4000	1000
Antimony	ug/g	<50		50
Arsenic	ug/g	<20		20
Barium	ug/g	40	20	20
Beryllium	ug/g	<5		5
Boron	ug/g	<500		500
Cadmium	ug/g	<5		5
Chromium	ug/g	<200		200
Cobalt	ug/g	<5		5
Copper	ug/g	<20		20
Iron	ug/g	11600	3000	1000
Lead	ug/g	14	8	5
Manganese	ug/g	190	100	50
Mercury	ug/g	<2		2
Molybdenum	ug/g	<50		50
Nickel	ug/g	<20		20
Selenium	ug/g	<2		2
Silver	ug/g	<5		5
Strontium	ug/g	70	60	50
Thallium	ug/g	<20		20
Tin	ug/g	<20		20
Titanium	ug/g	100	40	20
Uranium	ug/g	<2		2
Vanadium	ug/g	<50		50
Zinc	ug/g	<200		200
Lab Section 6				
Moisture	%	85.28	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Detection limits are influenced by several factors. "Less than" values reported above represent the lowest detection limits achievable for the sample due to insufficient sample size.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

Quality Control Report

Justin Wilson
Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Aluminum	ug/g	1280	1290
Aluminum	ug/g	1280	1320
Aluminum	ug/g	1280	1300
Aluminum	ug/g	1280	1240
Aluminum	ug/g	1280	1370
Aluminum	ug/g	1280	1310
Aluminum	ug/g	1280	1350
Arsenic	ug/g	6.87	6.54
Arsenic	ug/g	6.87	7.26
Arsenic	ug/g	6.87	6.78
Arsenic	ug/g	6.87	7.50
Arsenic	ug/g	6.87	6.82
Arsenic	ug/g	6.87	7.44
Arsenic	ug/g	6.87	6.75
Arsenic	ug/g	6.87	6.80
Cadmium	ug/g	0.299	0.292
Cadmium	ug/g	0.299	0.296
Cadmium	ug/g	0.299	0.302
Cadmium	ug/g	0.299	0.336
Cadmium	ug/g	0.299	0.326
Cadmium	ug/g	0.299	0.322
Cadmium	ug/g	0.299	0.321
Cadmium	ug/g	0.299	0.308
Chromium	ug/g	1.57	1.57
Chromium	ug/g	1.57	1.54
Chromium	ug/g	1.57	1.52
Chromium	ug/g	1.57	1.61
Chromium	ug/g	1.57	1.60
Chromium	ug/g	1.57	1.56
Chromium	ug/g	1.57	1.54
Chromium	ug/g	1.57	1.63
Copper	ug/g	13.8	13.4

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

QC Analysis	Units	Target Value	Obtained Value
Copper	ug/g	13.8	13.8
Copper	ug/g	13.8	14.3
Copper	ug/g	13.8	14.6
Copper	ug/g	13.8	14.5
Copper	ug/g	13.8	14.0
Copper	ug/g	13.8	14.2
Copper	ug/g	13.8	14.3
Iron	ug/g	312	307
Iron	ug/g	312	306
Iron	ug/g	312	303
Iron	ug/g	312	326
Iron	ug/g	312	317
Iron	ug/g	312	311
Iron	ug/g	312	300
Lead	ug/g	0.404	0.380
Lead	ug/g	0.404	0.394
Lead	ug/g	0.404	0.403
Lead	ug/g	0.404	0.414
Lead	ug/g	0.404	0.412
Lead	ug/g	0.404	0.419
Lead	ug/g	0.404	0.422
Lead	ug/g	0.404	0.411
Manganese	ug/g	2.70	2.31
Manganese	ug/g	2.70	2.35
Manganese	ug/g	2.70	2.52
Manganese	ug/g	2.70	2.10
Manganese	ug/g	2.70	2.08
Manganese	ug/g	2.70	2.82
Manganese	ug/g	2.70	3.11
Manganese	ug/g	2.70	2.10
Mercury	ug/g	0.364	0.374
Mercury	ug/g	0.364	0.338
Mercury	ug/g	0.364	0.367
Mercury	ug/g	0.364	0.350
Mercury	ug/g	0.364	0.406
Mercury	ug/g	0.364	0.379
Mercury	ug/g	0.364	0.373
Nickel	ug/g	1.20	1.15
Nickel	ug/g	1.20	1.17
Nickel	ug/g	1.20	1.14
Nickel	ug/g	1.20	1.17
Nickel	ug/g	1.20	1.21
Nickel	ug/g	1.20	1.19
Nickel	ug/g	1.20	1.19
Nickel	ug/g	1.20	1.18

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

QC Analysis	Units	Target Value	Obtained Value
Selenium	ug/g	3.45	3.45
Selenium	ug/g	3.45	3.80
Selenium	ug/g	3.45	3.61
Selenium	ug/g	3.45	3.91
Selenium	ug/g	3.45	3.56
Selenium	ug/g	3.45	3.81
Selenium	ug/g	3.45	3.56
Selenium	ug/g	3.45	3.55
Silver	ug/g	0.0234	0.0196
Silver	ug/g	0.0234	0.0197
Silver	ug/g	0.0234	0.0206
Silver	ug/g	0.0234	0.0210
Silver	ug/g	0.0234	0.0204
Silver	ug/g	0.0234	0.0213
Silver	ug/g	0.0234	0.0218
Silver	ug/g	0.0234	0.0208
Zinc	ug/g	47.8	48.6
Zinc	ug/g	47.8	47.0
Zinc	ug/g	47.8	47.5
Zinc	ug/g	47.8	48.7
Zinc	ug/g	47.8	48.4
Zinc	ug/g	47.8	47.5
Zinc	ug/g	47.8	48.0

Duplicates:

Duplicates are used to assess problems with precision and help ensure that samples within a given batch were processed appropriately. The difference between duplicates must be within strict limits, otherwise corrective action is required. Please note, the duplicate(s) in this report are duplicates analyzed within a given batch of test samples and may not be from this specific group of samples.

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Silver	ug/g	26982	<0.1	<0.1
Silver	ug/g	26984	<0.1	<0.1
Silver	ug/g	26988	<0.1	<0.1
Silver	ug/g	26992	<0.1	<0.1
Silver	ug/g	26996	0.01	0.01
Silver	ug/g	27018	<0.01	<0.01
Silver	ug/g	27041	0.01	0.01
Silver	ug/g	27045	0.01	0.01
Silver	ug/g	27083	<0.01	<0.01
Silver	ug/g	27092	<0.01	<0.01
Silver	ug/g	27095	<0.01	<0.01
Silver	ug/g	27101	0.02	0.02
Silver	ug/g	27108	<0.01	<0.01

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Silver	ug/g	27115	0.01	0.01
Aluminum	ug/g	26982	70	80
Aluminum	ug/g	26984	<20	<20
Aluminum	ug/g	26988	<20	<20
Aluminum	ug/g	26992	<20	<20
Aluminum	ug/g	26996	10	3
Aluminum	ug/g	27018	3	<2
Aluminum	ug/g	27041	2	<2
Aluminum	ug/g	27045	<2	<2
Aluminum	ug/g	27083	8	10
Aluminum	ug/g	27092	10	6
Aluminum	ug/g	27095	<2	<2
Aluminum	ug/g	27101	17	13
Aluminum	ug/g	27108	4	3
Aluminum	ug/g	27115	<2	<2
Arsenic	ug/g	26982	<0.5	<0.5
Arsenic	ug/g	26984	<0.5	<0.5
Arsenic	ug/g	26988	<0.5	<0.5
Arsenic	ug/g	26992	<0.5	<0.5
Arsenic	ug/g	26996	0.34	0.22
Arsenic	ug/g	27018	<0.05	<0.05
Arsenic	ug/g	27041	0.13	0.13
Arsenic	ug/g	27045	0.18	0.17
Arsenic	ug/g	27083	0.08	0.08
Arsenic	ug/g	27092	<0.05	<0.05
Arsenic	ug/g	27095	<0.05	<0.05
Arsenic	ug/g	27101	0.22	0.20
Arsenic	ug/g	27108	0.19	0.19
Arsenic	ug/g	27115	0.24	0.24
Boron	ug/g	26982	<10	<10
Boron	ug/g	26984	<10	<10
Boron	ug/g	26988	<10	<10
Boron	ug/g	26992	<10	<10
Boron	ug/g	26996	<1	<1
Boron	ug/g	27018	<1	<1
Boron	ug/g	27041	<1	<1
Boron	ug/g	27045	<1	<1
Boron	ug/g	27083	<1	<1
Boron	ug/g	27092	<1	<1
Boron	ug/g	27095	<1	<1
Boron	ug/g	27101	<1	<1
Boron	ug/g	27108	<1	<1
Boron	ug/g	27115	<1	<1
Barium	ug/g	26982	2.1	2.0
Barium	ug/g	26984	0.9	0.9
Barium	ug/g	26988	1.2	1.4

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Barium	ug/g	26992	1.0	1.1
Barium	ug/g	26996	0.53	0.35
Barium	ug/g	27018	0.26	0.25
Barium	ug/g	27041	0.91	0.89
Barium	ug/g	27045	1.4	1.4
Barium	ug/g	27083	0.07	0.08
Barium	ug/g	27092	0.17	0.10
Barium	ug/g	27095	0.14	0.16
Barium	ug/g	27101	1.0	0.94
Barium	ug/g	27108	0.60	0.77
Barium	ug/g	27115	0.40	0.43
Beryllium	ug/g	26982	<0.1	<0.1
Beryllium	ug/g	26984	<0.1	<0.1
Beryllium	ug/g	26988	<0.1	<0.1
Beryllium	ug/g	26992	<0.1	<0.1
Beryllium	ug/g	26996	<0.01	<0.01
Beryllium	ug/g	27018	<0.01	<0.01
Beryllium	ug/g	27041	<0.01	<0.01
Beryllium	ug/g	27045	<0.01	<0.01
Beryllium	ug/g	27083	<0.01	<0.01
Beryllium	ug/g	27092	<0.01	<0.01
Beryllium	ug/g	27095	<0.01	<0.01
Beryllium	ug/g	27101	<0.01	<0.01
Beryllium	ug/g	27108	<0.01	<0.01
Beryllium	ug/g	27115	<0.01	<0.01
Cadmium	ug/g	26982	<0.1	<0.1
Cadmium	ug/g	26984	<0.1	<0.1
Cadmium	ug/g	26988	<0.1	<0.1
Cadmium	ug/g	26992	<0.1	<0.1
Cadmium	ug/g	26996	<0.01	<0.01
Cadmium	ug/g	27018	<0.01	<0.01
Cadmium	ug/g	27041	0.04	0.02
Cadmium	ug/g	27045	0.01	<0.01
Cadmium	ug/g	27083	<0.01	<0.01
Cadmium	ug/g	27092	<0.01	<0.01
Cadmium	ug/g	27095	<0.01	<0.01
Cadmium	ug/g	27101	0.02	0.02
Cadmium	ug/g	27108	<0.01	<0.01
Cadmium	ug/g	27115	<0.01	<0.01
Cobalt	ug/g	26982	<0.1	0.1
Cobalt	ug/g	26984	<0.1	<0.1
Cobalt	ug/g	26988	<0.1	<0.1
Cobalt	ug/g	26992	<0.1	<0.1
Cobalt	ug/g	26996	0.04	0.04
Cobalt	ug/g	27018	0.04	0.04
Cobalt	ug/g	27041	0.06	0.06

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Cobalt	ug/g	27045	0.06	0.05
Cobalt	ug/g	27083	<0.01	0.02
Cobalt	ug/g	27092	0.02	0.02
Cobalt	ug/g	27095	0.04	0.04
Cobalt	ug/g	27101	0.08	0.07
Cobalt	ug/g	27108	0.02	0.02
Cobalt	ug/g	27115	0.05	0.04
Chromium	ug/g	26982	<5	<5
Chromium	ug/g	26984	<5	<5
Chromium	ug/g	26988	<5	<5
Chromium	ug/g	26992	<5	<5
Chromium	ug/g	26996	<0.5	<0.5
Chromium	ug/g	27018	<0.5	<0.5
Chromium	ug/g	27041	<0.5	<0.5
Chromium	ug/g	27045	<0.5	<0.5
Chromium	ug/g	27083	<0.5	<0.5
Chromium	ug/g	27092	<0.5	<0.5
Chromium	ug/g	27095	<0.5	<0.5
Chromium	ug/g	27101	<0.5	<0.5
Chromium	ug/g	27108	<0.5	<0.5
Chromium	ug/g	27115	<0.5	<0.5
Copper	ug/g	26982	2.5	2.9
Copper	ug/g	26984	2.6	3.2
Copper	ug/g	26988	3.1	3.3
Copper	ug/g	26992	3.0	3.0
Copper	ug/g	26996	3.0	3.2
Copper	ug/g	27018	2.1	2.1
Copper	ug/g	27041	4.1	3.9
Copper	ug/g	27045	3.8	3.7
Copper	ug/g	27083	1.1	1.0
Copper	ug/g	27092	1.2	1.1
Copper	ug/g	27095	2.1	2.1
Copper	ug/g	27101	3.8	3.8
Copper	ug/g	27108	1.8	2.0
Copper	ug/g	27115	3.2	3.3
Iron	ug/g	26982	120	130
Iron	ug/g	26984	40	60
Iron	ug/g	26988	60	80
Iron	ug/g	26992	60	60
Iron	ug/g	26996	59	49
Iron	ug/g	27018	34	31
Iron	ug/g	27041	100	98
Iron	ug/g	27045	54	47
Iron	ug/g	27083	19	20
Iron	ug/g	27092	23	19
Iron	ug/g	27095	29	29

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Iron	ug/g	27101	100	98
Iron	ug/g	27108	18	19
Iron	ug/g	27115	52	47
Mercury	ug/g	26982	0.05	<0.05
Mercury	ug/g	26984	<0.05	<0.05
Mercury	ug/g	26988	<0.05	<0.05
Mercury	ug/g	26992	<0.05	<0.05
Mercury	ug/g	26996	0.025	0.023
Mercury	ug/g	27018	0.018	0.016
Mercury	ug/g	27041	0.041	0.036
Mercury	ug/g	27045	0.024	0.022
Mercury	ug/g	27083	0.31	0.31
Mercury	ug/g	27092	0.24	0.24
Mercury	ug/g	27095	0.042	0.042
Mercury	ug/g	27101	0.044	0.040
Mercury	ug/g	27108	0.55	0.58
Mercury	ug/g	27115	0.022	0.022
Manganese	ug/g	26982	10	11
Manganese	ug/g	26984	5	6
Manganese	ug/g	26988	6	6
Manganese	ug/g	26992	5	6
Manganese	ug/g	26996	4.7	4.9
Manganese	ug/g	27018	2.1	2.1
Manganese	ug/g	27041	8.3	8.9
Manganese	ug/g	27045	4.4	4.5
Manganese	ug/g	27083	0.5	0.6
Manganese	ug/g	27092	0.8	0.6
Manganese	ug/g	27095	2.8	2.8
Manganese	ug/g	27101	6.6	6.4
Manganese	ug/g	27108	0.6	0.6
Manganese	ug/g	27115	6.3	6.0
Molybdenum	ug/g	26982	<1	<1
Molybdenum	ug/g	26984	<1	<1
Molybdenum	ug/g	26988	<1	<1
Molybdenum	ug/g	26992	<1	<1
Molybdenum	ug/g	26996	<0.1	<0.1
Molybdenum	ug/g	27018	<0.1	<0.1
Molybdenum	ug/g	27041	0.1	0.1
Molybdenum	ug/g	27045	<0.1	0.1
Molybdenum	ug/g	27083	<0.1	<0.1
Molybdenum	ug/g	27092	<0.1	<0.1
Molybdenum	ug/g	27095	<0.1	<0.1
Molybdenum	ug/g	27101	0.1	0.1
Molybdenum	ug/g	27108	<0.1	<0.1
Molybdenum	ug/g	27115	0.1	0.1
Moisture	%	27026	83.75	84.65

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Moisture	%	27041	66.13	66.03
Moisture	%	27046	78.57	77.00
Moisture	%	27075	78.01	77.92
Moisture	%	27092	75.87	75.45
Moisture	%	27095	83.37	83.49
Moisture	%	27102	79.38	78.63
Moisture	%	27111	65.36	66.60
Moisture	%	27128	75.67	74.63
Moisture	%	27145	83.79	92.46
Nickel	ug/g	26982	<0.5	<0.5
Nickel	ug/g	26984	<0.5	<0.5
Nickel	ug/g	26988	<0.5	<0.5
Nickel	ug/g	26992	<0.5	<0.5
Nickel	ug/g	26996	<0.05	<0.05
Nickel	ug/g	27018	<0.05	<0.05
Nickel	ug/g	27041	<0.05	<0.05
Nickel	ug/g	27045	<0.05	<0.05
Nickel	ug/g	27083	<0.05	<0.05
Nickel	ug/g	27092	<0.05	<0.05
Nickel	ug/g	27095	<0.05	<0.05
Nickel	ug/g	27101	<0.05	<0.05
Nickel	ug/g	27108	<0.05	<0.05
Nickel	ug/g	27115	<0.05	<0.05
Lead	ug/g	26982	<0.1	<0.1
Lead	ug/g	26984	<0.1	<0.1
Lead	ug/g	26988	<0.1	<0.1
Lead	ug/g	26992	<0.1	<0.1
Lead	ug/g	26996	0.02	<0.01
Lead	ug/g	27018	<0.01	<0.01
Lead	ug/g	27041	0.02	0.02
Lead	ug/g	27045	0.03	0.02
Lead	ug/g	27083	0.02	<0.01
Lead	ug/g	27092	<0.01	<0.01
Lead	ug/g	27095	<0.01	<0.01
Lead	ug/g	27101	0.04	0.03
Lead	ug/g	27108	0.03	0.06
Lead	ug/g	27115	0.02	0.01
Antimony	ug/g	26982	<1	<1
Antimony	ug/g	26984	<1	<1
Antimony	ug/g	26988	<1	<1
Antimony	ug/g	26992	<1	<1
Antimony	ug/g	26996	<0.1	<0.1
Antimony	ug/g	27018	<0.1	<0.1
Antimony	ug/g	27041	<0.1	<0.1
Antimony	ug/g	27045	<0.1	<0.1
Antimony	ug/g	27083	<0.1	<0.1

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Antimony	ug/g	27092	<0.1	<0.1
Antimony	ug/g	27095	<0.1	<0.1
Antimony	ug/g	27101	<0.1	<0.1
Antimony	ug/g	27108	<0.1	<0.1
Antimony	ug/g	27115	<0.1	<0.1
Selenium	ug/g	26982	16	16
Selenium	ug/g	26984	4.7	6.0
Selenium	ug/g	26988	9.9	10
Selenium	ug/g	26992	6.6	6.6
Selenium	ug/g	26996	6.5	6.7
Selenium	ug/g	27018	3.6	3.5
Selenium	ug/g	27041	8.7	8.4
Selenium	ug/g	27045	18	18
Selenium	ug/g	27083	2.0	1.9
Selenium	ug/g	27092	1.4	1.4
Selenium	ug/g	27095	2.4	2.4
Selenium	ug/g	27101	9.0	8.7
Selenium	ug/g	27108	1.7	1.8
Selenium	ug/g	27115	6.9	7.0
Tin	ug/g	26982	<0.5	<0.5
Tin	ug/g	26984	<0.5	<0.5
Tin	ug/g	26988	<0.5	<0.5
Tin	ug/g	26992	<0.5	<0.5
Tin	ug/g	26996	<0.05	<0.05
Tin	ug/g	27018	<0.05	<0.05
Tin	ug/g	27041	<0.05	<0.05
Tin	ug/g	27045	<0.05	<0.05
Tin	ug/g	27083	<0.05	<0.05
Tin	ug/g	27092	<0.05	<0.05
Tin	ug/g	27095	<0.05	<0.05
Tin	ug/g	27101	<0.05	<0.05
Tin	ug/g	27108	<0.05	<0.05
Tin	ug/g	27115	<0.05	<0.05
Strontium	ug/g	26982	<1	<1
Strontium	ug/g	26984	<1	<1
Strontium	ug/g	26988	<1	<1
Strontium	ug/g	26992	<1	<1
Strontium	ug/g	26996	0.3	0.2
Strontium	ug/g	27018	1.4	1.4
Strontium	ug/g	27041	0.4	0.3
Strontium	ug/g	27045	0.3	0.2
Strontium	ug/g	27083	0.3	0.3
Strontium	ug/g	27092	1.0	0.9
Strontium	ug/g	27095	1.8	1.6
Strontium	ug/g	27101	0.5	0.5
Strontium	ug/g	27108	0.6	0.7

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

Duplicate Analysis	Units	Sample ID	First Result	Second Result	
Strontium	ug/g	27115	0.3	0.3	
Titanium	ug/g	26982	1.5	1.6	
Titanium	ug/g	26984	<0.5	<0.5	
Titanium	ug/g	26988	<0.5	0.5	
Titanium	ug/g	26992	<0.5	<0.5	
Titanium	ug/g	26996	0.31	0.08	
Titanium	ug/g	27018	0.07	<0.05	
Titanium	ug/g	27041	0.08	0.07	
Titanium	ug/g	27045	0.06	0.06	
Titanium	ug/g	27083	0.46	0.12	*(1)
Titanium	ug/g	27092	0.20	0.06	
Titanium	ug/g	27095	0.06	0.10	
Titanium	ug/g	27101	0.26	0.42	
Titanium	ug/g	27108	0.09	0.08	
Titanium	ug/g	27115	0.06	<0.05	
Thallium	ug/g	26982	<0.5	<0.5	
Thallium	ug/g	26984	<0.5	<0.5	
Thallium	ug/g	26988	<0.5	<0.5	
Thallium	ug/g	26992	<0.5	<0.5	
Thallium	ug/g	26996	<0.05	<0.05	
Thallium	ug/g	27018	<0.05	<0.05	
Thallium	ug/g	27041	<0.05	<0.05	
Thallium	ug/g	27045	<0.05	<0.05	
Thallium	ug/g	27083	0.08	0.08	
Thallium	ug/g	27092	<0.05	<0.05	
Thallium	ug/g	27095	<0.05	<0.05	
Thallium	ug/g	27101	<0.05	<0.05	
Thallium	ug/g	27108	<0.05	<0.05	
Thallium	ug/g	27115	<0.05	<0.05	
Uranium	ug/g	26982	<0.05	<0.05	
Uranium	ug/g	26984	<0.05	<0.05	
Uranium	ug/g	26988	<0.05	<0.05	
Uranium	ug/g	26992	<0.05	<0.05	
Uranium	ug/g	26996	<0.005	<0.005	
Uranium	ug/g	27018	<0.005	<0.005	
Uranium	ug/g	27041	0.005	0.005	
Uranium	ug/g	27045	<0.005	<0.005	
Uranium	ug/g	27083	<0.005	<0.005	
Uranium	ug/g	27092	<0.005	<0.005	
Uranium	ug/g	27095	<0.005	<0.005	
Uranium	ug/g	27101	<0.005	<0.005	
Uranium	ug/g	27108	<0.005	<0.005	
Uranium	ug/g	27115	<0.005	<0.005	
Vanadium	ug/g	26982	<1	<1	
Vanadium	ug/g	26984	<1	<1	
Vanadium	ug/g	26988	<1	<1	

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 10, 2018

This report was generated for samples included in SRC Group # 2018-8314

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Vanadium	ug/g	26992	<1	<1
Vanadium	ug/g	26996	<0.1	<0.1
Vanadium	ug/g	27018	<0.1	<0.1
Vanadium	ug/g	27041	<0.1	<0.1
Vanadium	ug/g	27045	<0.1	<0.1
Vanadium	ug/g	27083	<0.1	<0.1
Vanadium	ug/g	27092	<0.1	<0.1
Vanadium	ug/g	27095	<0.1	<0.1
Vanadium	ug/g	27101	<0.1	<0.1
Vanadium	ug/g	27108	<0.1	<0.1
Vanadium	ug/g	27115	<0.1	<0.1
Zinc	ug/g	26982	120	120
Zinc	ug/g	26984	80	91
Zinc	ug/g	26988	110	110
Zinc	ug/g	26992	100	100
Zinc	ug/g	26996	99	96
Zinc	ug/g	27018	74	76
Zinc	ug/g	27041	110	110
Zinc	ug/g	27045	120	120
Zinc	ug/g	27083	16	16
Zinc	ug/g	27092	16	15
Zinc	ug/g	27095	79	82
Zinc	ug/g	27101	110	110
Zinc	ug/g	27108	33	40
Zinc	ug/g	27115	100	100

*(1) The duplicate results for Titanium were outside the laboratory's specified limits. The data was reviewed and all other quality control measures in the batch were within limits.

Overall, there were no other indications of problems with the analysis and the results were considered acceptable.

Roxane Ortmann - Quality Assurance Supervisor

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Justin Wilson

Date Samples Received: Jul-10-2018 Client P.O.: VPO00555477 Ref# 18-07

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 2 authorized by Keith Gipman, Supervisor
Results from Lab Section 6 authorized by Marion McConnell, Supervisor

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Justin Wilson

Sample #: **2018027156**
Date Sampled: **Jun 05, 2018**
Sample Matrix: **TISSUE**
Description: **06/05/2018 RG_SC_NSC01M_20180605**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.17	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.80	0.2	0.05
Iron	ug/g	13	5	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	0.5	0.2	0.1
Mercury	ug/g	1.4	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.7	0.2	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.15	0.07	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	20	3	0.5
Lab Section 6				
Moisture	%	77.93	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027157**
Date Sampled: **Jun 05, 2018**
Sample Matrix: **TISSUE**
Description: **06/05/2018 RG_SC_NSC01O_20180605**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7	5	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.12	0.05	0.05
Barium	ug/g	0.18	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	3.4	0.5	0.05
Iron	ug/g	110	20	2
Lead	ug/g	0.07	0.02	0.01
Manganese	ug/g	1.7	0.4	0.1
Mercury	ug/g	0.11	0.02	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	16	2	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.20	0.08	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	330	30	0.5
Lab Section 6				
Moisture	%	76.39	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027158**
Date Sampled: **Jun 05, 2018**
Sample Matrix: **TISSUE**
Description: **06/05/2018 RG_SC_NSC02M_20180605**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.07	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.68	0.2	0.05
Iron	ug/g	7	4	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	0.2	0.1	0.1
Mercury	ug/g	1.4	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.3	0.2	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.1	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	18	3	0.5
Lab Section 6				
Moisture	%	77.47	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027159**
Date Sampled: **Jun 05, 2018**
Sample Matrix: **TISSUE**
Description: **06/05/2018 RG_SC_NSC02O_20180605**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2	2	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.08	0.05	0.05
Barium	ug/g	0.13	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	3.9	0.6	0.05
Iron	ug/g	90	10	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	1.5	0.4	0.1
Mercury	ug/g	0.17	0.02	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	5.4	0.5	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	130	10	0.5
Lab Section 6				
Moisture	%	74.75	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027160**
Date Sampled: **Jun 05, 2018**
Sample Matrix: **TISSUE**
Description: **06/05/2018 RG_SC_NSC03M_20180605**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2	2	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.05	0.05	0.05
Barium	ug/g	0.17	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.82	0.2	0.05
Iron	ug/g	13	5	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	0.6	0.2	0.1
Mercury	ug/g	1.2	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.4	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.4	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.19	0.08	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	32	5	0.5
Lab Section 6				
Moisture	%	78.87	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027161**
Date Sampled: **Jun 05, 2018**
Sample Matrix: **TISSUE**
Description: **06/05/2018 RG_SC_NSC03O_20180605**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.08	0.05	0.05
Barium	ug/g	0.25	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	4.2	0.6	0.05
Iron	ug/g	120	20	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	5.3	0.8	0.1
Mercury	ug/g	0.076	0.02	0.005
Molybdenum	ug/g	0.2	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	9.2	2	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.1	0.3	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.08	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	210	20	0.5
Lab Section 6				
Moisture	%	75.02	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027162**
Date Sampled: **Jun 05, 2018**
Sample Matrix: **TISSUE**
Description: **06/05/2018 RG_SC_NSC04M_20180605**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.20	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.75	0.2	0.05
Iron	ug/g	9	4	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.7	0.2	0.1
Mercury	ug/g	0.89	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.6	0.2	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	25	4	0.5
Lab Section 6				
Moisture	%	79.13	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027163**
Date Sampled: **Jun 05, 2018**
Sample Matrix: **TISSUE**
Description: **06/05/2018 RG_SC_NSC04O_20180605**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7	5	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.17	0.05	0.05
Barium	ug/g	0.14	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	2.9	0.4	0.05
Iron	ug/g	100	20	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	6.0	0.9	0.1
Mercury	ug/g	0.053	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	5.4	0.5	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.16	0.07	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	190	20	0.5
Lab Section 6				
Moisture	%	73.98	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027164**
Date Sampled: **Jun 05, 2018**
Sample Matrix: **TISSUE**
Description: **06/05/2018 RG_SC_NSC05M_20180605**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.06	0.05	0.05
Barium	ug/g	0.55	0.1	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.72	0.2	0.05
Iron	ug/g	10	4	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	1.1	0.3	0.1
Mercury	ug/g	0.63	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.7	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.6	0.4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.10	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	21	3	0.5
Lab Section 6				
Moisture	%	78.10	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027165**
Date Sampled: **Jun 05, 2018**
Sample Matrix: **TISSUE**
Description: **06/05/2018 RG_SC_NSC05O_20180605**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.18	0.05	0.05
Barium	ug/g	0.41	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	3.8	0.6	0.05
Iron	ug/g	120	20	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	2.2	0.3	0.1
Mercury	ug/g	0.033	0.01	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	13	2	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.07	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	350	40	0.5
Lab Section 6				
Moisture	%	74.63	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027166**
Date Sampled: **Jun 10, 2018**
Sample Matrix: **TISSUE**
Description: **06/10/2018 RG_SC_NSC06M_20180610**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2	2	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.15	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.63	0.2	0.05
Iron	ug/g	8	4	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	0.4	0.2	0.1
Mercury	ug/g	1.6	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.0	0.3	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.11	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	20	3	0.5
Lab Section 6				
Moisture	%	78.76	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027167**
Date Sampled: **Jun 10, 2018**
Sample Matrix: **TISSUE**
Description: **06/10/2018 RG_SC_NSC06O_20180610**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.09	0.05	0.05
Barium	ug/g	0.38	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	3.5	0.5	0.05
Iron	ug/g	190	30	2
Lead	ug/g	0.14	0.04	0.01
Manganese	ug/g	1.4	0.4	0.1
Mercury	ug/g	0.12	0.02	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	27	4	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	0.06	0.05	0.05
Titanium	ug/g	0.08	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	320	30	0.5
Lab Section 6				
Moisture	%	77.89	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027168**
Date Sampled: **Jun 10, 2018**
Sample Matrix: **TISSUE**
Description: **06/10/2018 RG_SC_NSC07M_20180610**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.06	0.05	0.05
Barium	ug/g	0.06	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.64	0.2	0.05
Iron	ug/g	8	4	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	0.2	0.1	0.1
Mercury	ug/g	2.1	0.3	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.6	0.2	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	<0.1		0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	16	2	0.5
Lab Section 6				
Moisture	%	77.19	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027169**
Date Sampled: **Jun 10, 2018**
Sample Matrix: **TISSUE**
Description: **06/10/2018 RG_SC_NSC07O_20180610**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	0.14	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.03	0.01	0.01
Copper	ug/g	2.5	0.4	0.05
Iron	ug/g	68	10	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	1.1	0.3	0.1
Mercury	ug/g	0.12	0.02	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	5.8	0.6	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	130	10	0.5
Lab Section 6				
Moisture	%	70.90	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027170**
Date Sampled: **Jun 06, 2018**
Sample Matrix: **TISSUE**
Description: **06/06/2018 RG_ER_NSC01M_20180606**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.07	0.05	0.05
Barium	ug/g	0.14	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.58	0.1	0.05
Iron	ug/g	8	4	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	0.5	0.2	0.1
Mercury	ug/g	1.2	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	4.0	0.6	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	18	3	0.5
Lab Section 6				
Moisture	%	78.85	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027171**
Date Sampled: **Jun 06, 2018**
Sample Matrix: **TISSUE**
Description: **06/06/2018 RG_ER_NSC01O_20180606**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2	2	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.13	0.05	0.05
Barium	ug/g	0.36	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	2.7	0.4	0.05
Iron	ug/g	140	20	2
Lead	ug/g	0.19	0.05	0.01
Manganese	ug/g	1.7	0.4	0.1
Mercury	ug/g	0.065	0.02	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	16	2	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	0.06	0.06	0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	310	30	0.5
Lab Section 6				
Moisture	%	73.74	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027172**
Date Sampled: **Jun 06, 2018**
Sample Matrix: **TISSUE**
Description: **06/06/2018 RG_ER_NSC02M_20180606**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.06	0.05	0.05
Barium	ug/g	0.32	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.69	0.2	0.05
Iron	ug/g	13	5	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	0.7	0.2	0.1
Mercury	ug/g	1.2	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	3.1	0.5	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.0	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.07	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	20	3	0.5
Lab Section 6				
Moisture	%	79.56	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027173**
Date Sampled: **Jun 06, 2018**
Sample Matrix: **TISSUE**
Description: **06/06/2018 RG_ER_NSC02O_20180606**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	0.2	0.1	0.1
Barium	ug/g	0.4	0.2	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	0.02	0.02	0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	0.02	0.02	0.02
Copper	ug/g	4.2	0.6	0.1
Iron	ug/g	130	20	5
Lead	ug/g	0.11	0.04	0.02
Manganese	ug/g	0.8	0.4	0.2
Mercury	ug/g	0.07	0.02	0.01
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	19	5	1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	<0.2		0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.1		0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	520	50	1
Lab Section 6				
Moisture	%	74.22	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027174**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_ER_NSC03M_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.09	0.05	0.05
Barium	ug/g	0.46	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.56	0.1	0.05
Iron	ug/g	10	4	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.8	0.3	0.1
Mercury	ug/g	1.1	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.5	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.1	0.3	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	20	3	0.5
Lab Section 6				
Moisture	%	79.31	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027175**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_ER_NSC03O_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<20		20
Antimony	ug/g	<1		1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	1.8	0.9	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	<0.1		0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	<0.1		0.1
Copper	ug/g	5.2	1	0.5
Iron	ug/g	190	60	20
Lead	ug/g	0.3	0.2	0.1
Manganese	ug/g	2	1	1
Mercury	ug/g	0.08	0.06	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	17	2	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	<1		1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.05		0.05
Vanadium	ug/g	<1		1
Zinc	ug/g	670	70	5
Lab Section 6				
Moisture	%	79.67	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027176**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_ER_NSC04M_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.05	0.05	0.05
Barium	ug/g	0.18	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.62	0.2	0.05
Iron	ug/g	7	4	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	0.4	0.2	0.1
Mercury	ug/g	1.6	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	4.8	0.7	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.05	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	18	3	0.5
Lab Section 6				
Moisture	%	77.85	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027177**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_ER_NSC04O_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.12	0.05	0.05
Barium	ug/g	0.11	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	2.8	0.4	0.05
Iron	ug/g	67	10	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	1.3	0.3	0.1
Mercury	ug/g	0.11	0.02	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	24	4	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	130	10	0.5
Lab Section 6				
Moisture	%	67.68	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027178**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_ER_NSC05M_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.07	0.05	0.05
Barium	ug/g	1.9	0.3	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.72	0.2	0.05
Iron	ug/g	9	4	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	0.5	0.2	0.1
Mercury	ug/g	0.91	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	0.11	0.05	0.05
Selenium	ug/g	2.5	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	21	3	0.5
Lab Section 6				
Moisture	%	80.22	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027179**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_ER_NSC05O_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.06	0.05	0.05
Barium	ug/g	1.4	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	4.3	0.6	0.05
Iron	ug/g	280	30	2
Lead	ug/g	0.08	0.03	0.01
Manganese	ug/g	1.6	0.4	0.1
Mercury	ug/g	0.18	0.03	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	0.05	0.05	0.05
Selenium	ug/g	26	4	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.9	0.3	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.14	0.06	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	640	60	5
Lab Section 6				
Moisture	%	82.36	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027180**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_ER_NSC06M_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.10	0.05	0.05
Barium	ug/g	0.71	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.76	0.2	0.05
Iron	ug/g	8	4	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.73	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	4.4	0.7	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.8	0.3	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	26	4	0.5
Lab Section 6				
Moisture	%	78.93	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027181**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_ER_NSC06O_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	0.2	0.1	0.1
Barium	ug/g	9.3	1	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	0.03	0.02	0.02
Copper	ug/g	3.4	0.5	0.1
Iron	ug/g	84	20	5
Lead	ug/g	0.04	0.03	0.02
Manganese	ug/g	1.0	0.4	0.2
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	26	4	1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	<0.2		0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.1		0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	500	50	1
Lab Section 6				
Moisture	%	71.15	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027182**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_GC_NSC01M_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.07	0.05	0.05
Barium	ug/g	0.65	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.65	0.2	0.05
Iron	ug/g	8	4	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.6	0.2	0.1
Mercury	ug/g	1.2	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.9	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.3	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	22	3	0.5
Lab Section 6				
Moisture	%	78.92	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027183**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_GC_NSC01O_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.10	0.05	0.05
Barium	ug/g	0.87	0.2	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	3.1	0.5	0.05
Iron	ug/g	130	20	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	2.0	0.3	0.1
Mercury	ug/g	0.10	0.02	0.005
Molybdenum	ug/g	0.1	0.1	0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	13	2	0.5
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.1	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	230	20	0.5
Lab Section 6				
Moisture	%	75.18	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027184**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_GC_NSC02M_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.11	0.05	0.05
Barium	ug/g	0.44	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.73	0.2	0.05
Iron	ug/g	8	4	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	0.5	0.2	0.1
Mercury	ug/g	0.96	0.2	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.7	0.4	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	24	4	0.5
Lab Section 6				
Moisture	%	78.85	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027185**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_GC_NSC02O_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	0.2	0.1	0.1
Barium	ug/g	0.8	0.3	0.1
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<1		1
Cobalt	ug/g	0.03	0.02	0.02
Copper	ug/g	3.4	0.5	0.1
Iron	ug/g	150	20	5
Lead	ug/g	0.06	0.03	0.02
Manganese	ug/g	1.1	0.4	0.2
Mercury	ug/g	0.12	0.03	0.01
Molybdenum	ug/g	<0.2		0.2
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	19	5	1
Silver	ug/g	<0.02		0.02
Strontium	ug/g	<0.2		0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.1		0.1
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	470	50	1
Lab Section 6				
Moisture	%	76.94	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027186**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_GC_NSC03M_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.07	0.05	0.05
Barium	ug/g	2.1	0.3	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	0.79	0.2	0.05
Iron	ug/g	8	4	2
Lead	ug/g	0.06	0.02	0.01
Manganese	ug/g	0.3	0.2	0.1
Mercury	ug/g	2.0	0.3	0.05
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.7	0.2	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.06	0.05	0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	18	3	0.5
Lab Section 6				
Moisture	%	76.66	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027187**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_GC_NSC03O_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	0.07	0.05	0.05
Barium	ug/g	0.25	0.05	0.05
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	0.03	0.01	0.01
Copper	ug/g	2.8	0.4	0.05
Iron	ug/g	31	8	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	1.9	0.5	0.1
Mercury	ug/g	0.078	0.02	0.005
Molybdenum	ug/g	<0.1		0.1
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	3.6	0.5	0.05
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.2	0.1	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.05		0.05
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	88	9	0.5
Lab Section 6				
Moisture	%	63.78	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027188**
Date Sampled: **Jun 07, 2018**
Sample Matrix: **TISSUE**
Description: **06/07/2018 RG_ER_WCT01M_20180607**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	14	5	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	8.6	2	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	77.98	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027189**
Date Sampled: **Jun 11, 2018**
Sample Matrix: **TISSUE**
Description: **06/11/2018 RG_TN_1_20180611**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6200	900	200
Antimony	ug/g	2	1	1
Arsenic	ug/g	7.0	2	0.5
Barium	ug/g	92	9	0.5
Beryllium	ug/g	0.2	0.1	0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.8	0.4	0.1
Chromium	ug/g	6	6	5
Cobalt	ug/g	2.2	0.3	0.1
Copper	ug/g	11	2	0.5
Iron	ug/g	4600	700	200
Lead	ug/g	6.7	1	0.1
Manganese	ug/g	130	10	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	5.0	1	0.5
Selenium	ug/g	2.0	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	150	20	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	1.1	0.7	0.5
Titanium	ug/g	64	6	0.5
Uranium	ug/g	0.61	0.2	0.05
Vanadium	ug/g	6	2	1
Zinc	ug/g	120	20	5
Lab Section 6				
Moisture	%	99.78	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027190**
Date Sampled: **Jun 11, 2018**
Sample Matrix: **TISSUE**
Description: **06/11/2018 RG_TN_2_20180611**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4700	500	20
Antimony	ug/g	<1		1
Arsenic	ug/g	4.0	1	0.5
Barium	ug/g	86	9	0.5
Beryllium	ug/g	0.2	0.1	0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.3	0.3	0.1
Chromium	ug/g	5	5	5
Cobalt	ug/g	2.1	0.3	0.1
Copper	ug/g	11	2	0.5
Iron	ug/g	4400	400	20
Lead	ug/g	9.0	1	0.1
Manganese	ug/g	120	10	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	20	3	0.5
Selenium	ug/g	1.5	0.8	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	160	20	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	60	6	0.5
Uranium	ug/g	0.97	0.2	0.05
Vanadium	ug/g	6	2	1
Zinc	ug/g	110	20	5
Lab Section 6				
Moisture	%	99.90	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027191**
Date Sampled: **Jun 11, 2018**
Sample Matrix: **TISSUE**
Description: **06/11/2018 RG_TN_3_20180611**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6000	600	50
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	5.3	0.8	0.1
Barium	ug/g	90	9	0.1
Beryllium	ug/g	0.25	0.06	0.02
Boron	ug/g	5	3	2
Cadmium	ug/g	1.6	0.2	0.02
Chromium	ug/g	6	2	1
Cobalt	ug/g	2.3	0.2	0.02
Copper	ug/g	13	1	0.1
Iron	ug/g	4600	700	50
Lead	ug/g	7.1	0.7	0.02
Manganese	ug/g	140	10	0.2
Mercury	ug/g	0.05	0.02	0.01
Molybdenum	ug/g	0.5	0.3	0.2
Nickel	ug/g	17	2	0.1
Selenium	ug/g	2.3	0.3	0.1
Silver	ug/g	0.04	0.03	0.02
Strontium	ug/g	160	20	0.2
Thallium	ug/g	0.1	0.1	0.1
Tin	ug/g	1.3	0.3	0.1
Titanium	ug/g	59	6	0.1
Uranium	ug/g	0.48	0.07	0.01
Vanadium	ug/g	6.1	0.9	0.2
Zinc	ug/g	120	10	1
Lab Section 6				
Moisture	%	99.73	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027192**
Date Sampled: **Jun 11, 2018**
Sample Matrix: **TISSUE**
Description: **06/11/2018 RG_TN_4_20180611**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6200	600	50
Antimony	ug/g	<0.2		0.2
Arsenic	ug/g	4.7	0.7	0.1
Barium	ug/g	90	9	0.1
Beryllium	ug/g	0.26	0.06	0.02
Boron	ug/g	6	3	2
Cadmium	ug/g	1.3	0.2	0.02
Chromium	ug/g	6	2	1
Cobalt	ug/g	2.2	0.2	0.02
Copper	ug/g	12	1	0.1
Iron	ug/g	4600	700	50
Lead	ug/g	7.7	0.8	0.02
Manganese	ug/g	140	10	0.2
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.5	0.3	0.2
Nickel	ug/g	4.8	0.7	0.1
Selenium	ug/g	2.0	0.3	0.1
Silver	ug/g	0.03	0.02	0.02
Strontium	ug/g	160	20	0.2
Thallium	ug/g	0.1	0.1	0.1
Tin	ug/g	0.3	0.2	0.1
Titanium	ug/g	59	6	0.1
Uranium	ug/g	0.55	0.08	0.01
Vanadium	ug/g	6.1	0.9	0.2
Zinc	ug/g	110	10	1
Lab Section 6				
Moisture	%	99.79	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027193**
Date Sampled: **Jun 11, 2018**
Sample Matrix: **TISSUE**
Description: **06/11/2018 RG_TN_5_20180611**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3900	1000	200
Antimony	ug/g	<1		1
Arsenic	ug/g	4.3	1	0.5
Barium	ug/g	68	7	0.5
Beryllium	ug/g	0.2	0.1	0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.3	0.3	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	2.0	0.3	0.1
Copper	ug/g	12	2	0.5
Iron	ug/g	3900	1000	200
Lead	ug/g	6.2	0.9	0.1
Manganese	ug/g	130	10	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	4.2	1	0.5
Selenium	ug/g	1.7	0.9	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	140	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	47	7	0.5
Uranium	ug/g	0.62	0.2	0.05
Vanadium	ug/g	4	2	1
Zinc	ug/g	100	20	5
Lab Section 6				
Moisture	%	99.83	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027194**
Date Sampled: **Jun 09, 2018**
Sample Matrix: **TISSUE**
Description: **06/09/2018 RG_T4_2_20180609**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	1500	200	20
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	5.0	0.5	0.05
Barium	ug/g	27	3	0.05
Beryllium	ug/g	0.08	0.02	0.01
Boron	ug/g	2	1	1
Cadmium	ug/g	0.95	0.1	0.01
Chromium	ug/g	1.3	0.8	0.5
Cobalt	ug/g	1.2	0.1	0.01
Copper	ug/g	8.9	0.9	0.05
Iron	ug/g	750	100	20
Lead	ug/g	2.0	0.2	0.01
Manganese	ug/g	106	10	0.1
Mercury	ug/g	0.037	0.01	0.005
Molybdenum	ug/g	0.3	0.2	0.1
Nickel	ug/g	3.0	0.4	0.05
Selenium	ug/g	2.2	0.3	0.05
Silver	ug/g	0.03	0.02	0.01
Strontium	ug/g	32	3	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	0.37	0.06	0.05
Titanium	ug/g	14	1	0.05
Uranium	ug/g	0.090	0.02	0.005
Vanadium	ug/g	1.7	0.4	0.1
Zinc	ug/g	78	8	0.5
Lab Section 6				
Moisture	%	97.90	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027195**
Date Sampled: **Jun 08, 2018**
Sample Matrix: **TISSUE**
Description: **06/08/2018 RG_T4_3_20180608**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	1200	200	20
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	6.0	0.6	0.05
Barium	ug/g	26	3	0.05
Beryllium	ug/g	0.06	0.01	0.01
Boron	ug/g	2	1	1
Cadmium	ug/g	0.94	0.1	0.01
Chromium	ug/g	1.4	0.8	0.5
Cobalt	ug/g	1.2	0.1	0.01
Copper	ug/g	9.5	1	0.05
Iron	ug/g	700	100	20
Lead	ug/g	6.6	0.7	0.01
Manganese	ug/g	104	10	0.1
Mercury	ug/g	0.039	0.01	0.005
Molybdenum	ug/g	0.4	0.2	0.1
Nickel	ug/g	2.0	0.3	0.05
Selenium	ug/g	2.7	0.4	0.05
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	33	3	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	0.76	0.2	0.05
Titanium	ug/g	12	1	0.05
Uranium	ug/g	0.11	0.02	0.005
Vanadium	ug/g	1.4	0.4	0.1
Zinc	ug/g	100	10	0.5
Lab Section 6				
Moisture	%	97.73	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

This sample was reanalyzed for Lead. Reanalysis confirms original results are within the expected measurement uncertainty.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027196**
Date Sampled: **Jun 09, 2018**
Sample Matrix: **TISSUE**
Description: **06/09/2018 RG_T4_4_20180609**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	1200	200	20
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	6.0	0.6	0.05
Barium	ug/g	25	2	0.05
Beryllium	ug/g	0.08	0.02	0.01
Boron	ug/g	1	1	1
Cadmium	ug/g	0.97	0.1	0.01
Chromium	ug/g	1.0	0.7	0.5
Cobalt	ug/g	1.1	0.1	0.01
Copper	ug/g	9.0	0.9	0.05
Iron	ug/g	640	100	20
Lead	ug/g	1.7	0.2	0.01
Manganese	ug/g	107	10	0.1
Mercury	ug/g	0.037	0.01	0.005
Molybdenum	ug/g	0.3	0.2	0.1
Nickel	ug/g	1.6	0.2	0.05
Selenium	ug/g	2.5	0.4	0.05
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	28	3	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	0.21	0.05	0.05
Titanium	ug/g	10	1	0.05
Uranium	ug/g	0.094	0.02	0.005
Vanadium	ug/g	1.4	0.4	0.1
Zinc	ug/g	86	9	0.5
Lab Section 6				
Moisture	%	97.83	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027197**
Date Sampled: **Jun 09, 2018**
Sample Matrix: **TISSUE**
Description: **06/09/2018 RG_T4_5_20180609**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	1300	200	20
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	6.0	0.6	0.05
Barium	ug/g	28	3	0.05
Beryllium	ug/g	0.08	0.02	0.01
Boron	ug/g	2	1	1
Cadmium	ug/g	0.96	0.1	0.01
Chromium	ug/g	1.0	0.7	0.5
Cobalt	ug/g	1.3	0.1	0.01
Copper	ug/g	8.5	0.8	0.05
Iron	ug/g	780	100	20
Lead	ug/g	1.6	0.2	0.01
Manganese	ug/g	114	10	0.1
Mercury	ug/g	0.039	0.01	0.005
Molybdenum	ug/g	0.3	0.2	0.1
Nickel	ug/g	2.0	0.3	0.05
Selenium	ug/g	2.7	0.4	0.05
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	34	3	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	0.11	0.05	0.05
Titanium	ug/g	12	1	0.05
Uranium	ug/g	0.092	0.02	0.005
Vanadium	ug/g	1.5	0.4	0.1
Zinc	ug/g	85	8	0.5
Lab Section 6				
Moisture	%	97.78	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-8318

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018027198**
Date Sampled: **Jun 09, 2018**
Sample Matrix: **TISSUE**
Description: **06/09/2018 RG_T4_6_20180609**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Jul 10, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	1300	200	20
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	5.1	0.5	0.05
Barium	ug/g	26	3	0.05
Beryllium	ug/g	0.07	0.01	0.01
Boron	ug/g	1	1	1
Cadmium	ug/g	0.74	0.1	0.01
Chromium	ug/g	1.1	0.7	0.5
Cobalt	ug/g	1.1	0.1	0.01
Copper	ug/g	6.8	0.7	0.05
Iron	ug/g	840	100	20
Lead	ug/g	1.3	0.1	0.01
Manganese	ug/g	90	9	0.1
Mercury	ug/g	0.035	0.01	0.005
Molybdenum	ug/g	0.3	0.2	0.1
Nickel	ug/g	1.8	0.3	0.05
Selenium	ug/g	2.4	0.4	0.05
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	37	4	0.1
Thallium	ug/g	<0.05		0.05
Tin	ug/g	0.10	0.05	0.05
Titanium	ug/g	12	1	0.05
Uranium	ug/g	0.082	0.02	0.005
Vanadium	ug/g	1.5	0.4	0.1
Zinc	ug/g	70	7	0.5
Lab Section 6				
Moisture	%	97.53	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 16, 2018

This report was generated for samples included in SRC Group # 2018-8318

Quality Control Report

Justin Wilson
Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Aluminum	ug/g	1280	1370
Aluminum	ug/g	1280	1380
Aluminum	ug/g	1280	1370
Aluminum	ug/g	1280	1360
Arsenic	ug/g	6.87	6.68
Arsenic	ug/g	6.87	7.09
Arsenic	ug/g	6.87	8.12
Cadmium	ug/g	0.299	0.315
Cadmium	ug/g	0.299	0.306
Cadmium	ug/g	0.299	0.318
Chromium	ug/g	1.57	1.58
Chromium	ug/g	1.57	1.72
Chromium	ug/g	1.57	1.58
Copper	ug/g	13.8	14.4
Copper	ug/g	13.8	14.0
Copper	ug/g	13.8	14.4
Iron	ug/g	312	308
Iron	ug/g	312	321
Iron	ug/g	312	306
Iron	ug/g	312	317
Lead	ug/g	0.404	0.404
Lead	ug/g	0.404	0.399
Lead	ug/g	0.404	0.400
Manganese	ug/g	2.70	2.64
Manganese	ug/g	2.70	2.80
Manganese	ug/g	2.70	2.89
Mercury	ug/g	0.364	0.390
Mercury	ug/g	0.364	0.326
Mercury	ug/g	0.364	0.322
Nickel	ug/g	1.20	1.18
Nickel	ug/g	1.20	1.21
Nickel	ug/g	1.20	1.16

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 16, 2018

This report was generated for samples included in SRC Group # 2018-8318

QC Analysis	Units	Target Value	Obtained Value
Selenium	ug/g	3.45	3.47
Selenium	ug/g	3.45	3.58
Selenium	ug/g	3.45	4.17
Silver	ug/g	0.0234	0.0209
Silver	ug/g	0.0234	0.0201
Silver	ug/g	0.0234	0.0214
Zinc	ug/g	47.8	48.5
Zinc	ug/g	47.8	47.0
Zinc	ug/g	47.8	47.7

Duplicates:

Duplicates are used to assess problems with precision and help ensure that samples within a given batch were processed appropriately. The difference between duplicates must be within strict limits, otherwise corrective action is required. Please note, the duplicate(s) in this report are duplicates analyzed within a given batch of test samples and may not be from this specific group of samples.

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Silver	ug/g	27161	<0.01	<0.01
Silver	ug/g	27168	<0.01	<0.01
Silver	ug/g	27182	<0.01	<0.01
Silver	ug/g	27194	0.03	0.02
Silver	ug/g	27198	0.02	0.02
Aluminum	ug/g	27161	5	6
Aluminum	ug/g	27168	<2	<2
Aluminum	ug/g	27182	<2	<2
Aluminum	ug/g	27194	1300	1100
Aluminum	ug/g	27194	1500	1200
Aluminum	ug/g	27198	1300	1200
Arsenic	ug/g	27161	0.08	0.07
Arsenic	ug/g	27168	0.06	0.08
Arsenic	ug/g	27182	0.07	0.08
Arsenic	ug/g	27194	5.0	5.5
Arsenic	ug/g	27198	5.1	4.9
Boron	ug/g	27161	<1	<1
Boron	ug/g	27168	<1	<1
Boron	ug/g	27182	<1	<1
Boron	ug/g	27194	2	1
Boron	ug/g	27198	1	1
Barium	ug/g	27161	0.25	0.23
Barium	ug/g	27168	0.06	0.17
Barium	ug/g	27182	0.65	0.58
Barium	ug/g	27194	27	25
Barium	ug/g	27198	26	25
Beryllium	ug/g	27161	<0.01	<0.01
Beryllium	ug/g	27168	<0.01	<0.01

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 16, 2018

This report was generated for samples included in SRC Group # 2018-8318

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Beryllium	ug/g	27182	<0.01	<0.01
Beryllium	ug/g	27194	0.08	0.07
Beryllium	ug/g	27198	0.07	0.06
Cadmium	ug/g	27161	0.01	0.01
Cadmium	ug/g	27168	<0.01	<0.01
Cadmium	ug/g	27182	<0.01	<0.01
Cadmium	ug/g	27194	0.95	0.88
Cadmium	ug/g	27198	0.74	0.73
Cobalt	ug/g	27161	0.05	0.05
Cobalt	ug/g	27168	<0.01	<0.01
Cobalt	ug/g	27182	<0.01	<0.01
Cobalt	ug/g	27194	1.2	1.3
Cobalt	ug/g	27198	1.1	1.1
Chromium	ug/g	27161	<0.5	<0.5
Chromium	ug/g	27168	<0.5	<0.5
Chromium	ug/g	27182	<0.5	<0.5
Chromium	ug/g	27194	1.3	1.1
Chromium	ug/g	27198	1.1	1.0
Copper	ug/g	27161	4.2	4.0
Copper	ug/g	27168	0.64	0.64
Copper	ug/g	27182	0.65	0.66
Copper	ug/g	27194	8.9	8.5
Copper	ug/g	27198	6.8	6.7
Iron	ug/g	27161	120	120
Iron	ug/g	27168	8	7
Iron	ug/g	27182	8	7
Iron	ug/g	27194	730	700
Iron	ug/g	27194	750	700
Iron	ug/g	27198	840	780
Mercury	ug/g	27161	0.076	0.079
Mercury	ug/g	27168	2.1	2.1
Mercury	ug/g	27182	1.2	1.2
Mercury	ug/g	27182	1.3	1.3
Mercury	ug/g	27194	0.037	0.036
Mercury	ug/g	27198	0.035	0.034
Manganese	ug/g	27161	5.3	4.9
Manganese	ug/g	27168	0.2	0.3
Manganese	ug/g	27182	0.6	0.5
Manganese	ug/g	27194	106	103
Manganese	ug/g	27198	90	86
Molybdenum	ug/g	27161	0.2	0.2
Molybdenum	ug/g	27168	<0.1	<0.1
Molybdenum	ug/g	27182	<0.1	<0.1
Molybdenum	ug/g	27194	0.3	0.3
Molybdenum	ug/g	27198	0.3	0.3
Moisture	%	27156	77.93	78.70

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 16, 2018

This report was generated for samples included in SRC Group # 2018-8318

Duplicate Analysis	Units	Sample ID	First Result	Second Result	
Moisture	%	27166	78.76	78.52	
Moisture	%	27176	77.85	78.46	
Moisture	%	27186	76.66	77.25	
Nickel	ug/g	27161	<0.05	<0.05	
Nickel	ug/g	27168	<0.05	<0.05	
Nickel	ug/g	27182	<0.05	<0.05	
Nickel	ug/g	27194	3.0	4.7	*(1)
Nickel	ug/g	27198	3.3	1.6	*(2)
Nickel	ug/g	27198	1.8	3.1	*(3)
Lead	ug/g	27161	0.02	0.05	
Lead	ug/g	27168	0.03	0.02	
Lead	ug/g	27182	<0.01	0.02	
Lead	ug/g	27194	2.0	1.8	
Lead	ug/g	27198	1.3	1.3	
Antimony	ug/g	27161	<0.1	<0.1	
Antimony	ug/g	27168	<0.1	<0.1	
Antimony	ug/g	27182	<0.1	<0.1	
Antimony	ug/g	27194	<0.1	<0.1	
Antimony	ug/g	27198	<0.1	<0.1	
Selenium	ug/g	27161	9.2	9.5	
Selenium	ug/g	27168	1.6	1.6	
Selenium	ug/g	27182	2.9	2.8	
Selenium	ug/g	27194	2.2	2.3	
Selenium	ug/g	27198	2.4	2.3	
Tin	ug/g	27161	<0.05	<0.05	
Tin	ug/g	27168	<0.05	<0.05	
Tin	ug/g	27182	<0.05	<0.05	
Tin	ug/g	27194	0.37	0.33	
Tin	ug/g	27198	0.10	0.10	
Strontium	ug/g	27161	1.1	1.0	
Strontium	ug/g	27168	<0.1	0.6	
Strontium	ug/g	27182	0.3	0.1	
Strontium	ug/g	27194	32	32	
Strontium	ug/g	27198	37	36	
Titanium	ug/g	27161	0.08	0.14	
Titanium	ug/g	27168	<0.05	<0.05	
Titanium	ug/g	27182	<0.05	<0.05	
Titanium	ug/g	27194	14	12	
Titanium	ug/g	27198	12	12	
Thallium	ug/g	27161	<0.05	<0.05	
Thallium	ug/g	27168	<0.05	<0.05	
Thallium	ug/g	27182	<0.05	<0.05	
Thallium	ug/g	27194	<0.05	<0.05	
Thallium	ug/g	27198	<0.05	<0.05	
Uranium	ug/g	27161	<0.005	<0.005	
Uranium	ug/g	27168	<0.005	<0.005	

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 16, 2018

This report was generated for samples included in SRC Group # 2018-8318

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Uranium	ug/g	27182	<0.005	<0.005
Uranium	ug/g	27194	0.090	0.084
Uranium	ug/g	27198	0.082	0.082
Vanadium	ug/g	27161	<0.1	<0.1
Vanadium	ug/g	27168	<0.1	<0.1
Vanadium	ug/g	27182	<0.1	<0.1
Vanadium	ug/g	27194	1.7	1.5
Vanadium	ug/g	27198	1.5	1.4
Zinc	ug/g	27161	210	210
Zinc	ug/g	27168	16	17
Zinc	ug/g	27182	22	20
Zinc	ug/g	27194	78	75
Zinc	ug/g	27198	70	67

*(1) (2) (3) The duplicate results for Nickel were outside the laboratory's specified limits. The data was reviewed and all other quality control measures in the batch were within limits. Duplicate results acceptable for tissue samples.

Overall, there were no other indications of problems with the analysis and the results were considered acceptable.

Roxane Ortmann - Quality Assurance Supervisor

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Justin Wilson

Date Samples Received: Sep-05-2018 Client P.O.: VPO00555477 Ref# 18-07

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 2 authorized by Keith Gipman, Supervisor
Results from Lab Section 6 authorized by Marion McConnell, Supervisor

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Justin Wilson

Sample #: **2018034689**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_TN-1-ZOOT-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5700	600	50
Antimony	ug/g	0.8	0.4	0.2
Arsenic	ug/g	3.8	0.6	0.1
Barium	ug/g	78	8	0.1
Beryllium	ug/g	0.26	0.06	0.02
Boron	ug/g	8	4	2
Cadmium	ug/g	0.93	0.1	0.02
Chromium	ug/g	7	2	1
Cobalt	ug/g	2.3	0.2	0.02
Copper	ug/g	10	1	0.1
Iron	ug/g	4400	700	50
Lead	ug/g	50	5	0.2
Manganese	ug/g	220	20	0.2
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.5	0.3	0.2
Nickel	ug/g	6.0	0.9	0.1
Selenium	ug/g	2.7	0.4	0.1
Silver	ug/g	0.04	0.03	0.02
Strontium	ug/g	100	10	0.2
Thallium	ug/g	0.1	0.1	0.1
Tin	ug/g	1.6	0.4	0.1
Titanium	ug/g	91	9	0.1
Uranium	ug/g	0.42	0.06	0.01
Vanadium	ug/g	8.2	1	0.2
Zinc	ug/g	87	10	1
Lab Section 6				
Moisture	%	99.87	10	0.02

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034690**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_TN-2-ZOOT-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6700	700	50
Antimony	ug/g	1.1	0.4	0.2
Arsenic	ug/g	4.0	0.6	0.1
Barium	ug/g	93	9	0.1
Beryllium	ug/g	0.29	0.07	0.02
Boron	ug/g	9	4	2
Cadmium	ug/g	0.85	0.1	0.02
Chromium	ug/g	8	3	1
Cobalt	ug/g	2.5	0.2	0.02
Copper	ug/g	11	1	0.1
Iron	ug/g	5100	500	50
Lead	ug/g	16	2	0.02
Manganese	ug/g	240	20	0.2
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.6	0.3	0.2
Nickel	ug/g	6.2	0.9	0.1
Selenium	ug/g	2.7	0.4	0.1
Silver	ug/g	0.04	0.03	0.02
Strontium	ug/g	120	10	0.2
Thallium	ug/g	0.1	0.1	0.1
Tin	ug/g	2.8	0.4	0.1
Titanium	ug/g	107	10	0.1
Uranium	ug/g	0.50	0.08	0.01
Vanadium	ug/g	9.4	1	0.2
Zinc	ug/g	100	10	1
Lab Section 6				
Moisture	%	99.89	10	0.02

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034691**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_TN-3-ZOOT-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7400	700	50
Antimony	ug/g	0.4	0.3	0.2
Arsenic	ug/g	3.8	0.6	0.1
Barium	ug/g	85	8	0.1
Beryllium	ug/g	0.32	0.08	0.02
Boron	ug/g	8	4	2
Cadmium	ug/g	0.90	0.1	0.02
Chromium	ug/g	9	3	1
Cobalt	ug/g	2.8	0.3	0.02
Copper	ug/g	12	1	0.1
Iron	ug/g	6200	600	50
Lead	ug/g	27	3	0.2
Manganese	ug/g	270	30	0.2
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.5	0.3	0.2
Nickel	ug/g	7.3	1	0.1
Selenium	ug/g	2.6	0.4	0.1
Silver	ug/g	0.06	0.03	0.02
Strontium	ug/g	100	10	0.2
Thallium	ug/g	0.1	0.1	0.1
Tin	ug/g	0.7	0.2	0.1
Titanium	ug/g	117	10	0.1
Uranium	ug/g	0.43	0.06	0.01
Vanadium	ug/g	11	2	0.2
Zinc	ug/g	100	10	1
Lab Section 6				
Moisture	%	99.62	10	0.02

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034692**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_TN-4-ZOOT-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6500	600	50
Antimony	ug/g	0.5	0.3	0.2
Arsenic	ug/g	3.6	0.5	0.1
Barium	ug/g	94	9	0.1
Beryllium	ug/g	0.28	0.07	0.02
Boron	ug/g	8	4	2
Cadmium	ug/g	0.89	0.1	0.02
Chromium	ug/g	8	3	1
Cobalt	ug/g	2.4	0.2	0.02
Copper	ug/g	10	1	0.1
Iron	ug/g	5400	500	50
Lead	ug/g	12	1	0.02
Manganese	ug/g	250	20	0.2
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.6	0.3	0.2
Nickel	ug/g	5.9	0.9	0.1
Selenium	ug/g	2.5	0.4	0.1
Silver	ug/g	0.04	0.03	0.02
Strontium	ug/g	110	10	0.2
Thallium	ug/g	0.1	0.1	0.1
Tin	ug/g	2.3	0.3	0.1
Titanium	ug/g	102	10	0.1
Uranium	ug/g	0.53	0.08	0.01
Vanadium	ug/g	9.5	1	0.2
Zinc	ug/g	96	10	1
Lab Section 6				
Moisture	%	99.81	10	0.02

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034693**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_TN-5-ZOOT-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7000	700	50
Antimony	ug/g	0.4	0.3	0.2
Arsenic	ug/g	3.1	0.5	0.1
Barium	ug/g	93	9	0.1
Beryllium	ug/g	0.29	0.07	0.02
Boron	ug/g	9	4	2
Cadmium	ug/g	0.86	0.1	0.02
Chromium	ug/g	9	3	1
Cobalt	ug/g	2.5	0.2	0.02
Copper	ug/g	9.9	1	0.1
Iron	ug/g	5000	500	50
Lead	ug/g	14	1	0.02
Manganese	ug/g	240	20	0.2
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.6	0.3	0.2
Nickel	ug/g	6.2	0.9	0.1
Selenium	ug/g	2.1	0.3	0.1
Silver	ug/g	0.04	0.03	0.02
Strontium	ug/g	120	10	0.2
Thallium	ug/g	0.1	0.1	0.1
Tin	ug/g	1.4	0.4	0.1
Titanium	ug/g	110	10	0.1
Uranium	ug/g	0.51	0.08	0.01
Vanadium	ug/g	10	2	0.2
Zinc	ug/g	94	10	1
Lab Section 6				
Moisture	%	99.83	10	0.02

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034694**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_TN-1-ZOOT10-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2800	700	200
Antimony	ug/g	2	1	1
Arsenic	ug/g	3.8	1	0.5
Barium	ug/g	72	7	0.5
Beryllium	ug/g	0.1	0.1	0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.0	0.2	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.4	0.4	0.1
Copper	ug/g	13	2	0.5
Iron	ug/g	2500	600	200
Lead	ug/g	93	10	1
Manganese	ug/g	120	10	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	4.5	1	0.5
Selenium	ug/g	3.2	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	120	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	5.6	1	0.5
Titanium	ug/g	58	6	0.5
Uranium	ug/g	0.68	0.2	0.05
Vanadium	ug/g	4	2	1
Zinc	ug/g	120	20	5
Lab Section 6				
Moisture	%	99.88	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034695**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_TN-2-ZOOT10-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2200	600	200
Antimony	ug/g	1	1	1
Arsenic	ug/g	2.7	1	0.5
Barium	ug/g	96	10	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	0.8	0.3	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.1	0.3	0.1
Copper	ug/g	9.5	2	0.5
Iron	ug/g	1900	300	20
Lead	ug/g	20	2	0.1
Manganese	ug/g	95	10	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	7.6	2	0.5
Selenium	ug/g	2.6	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	170	20	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	1.8	0.9	0.5
Titanium	ug/g	37	6	0.5
Uranium	ug/g	0.76	0.2	0.05
Vanadium	ug/g	3	2	1
Zinc	ug/g	100	20	5
Lab Section 6				
Moisture	%	99.93	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034696**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_TN-3-ZOOT10-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3200	800	200
Antimony	ug/g	2	1	1
Arsenic	ug/g	3.6	1	0.5
Barium	ug/g	86	9	0.5
Beryllium	ug/g	0.1	0.1	0.1
Boron	ug/g	<10		10
Cadmium	ug/g	0.9	0.3	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.4	0.4	0.1
Copper	ug/g	10	2	0.5
Iron	ug/g	2900	300	20
Lead	ug/g	29	3	0.1
Manganese	ug/g	130	10	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	4.2	1	0.5
Selenium	ug/g	3.3	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	160	20	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	1.6	0.9	0.5
Titanium	ug/g	52	5	0.5
Uranium	ug/g	0.82	0.2	0.05
Vanadium	ug/g	5	2	1
Zinc	ug/g	100	20	5
Lab Section 6				
Moisture	%	99.92	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034697**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_TN-4-ZOOT10-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7400	1000	200
Antimony	ug/g	3	2	1
Arsenic	ug/g	4.4	1	0.5
Barium	ug/g	130	10	0.5
Beryllium	ug/g	0.3	0.2	0.1
Boron	ug/g	10	10	10
Cadmium	ug/g	0.9	0.3	0.1
Chromium	ug/g	10	7	5
Cobalt	ug/g	3.1	0.5	0.1
Copper	ug/g	14	2	0.5
Iron	ug/g	6400	1000	200
Lead	ug/g	52	5	0.1
Manganese	ug/g	220	20	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	1	1	1
Nickel	ug/g	8.2	2	0.5
Selenium	ug/g	3.3	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	210	20	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	2.2	1	0.5
Titanium	ug/g	130	10	0.5
Uranium	ug/g	1.2	0.2	0.05
Vanadium	ug/g	11	3	1
Zinc	ug/g	120	20	5
Lab Section 6				
Moisture	%	99.94	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034698**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_TN-5-ZOOT10-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7000	1000	200
Antimony	ug/g	2	1	1
Arsenic	ug/g	3.9	1	0.5
Barium	ug/g	120	10	0.5
Beryllium	ug/g	0.3	0.2	0.1
Boron	ug/g	10	10	10
Cadmium	ug/g	1.0	0.2	0.1
Chromium	ug/g	10	7	5
Cobalt	ug/g	3.1	0.5	0.1
Copper	ug/g	15	2	0.5
Iron	ug/g	6000	900	200
Lead	ug/g	40	4	0.1
Manganese	ug/g	270	30	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	1	1	1
Nickel	ug/g	8.0	2	0.5
Selenium	ug/g	2.8	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	220	20	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	1.4	0.8	0.5
Titanium	ug/g	120	10	0.5
Uranium	ug/g	1.0	0.2	0.05
Vanadium	ug/g	11	3	1
Zinc	ug/g	120	20	5
Lab Section 6				
Moisture	%	99.91	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034699**
Date Sampled: **Aug 30, 2018**
Sample Matrix: **TISSUE**
Description: **08/30/2018 RG_T4-1-ZOOT-20180830**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	1900	600	200
Antimony	ug/g	3	2	1
Arsenic	ug/g	4.4	1	0.5
Barium	ug/g	53	5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.8	0.4	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.1	0.3	0.1
Copper	ug/g	16	2	0.5
Iron	ug/g	1800	300	20
Lead	ug/g	8.2	1	0.1
Manganese	ug/g	94	10	1
Mercury	ug/g	0.05	0.05	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	3.3	1	0.5
Selenium	ug/g	3.8	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	91	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	3.3	1	0.5
Titanium	ug/g	38	6	0.5
Uranium	ug/g	0.45	0.1	0.05
Vanadium	ug/g	3	2	1
Zinc	ug/g	150	20	5
Lab Section 6				
Moisture	%	99.81	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034700**
Date Sampled: **Aug 30, 2018**
Sample Matrix: **TISSUE**
Description: **08/30/2018 RG_T4-2-ZOOT-20180830**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2600	600	200
Antimony	ug/g	2	1	1
Arsenic	ug/g	5.8	1	0.5
Barium	ug/g	65	6	0.5
Beryllium	ug/g	0.1	0.1	0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.8	0.4	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.2	0.3	0.1
Copper	ug/g	14	2	0.5
Iron	ug/g	1900	600	200
Lead	ug/g	6.4	1	0.1
Manganese	ug/g	120	10	1
Mercury	ug/g	0.05	0.05	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	3.8	1	0.5
Selenium	ug/g	4.9	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	110	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	3.8	1	0.5
Titanium	ug/g	47	7	0.5
Uranium	ug/g	0.48	0.1	0.05
Vanadium	ug/g	4	2	1
Zinc	ug/g	150	20	5
Lab Section 6				
Moisture	%	99.84	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034701**
Date Sampled: **Aug 30, 2018**
Sample Matrix: **TISSUE**
Description: **08/30/2018 RG_T4-3-ZOOT-20180830**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3000	400	50
Antimony	ug/g	1.0	0.4	0.2
Arsenic	ug/g	5.4	0.8	0.1
Barium	ug/g	65	6	0.1
Beryllium	ug/g	0.12	0.05	0.02
Boron	ug/g	5	3	2
Cadmium	ug/g	1.8	0.3	0.02
Chromium	ug/g	4	2	1
Cobalt	ug/g	2.0	0.2	0.02
Copper	ug/g	14	1	0.1
Iron	ug/g	2700	400	50
Lead	ug/g	8.6	0.9	0.02
Manganese	ug/g	160	20	0.2
Mercury	ug/g	0.05	0.02	0.01
Molybdenum	ug/g	0.8	0.4	0.2
Nickel	ug/g	5.1	0.8	0.1
Selenium	ug/g	4.7	0.7	0.1
Silver	ug/g	0.05	0.03	0.02
Strontium	ug/g	110	10	0.2
Thallium	ug/g	<0.1		0.1
Tin	ug/g	1.1	0.3	0.1
Titanium	ug/g	55	6	0.1
Uranium	ug/g	0.42	0.06	0.01
Vanadium	ug/g	4.2	0.6	0.2
Zinc	ug/g	140	10	1
Lab Section 6				
Moisture	%	99.80	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034702**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_T4-4-ZOOT-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3200	800	200
Antimony	ug/g	1	1	1
Arsenic	ug/g	5.5	1	0.5
Barium	ug/g	70	7	0.5
Beryllium	ug/g	0.1	0.1	0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.7	0.4	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.8	0.4	0.1
Copper	ug/g	17	2	0.5
Iron	ug/g	3200	800	200
Lead	ug/g	14	1	0.1
Manganese	ug/g	160	20	1
Mercury	ug/g	0.05	0.05	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	5.9	1	0.5
Selenium	ug/g	4.4	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	120	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	3.1	1	0.5
Titanium	ug/g	59	6	0.5
Uranium	ug/g	0.59	0.1	0.05
Vanadium	ug/g	5	2	1
Zinc	ug/g	130	20	5
Lab Section 6				
Moisture	%	99.87	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034703**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_T4-5-ZOOT-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3400	500	50
Antimony	ug/g	1.1	0.4	0.2
Arsenic	ug/g	4.7	0.7	0.1
Barium	ug/g	64	6	0.1
Beryllium	ug/g	0.13	0.05	0.02
Boron	ug/g	6	3	2
Cadmium	ug/g	1.9	0.3	0.02
Chromium	ug/g	5	2	1
Cobalt	ug/g	1.5	0.2	0.02
Copper	ug/g	20	2	0.1
Iron	ug/g	2600	400	50
Lead	ug/g	260	30	0.2
Manganese	ug/g	140	10	0.2
Mercury	ug/g	0.06	0.02	0.01
Molybdenum	ug/g	0.8	0.4	0.2
Nickel	ug/g	6.9	1	0.1
Selenium	ug/g	3.8	0.6	0.1
Silver	ug/g	0.06	0.03	0.02
Strontium	ug/g	94	9	0.2
Thallium	ug/g	0.2	0.1	0.1
Tin	ug/g	4.3	0.6	0.1
Titanium	ug/g	66	7	0.1
Uranium	ug/g	0.43	0.06	0.01
Vanadium	ug/g	5.3	0.8	0.2
Zinc	ug/g	130	10	1
Lab Section 6				
Moisture	%	99.79	10	0.02

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034704**
Date Sampled: **Aug 30, 2018**
Sample Matrix: **TISSUE**
Description: **08/30/2018 RG_T4-1-ZOOT10-20180830**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	1200	200	20
Antimony	ug/g	6	2	1
Arsenic	ug/g	4.4	1	0.5
Barium	ug/g	56	6	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.9	0.5	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.0	0.2	0.1
Copper	ug/g	17	2	0.5
Iron	ug/g	1200	200	20
Lead	ug/g	14	1	0.1
Manganese	ug/g	83	10	1
Mercury	ug/g	0.06	0.06	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	3.0	1	0.5
Selenium	ug/g	3.9	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	110	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	4.8	1	0.5
Titanium	ug/g	27	4	0.5
Uranium	ug/g	0.81	0.2	0.05
Vanadium	ug/g	2	1	1
Zinc	ug/g	150	20	5
Lab Section 6				
Moisture	%	99.86	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034705**
Date Sampled: **Aug 30, 2018**
Sample Matrix: **TISSUE**
Description: **08/30/2018 RG_T4-2-ZOOT10-20180830**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	1600	200	20
Antimony	ug/g	4	2	1
Arsenic	ug/g	6.4	2	0.5
Barium	ug/g	54	5	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	2.0	0.3	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.2	0.3	0.1
Copper	ug/g	17	2	0.5
Iron	ug/g	1600	200	20
Lead	ug/g	8.9	1	0.1
Manganese	ug/g	100	10	1
Mercury	ug/g	0.06	0.06	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	4.1	1	0.5
Selenium	ug/g	4.9	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	100	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	2.3	1	0.5
Titanium	ug/g	34	5	0.5
Uranium	ug/g	0.48	0.1	0.05
Vanadium	ug/g	2	1	1
Zinc	ug/g	160	20	5
Lab Section 6				
Moisture	%	99.78	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034706**
Date Sampled: **Aug 30, 2018**
Sample Matrix: **TISSUE**
Description: **08/30/2018 RG_T4-3-ZOOT10-20180830**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	1500	200	20
Antimony	ug/g	2	1	1
Arsenic	ug/g	4.9	1	0.5
Barium	ug/g	57	6	0.5
Beryllium	ug/g	<0.1		0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.6	0.4	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.0	0.2	0.1
Copper	ug/g	16	2	0.5
Iron	ug/g	1400	200	20
Lead	ug/g	330	30	1
Manganese	ug/g	83	10	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	3.3	1	0.5
Selenium	ug/g	4.7	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	110	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	1.1	0.7	0.5
Titanium	ug/g	34	5	0.5
Uranium	ug/g	0.68	0.2	0.05
Vanadium	ug/g	2	1	1
Zinc	ug/g	170	20	5
Lab Section 6				
Moisture	%	99.86	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034707**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_T4-4-ZOOT10-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2900	300	20
Antimony	ug/g	2	1	1
Arsenic	ug/g	3.4	1	0.5
Barium	ug/g	85	8	0.5
Beryllium	ug/g	0.1	0.1	0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.8	0.4	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.2	0.3	0.1
Copper	ug/g	15	2	0.5
Iron	ug/g	2200	200	20
Lead	ug/g	14	1	0.1
Manganese	ug/g	120	10	1
Mercury	ug/g	0.06	0.06	0.05
Molybdenum	ug/g	1	1	1
Nickel	ug/g	4.7	1	0.5
Selenium	ug/g	3.2	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	140	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	2.5	1	0.5
Titanium	ug/g	46	7	0.5
Uranium	ug/g	0.94	0.2	0.05
Vanadium	ug/g	4	2	1
Zinc	ug/g	130	20	5
Lab Section 6				
Moisture	%	99.93	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034708**
Date Sampled: **Aug 31, 2018**
Sample Matrix: **TISSUE**
Description: **08/31/2018 RG_T4-5-ZOOT10-20180831**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2800	300	20
Antimony	ug/g	3	2	1
Arsenic	ug/g	5.1	1	0.5
Barium	ug/g	78	8	0.5
Beryllium	ug/g	0.1	0.1	0.1
Boron	ug/g	<10		10
Cadmium	ug/g	1.6	0.4	0.1
Chromium	ug/g	<5		5
Cobalt	ug/g	1.6	0.4	0.1
Copper	ug/g	17	2	0.5
Iron	ug/g	3000	300	20
Lead	ug/g	140	10	1
Manganese	ug/g	130	10	1
Mercury	ug/g	<0.05		0.05
Molybdenum	ug/g	1	1	1
Nickel	ug/g	4.5	1	0.5
Selenium	ug/g	4.2	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	140	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	3.2	1	0.5
Titanium	ug/g	69	7	0.5
Uranium	ug/g	0.81	0.2	0.05
Vanadium	ug/g	4	2	1
Zinc	ug/g	140	20	5
Lab Section 6				
Moisture	%	99.91	10	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034709**
Date Sampled: **Aug 28, 2018**
Sample Matrix: **TISSUE**
Description: **08/28/2018 RG_T4-BIT-20180828**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	Not Reported		0.5
Antimony	ug/g	Not Reported		0.02
Arsenic	ug/g	Not Reported		0.01
Barium	ug/g	Not Reported		0.01
Beryllium	ug/g	Not Reported		0.002
Boron	ug/g	Not Reported		0.2
Cadmium	ug/g	Not Reported		0.002
Chromium	ug/g	Not Reported		0.1
Cobalt	ug/g	Not Reported		0.002
Copper	ug/g	Not Reported		0.01
Iron	ug/g	Not Reported		0.5
Lead	ug/g	Not Reported		0.002
Manganese	ug/g	Not Reported		0.02
Mercury	ug/g	Not Reported		0.001
Molybdenum	ug/g	Not Reported		0.02
Nickel	ug/g	Not Reported		0.01
Selenium	ug/g	Not Reported		0.01
Silver	ug/g	Not Reported		0.002
Strontium	ug/g	Not Reported		0.02
Thallium	ug/g	Not Reported		0.01
Tin	ug/g	Not Reported		0.01
Titanium	ug/g	Not Reported		0.01
Uranium	ug/g	Not Reported		0.001
Vanadium	ug/g	Not Reported		0.02
Zinc	ug/g	Not Reported		0.1
Lab Section 6				
Moisture	%	79.80	8	0.02

Sample was inadvertently ruined in the analytical testing process.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034710**
Date Sampled: **Aug 29, 2018**
Sample Matrix: **TISSUE**
Description: **08/29/2018 RG_TN-BIT-20180829**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5600	800	200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	47	5	5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	1	1	1
Chromium	ug/g	<50		50
Cobalt	ug/g	7	1	1
Copper	ug/g	22	10	5
Iron	ug/g	8800	1000	200
Lead	ug/g	11	3	1
Manganese	ug/g	170	40	10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	10	5	5
Selenium	ug/g	4.7	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	80	30	10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	140	20	5
Uranium	ug/g	0.7	0.6	0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	100	70	50
Lab Section 6				
Moisture	%	88.07	9	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034711**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-RT-01M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.2	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	75.06	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034712**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_GC-KO-01M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.5	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	67.42	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034713**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-KO-02M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.5	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	71.93	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034714**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-KO-03M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.6	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	72.67	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034715**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-KO-04M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.4	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	69.87	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034716**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-KO-05M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.7	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	70.43	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034717**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-KO-06M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.8	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	70.82	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034718**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-KO-07M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.2	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	69.85	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034719**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-KO-08M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.6	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	70.57	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034720**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-NSC-01M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	1.8	0.9	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.6	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	75.32	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034721**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-NSC-02M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	1.6	0.9	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.2	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	71.30	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034722**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-NSC-03M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	1.1	0.7	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	2.5	1	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	77.42	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018034723**
Date Sampled: **Sep 01, 2018**
Sample Matrix: **TISSUE**
Description: **09/01/2018 RG_ER-NSC-04M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	0.8	0.6	0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.4	0.8	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	76.65	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2018-10946

Aug 28, 2019

Minnow Environmental Inc.

Sample #: **2018035061**
Date Sampled:
Sample Matrix: **TISSUE**
Description: **RG_ER-KO-01M-20180901**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Sep 05, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<200		200
Antimony	ug/g	<10		10
Arsenic	ug/g	<5		5
Barium	ug/g	<5		5
Beryllium	ug/g	<1		1
Boron	ug/g	<100		100
Cadmium	ug/g	<1		1
Chromium	ug/g	<50		50
Cobalt	ug/g	<1		1
Copper	ug/g	<5		5
Iron	ug/g	<200		200
Lead	ug/g	<1		1
Manganese	ug/g	<10		10
Mercury	ug/g	<0.5		0.5
Molybdenum	ug/g	<10		10
Nickel	ug/g	<5		5
Selenium	ug/g	1.6	0.9	0.5
Silver	ug/g	<1		1
Strontium	ug/g	<10		10
Thallium	ug/g	<5		5
Tin	ug/g	<5		5
Titanium	ug/g	<5		5
Uranium	ug/g	<0.5		0.5
Vanadium	ug/g	<10		10
Zinc	ug/g	<50		50
Lab Section 6				
Moisture	%	70.63	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

Sep 20, 2018

This report was generated for samples included in SRC Group # 2018-10946

Quality Control Report

Justin Wilson
Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Aluminum	ug/g	1280	1150
Aluminum	ug/g	1280	1430
Arsenic	ug/g	6.87	7.32
Cadmium	ug/g	0.299	0.304
Chromium	ug/g	1.57	1.57
Copper	ug/g	13.8	13.8
Iron	ug/g	312	321
Iron	ug/g	312	322
Lead	ug/g	0.404	0.408
Lead	ug/g	0.404	0.424
Manganese	ug/g	2.70	3.05
Mercury	ug/g	0.364	0.373
Nickel	ug/g	1.20	1.20
Selenium	ug/g	3.74	4.05
Silver	ug/g	0.0215	0.0209
Zinc	ug/g	47.8	49.8

Please note, duplicates could not be analyzed due to insufficient sample available.

All quality control results were within the specified limits and considered acceptable.

Roxane Ortmann - Quality Assurance Supervisor

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-13833

Aug 30, 2019

Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Justin Wilson

Date Samples Received: Nov-02-2018 Client P.O.: VPO00555477 Ref# 18-07

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 2 authorized by Keith Gipman, Supervisor
Results from Lab Section 6 authorized by Marion McConnell, Supervisor

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2018-13833

Aug 30, 2019

Minnow Environmental Inc.

2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Justin Wilson

Sample #: **2018045644**
Date Sampled: **Oct 10, 2018**
Sample Matrix: **TISSUE**
Description: **10/10/2018 RG_T4-BIT_20181009-1555**

Client PO #: **VPO00555477 Ref# 18-07**
Date Received: **Nov 02, 2018**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	12100	2000	200
Antimony	ug/g	<1		1
Arsenic	ug/g	9.3	2	0.5
Barium	ug/g	110	10	0.5
Beryllium	ug/g	0.4	0.2	0.1
Boron	ug/g	10	10	10
Cadmium	ug/g	1.1	0.3	0.1
Chromium	ug/g	16	9	5
Cobalt	ug/g	5.4	0.8	0.1
Copper	ug/g	22	3	0.5
Iron	ug/g	16300	2000	200
Lead	ug/g	11	1	0.1
Manganese	ug/g	310	30	1
Mercury	ug/g	0.06	0.06	0.05
Molybdenum	ug/g	<1		1
Nickel	ug/g	13	2	0.5
Selenium	ug/g	4.7	1	0.5
Silver	ug/g	<0.1		0.1
Strontium	ug/g	130	10	1
Thallium	ug/g	<0.5		0.5
Tin	ug/g	<0.5		0.5
Titanium	ug/g	170	20	0.5
Uranium	ug/g	0.56	0.1	0.05
Vanadium	ug/g	19	5	1
Zinc	ug/g	94	20	5
Lab Section 6				
Moisture	%	86.26	9	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

Nov 19, 2018

This report was generated for samples included in SRC Group # 2018-13833

Quality Control Report

Justin Wilson
Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Aluminum	ug/g	1280	1390
Arsenic	ug/g	6.87	7.67
Cadmium	ug/g	0.299	0.303
Chromium	ug/g	1.57	1.57
Copper	ug/g	13.8	14.4
Iron	ug/g	312	331
Lead	ug/g	0.404	0.419
Manganese	ug/g	2.70	2.48
Mercury	ug/g	0.364	0.364
Nickel	ug/g	1.20	1.17
Selenium	ug/g	3.74	4.03
Silver	ug/g	0.0215	0.0183
Zinc	ug/g	47.8	47.5

Please note, duplicates could not be analyzed due to insufficient sample available.

All quality control results were within the specified limits and considered acceptable.

Roxane Ortmann - Quality Assurance Supervisor

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Heidi Currier

Date Samples Received: May-02-2019 Client P.O.: VPO00616225 Ref# 19-08

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 2 authorized by Keith Gipman, Supervisor
Results from Lab Section 6 authorized by Marion McConnell, Supervisor

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Heidi Currier

Sample #: **2019021456**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-01-M_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	12	7	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.13	0.03	0.01
Barium	ug/g	0.92	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	0.08	0.06	0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.96	0.2	0.05
Iron	ug/g	18	6	2
Lead	ug/g	0.19	0.05	0.01
Manganese	ug/g	1.2	0.3	0.1
Mercury	ug/g	0.50	0.05	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	0.12	0.05	0.05
Selenium	ug/g	1.2	0.1	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	5.0	0.5	0.05
Thallium	ug/g	0.021	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.5	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	22	3	0.5
Lab Section 6				
Moisture	%	77.68	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021457**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-01-O_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.48	0.07	0.01
Barium	ug/g	0.76	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	3.0	0.4	0.05
Iron	ug/g	45	7	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	3.6	0.5	0.1
Mercury	ug/g	0.016	0.009	0.005
Molybdenum	ug/g	0.09	0.04	0.02
Nickel	ug/g	0.12	0.05	0.05
Selenium	ug/g	5.4	0.5	0.01
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.26	0.1	0.05
Thallium	ug/g	0.006	0.006	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	100	10	0.5
Lab Section 6				
Moisture	%	60.37	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021458**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-02-M_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.11	0.03	0.01
Barium	ug/g	0.58	0.09	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	0.95	0.2	0.05
Iron	ug/g	10	4	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	0.8	0.3	0.1
Mercury	ug/g	0.35	0.05	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.1	0.2	0.01
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	2.3	0.3	0.05
Thallium	ug/g	0.012	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	20	3	0.5
Lab Section 6				
Moisture	%	77.55	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021459**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-02-O_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.29	0.04	0.01
Barium	ug/g	0.49	0.07	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	2.9	0.4	0.05
Iron	ug/g	52	8	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	4.7	0.7	0.1
Mercury	ug/g	0.014	0.008	0.005
Molybdenum	ug/g	0.08	0.04	0.02
Nickel	ug/g	0.20	0.05	0.05
Selenium	ug/g	7.4	0.7	0.01
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.24	0.1	0.05
Thallium	ug/g	0.008	0.006	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.3	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	86	9	0.5
Lab Section 6				
Moisture	%	62.36	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021460**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-03-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.10	0.02	0.01
Barium	ug/g	0.74	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.94	0.2	0.05
Iron	ug/g	8	4	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.52	0.05	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.9	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	4.1	0.6	0.05
Thallium	ug/g	0.016	0.009	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	19	3	0.5
Lab Section 6				
Moisture	%	78.28	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021461**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-03-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.46	0.07	0.01
Barium	ug/g	0.72	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	2.6	0.4	0.05
Iron	ug/g	50	8	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	5.2	0.8	0.1
Mercury	ug/g	0.021	0.01	0.005
Molybdenum	ug/g	0.08	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	6.1	0.6	0.01
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.22	0.1	0.05
Thallium	ug/g	0.010	0.007	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	88	9	0.5
Lab Section 6				
Moisture	%	60.42	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021462**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-04-M_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.15	0.04	0.01
Barium	ug/g	0.64	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	1.0	0.2	0.05
Iron	ug/g	10	4	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.53	0.05	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.8	0.3	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	2.0	0.3	0.05
Thallium	ug/g	0.013	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	20	3	0.5
Lab Section 6				
Moisture	%	77.48	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021463**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-04-O_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.22	0.03	0.01
Barium	ug/g	0.83	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	2.9	0.4	0.05
Iron	ug/g	53	8	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	4.8	0.7	0.1
Mercury	ug/g	0.021	0.01	0.005
Molybdenum	ug/g	0.08	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	11.2	1	0.01
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.20	0.1	0.05
Thallium	ug/g	0.008	0.006	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	100	10	0.5
Lab Section 6				
Moisture	%	62.24	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021464**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-05-M_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	18	9	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.22	0.03	0.01
Barium	ug/g	1.9	0.3	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	0.06	0.06	0.05
Cobalt	ug/g	0.03	0.01	0.01
Copper	ug/g	2.0	0.3	0.05
Iron	ug/g	35	9	2
Lead	ug/g	0.11	0.03	0.01
Manganese	ug/g	1.5	0.4	0.1
Mercury	ug/g	0.51	0.05	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	0.09	0.05	0.05
Selenium	ug/g	2.2	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	4.3	0.6	0.05
Thallium	ug/g	0.017	0.009	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.6	0.3	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	41	6	0.5
Lab Section 6				
Moisture	%	75.70	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021465**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-05-O_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	9	6	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.28	0.04	0.01
Barium	ug/g	0.68	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	3.3	0.5	0.05
Iron	ug/g	63	9	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	5.6	0.8	0.1
Mercury	ug/g	0.018	0.009	0.005
Molybdenum	ug/g	0.10	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	8.3	0.8	0.01
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.29	0.1	0.05
Thallium	ug/g	0.010	0.007	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.3	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	100	10	0.5
Lab Section 6				
Moisture	%	63.70	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021466**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-06-M_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	12	7	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.14	0.04	0.01
Barium	ug/g	1.2	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	0.05	0.05	0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.90	0.2	0.05
Iron	ug/g	15	5	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	1.4	0.4	0.1
Mercury	ug/g	0.20	0.03	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	3.3	0.3	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.8	0.6	0.05
Thallium	ug/g	0.008	0.006	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.2	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	18	3	0.5
Lab Section 6				
Moisture	%	77.41	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021467**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-06-O_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.17	0.04	0.01
Barium	ug/g	1.0	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	2.8	0.4	0.05
Iron	ug/g	48	7	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	3.5	0.5	0.1
Mercury	ug/g	0.007	0.006	0.005
Molybdenum	ug/g	0.07	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	9.5	1	0.01
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.18	0.09	0.05
Thallium	ug/g	0.006	0.006	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	86	9	0.5
Lab Section 6				
Moisture	%	61.17	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021468**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_PCC-07-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.25	0.04	0.01
Barium	ug/g	1.1	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	1.0	0.2	0.05
Iron	ug/g	10	4	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	1.0	0.2	0.1
Mercury	ug/g	0.48	0.07	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.0	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.3	0.5	0.05
Thallium	ug/g	0.014	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	32	5	0.5
Lab Section 6				
Moisture	%	78.32	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021469**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_PCC-07-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.40	0.06	0.01
Barium	ug/g	1.0	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	2.6	0.4	0.05
Iron	ug/g	47	7	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	3.1	0.5	0.1
Mercury	ug/g	0.025	0.01	0.005
Molybdenum	ug/g	0.08	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	6.5	0.6	0.01
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.37	0.1	0.05
Thallium	ug/g	0.010	0.007	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	100	10	0.5
Lab Section 6				
Moisture	%	63.22	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021470**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_PCC-08-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	5	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.17	0.04	0.01
Barium	ug/g	0.62	0.09	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.92	0.2	0.05
Iron	ug/g	20	5	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	1.4	0.4	0.1
Mercury	ug/g	0.51	0.05	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.6	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	4.6	0.7	0.05
Thallium	ug/g	0.014	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	22	3	0.5
Lab Section 6				
Moisture	%	77.28	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021471**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_PCC-08-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.38	0.06	0.01
Barium	ug/g	0.42	0.06	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	2.7	0.4	0.05
Iron	ug/g	41	6	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	4.3	0.6	0.1
Mercury	ug/g	0.019	0.01	0.005
Molybdenum	ug/g	0.07	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	6.0	0.6	0.01
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.21	0.1	0.05
Thallium	ug/g	0.007	0.006	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	86	9	0.5
Lab Section 6				
Moisture	%	60.16	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021472**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_PCC-09-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.20	0.03	0.01
Barium	ug/g	0.72	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.7	0.2	0.05
Iron	ug/g	16	5	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.7	0.2	0.1
Mercury	ug/g	0.43	0.06	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.0	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	2.6	0.4	0.05
Thallium	ug/g	0.018	0.009	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	36	5	0.5
Lab Section 6				
Moisture	%	76.64	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021473**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_PCC-09-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7	5	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.33	0.05	0.01
Barium	ug/g	0.89	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	2.1	0.3	0.05
Iron	ug/g	57	8	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	7.0	1	0.1
Mercury	ug/g	0.024	0.01	0.005
Molybdenum	ug/g	0.12	0.05	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	6.4	0.6	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.34	0.1	0.05
Thallium	ug/g	0.014	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	65.35	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021474**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_PCC-10-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.10	0.02	0.01
Barium	ug/g	0.78	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	0.87	0.2	0.05
Iron	ug/g	15	5	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	1.0	0.2	0.1
Mercury	ug/g	0.38	0.06	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.8	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	4.0	0.6	0.05
Thallium	ug/g	0.016	0.009	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	23	3	0.5
Lab Section 6				
Moisture	%	77.90	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021475**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_PCC-10-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.38	0.06	0.01
Barium	ug/g	0.69	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	2.6	0.4	0.05
Iron	ug/g	54	8	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	4.5	0.7	0.1
Mercury	ug/g	0.017	0.009	0.005
Molybdenum	ug/g	0.11	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	8.3	0.8	0.01
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.29	0.1	0.05
Thallium	ug/g	0.012	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	88	9	0.5
Lab Section 6				
Moisture	%	63.20	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021476**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_RSC-01-O_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	51	10	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.73	0.2	0.05
Barium	ug/g	2.4	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.06	0.02	0.02
Chromium	ug/g	0.5	0.5	0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	7.5	2	0.5
Iron	ug/g	180	30	5
Lead	ug/g	0.10	0.07	0.05
Manganese	ug/g	9.3	2	0.5
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.18	0.09	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	11	1	0.05
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	0.9	0.3	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	3.1	1	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	0.2	0.2	0.2
Zinc	ug/g	280	40	5
Lab Section 6				
Moisture	%	71.40	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021477**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_RSC-01-M_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.11	0.05	0.05
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	1.2	0.8	0.5
Iron	ug/g	10	7	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.5	0.8	0.5
Mercury	ug/g	0.28	0.04	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.3	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	1.5	0.4	0.1
Thallium	ug/g	0.01	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	38	10	5
Lab Section 6				
Moisture	%	76.45	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021478**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_RSC-02-O_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	17	10	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.26	0.05	0.05
Barium	ug/g	1.6	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.04	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	7.3	2	0.5
Iron	ug/g	120	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	8.7	2	0.5
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.21	0.1	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	18	2	0.05
Silver	ug/g	0.04	0.03	0.02
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	0.01	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	280	40	5
Lab Section 6				
Moisture	%	76.96	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021479**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_RSC-02-M_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	5	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.15	0.05	0.05
Barium	ug/g	0.6	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	1.2	0.8	0.5
Iron	ug/g	13	8	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.2	0.8	0.5
Mercury	ug/g	0.38	0.06	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.6	0.2	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	1.2	0.3	0.1
Thallium	ug/g	<0.01		0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	21	10	5
Lab Section 6				
Moisture	%	76.16	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021480**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_RSC-03-O_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	17	10	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.57	0.1	0.05
Barium	ug/g	1.6	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.08	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	6.1	2	0.5
Iron	ug/g	110	20	5
Lead	ug/g	0.05	0.05	0.05
Manganese	ug/g	6.1	2	0.5
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.10	0.07	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	22	2	0.05
Silver	ug/g	0.03	0.02	0.02
Strontium	ug/g	1.0	0.2	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	1.2	0.6	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	260	40	5
Lab Section 6				
Moisture	%	71.00	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021481**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_RSC-03-M_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	37	20	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.22	0.05	0.05
Barium	ug/g	2.5	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.02	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	3.2	1	0.5
Iron	ug/g	73	20	5
Lead	ug/g	0.22	0.1	0.05
Manganese	ug/g	3.0	1	0.5
Mercury	ug/g	0.27	0.04	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.6	0.4	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	3.3	0.5	0.1
Thallium	ug/g	<0.01		0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	1.1	0.6	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	88	20	5
Lab Section 6				
Moisture	%	72.56	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021482**
Date Sampled: **Apr 23, 2019**
Sample Matrix: **TISSUE**
Description: **04/23/2019 RG_ER_RSC-04-O_20190423**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	13	10	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.32	0.05	0.05
Barium	ug/g	1.3	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.03	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	6.1	2	0.5
Iron	ug/g	140	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	6.6	2	0.5
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.16	0.09	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	8.6	0.9	0.05
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	0.9	0.3	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	230	30	5
Lab Section 6				
Moisture	%	75.40	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021483**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-04-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.12	0.05	0.05
Barium	ug/g	0.6	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	1.1	0.7	0.5
Iron	ug/g	11	7	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.3	0.8	0.5
Mercury	ug/g	0.28	0.04	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.5	0.2	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	2.8	0.4	0.1
Thallium	ug/g	<0.01		0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	25	10	5
Lab Section 6				
Moisture	%	76.26	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021484**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-05-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	21	10	5
Antimony	ug/g	0.06	0.03	0.02
Arsenic	ug/g	0.42	0.05	0.05
Barium	ug/g	1.3	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	5.2	1	0.5
Iron	ug/g	150	20	5
Lead	ug/g	0.10	0.07	0.05
Manganese	ug/g	8.2	2	0.5
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.19	0.1	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	11	1	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.8	0.3	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	3.8	1	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	220	30	5
Lab Section 6				
Moisture	%	74.83	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021485**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-05-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	18	10	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.18	0.05	0.05
Barium	ug/g	2.0	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	2.8	1	0.5
Iron	ug/g	54	10	5
Lead	ug/g	0.09	0.07	0.05
Manganese	ug/g	2.1	1	0.5
Mercury	ug/g	0.33	0.05	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.3	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	3.2	0.5	0.1
Thallium	ug/g	0.01	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	0.7	0.5	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	62	20	5
Lab Section 6				
Moisture	%	76.05	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021486**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-06-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	16	10	5
Antimony	ug/g	0.03	0.02	0.02
Arsenic	ug/g	0.21	0.05	0.02
Barium	ug/g	1.7	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	0.03	0.02	0.02
Chromium	ug/g	0.1	0.1	0.1
Cobalt	ug/g	0.14	0.02	0.02
Copper	ug/g	4.6	0.7	0.1
Iron	ug/g	130	20	5
Lead	ug/g	0.04	0.03	0.02
Manganese	ug/g	8.5	1	0.2
Mercury	ug/g	0.02	0.01	0.01
Molybdenum	ug/g	0.15	0.08	0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	15	2	0.02
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	0.7	0.2	0.1
Thallium	ug/g	0.03	0.02	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	260	30	1
Lab Section 6				
Moisture	%	74.70	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021487**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-06-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7	6	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.18	0.05	0.05
Barium	ug/g	0.5	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	1.0	0.7	0.5
Iron	ug/g	18	9	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.6	0.9	0.5
Mercury	ug/g	0.32	0.05	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.3	0.3	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	2.1	0.3	0.1
Thallium	ug/g	<0.01		0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	40	10	5
Lab Section 6				
Moisture	%	76.91	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021488**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-07-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	7	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.30	0.05	0.05
Barium	ug/g	1.2	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	5.3	1	0.5
Iron	ug/g	110	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	14	2	0.5
Mercury	ug/g	0.02	0.01	0.01
Molybdenum	ug/g	0.20	0.1	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	11	1	0.05
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	240	40	5
Lab Section 6				
Moisture	%	75.41	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021489**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-07-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.09	0.05	0.05
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	0.9	0.7	0.5
Iron	ug/g	12	8	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.3	0.8	0.5
Mercury	ug/g	0.24	0.04	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.3	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	1.6	0.4	0.1
Thallium	ug/g	<0.01		0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	18	9	5
Lab Section 6				
Moisture	%	76.75	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021490**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-08-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	7	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.29	0.05	0.05
Barium	ug/g	1.4	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.02	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	5.9	1	0.5
Iron	ug/g	110	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	15	2	0.5
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.16	0.09	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	18	2	0.05
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	0.01	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	240	40	5
Lab Section 6				
Moisture	%	75.35	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021491**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-08-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	32	20	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.14	0.05	0.05
Barium	ug/g	1.3	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	2.7	1	0.5
Iron	ug/g	62	20	5
Lead	ug/g	0.10	0.07	0.05
Manganese	ug/g	2.3	1	0.5
Mercury	ug/g	0.29	0.04	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.8	0.3	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	2.7	0.4	0.1
Thallium	ug/g	<0.01		0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	1.4	0.6	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	54	10	5
Lab Section 6				
Moisture	%	76.62	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021492**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-09-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.24	0.06	0.02
Barium	ug/g	3.4	0.5	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	0.05	0.02	0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.09	0.02	0.02
Copper	ug/g	6.2	0.9	0.1
Iron	ug/g	130	20	5
Lead	ug/g	0.02	0.02	0.02
Manganese	ug/g	7.8	1	0.2
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.15	0.08	0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	9.4	0.9	0.02
Silver	ug/g	0.04	0.03	0.02
Strontium	ug/g	1.0	0.2	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	220	20	1
Lab Section 6				
Moisture	%	74.91	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021493**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-09-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.07	0.05	0.05
Barium	ug/g	1.4	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	1.6	0.9	0.5
Iron	ug/g	22	10	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.6	0.9	0.5
Mercury	ug/g	0.38	0.06	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.6	0.2	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	5.3	0.8	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	55	10	5
Lab Section 6				
Moisture	%	77.77	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021494**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-10-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	35	20	5
Antimony	ug/g	0.02	0.02	0.02
Arsenic	ug/g	0.30	0.05	0.05
Barium	ug/g	1.9	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.08	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	6.0	2	0.5
Iron	ug/g	140	20	5
Lead	ug/g	0.07	0.06	0.05
Manganese	ug/g	8.6	2	0.5
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.14	0.08	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	13	1	0.05
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	0.8	0.3	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	5.4	1	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	270	40	5
Lab Section 6				
Moisture	%	75.83	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021495**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER_RSC-10-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	<0.02		0.02
Barium	ug/g	<0.05		0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	0.3	0.2	0.1
Cobalt	ug/g	0.14	0.02	0.02
Copper	ug/g	<0.1		0.1
Iron	ug/g	<5		5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	<0.2		0.2
Mercury	ug/g	<0.01		0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	0.02	0.02	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	<0.1		0.1
Thallium	ug/g	<0.01		0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	<1		1
Lab Section 6				
Moisture	%	78.04	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021496**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-01-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	160	20	2
Antimony	ug/g	0.02	0.01	0.01
Arsenic	ug/g	0.31	0.05	0.01
Barium	ug/g	4.3	0.4	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.10	0.02	0.01
Chromium	ug/g	0.20	0.1	0.05
Cobalt	ug/g	0.11	0.03	0.01
Copper	ug/g	4.4	0.7	0.05
Iron	ug/g	180	30	2
Lead	ug/g	0.18	0.04	0.01
Manganese	ug/g	9.1	1	0.1
Mercury	ug/g	0.025	0.01	0.005
Molybdenum	ug/g	0.10	0.04	0.02
Nickel	ug/g	0.19	0.05	0.05
Selenium	ug/g	10	1	0.1
Silver	ug/g	0.04	0.02	0.01
Strontium	ug/g	1.6	0.2	0.05
Thallium	ug/g	0.016	0.009	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	2.7	0.7	0.2
Uranium	ug/g	0.009	0.007	0.005
Vanadium	ug/g	0.2	0.1	0.1
Zinc	ug/g	110	10	0.5
Lab Section 6				
Moisture	%	64.64	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021497**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-01-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.22	0.03	0.01
Barium	ug/g	0.97	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.0	0.2	0.05
Iron	ug/g	10	4	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	1.0	0.2	0.1
Mercury	ug/g	0.55	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.2	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	2.9	0.4	0.05
Thallium	ug/g	0.014	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	23	3	0.5
Lab Section 6				
Moisture	%	78.49	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021498**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-02-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	5	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.43	0.06	0.01
Barium	ug/g	1.5	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	0.06	0.06	0.05
Cobalt	ug/g	0.08	0.01	0.01
Copper	ug/g	2.9	0.4	0.05
Iron	ug/g	75	10	2
Lead	ug/g	0.08	0.03	0.01
Manganese	ug/g	11	1	0.1
Mercury	ug/g	0.035	0.01	0.005
Molybdenum	ug/g	0.20	0.05	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	21	2	0.1
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.52	0.1	0.05
Thallium	ug/g	0.021	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.3	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	110	10	0.5
Lab Section 6				
Moisture	%	69.50	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021499**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-02-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.07	0.01	0.01
Barium	ug/g	0.78	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	0.08	0.06	0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.1	0.2	0.05
Iron	ug/g	19	6	2
Lead	ug/g	0.06	0.02	0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.31	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.3	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.2	0.5	0.05
Thallium	ug/g	0.018	0.009	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.2	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	19	3	0.5
Lab Section 6				
Moisture	%	77.76	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021500**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-03-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	140	20	2
Antimony	ug/g	0.01	0.01	0.01
Arsenic	ug/g	0.30	0.04	0.01
Barium	ug/g	2.6	0.3	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	0.17	0.09	0.05
Cobalt	ug/g	0.11	0.03	0.01
Copper	ug/g	3.7	0.6	0.05
Iron	ug/g	140	20	2
Lead	ug/g	0.12	0.03	0.01
Manganese	ug/g	9.5	1	0.1
Mercury	ug/g	0.012	0.008	0.005
Molybdenum	ug/g	0.09	0.04	0.02
Nickel	ug/g	0.14	0.05	0.05
Selenium	ug/g	7.3	0.7	0.01
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	1.4	0.2	0.05
Thallium	ug/g	0.005	0.005	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	2.3	0.6	0.2
Uranium	ug/g	0.006	0.006	0.005
Vanadium	ug/g	0.2	0.1	0.1
Zinc	ug/g	99	10	0.5
Lab Section 6				
Moisture	%	62.71	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

This sample was reanalyzed for Lab Section 2 (ICP). Reanalysis confirms original results are within the expected measurement uncertainty.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021501**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-03-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	24	6	2
Antimony	ug/g	0.02	0.01	0.01
Arsenic	ug/g	0.17	0.04	0.01
Barium	ug/g	1.3	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	0.06	0.06	0.05
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	2.1	0.3	0.05
Iron	ug/g	33	8	2
Lead	ug/g	0.07	0.02	0.01
Manganese	ug/g	2.2	0.3	0.1
Mercury	ug/g	0.27	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	0.10	0.05	0.05
Selenium	ug/g	1.8	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	4.0	0.6	0.05
Thallium	ug/g	0.011	0.007	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.5	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	41	6	0.5
Lab Section 6				
Moisture	%	78.06	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021502**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-04-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.20	0.03	0.01
Barium	ug/g	0.92	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.03	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	3.1	0.5	0.05
Iron	ug/g	35	9	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	4.2	0.6	0.1
Mercury	ug/g	0.014	0.008	0.005
Molybdenum	ug/g	0.10	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	12	1	0.1
Silver	ug/g	0.03	0.02	0.01
Strontium	ug/g	0.27	0.1	0.05
Thallium	ug/g	0.008	0.006	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	90	9	0.5
Lab Section 6				
Moisture	%	62.43	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021503**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-04-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.12	0.03	0.01
Barium	ug/g	0.60	0.09	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	0.87	0.2	0.05
Iron	ug/g	7	4	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	1.0	0.2	0.1
Mercury	ug/g	0.34	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	3.0	0.3	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	2.3	0.3	0.05
Thallium	ug/g	0.010	0.007	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	23	3	0.5
Lab Section 6				
Moisture	%	77.79	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021504**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-05-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.25	0.04	0.01
Barium	ug/g	0.78	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	2.9	0.4	0.05
Iron	ug/g	36	9	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	5.0	0.8	0.1
Mercury	ug/g	0.013	0.008	0.005
Molybdenum	ug/g	0.08	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	12	1	0.1
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.27	0.1	0.05
Thallium	ug/g	0.014	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	81	8	0.5
Lab Section 6				
Moisture	%	60.82	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021505**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-05-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	5	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.10	0.02	0.01
Barium	ug/g	0.82	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	0.09	0.07	0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.97	0.2	0.05
Iron	ug/g	14	5	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	1.4	0.4	0.1
Mercury	ug/g	0.50	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	0.05	0.05	0.05
Selenium	ug/g	1.8	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	4.5	0.7	0.05
Thallium	ug/g	0.022	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.2	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	17	2	0.5
Lab Section 6				
Moisture	%	76.49	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021506**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-06-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	96	10	2
Antimony	ug/g	0.02	0.01	0.01
Arsenic	ug/g	0.31	0.05	0.01
Barium	ug/g	2.6	0.3	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	0.17	0.09	0.05
Cobalt	ug/g	0.10	0.02	0.01
Copper	ug/g	4.0	0.6	0.05
Iron	ug/g	160	20	2
Lead	ug/g	0.14	0.04	0.01
Manganese	ug/g	13	1	0.1
Mercury	ug/g	0.052	0.01	0.005
Molybdenum	ug/g	0.21	0.05	0.02
Nickel	ug/g	0.25	0.05	0.05
Selenium	ug/g	13	1	0.1
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	1.3	0.2	0.05
Thallium	ug/g	0.032	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	1.7	0.5	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	0.1	0.1	0.1
Zinc	ug/g	170	20	0.5
Lab Section 6				
Moisture	%	73.02	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021507**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-06-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	0.02	0.01	0.01
Arsenic	ug/g	0.15	0.04	0.01
Barium	ug/g	1.5	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.03	0.01	0.01
Copper	ug/g	1.8	0.3	0.05
Iron	ug/g	16	5	2
Lead	ug/g	0.07	0.02	0.01
Manganese	ug/g	1.3	0.3	0.1
Mercury	ug/g	0.56	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	0.13	0.05	0.05
Selenium	ug/g	1.7	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	5.7	0.6	0.05
Thallium	ug/g	0.030	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	43	6	0.5
Lab Section 6				
Moisture	%	76.99	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021508**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-07-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	5	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.14	0.04	0.01
Barium	ug/g	0.83	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.09	0.01	0.01
Copper	ug/g	3.5	0.5	0.05
Iron	ug/g	100	20	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	8.1	1	0.1
Mercury	ug/g	0.035	0.01	0.005
Molybdenum	ug/g	0.23	0.06	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	16	2	0.1
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.46	0.1	0.05
Thallium	ug/g	0.021	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.2	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	150	20	0.5
Lab Section 6				
Moisture	%	72.31	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021509**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-07-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	4	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.08	0.01	0.01
Barium	ug/g	1.6	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.03	0.01	0.01
Copper	ug/g	1.0	0.2	0.05
Iron	ug/g	13	5	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	1.8	0.4	0.1
Mercury	ug/g	0.43	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.4	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	8.8	0.9	0.05
Thallium	ug/g	0.015	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	24	4	0.5
Lab Section 6				
Moisture	%	77.46	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021510**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-08-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.11	0.03	0.01
Barium	ug/g	3.2	0.3	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.03	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	2.1	0.3	0.05
Iron	ug/g	110	20	2
Lead	ug/g	0.06	0.02	0.01
Manganese	ug/g	5.4	0.8	0.1
Mercury	ug/g	0.049	0.01	0.005
Molybdenum	ug/g	0.14	0.05	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	12	1	0.1
Silver	ug/g	0.03	0.02	0.01
Strontium	ug/g	0.37	0.1	0.05
Thallium	ug/g	<0.005		0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	0.009	0.007	0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	69.50	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021511**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-08-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.09	0.01	0.01
Barium	ug/g	1.9	0.3	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.3	0.2	0.05
Iron	ug/g	24	6	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	0.6	0.2	0.1
Mercury	ug/g	0.87	0.2	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.9	0.3	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	1.2	0.2	0.05
Thallium	ug/g	<0.005		0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	32	5	0.5
Lab Section 6				
Moisture	%	79.48	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021512**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-09-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2	2	2
Antimony	ug/g	0.01	0.01	0.01
Arsenic	ug/g	0.09	0.01	0.01
Barium	ug/g	1.1	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.93	0.2	0.05
Iron	ug/g	10	4	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.41	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.8	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.9	0.6	0.05
Thallium	ug/g	0.012	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	23	3	0.5
Lab Section 6				
Moisture	%	78.35	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021513**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-09-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	13	8	2
Antimony	ug/g	0.01	0.01	0.01
Arsenic	ug/g	0.26	0.04	0.01
Barium	ug/g	1.5	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	0.06	0.06	0.05
Cobalt	ug/g	0.09	0.01	0.01
Copper	ug/g	4.1	0.6	0.05
Iron	ug/g	100	20	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	7.5	1	0.1
Mercury	ug/g	0.034	0.01	0.005
Molybdenum	ug/g	0.15	0.05	0.02
Nickel	ug/g	0.29	0.05	0.05
Selenium	ug/g	8.8	0.9	0.01
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.46	0.1	0.05
Thallium	ug/g	0.010	0.007	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.3	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	66.57	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021514**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-10-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2	2	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.10	0.02	0.01
Barium	ug/g	0.84	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.78	0.2	0.05
Iron	ug/g	7	4	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	1.2	0.3	0.1
Mercury	ug/g	0.57	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.2	0.1	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	5.1	0.5	0.05
Thallium	ug/g	0.012	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	26	4	0.5
Lab Section 6				
Moisture	%	78.25	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021515**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_PCC-10-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	13	8	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.48	0.07	0.01
Barium	ug/g	0.99	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.01	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	2.7	0.4	0.05
Iron	ug/g	68	10	2
Lead	ug/g	0.04	0.02	0.01
Manganese	ug/g	4.8	0.7	0.1
Mercury	ug/g	0.030	0.01	0.005
Molybdenum	ug/g	0.15	0.05	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	11	1	0.1
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.55	0.1	0.05
Thallium	ug/g	0.016	0.009	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.2	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	67.32	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021516**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-01-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.07	0.02	0.02
Barium	ug/g	0.62	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.04	0.02	0.02
Copper	ug/g	1.8	0.4	0.1
Iron	ug/g	18	9	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.0	0.4	0.2
Mercury	ug/g	0.4	0.2	0.1
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	1.3	0.2	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	1.1	0.3	0.1
Thallium	ug/g	0.01	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	48	7	1
Lab Section 6				
Moisture	%	76.90	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021517**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-01-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	5	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.22	0.06	0.02
Barium	ug/g	1.2	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	0.02	0.02	0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.11	0.02	0.02
Copper	ug/g	6.2	0.9	0.1
Iron	ug/g	98	20	5
Lead	ug/g	0.07	0.04	0.02
Manganese	ug/g	11	2	0.2
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.19	0.1	0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	20	2	0.02
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	230	20	1
Lab Section 6				
Moisture	%	74.95	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021518**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-02-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.11	0.05	0.05
Barium	ug/g	1.4	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	2.6	1	0.5
Iron	ug/g	27	10	5
Lead	ug/g	0.05	0.05	0.05
Manganese	ug/g	1.8	0.9	0.5
Mercury	ug/g	0.41	0.06	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.4	0.2	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	3.3	0.5	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	70	20	5
Lab Section 6				
Moisture	%	75.98	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021519**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-02-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	6	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.22	0.06	0.02
Barium	ug/g	0.39	0.05	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.07	0.02	0.02
Copper	ug/g	5.5	0.8	0.1
Iron	ug/g	110	20	5
Lead	ug/g	0.03	0.02	0.02
Manganese	ug/g	10	2	0.2
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.14	0.08	0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	7.6	0.8	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	150	20	1
Lab Section 6				
Moisture	%	72.82	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021520**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-03-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	10	8	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.08	0.05	0.05
Barium	ug/g	0.8	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	1.1	0.7	0.5
Iron	ug/g	22	10	5
Lead	ug/g	0.10	0.07	0.05
Manganese	ug/g	2.5	1	0.5
Mercury	ug/g	0.31	0.05	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.5	0.2	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	5.3	0.8	0.1
Thallium	ug/g	0.01	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	0.6	0.5	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	28	10	5
Lab Section 6				
Moisture	%	77.32	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021521**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-03-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	18	10	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.25	0.05	0.05
Barium	ug/g	1.2	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.02	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	6.5	2	0.5
Iron	ug/g	140	20	5
Lead	ug/g	0.19	0.1	0.05
Manganese	ug/g	4.9	1	0.5
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.17	0.09	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	17	2	0.05
Silver	ug/g	0.03	0.02	0.02
Strontium	ug/g	0.7	0.2	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	1.1	0.6	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	210	30	5
Lab Section 6				
Moisture	%	75.53	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021522**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-04-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.09	0.02	0.02
Barium	ug/g	0.76	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	<0.02		0.02
Copper	ug/g	1.7	0.4	0.1
Iron	ug/g	17	9	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.5	0.5	0.2
Mercury	ug/g	0.30	0.04	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	3.2	0.3	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.8	0.3	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	58	9	1
Lab Section 6				
Moisture	%	77.27	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021523**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-04-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	6	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.18	0.05	0.05
Barium	ug/g	1.0	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.02	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	5.9	1	0.5
Iron	ug/g	120	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	10	2	0.5
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.15	0.08	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	15	2	0.05
Silver	ug/g	0.04	0.03	0.02
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	0.03	0.02	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	200	30	5
Lab Section 6				
Moisture	%	75.22	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021524**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-05-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.08	0.02	0.02
Barium	ug/g	0.33	0.05	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.02	0.02	0.02
Copper	ug/g	0.9	0.3	0.1
Iron	ug/g	10	7	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.4	0.5	0.2
Mercury	ug/g	0.30	0.04	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	1.5	0.2	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	2.4	0.4	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	27	4	1
Lab Section 6				
Moisture	%	78.20	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021525**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-05-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	28	20	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.39	0.05	0.05
Barium	ug/g	1.6	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	2.6	1	0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	7.4	2	0.5
Iron	ug/g	160	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	5.8	1	0.5
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.15	0.08	0.05
Nickel	ug/g	1.0	0.5	0.5
Selenium	ug/g	12	1	0.05
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	0.7	0.2	0.1
Thallium	ug/g	0.03	0.02	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	0.5	0.5	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	250	40	5
Lab Section 6				
Moisture	%	74.47	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021526**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-06-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	5	5	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.07	0.02	0.02
Barium	ug/g	0.97	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	0.7	0.2	0.1
Cobalt	ug/g	<0.02		0.02
Copper	ug/g	1.5	0.4	0.1
Iron	ug/g	19	10	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.7	0.6	0.2
Mercury	ug/g	0.50	0.08	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	0.3	0.1	0.1
Selenium	ug/g	2.0	0.2	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	3.0	0.4	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	38	6	1
Lab Section 6				
Moisture	%	76.79	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021527**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-06-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	44	20	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.41	0.05	0.05
Barium	ug/g	2.0	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.05	0.02	0.02
Chromium	ug/g	1.4	0.8	0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	6.5	2	0.5
Iron	ug/g	170	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	6.4	2	0.5
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.16	0.09	0.05
Nickel	ug/g	0.7	0.5	0.5
Selenium	ug/g	12	1	0.05
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	1.2	0.3	0.1
Thallium	ug/g	0.03	0.02	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	0.6	0.5	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	240	40	5
Lab Section 6				
Moisture	%	74.01	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021528**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-07-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	12	9	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.25	0.06	0.02
Barium	ug/g	0.56	0.1	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	2.6	0.4	0.1
Cobalt	ug/g	0.11	0.02	0.02
Copper	ug/g	6.6	1	0.1
Iron	ug/g	120	20	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	11	2	0.2
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.18	0.09	0.05
Nickel	ug/g	1.1	0.3	0.1
Selenium	ug/g	16	2	0.02
Silver	ug/g	0.03	0.02	0.02
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	0.5	0.5	0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	160	20	1
Lab Section 6				
Moisture	%	73.46	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021529**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-07-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	10	8	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.10	0.02	0.02
Barium	ug/g	0.47	0.05	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	1.8	0.4	0.1
Cobalt	ug/g	<0.02		0.02
Copper	ug/g	1.3	0.3	0.1
Iron	ug/g	27	10	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.9	0.6	0.2
Mercury	ug/g	0.34	0.05	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	0.7	0.1	0.1
Selenium	ug/g	1.5	0.2	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	2.4	0.4	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	0.5	0.5	0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	47	7	1
Lab Section 6				
Moisture	%	76.28	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021530**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-08-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.26	0.05	0.05
Barium	ug/g	0.6	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	5.4	1	0.5
Iron	ug/g	130	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	8.2	2	0.5
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.16	0.09	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	8.4	0.8	0.05
Silver	ug/g	0.03	0.02	0.02
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	0.03	0.02	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	190	30	5
Lab Section 6				
Moisture	%	74.40	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021531**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-08-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.06	0.02	0.02
Barium	ug/g	0.46	0.05	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	0.3	0.2	0.1
Cobalt	ug/g	<0.02		0.02
Copper	ug/g	1.2	0.3	0.1
Iron	ug/g	12	8	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.5	0.5	0.2
Mercury	ug/g	0.38	0.06	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	0.1	0.1	0.1
Selenium	ug/g	1.8	0.3	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	2.2	0.3	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	35	5	1
Lab Section 6				
Moisture	%	77.75	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021532**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-09-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<50		50
Antimony	ug/g	<0.1		0.1
Arsenic	ug/g	<0.5		0.5
Barium	ug/g	<5		5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<50		50
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<5		5
Cobalt	ug/g	<5		5
Copper	ug/g	5	5	5
Iron	ug/g	150	80	50
Lead	ug/g	<0.5		0.5
Manganese	ug/g	9	7	5
Mercury	ug/g	0.05	0.03	0.02
Molybdenum	ug/g	<0.5		0.5
Nickel	ug/g	<5		5
Selenium	ug/g	17	2	0.5
Silver	ug/g	<0.02		0.02
Strontium	ug/g	<1		1
Thallium	ug/g	<0.1		0.1
Tin	ug/g	<2		2
Titanium	ug/g	<5		5
Uranium	ug/g	<0.1		0.1
Vanadium	ug/g	<1		1
Zinc	ug/g	240	100	50
Lab Section 6				
Moisture	%	67.10	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021533**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-09-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	7	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.08	0.05	0.05
Barium	ug/g	0.5	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	1.7	0.9	0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	1.0	0.7	0.5
Iron	ug/g	20	10	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.5	0.8	0.5
Mercury	ug/g	0.37	0.06	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	0.8	0.5	0.5
Selenium	ug/g	2.0	0.3	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	2.2	0.3	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	36	10	5
Lab Section 6				
Moisture	%	76.60	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021534**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-10-O_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	16	10	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.16	0.05	0.05
Barium	ug/g	0.8	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.02	0.02	0.02
Chromium	ug/g	0.9	0.7	0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	7.2	2	0.5
Iron	ug/g	140	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	10	2	0.5
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.15	0.08	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	8.8	0.9	0.05
Silver	ug/g	0.03	0.02	0.02
Strontium	ug/g	0.7	0.2	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	140	20	5
Lab Section 6				
Moisture	%	75.51	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021535**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC_RSC-10-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	0.02	0.02	0.02
Arsenic	ug/g	0.09	0.02	0.02
Barium	ug/g	1.5	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	<0.02		0.02
Copper	ug/g	2.3	0.3	0.1
Iron	ug/g	23	10	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.8	0.6	0.2
Mercury	ug/g	0.40	0.06	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	1.7	0.2	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	3.7	0.6	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	82	10	1
Lab Section 6				
Moisture	%	75.66	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021536**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-01-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	5	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.08	0.01	0.01
Barium	ug/g	0.52	0.08	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	0.44	0.1	0.05
Cobalt	ug/g	0.28	0.04	0.01
Copper	ug/g	2.2	0.3	0.05
Iron	ug/g	170	20	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	4.7	0.7	0.1
Mercury	ug/g	0.045	0.01	0.005
Molybdenum	ug/g	0.27	0.07	0.02
Nickel	ug/g	0.10	0.05	0.05
Selenium	ug/g	18	2	0.1
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.42	0.1	0.05
Thallium	ug/g	0.006	0.006	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	160	20	0.5
Lab Section 6				
Moisture	%	74.20	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021537**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-01-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.13	0.03	0.01
Barium	ug/g	2.8	0.3	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.04	0.01	0.01
Copper	ug/g	1.6	0.2	0.05
Iron	ug/g	26	6	2
Lead	ug/g	0.05	0.02	0.01
Manganese	ug/g	1.6	0.4	0.1
Mercury	ug/g	0.66	0.2	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	3.7	0.4	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	8.4	0.8	0.05
Thallium	ug/g	0.009	0.007	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	37	6	0.5
Lab Section 6				
Moisture	%	78.04	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021538**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-02-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.19	0.05	0.01
Barium	ug/g	1.9	0.3	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	3.7	0.6	0.05
Iron	ug/g	66	10	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	5.6	0.8	0.1
Mercury	ug/g	0.051	0.01	0.005
Molybdenum	ug/g	0.09	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	12	1	0.1
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.25	0.1	0.05
Thallium	ug/g	0.012	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	86	9	0.5
Lab Section 6				
Moisture	%	64.06	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021539**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-02-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.13	0.03	0.01
Barium	ug/g	1.1	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	1.4	0.2	0.05
Iron	ug/g	12	5	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.7	0.2	0.1
Mercury	ug/g	1.2	0.2	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.7	0.3	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	2.6	0.4	0.05
Thallium	ug/g	0.013	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	15	2	0.5
Lab Section 6				
Moisture	%	77.47	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021540**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-03-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7	5	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.35	0.05	0.01
Barium	ug/g	0.82	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.03	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.05	0.01	0.01
Copper	ug/g	2.8	0.4	0.05
Iron	ug/g	55	8	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	5.1	0.8	0.1
Mercury	ug/g	0.027	0.01	0.005
Molybdenum	ug/g	0.10	0.04	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	6.5	0.6	0.01
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.26	0.1	0.05
Thallium	ug/g	0.017	0.009	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.2	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	100	10	0.5
Lab Section 6				
Moisture	%	63.44	6	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021541**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-03-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.22	0.03	0.01
Barium	ug/g	0.49	0.07	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	<0.01		0.01
Copper	ug/g	1.5	0.2	0.05
Iron	ug/g	15	5	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.4	0.2	0.1
Mercury	ug/g	0.55	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.0	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.39	0.1	0.05
Thallium	ug/g	0.023	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	25	4	0.5
Lab Section 6				
Moisture	%	77.57	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021542**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-04-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.16	0.04	0.01
Barium	ug/g	1.8	0.3	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.04	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.10	0.02	0.01
Copper	ug/g	4.2	0.6	0.05
Iron	ug/g	110	20	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	15	2	0.1
Mercury	ug/g	0.064	0.02	0.005
Molybdenum	ug/g	0.24	0.06	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	12	1	0.1
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.51	0.1	0.05
Thallium	ug/g	0.045	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	130	10	0.5
Lab Section 6				
Moisture	%	74.75	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021543**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-04-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.10	0.02	0.01
Barium	ug/g	0.72	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.1	0.2	0.05
Iron	ug/g	15	5	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.50	0.1	0.05
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.0	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	2.7	0.4	0.05
Thallium	ug/g	0.019	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	22	3	0.5
Lab Section 6				
Moisture	%	79.07	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021544**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-05-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	6	4	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.39	0.06	0.01
Barium	ug/g	1.0	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	0.09	0.07	0.05
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	3.4	0.5	0.05
Iron	ug/g	74	10	2
Lead	ug/g	0.01	0.01	0.01
Manganese	ug/g	14	1	0.1
Mercury	ug/g	0.040	0.01	0.005
Molybdenum	ug/g	0.17	0.06	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	14	1	0.1
Silver	ug/g	<0.01		0.01
Strontium	ug/g	0.41	0.1	0.05
Thallium	ug/g	0.024	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.3	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	70.81	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021545**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-05-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	3	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.24	0.04	0.01
Barium	ug/g	2.4	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	0.07	0.06	0.05
Cobalt	ug/g	0.03	0.01	0.01
Copper	ug/g	2.2	0.3	0.05
Iron	ug/g	20	5	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	1.4	0.4	0.1
Mercury	ug/g	0.39	0.06	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.7	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	7.2	0.7	0.05
Thallium	ug/g	0.039	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	47	7	0.5
Lab Section 6				
Moisture	%	73.96	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021546**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-06-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	9	6	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.10	0.02	0.01
Barium	ug/g	1.9	0.3	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.03	0.01	0.01
Copper	ug/g	1.0	0.2	0.05
Iron	ug/g	18	6	2
Lead	ug/g	0.03	0.02	0.01
Manganese	ug/g	1.3	0.3	0.1
Mercury	ug/g	0.45	0.07	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.1	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	8.4	0.8	0.05
Thallium	ug/g	0.033	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.3	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	27	4	0.5
Lab Section 6				
Moisture	%	76.14	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021547**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-06-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	2	2	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.22	0.03	0.01
Barium	ug/g	0.84	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	3.0	0.4	0.05
Iron	ug/g	69	10	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	5.7	0.8	0.1
Mercury	ug/g	0.028	0.01	0.005
Molybdenum	ug/g	0.12	0.05	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	10	1	0.1
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.31	0.1	0.05
Thallium	ug/g	0.014	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	94	9	0.5
Lab Section 6				
Moisture	%	67.71	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021548**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-07-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.09	0.01	0.01
Barium	ug/g	1.2	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.01	0.01	0.01
Copper	ug/g	0.77	0.2	0.05
Iron	ug/g	9	4	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.9	0.3	0.1
Mercury	ug/g	0.44	0.07	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.9	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.5	0.5	0.05
Thallium	ug/g	0.014	0.008	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	23	3	0.5
Lab Section 6				
Moisture	%	78.35	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021549**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-07-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	12	7	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.74	0.1	0.01
Barium	ug/g	8.5	0.8	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.09	0.01	0.01
Chromium	ug/g	0.15	0.08	0.05
Cobalt	ug/g	0.07	0.01	0.01
Copper	ug/g	3.3	0.5	0.05
Iron	ug/g	150	20	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	7.6	1	0.1
Mercury	ug/g	0.042	0.01	0.005
Molybdenum	ug/g	0.19	0.06	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	14	1	0.1
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.61	0.2	0.05
Thallium	ug/g	0.034	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.3	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	280	30	0.5
Lab Section 6				
Moisture	%	75.96	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021550**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-08-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.13	0.03	0.01
Barium	ug/g	1.6	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.03	0.01	0.01
Copper	ug/g	1.5	0.2	0.05
Iron	ug/g	15	5	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	1.0	0.2	0.1
Mercury	ug/g	0.45	0.07	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	2.0	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	5.8	0.6	0.05
Thallium	ug/g	0.030	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	34	5	0.5
Lab Section 6				
Moisture	%	77.37	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021551**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-08-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	4	3	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.39	0.06	0.01
Barium	ug/g	1.3	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.03	0.01	0.01
Chromium	ug/g	0.15	0.08	0.05
Cobalt	ug/g	0.09	0.01	0.01
Copper	ug/g	3.1	0.5	0.05
Iron	ug/g	75	10	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	7.3	1	0.1
Mercury	ug/g	0.035	0.01	0.005
Molybdenum	ug/g	0.16	0.05	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	9.3	0.9	0.01
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.43	0.1	0.05
Thallium	ug/g	0.022	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.5	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	120	10	0.5
Lab Section 6				
Moisture	%	67.42	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021552**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-09-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.10	0.02	0.01
Barium	ug/g	0.98	0.1	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	1.1	0.2	0.05
Iron	ug/g	11	4	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	0.8	0.3	0.1
Mercury	ug/g	0.47	0.07	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	1.8	0.2	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	3.2	0.5	0.05
Thallium	ug/g	0.024	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	31	5	0.5
Lab Section 6				
Moisture	%	77.31	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021553**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-09-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	9	6	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.47	0.07	0.01
Barium	ug/g	1.4	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.02	0.01	0.01
Chromium	ug/g	<0.05		0.05
Cobalt	ug/g	0.06	0.01	0.01
Copper	ug/g	3.7	0.6	0.05
Iron	ug/g	110	20	2
Lead	ug/g	0.02	0.01	0.01
Manganese	ug/g	13	1	0.1
Mercury	ug/g	0.044	0.01	0.005
Molybdenum	ug/g	0.16	0.05	0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	18	2	0.1
Silver	ug/g	0.01	0.01	0.01
Strontium	ug/g	0.49	0.1	0.05
Thallium	ug/g	0.044	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.3	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	200	20	0.5
Lab Section 6				
Moisture	%	74.82	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021554**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-10-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<2		2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.10	0.02	0.01
Barium	ug/g	2.0	0.2	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	<0.01		0.01
Chromium	ug/g	0.08	0.06	0.05
Cobalt	ug/g	0.02	0.01	0.01
Copper	ug/g	0.74	0.2	0.05
Iron	ug/g	9	4	2
Lead	ug/g	<0.01		0.01
Manganese	ug/g	1.5	0.4	0.1
Mercury	ug/g	0.46	0.07	0.005
Molybdenum	ug/g	<0.02		0.02
Nickel	ug/g	<0.05		0.05
Selenium	ug/g	3.3	0.3	0.01
Silver	ug/g	<0.01		0.01
Strontium	ug/g	7.5	0.8	0.05
Thallium	ug/g	0.019	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	<0.2		0.2
Uranium	ug/g	0.007	0.006	0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	18	3	0.5
Lab Section 6				
Moisture	%	78.25	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021555**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_PCC-10-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	11	7	2
Antimony	ug/g	<0.01		0.01
Arsenic	ug/g	0.35	0.05	0.01
Barium	ug/g	3.7	0.4	0.02
Beryllium	ug/g	<0.01		0.01
Boron	ug/g	<1		1
Cadmium	ug/g	0.06	0.01	0.01
Chromium	ug/g	0.17	0.09	0.05
Cobalt	ug/g	0.11	0.03	0.01
Copper	ug/g	5.4	0.5	0.05
Iron	ug/g	120	20	2
Lead	ug/g	0.11	0.03	0.01
Manganese	ug/g	18	2	0.1
Mercury	ug/g	0.057	0.01	0.005
Molybdenum	ug/g	0.21	0.05	0.02
Nickel	ug/g	0.08	0.05	0.05
Selenium	ug/g	23	2	0.1
Silver	ug/g	0.02	0.01	0.01
Strontium	ug/g	0.58	0.1	0.05
Thallium	ug/g	0.047	0.01	0.005
Tin	ug/g	<0.05		0.05
Titanium	ug/g	0.3	0.2	0.2
Uranium	ug/g	<0.005		0.005
Vanadium	ug/g	<0.1		0.1
Zinc	ug/g	210	20	0.5
Lab Section 6				
Moisture	%	78.81	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021556**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-01-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.10	0.02	0.02
Barium	ug/g	1.2	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	0.03	0.02	0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.08	0.02	0.02
Copper	ug/g	6.7	1	0.1
Iron	ug/g	150	20	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	8.5	1	0.2
Mercury	ug/g	0.03	0.02	0.01
Molybdenum	ug/g	0.14	0.08	0.05
Nickel	ug/g	0.3	0.1	0.1
Selenium	ug/g	17	2	0.02
Silver	ug/g	0.06	0.03	0.02
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	0.04	0.02	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	200	20	1
Lab Section 6				
Moisture	%	74.34	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021557**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-01-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.08	0.05	0.05
Barium	ug/g	1.5	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	2.0	1	0.5
Iron	ug/g	19	10	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	0.8	0.6	0.5
Mercury	ug/g	0.54	0.08	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	3.2	0.5	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	68	20	5
Lab Section 6				
Moisture	%	77.38	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021558**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-02-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	110	20	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.18	0.02	0.02
Barium	ug/g	1.6	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	0.02	0.02	0.02
Chromium	ug/g	0.2	0.1	0.1
Cobalt	ug/g	0.11	0.02	0.02
Copper	ug/g	4.7	0.7	0.1
Iron	ug/g	300	40	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	7.8	1	0.2
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.18	0.09	0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	18	2	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	1.2	0.3	0.1
Thallium	ug/g	0.03	0.02	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	3.8	1	0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	0.3	0.2	0.2
Zinc	ug/g	270	30	1
Lab Section 6				
Moisture	%	75.31	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021559**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-02-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.06	0.05	0.05
Barium	ug/g	<0.5		0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	0.8	0.6	0.5
Iron	ug/g	12	8	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.2	0.8	0.5
Mercury	ug/g	0.36	0.05	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.6	0.2	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	2.0	0.3	0.1
Thallium	ug/g	0.01	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	19	10	5
Lab Section 6				
Moisture	%	76.25	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021560**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-03-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7	6	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.06	0.02	0.02
Barium	ug/g	0.37	0.05	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	0.2	0.1	0.1
Cobalt	ug/g	0.11	0.02	0.02
Copper	ug/g	5.9	0.9	0.1
Iron	ug/g	140	20	5
Lead	ug/g	0.04	0.03	0.02
Manganese	ug/g	5.3	0.8	0.2
Mercury	ug/g	0.02	0.01	0.01
Molybdenum	ug/g	0.18	0.09	0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	33	3	0.02
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	0.03	0.02	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	180	20	1
Lab Section 6				
Moisture	%	75.35	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021561**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-03-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.07	0.02	0.02
Barium	ug/g	2.3	0.3	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.05	0.02	0.02
Copper	ug/g	3.6	0.5	0.1
Iron	ug/g	38	10	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.8	0.6	0.2
Mercury	ug/g	0.37	0.06	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	2.2	0.2	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	3.2	0.5	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	100	10	1
Lab Section 6				
Moisture	%	76.31	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021562**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-04-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.13	0.05	0.05
Barium	ug/g	0.9	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.02	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	4.0	1	0.5
Iron	ug/g	170	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	6.0	2	0.5
Mercury	ug/g	0.02	0.01	0.01
Molybdenum	ug/g	0.20	0.1	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	12	1	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	250	40	5
Lab Section 6				
Moisture	%	75.78	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021563**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-04-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.05	0.02	0.02
Barium	ug/g	1.2	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.02	0.02	0.02
Copper	ug/g	2.0	0.3	0.1
Iron	ug/g	20	10	5
Lead	ug/g	0.03	0.02	0.02
Manganese	ug/g	1.2	0.5	0.2
Mercury	ug/g	0.38	0.06	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	2.5	0.2	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	2.0	0.3	0.1
Thallium	ug/g	<0.01		0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	64	10	1
Lab Section 6				
Moisture	%	77.88	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021564**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-05-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	20	10	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.26	0.05	0.05
Barium	ug/g	3.7	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.14	0.02	0.02
Chromium	ug/g	0.6	0.6	0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	6.5	2	0.5
Iron	ug/g	230	30	5
Lead	ug/g	0.12	0.08	0.05
Manganese	ug/g	10	2	0.5
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.21	0.1	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	20	2	0.05
Silver	ug/g	0.02	0.02	0.02
Strontium	ug/g	8.7	1	0.1
Thallium	ug/g	0.04	0.02	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	0.8	0.5	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	250	40	5
Lab Section 6				
Moisture	%	75.32	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021565**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-05-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	<0.05		0.05
Barium	ug/g	1.9	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	4.6	1	0.5
Iron	ug/g	19	10	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.8	0.9	0.5
Mercury	ug/g	0.32	0.05	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.6	0.4	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	4.4	0.7	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	35	10	5
Lab Section 6				
Moisture	%	77.26	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021566**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-06-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.15	0.02	0.02
Barium	ug/g	1.4	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	0.06	0.02	0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.09	0.02	0.02
Copper	ug/g	7.0	1	0.1
Iron	ug/g	120	20	5
Lead	ug/g	0.02	0.02	0.02
Manganese	ug/g	5.6	0.8	0.2
Mercury	ug/g	0.02	0.01	0.01
Molybdenum	ug/g	0.18	0.09	0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	14	1	0.02
Silver	ug/g	0.03	0.02	0.02
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	0.04	0.02	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	220	20	1
Lab Section 6				
Moisture	%	75.34	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021567**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-06-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.06	0.05	0.05
Barium	ug/g	1.3	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	2.9	1	0.5
Iron	ug/g	27	10	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.5	0.8	0.5
Mercury	ug/g	0.39	0.06	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	3.5	0.5	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	5.0	0.8	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	67	20	5
Lab Section 6				
Moisture	%	76.76	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021568**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-07-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	7	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.17	0.05	0.05
Barium	ug/g	1.7	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.02	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	6.0	2	0.5
Iron	ug/g	130	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	6.9	2	0.5
Mercury	ug/g	0.04	0.02	0.01
Molybdenum	ug/g	0.15	0.08	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	28	3	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	0.04	0.02	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	240	40	5
Lab Section 6				
Moisture	%	75.58	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021569**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-07-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.06	0.05	0.05
Barium	ug/g	1.0	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	1.0	0.7	0.5
Iron	ug/g	17	9	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	2.0	1	0.5
Mercury	ug/g	0.55	0.08	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	1.9	0.3	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	8.0	1	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	38	10	5
Lab Section 6				
Moisture	%	77.22	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021570**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-08-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	17	10	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.21	0.05	0.05
Barium	ug/g	0.8	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.03	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	5.0	1	0.5
Iron	ug/g	160	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	11	2	0.5
Mercury	ug/g	0.02	0.01	0.01
Molybdenum	ug/g	0.20	0.1	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	11	1	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.6	0.2	0.1
Thallium	ug/g	0.04	0.02	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	0.7	0.5	0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	180	30	5
Lab Section 6				
Moisture	%	75.26	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021571**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-08-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.12	0.02	0.02
Barium	ug/g	2.4	0.4	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.02	0.02	0.02
Copper	ug/g	3.2	0.5	0.1
Iron	ug/g	33	10	5
Lead	ug/g	<0.02		0.02
Manganese	ug/g	1.4	0.5	0.2
Mercury	ug/g	0.32	0.05	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	1.8	0.3	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	4.4	0.7	0.1
Thallium	ug/g	0.04	0.02	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	100	10	1
Lab Section 6				
Moisture	%	76.42	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021572**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-09-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	7	6	5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.25	0.06	0.02
Barium	ug/g	1.6	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	0.05	0.02	0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.09	0.02	0.02
Copper	ug/g	6.0	0.9	0.1
Iron	ug/g	130	20	5
Lead	ug/g	0.02	0.02	0.02
Manganese	ug/g	6.0	0.9	0.2
Mercury	ug/g	0.02	0.01	0.01
Molybdenum	ug/g	0.18	0.09	0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	8.3	0.8	0.02
Silver	ug/g	0.05	0.03	0.02
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	0.04	0.02	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	230	20	1
Lab Section 6				
Moisture	%	74.72	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021573**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-09-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.10	0.05	0.05
Barium	ug/g	1.4	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	2.1	1	0.5
Iron	ug/g	22	10	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	1.7	0.9	0.5
Mercury	ug/g	0.49	0.07	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	2.3	0.3	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	6.7	1	0.1
Thallium	ug/g	0.02	0.01	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	70	20	5
Lab Section 6				
Moisture	%	77.17	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021574**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-10-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	8	7	5
Antimony	ug/g	0.03	0.02	0.02
Arsenic	ug/g	0.12	0.02	0.02
Barium	ug/g	0.98	0.2	0.05
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<2		2
Cadmium	ug/g	<0.02		0.02
Chromium	ug/g	<0.1		0.1
Cobalt	ug/g	0.02	0.02	0.02
Copper	ug/g	1.6	0.4	0.1
Iron	ug/g	23	10	5
Lead	ug/g	0.04	0.03	0.02
Manganese	ug/g	1.0	0.4	0.2
Mercury	ug/g	0.28	0.04	0.01
Molybdenum	ug/g	<0.05		0.05
Nickel	ug/g	<0.1		0.1
Selenium	ug/g	1.6	0.2	0.02
Silver	ug/g	<0.02		0.02
Strontium	ug/g	1.9	0.5	0.1
Thallium	ug/g	0.03	0.02	0.01
Tin	ug/g	<0.1		0.1
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.01		0.01
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	54	8	1
Lab Section 6				
Moisture	%	76.88	8	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-5208

Sep 03, 2019

Minnow Environmental Inc.

Sample #: **2019021575**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC_RSC-10-O_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **May 02, 2019**

Analyte	Units	Result	+/-	DL
Lab Section 2				
Aluminum	ug/g	<5		5
Antimony	ug/g	<0.02		0.02
Arsenic	ug/g	0.74	0.2	0.05
Barium	ug/g	1.9	0.5	0.5
Beryllium	ug/g	<0.02		0.02
Boron	ug/g	<5		5
Cadmium	ug/g	0.03	0.02	0.02
Chromium	ug/g	<0.5		0.5
Cobalt	ug/g	<0.5		0.5
Copper	ug/g	5.6	1	0.5
Iron	ug/g	97	20	5
Lead	ug/g	<0.05		0.05
Manganese	ug/g	7.5	2	0.5
Mercury	ug/g	0.02	0.01	0.01
Molybdenum	ug/g	0.19	0.1	0.05
Nickel	ug/g	<0.5		0.5
Selenium	ug/g	7.5	0.8	0.05
Silver	ug/g	<0.02		0.02
Strontium	ug/g	0.5	0.2	0.1
Thallium	ug/g	0.04	0.02	0.01
Tin	ug/g	<0.2		0.2
Titanium	ug/g	<0.5		0.5
Uranium	ug/g	<0.02		0.02
Vanadium	ug/g	<0.2		0.2
Zinc	ug/g	230	30	5
Lab Section 6				
Moisture	%	71.67	7	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 9.4 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

May 27, 2019

This report was generated for samples included in SRC Group # 2019-5208

Quality Control Report

Heidi Currier
Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Aluminum	ug/g	1280	1330
Aluminum	ug/g	1280	1350
Aluminum	ug/g	1280	1360
Aluminum	ug/g	1280	1390
Arsenic	ug/g	6.87	7.88
Arsenic	ug/g	6.87	6.87
Arsenic	ug/g	6.87	7.26
Arsenic	ug/g	6.87	6.70
Cadmium	ug/g	0.299	0.290
Cadmium	ug/g	0.299	0.305
Cadmium	ug/g	0.299	0.309
Cadmium	ug/g	0.299	0.306
Chromium	ug/g	1.57	1.57
Chromium	ug/g	1.57	1.66
Chromium	ug/g	1.57	1.64
Chromium	ug/g	1.57	1.70
Copper	ug/g	13.8	14.1
Copper	ug/g	14.4	14.2
Copper	ug/g	14.4	14.4
Copper	ug/g	14.4	14.9
Iron	ug/g	312	308
Iron	ug/g	312	298
Iron	ug/g	312	302
Iron	ug/g	312	306
Lead	ug/g	0.404	0.399
Lead	ug/g	0.404	0.422
Lead	ug/g	0.404	0.400
Lead	ug/g	0.404	0.411
Manganese	ug/g	2.70	2.73
Manganese	ug/g	2.70	2.83
Manganese	ug/g	2.70	2.67
Manganese	ug/g	2.70	2.78

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

May 27, 2019

This report was generated for samples included in SRC Group # 2019-5208

QC Analysis	Units	Target Value	Obtained Value
Mercury	ug/g	0.364	0.319
Mercury	ug/g	0.364	0.244
Mercury	ug/g	0.364	0.440
Mercury	ug/g	0.364	0.355
Nickel	ug/g	1.20	1.18
Nickel	ug/g	1.20	1.18
Nickel	ug/g	1.20	1.25
Nickel	ug/g	1.20	1.24
Selenium	ug/g	3.45	3.48
Selenium	ug/g	3.74	3.66
Selenium	ug/g	3.74	3.76
Selenium	ug/g	3.74	3.49
Silver	ug/g	0.0234	0.0240
Silver	ug/g	0.0219	0.0264
Silver	ug/g	0.0219	0.0274
Silver	ug/g	0.0219	0.0263
Zinc	ug/g	47.8	47.5
Zinc	ug/g	47.8	46.9
Zinc	ug/g	47.8	45.5
Zinc	ug/g	47.8	45.7

Duplicates:

Duplicates are used to assess problems with precision and help ensure that samples within a given batch were processed appropriately. The difference between duplicates must be within strict limits, otherwise corrective action is required. Please note, the duplicate(s) in this report are duplicates analyzed within a given batch of test samples and may not be from this specific group of samples.

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Silver	ug/g	21457	0.01	0.01
Silver	ug/g	21467	0.02	0.02
Silver	ug/g	21496	0.04	0.04
Silver	ug/g	21498	0.02	0.02
Silver	ug/g	21501	<0.01	<0.01
Silver	ug/g	21510	0.03	0.03
Silver	ug/g	21515	0.02	0.02
Silver	ug/g	21538	0.02	0.02
Silver	ug/g	21540	0.01	0.01
Silver	ug/g	21547	0.01	0.02
Silver	ug/g	21551	0.01	0.01
Aluminum	ug/g	21457	4	5
Aluminum	ug/g	21467	6	7
Aluminum	ug/g	21496	160	140
Aluminum	ug/g	21498	8	3
Aluminum	ug/g	21501	24	22
Aluminum	ug/g	21510	6	9

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

May 27, 2019

This report was generated for samples included in SRC Group # 2019-5208

Duplicate Analysis	Units	Sample ID	First Result	Second Result	
Aluminum	ug/g	21515	13	12	
Aluminum	ug/g	21538	3	6	
Aluminum	ug/g	21540	7	5	
Aluminum	ug/g	21547	2	<2	
Aluminum	ug/g	21551	4	4	
Arsenic	ug/g	21457	0.48	0.55	
Arsenic	ug/g	21467	0.17	0.18	
Arsenic	ug/g	21496	0.31	0.26	
Arsenic	ug/g	21498	0.43	0.37	
Arsenic	ug/g	21501	0.17	0.18	
Arsenic	ug/g	21510	0.11	0.11	
Arsenic	ug/g	21515	0.48	0.46	
Arsenic	ug/g	21538	0.19	0.20	
Arsenic	ug/g	21540	0.35	0.29	
Arsenic	ug/g	21547	0.22	0.26	
Arsenic	ug/g	21551	0.39	0.42	
Boron	ug/g	21457	<1	<1	
Boron	ug/g	21467	<1	<1	
Boron	ug/g	21496	<1	<1	
Boron	ug/g	21498	<1	<1	
Boron	ug/g	21501	<1	<1	
Boron	ug/g	21510	<1	<1	
Boron	ug/g	21515	<1	<1	
Boron	ug/g	21538	<1	<1	
Boron	ug/g	21540	<1	<1	
Boron	ug/g	21547	<1	<1	
Boron	ug/g	21551	<1	<1	
Barium	ug/g	21457	0.76	0.90	
Barium	ug/g	21467	1.0	1.0	
Barium	ug/g	21496	4.3	3.5	
Barium	ug/g	21498	1.5	1.3	
Barium	ug/g	21501	1.8	1.3	*(1)
Barium	ug/g	21510	3.2	3.3	
Barium	ug/g	21515	0.99	0.99	
Barium	ug/g	21538	1.9	2.1	
Barium	ug/g	21540	0.82	0.68	
Barium	ug/g	21547	0.84	0.71	
Barium	ug/g	21551	1.3	1.2	
Beryllium	ug/g	21457	<0.01	<0.01	
Beryllium	ug/g	21467	<0.01	<0.01	
Beryllium	ug/g	21496	<0.01	<0.01	
Beryllium	ug/g	21498	<0.01	<0.01	
Beryllium	ug/g	21501	<0.01	<0.01	
Beryllium	ug/g	21510	<0.01	<0.01	
Beryllium	ug/g	21515	<0.01	<0.01	
Beryllium	ug/g	21538	<0.01	<0.01	

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

May 27, 2019

This report was generated for samples included in SRC Group # 2019-5208

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Beryllium	ug/g	21540	<0.01	<0.01
Beryllium	ug/g	21547	<0.01	<0.01
Beryllium	ug/g	21551	<0.01	<0.01
Cadmium	ug/g	21457	<0.01	<0.01
Cadmium	ug/g	21467	<0.01	<0.01
Cadmium	ug/g	21496	0.10	0.09
Cadmium	ug/g	21498	0.02	0.02
Cadmium	ug/g	21501	<0.01	<0.01
Cadmium	ug/g	21510	0.03	0.04
Cadmium	ug/g	21515	0.01	0.02
Cadmium	ug/g	21538	<0.01	0.02
Cadmium	ug/g	21540	0.03	0.02
Cadmium	ug/g	21547	<0.01	<0.01
Cadmium	ug/g	21551	0.03	0.02
Cobalt	ug/g	21457	0.05	0.05
Cobalt	ug/g	21467	0.07	0.07
Cobalt	ug/g	21496	0.11	0.09
Cobalt	ug/g	21498	0.08	0.07
Cobalt	ug/g	21501	0.04	0.03
Cobalt	ug/g	21510	0.07	0.07
Cobalt	ug/g	21515	0.05	0.06
Cobalt	ug/g	21538	0.05	0.05
Cobalt	ug/g	21540	0.05	0.05
Cobalt	ug/g	21547	0.06	0.07
Cobalt	ug/g	21551	0.09	0.09
Chromium	ug/g	21457	<0.05	<0.05
Chromium	ug/g	21467	<0.05	<0.05
Chromium	ug/g	21496	0.20	0.16
Chromium	ug/g	21498	0.06	<0.05
Chromium	ug/g	21501	0.06	0.07
Chromium	ug/g	21510	<0.05	<0.05
Chromium	ug/g	21515	<0.05	<0.05
Chromium	ug/g	21538	<0.05	<0.05
Chromium	ug/g	21540	<0.05	<0.05
Chromium	ug/g	21547	<0.05	<0.05
Chromium	ug/g	21551	0.15	<0.05
Copper	ug/g	21457	3.0	2.9
Copper	ug/g	21467	2.8	2.8
Copper	ug/g	21496	4.4	3.9
Copper	ug/g	21498	2.9	3.1
Copper	ug/g	21501	2.1	1.9
Copper	ug/g	21510	2.1	2.1
Copper	ug/g	21515	2.7	3.0
Copper	ug/g	21538	3.7	3.6
Copper	ug/g	21540	2.8	2.8
Copper	ug/g	21547	3.0	3.4

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

May 27, 2019

This report was generated for samples included in SRC Group # 2019-5208

Duplicate Analysis	Units	Sample ID	First Result	Second Result	
Copper	ug/g	21551	3.1	2.9	
Iron	ug/g	21457	45	41	
Iron	ug/g	21467	48	52	
Iron	ug/g	21496	180	140	
Iron	ug/g	21498	75	34	*(2)
Iron	ug/g	21501	33	33	
Iron	ug/g	21510	110	110	
Iron	ug/g	21515	68	73	
Iron	ug/g	21538	66	65	
Iron	ug/g	21540	55	52	
Iron	ug/g	21547	69	74	
Iron	ug/g	21551	75	65	
Mercury	ug/g	21457	0.016	0.016	
Mercury	ug/g	21467	0.007	0.007	
Mercury	ug/g	21496	0.025	0.023	
Mercury	ug/g	21498	0.035	0.033	
Mercury	ug/g	21501	0.27	0.30	
Mercury	ug/g	21510	0.049	0.050	
Mercury	ug/g	21515	0.030	0.031	
Mercury	ug/g	21538	0.051	0.050	
Mercury	ug/g	21540	0.027	0.020	
Mercury	ug/g	21547	0.028	0.029	
Mercury	ug/g	21551	0.035	0.034	
Manganese	ug/g	21457	3.6	3.4	
Manganese	ug/g	21467	3.5	3.7	
Manganese	ug/g	21496	9.1	8.0	
Manganese	ug/g	21498	11	11	
Manganese	ug/g	21501	2.2	1.8	
Manganese	ug/g	21510	5.4	5.7	
Manganese	ug/g	21515	4.8	5.2	
Manganese	ug/g	21538	5.6	5.7	
Manganese	ug/g	21540	5.1	5.1	
Manganese	ug/g	21547	5.7	6.6	
Manganese	ug/g	21551	7.3	7.2	
Molybdenum	ug/g	21457	0.09	0.09	
Molybdenum	ug/g	21467	0.07	0.07	
Molybdenum	ug/g	21496	0.10	0.10	
Molybdenum	ug/g	21498	0.20	0.18	
Molybdenum	ug/g	21501	<0.02	<0.02	
Molybdenum	ug/g	21510	0.14	0.14	
Molybdenum	ug/g	21515	0.15	0.17	
Molybdenum	ug/g	21538	0.09	0.09	
Molybdenum	ug/g	21540	0.10	0.10	
Molybdenum	ug/g	21547	0.12	0.13	
Molybdenum	ug/g	21551	0.16	0.15	
Moisture	%	21457	60.37	62.53	

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

May 27, 2019

This report was generated for samples included in SRC Group # 2019-5208

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Moisture	%	21459	62.36	60.54
Moisture	%	21471	60.16	60.69
Moisture	%	21496	64.64	63.69
Moisture	%	21500	62.71	62.87
Moisture	%	21501	78.06	77.12
Moisture	%	21504	60.82	60.32
Moisture	%	21513	66.57	67.26
Moisture	%	21537	78.04	76.42
Moisture	%	21538	64.06	64.39
Moisture	%	21540	63.44	62.09
Moisture	%	21551	67.42	64.99
Nickel	ug/g	21457	0.12	<0.05
Nickel	ug/g	21467	<0.05	<0.05
Nickel	ug/g	21496	0.19	0.15
Nickel	ug/g	21498	<0.05	<0.05
Nickel	ug/g	21501	0.10	0.11
Nickel	ug/g	21510	<0.05	<0.05
Nickel	ug/g	21515	<0.05	<0.05
Nickel	ug/g	21538	<0.05	<0.05
Nickel	ug/g	21540	<0.05	<0.05
Nickel	ug/g	21547	<0.05	<0.05
Nickel	ug/g	21551	<0.05	<0.05
Lead	ug/g	21457	0.03	0.07
Lead	ug/g	21467	0.03	0.03
Lead	ug/g	21496	0.18	0.13
Lead	ug/g	21498	0.08	0.06
Lead	ug/g	21501	0.07	0.05
Lead	ug/g	21510	0.06	0.07
Lead	ug/g	21515	0.04	0.05
Lead	ug/g	21538	<0.01	<0.01
Lead	ug/g	21540	<0.01	<0.01
Lead	ug/g	21547	<0.01	<0.01
Lead	ug/g	21551	<0.01	0.01
Antimony	ug/g	21457	<0.01	<0.01
Antimony	ug/g	21467	<0.01	<0.01
Antimony	ug/g	21496	0.02	<0.01
Antimony	ug/g	21498	<0.01	<0.01
Antimony	ug/g	21501	0.02	0.02
Antimony	ug/g	21510	<0.01	<0.01
Antimony	ug/g	21515	<0.01	<0.01
Antimony	ug/g	21538	<0.01	<0.01
Antimony	ug/g	21540	<0.01	<0.01
Antimony	ug/g	21547	<0.01	<0.01
Antimony	ug/g	21551	<0.01	<0.01
Selenium	ug/g	21457	5.4	5.4
Selenium	ug/g	21467	9.5	9.9

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

May 27, 2019

This report was generated for samples included in SRC Group # 2019-5208

Duplicate Analysis	Units	Sample ID	First Result	Second Result	
Selenium	ug/g	21496	10	9.7	
Selenium	ug/g	21498	21	23	
Selenium	ug/g	21501	1.8	1.8	
Selenium	ug/g	21510	12	12	
Selenium	ug/g	21515	11	11	
Selenium	ug/g	21538	12	13	
Selenium	ug/g	21540	6.5	6.4	
Selenium	ug/g	21547	10	12	
Selenium	ug/g	21551	9.3	8.6	
Tin	ug/g	21457	<0.05	<0.05	
Tin	ug/g	21467	<0.05	<0.05	
Tin	ug/g	21496	<0.05	<0.05	
Tin	ug/g	21498	<0.05	<0.05	
Tin	ug/g	21501	<0.05	<0.05	
Tin	ug/g	21510	<0.05	<0.05	
Tin	ug/g	21515	<0.05	<0.05	
Tin	ug/g	21538	<0.05	<0.05	
Tin	ug/g	21540	<0.05	<0.05	
Tin	ug/g	21547	<0.05	<0.05	
Tin	ug/g	21551	<0.05	<0.05	
Strontium	ug/g	21457	0.26	0.26	
Strontium	ug/g	21467	0.18	0.20	
Strontium	ug/g	21496	1.6	1.2	*(3)
Strontium	ug/g	21498	0.52	0.45	
Strontium	ug/g	21501	4.0	3.2	
Strontium	ug/g	21510	0.37	0.41	
Strontium	ug/g	21515	0.55	0.59	
Strontium	ug/g	21538	0.25	0.24	
Strontium	ug/g	21540	0.26	0.23	
Strontium	ug/g	21547	0.31	0.34	
Strontium	ug/g	21551	0.43	0.41	
Titanium	ug/g	21457	<0.2	<0.2	
Titanium	ug/g	21467	<0.2	<0.2	
Titanium	ug/g	21496	2.7	2.3	
Titanium	ug/g	21498	0.3	0.3	
Titanium	ug/g	21501	0.5	0.5	
Titanium	ug/g	21510	<0.2	0.4	
Titanium	ug/g	21515	0.2	0.2	
Titanium	ug/g	21538	<0.2	0.2	
Titanium	ug/g	21540	0.2	<0.2	
Titanium	ug/g	21547	<0.2	<0.2	
Titanium	ug/g	21551	0.5	<0.2	
Thallium	ug/g	21457	0.006	0.006	
Thallium	ug/g	21467	0.006	0.007	
Thallium	ug/g	21496	0.016	0.010	
Thallium	ug/g	21498	0.021	0.020	

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

May 27, 2019

This report was generated for samples included in SRC Group # 2019-5208

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Thallium	ug/g	21501	0.011	0.010
Thallium	ug/g	21510	<0.005	<0.005
Thallium	ug/g	21515	0.016	0.016
Thallium	ug/g	21538	0.012	0.012
Thallium	ug/g	21540	0.017	0.017
Thallium	ug/g	21547	0.014	0.015
Thallium	ug/g	21551	0.022	0.021
Uranium	ug/g	21457	<0.005	<0.005
Uranium	ug/g	21467	<0.005	<0.005
Uranium	ug/g	21496	0.009	0.007
Uranium	ug/g	21498	<0.005	<0.005
Uranium	ug/g	21501	<0.005	<0.005
Uranium	ug/g	21510	0.009	0.009
Uranium	ug/g	21515	<0.005	<0.005
Uranium	ug/g	21538	<0.005	<0.005
Uranium	ug/g	21540	<0.005	<0.005
Uranium	ug/g	21547	<0.005	<0.005
Uranium	ug/g	21551	<0.005	<0.005
Vanadium	ug/g	21457	<0.1	<0.1
Vanadium	ug/g	21467	<0.1	<0.1
Vanadium	ug/g	21496	0.2	0.2
Vanadium	ug/g	21498	<0.1	<0.1
Vanadium	ug/g	21501	<0.1	<0.1
Vanadium	ug/g	21510	<0.1	<0.1
Vanadium	ug/g	21515	<0.1	<0.1
Vanadium	ug/g	21538	<0.1	<0.1
Vanadium	ug/g	21540	<0.1	<0.1
Vanadium	ug/g	21547	<0.1	<0.1
Vanadium	ug/g	21551	<0.1	<0.1
Zinc	ug/g	21457	100	100
Zinc	ug/g	21467	86	88
Zinc	ug/g	21496	110	96
Zinc	ug/g	21498	110	110
Zinc	ug/g	21501	41	32
Zinc	ug/g	21510	120	120
Zinc	ug/g	21515	120	120
Zinc	ug/g	21538	86	86
Zinc	ug/g	21540	100	100
Zinc	ug/g	21547	94	100
Zinc	ug/g	21551	120	110

*(1) The duplicate results for Barium were outside the laboratory's specified limits. The data was reviewed and the sample was reanalyzed. All other quality control measures in the batch were within limits.

*(2) The duplicate results for Iron were outside the laboratory's specified limits. The data was reviewed and all other quality control measures in the batch were within limits.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

May 27, 2019

This report was generated for samples included in SRC Group # 2019-5208

*(3) The duplicate results for Strontium were outside the laboratory's specified limits. The data was reviewed and the duplicate samples were reanalyzed. All other quality control measures in the batch were within limits.

Overall, there were no other indications of problems with the analysis and the results were considered acceptable.

Roxane Ortmann - Quality Assurance Supervisor

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11532

May 21, 2020

Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Heidi Currier

Date Samples Received: Aug-15-2019 Client P.O.: VPO00616225 Ref# 19-08

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 2 authorized by Keith Gipman, Supervisor
Results from Lab Section 6 authorized by Marion McConnell, Supervisor

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11532

May 21, 2020

Minnow Environmental Inc.

2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Heidi Currier

Sample #: **2019045494**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_TN-INV_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	2000	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	3.0	0.5
Barium	ug/g	17	5
Beryllium	ug/g	0.06	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	1.6	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	20	5
Iron	ug/g	3600	50
Lead	ug/g	4.0	0.5
Manganese	ug/g	85	5
Mercury	ug/g	0.04	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	5.2	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	30	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	50	5
Uranium	ug/g	0.3	0.1
Vanadium	ug/g	3	1
Zinc	ug/g	100	50
Lab Section 6			
Moisture	%	84.88	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11532

May 21, 2020

Minnow Environmental Inc.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11532

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045495**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_T4-INV_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	7400	50
Antimony	ug/g	0.16	0.02
Arsenic	ug/g	6.0	0.05
Barium	ug/g	78	0.5
Beryllium	ug/g	0.29	0.02
Boron	ug/g	8	5
Cadmium	ug/g	1.7	0.02
Chromium	ug/g	9.8	0.5
Cobalt	ug/g	3.6	0.5
Copper	ug/g	20	0.5
Iron	ug/g	10200	50
Lead	ug/g	6.8	0.05
Manganese	ug/g	220	0.5
Mercury	ug/g	0.04	0.01
Molybdenum	ug/g	0.52	0.05
Nickel	ug/g	9.1	0.5
Selenium	ug/g	8.0	0.05
Silver	ug/g	0.08	0.02
Strontium	ug/g	73	0.1
Thallium	ug/g	0.14	0.01
Tin	ug/g	0.2	0.2
Titanium	ug/g	87	0.5
Uranium	ug/g	0.39	0.02
Vanadium	ug/g	13	0.2
Zinc	ug/g	110	5
Lab Section 6			
Moisture	%	81.63	0.02

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11532

May 21, 2020

Minnow Environmental Inc.

Analyte Methods

Name	Units	Method
Silver	ug/g	PRP-034 / Chm-522
Aluminum	ug/g	PRP-034 / Chm-522
Arsenic	ug/g	PRP-034 / Chm-522
Boron	ug/g	PRP-034 / Chm-522
Barium	ug/g	PRP-034 / Chm-522
Beryllium	ug/g	PRP-034 / Chm-522
Cadmium	ug/g	PRP-034 / Chm-522
Cobalt	ug/g	PRP-034 / Chm-522
Chromium	ug/g	PRP-034 / Chm-522
Copper	ug/g	PRP-034 / Chm-522
Iron	ug/g	PRP-034 / Chm-522
Mercury	ug/g	PRP-034 / Chm-522
Manganese	ug/g	PRP-034 / Chm-522
Molybdenum	ug/g	PRP-034 / Chm-522
Nickel	ug/g	PRP-034 / Chm-522
Lead	ug/g	PRP-034 / Chm-522
Antimony	ug/g	PRP-034 / Chm-522
Selenium	ug/g	PRP-034 / Chm-522
Tin	ug/g	PRP-034 / Chm-522
Strontium	ug/g	PRP-034 / Chm-522
Titanium	ug/g	PRP-034 / Chm-522
Thallium	ug/g	PRP-034 / Chm-522
Uranium	ug/g	PRP-034 / Chm-522
Vanadium	ug/g	PRP-034 / Chm-522
Zinc	ug/g	PRP-034 / Chm-522
Moisture	%	PRP-010

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Sep 05, 2019

This report was generated for samples included in SRC Group # 2019-11532

Quality Control Report

Heidi Currier
Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Aluminum	ug/g	1280	1200
Aluminum	ug/g	1340	1210
Arsenic	ug/g	6.87	6.47
Arsenic	ug/g	6.87	5.85
Cadmium	ug/g	0.299	0.279
Cadmium	ug/g	0.299	0.280
Chromium	ug/g	1.87	1.44
Chromium	ug/g	1.57	1.49
Copper	ug/g	15.7	12.7
Copper	ug/g	14.4	13.4
Iron	ug/g	343	284
Iron	ug/g	312	270
Lead	ug/g	0.404	0.365
Lead	ug/g	0.404	0.385
Manganese	ug/g	3.17	2.51
Manganese	ug/g	2.70	2.64
Mercury	ug/g	0.412	0.332
Mercury	ug/g	0.364	0.314
Nickel	ug/g	1.34	1.08
Nickel	ug/g	1.20	1.14
Selenium	ug/g	3.45	3.50
Selenium	ug/g	3.74	3.22
Silver	ug/g	0.0252	0.0232
Silver	ug/g	0.0219	0.0203
Zinc	ug/g	51.6	45.7
Zinc	ug/g	47.8	41.7

Please note, duplicates could not be analyzed for ICP due to insufficient sample available.

All quality control results were within the specified limits and considered acceptable.

Roxane Ortmann - Quality Assurance Supervisor

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Heidi Currier

Date Samples Received: Aug-15-2019 Client P.O.: VPO00616225 Ref# 19-08

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 2 authorized by Keith Gipman, Supervisor
Results from Lab Section 6 authorized by Marion McConnell, Supervisor

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Heidi Currier

Sample #: **2019045598**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC-WCT-01-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.13	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	3.6	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	74.53	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045599**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-WCT-02-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.30	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	4.0	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	73.84	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045600**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-WCT-03-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.06	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	2.1	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	79.53	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045601**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC-RBT-01-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.14	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	0.8	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	50	50
Lab Section 6			
Moisture	%	74.02	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045602**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-RBT-02-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.20	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.2	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	78.74	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045603**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_GC-MWF-01-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	36	5
Antimony	ug/g	<0.02	0.02
Arsenic	ug/g	0.96	0.05
Barium	ug/g	<0.5	0.5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<5	5
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<0.5	0.5
Cobalt	ug/g	<0.5	0.5
Copper	ug/g	1.2	0.5
Iron	ug/g	43	5
Lead	ug/g	0.09	0.05
Manganese	ug/g	1.6	0.5
Mercury	ug/g	0.13	0.01
Molybdenum	ug/g	<0.05	0.05
Nickel	ug/g	<0.5	0.5
Selenium	ug/g	3.6	0.05
Silver	ug/g	<0.02	0.02
Strontium	ug/g	1.4	0.1
Thallium	ug/g	0.05	0.01
Tin	ug/g	<0.2	0.2
Titanium	ug/g	1.2	0.5
Uranium	ug/g	<0.02	0.02
Vanadium	ug/g	<0.2	0.2
Zinc	ug/g	22	5
Lab Section 6			
Moisture	%	79.34	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045604**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-MWF-02-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.29	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.5	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	79.75	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045605**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-MWF-03-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.21	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	2.3	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	78.90	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045606**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-MWF-04-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	0.6	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.16	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	2.3	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	77.99	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045607**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-BT-01-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	0.03	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.80	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.8	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	80.49	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045608**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-BT-02-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	0.05	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	60	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	1.1	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.7	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	82.47	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045609**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-BT-03-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	620	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	640	50
Lead	ug/g	3.1	0.5
Manganese	ug/g	6	5
Mercury	ug/g	1.0	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	2.4	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	2	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	8	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	90.96	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045610**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-MWF-05-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.12	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	4.2	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	73.44	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045611**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-MWF-06-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.20	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.8	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	66.47	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045612**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-MWF-07-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	0.6	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.15	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	2.0	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	80.30	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045613**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-WCT-04-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.15	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	3.4	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	77.32	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045614**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_GC-WCT-05-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	70	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.24	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	2.1	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	75.93	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045615**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC-WCT-01-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.15	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	2.8	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	79.49	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045616**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC-KO-01-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.29	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.7	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	74.90	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045617**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC-KO-02-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.20	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.5	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	75.03	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045618**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC-KO-03-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.22	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.9	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	74.96	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045619**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC-KO-04-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.19	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.4	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	71.18	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045620**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC-KO-05-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.25	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.6	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	74.50	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045621**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_SC-BT-01-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	1.9	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.7	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	84.97	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045622**
Date Sampled: **Apr 25, 2019**
Sample Matrix: **TISSUE**
Description: **04/25/2019 RG_SC-BT-02-M_20190425**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	1.2	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.9	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	76.03	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045623**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER-KO-01-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.21	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.4	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	2	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	70.00	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045624**
Date Sampled: **Apr 24, 2019**
Sample Matrix: **TISSUE**
Description: **04/24/2019 RG_ER-KO-02-M_20190424**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.26	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.6	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	75.50	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045625**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_ER-KO-03-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.22	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.4	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	72.75	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045626**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_ER-KO-04-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.20	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.3	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	72.67	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045627**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_ER-KO-05-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.12	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.4	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	3	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	67.09	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019045628**
Date Sampled: **Apr 26, 2019**
Sample Matrix: **TISSUE**
Description: **04/26/2019 RG_ER-KO-06-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.16	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	1.5	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	59.71	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019047008**
Date Sampled: **Aug 26, 2019**
Sample Matrix: **TISSUE**
Description: **08/26/2019 RG_GC_MWF-01-M_20190426**

Client PO #: **VPO00616225 Ref# 19-08**
Date Received: **Aug 15, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	<50	50
Antimony	ug/g	<0.1	0.1
Arsenic	ug/g	<0.5	0.5
Barium	ug/g	<5	5
Beryllium	ug/g	<0.02	0.02
Boron	ug/g	<50	50
Cadmium	ug/g	<0.02	0.02
Chromium	ug/g	<5	5
Cobalt	ug/g	<5	5
Copper	ug/g	<5	5
Iron	ug/g	<50	50
Lead	ug/g	<0.5	0.5
Manganese	ug/g	<5	5
Mercury	ug/g	0.28	0.02
Molybdenum	ug/g	<0.5	0.5
Nickel	ug/g	<5	5
Selenium	ug/g	2.0	0.5
Silver	ug/g	<0.02	0.02
Strontium	ug/g	<1	1
Thallium	ug/g	<0.1	0.1
Tin	ug/g	<2	2
Titanium	ug/g	<5	5
Uranium	ug/g	<0.1	0.1
Vanadium	ug/g	<1	1
Zinc	ug/g	<50	50
Lab Section 6			
Moisture	%	76.58	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 12.7 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11533

May 21, 2020

Minnow Environmental Inc.

Analyte Methods

Name	Units	Method
Silver	ug/g	PRP-034 / Chm-522
Aluminum	ug/g	PRP-034 / Chm-522
Arsenic	ug/g	PRP-034 / Chm-522
Boron	ug/g	PRP-034 / Chm-522
Barium	ug/g	PRP-034 / Chm-522
Beryllium	ug/g	PRP-034 / Chm-522
Cadmium	ug/g	PRP-034 / Chm-522
Cobalt	ug/g	PRP-034 / Chm-522
Chromium	ug/g	PRP-034 / Chm-522
Copper	ug/g	PRP-034 / Chm-522
Iron	ug/g	PRP-034 / Chm-522
Mercury	ug/g	PRP-034 / Chm-522
Manganese	ug/g	PRP-034 / Chm-522
Molybdenum	ug/g	PRP-034 / Chm-522
Nickel	ug/g	PRP-034 / Chm-522
Lead	ug/g	PRP-034 / Chm-522
Antimony	ug/g	PRP-034 / Chm-522
Selenium	ug/g	PRP-034 / Chm-522
Tin	ug/g	PRP-034 / Chm-522
Strontium	ug/g	PRP-034 / Chm-522
Titanium	ug/g	PRP-034 / Chm-522
Thallium	ug/g	PRP-034 / Chm-522
Uranium	ug/g	PRP-034 / Chm-522
Vanadium	ug/g	PRP-034 / Chm-522
Zinc	ug/g	PRP-034 / Chm-522
Moisture	%	PRP-010

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Sep 05, 2019

This report was generated for samples included in SRC Group # 2019-11533

Quality Control Report

Heidi Currier
Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Aluminum	ug/g	1340	1240
Arsenic	ug/g	6.87	5.93
Cadmium	ug/g	0.299	0.288
Chromium	ug/g	1.57	1.48
Copper	ug/g	14.4	13.5
Iron	ug/g	312	290
Lead	ug/g	0.404	0.388
Manganese	ug/g	2.70	2.93
Mercury	ug/g	0.364	0.325
Nickel	ug/g	1.20	1.16
Selenium	ug/g	3.74	3.23
Silver	ug/g	0.0219	0.0193
Zinc	ug/g	47.8	42.8

Please note, duplicates could not be analyzed for ICP due to insufficient sample available.

All quality control results were within the specified limits and considered acceptable.

Roxane Ortmann - Quality Assurance Supervisor

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11739

May 21, 2020

Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Heidi Currier

Date Samples Received: Aug-20-2019 Client P.O.: VPO00616225 Ref#19-08

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 2 authorized by Keith Gipman, Supervisor
Results from Lab Section 6 authorized by Marion McConnell, Supervisor

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11739

May 21, 2020

Minnow Environmental Inc.

2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Heidi Currier

Sample #: **2019046558**
Date Sampled: **Jun 14, 2019**
Sample Matrix: **TISSUE**
Description: **06/14/2019 RGT_T4-1_ZOOT_20190614**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Aug 20, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	1400	5
Antimony	ug/g	0.12	0.02
Arsenic	ug/g	2.9	0.02
Barium	ug/g	25	0.05
Beryllium	ug/g	0.05	0.02
Boron	ug/g	<2	2
Cadmium	ug/g	0.54	0.02
Chromium	ug/g	2.0	0.1
Cobalt	ug/g	1.2	0.02
Copper	ug/g	7.8	0.1
Iron	ug/g	1400	5
Lead	ug/g	6.9	0.02
Manganese	ug/g	84	0.2
Mercury	ug/g	0.04	0.01
Molybdenum	ug/g	0.27	0.05
Nickel	ug/g	2.2	0.1
Selenium	ug/g	3.4	0.02
Silver	ug/g	0.03	0.02
Strontium	ug/g	18	0.1
Thallium	ug/g	0.04	0.01
Tin	ug/g	0.3	0.1
Titanium	ug/g	21	0.5
Uranium	ug/g	0.08	0.01
Vanadium	ug/g	2.0	0.2
Zinc	ug/g	150	1
Lab Section 6			
Moisture	%	92.17	0.02

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 5.1 °C upon receipt.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11739

May 21, 2020

Minnow Environmental Inc.

Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11739

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019046559**
Date Sampled: **Jun 14, 2019**
Sample Matrix: **TISSUE**
Description: **06/14/2019 RGT_T4-2_ZOOT_20190614**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Aug 20, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	1500	20
Antimony	ug/g	0.06	0.01
Arsenic	ug/g	2.6	0.01
Barium	ug/g	19	0.02
Beryllium	ug/g	0.05	0.01
Boron	ug/g	1	1
Cadmium	ug/g	0.54	0.01
Chromium	ug/g	1.8	0.05
Cobalt	ug/g	1.1	0.01
Copper	ug/g	6.7	0.05
Iron	ug/g	1300	20
Lead	ug/g	2.9	0.01
Manganese	ug/g	67	0.1
Mercury	ug/g	0.043	0.005
Molybdenum	ug/g	0.26	0.02
Nickel	ug/g	1.9	0.05
Selenium	ug/g	3.0	0.01
Silver	ug/g	0.02	0.01
Strontium	ug/g	18	0.05
Thallium	ug/g	0.032	0.005
Tin	ug/g	0.19	0.05
Titanium	ug/g	16	0.2
Uranium	ug/g	0.073	0.005
Vanadium	ug/g	2.0	0.1
Zinc	ug/g	140	0.5
Lab Section 6			
Moisture	%	92.00	0.02

The temperature of the cooler was 5.1 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11739

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019046560**
Date Sampled: **Jun 14, 2019**
Sample Matrix: **TISSUE**
Description: **06/14/2019 RGT_T4-3_ZOOT_20190614**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Aug 20, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	1600	20
Antimony	ug/g	0.07	0.01
Arsenic	ug/g	2.6	0.01
Barium	ug/g	22	0.02
Beryllium	ug/g	0.06	0.01
Boron	ug/g	1	1
Cadmium	ug/g	0.57	0.01
Chromium	ug/g	1.9	0.05
Cobalt	ug/g	0.98	0.01
Copper	ug/g	7.0	0.05
Iron	ug/g	1300	20
Lead	ug/g	2.0	0.01
Manganese	ug/g	73	0.1
Mercury	ug/g	0.047	0.005
Molybdenum	ug/g	0.27	0.02
Nickel	ug/g	1.7	0.05
Selenium	ug/g	2.9	0.01
Silver	ug/g	0.03	0.01
Strontium	ug/g	22	0.05
Thallium	ug/g	0.036	0.005
Tin	ug/g	0.21	0.05
Titanium	ug/g	18	0.2
Uranium	ug/g	0.074	0.005
Vanadium	ug/g	2.2	0.1
Zinc	ug/g	130	0.5
Lab Section 6			
Moisture	%	92.08	0.02

The temperature of the cooler was 5.1 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11739

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019046561**
Date Sampled: **Jun 14, 2019**
Sample Matrix: **TISSUE**
Description: **06/14/2019 RGT_T4-4_ZOOT_20190614**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Aug 20, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	1300	20
Antimony	ug/g	0.06	0.01
Arsenic	ug/g	2.7	0.01
Barium	ug/g	20	0.02
Beryllium	ug/g	0.05	0.01
Boron	ug/g	1	1
Cadmium	ug/g	0.56	0.01
Chromium	ug/g	1.5	0.05
Cobalt	ug/g	0.94	0.01
Copper	ug/g	8.5	0.05
Iron	ug/g	1200	20
Lead	ug/g	1.6	0.01
Manganese	ug/g	71	0.1
Mercury	ug/g	0.040	0.005
Molybdenum	ug/g	0.28	0.02
Nickel	ug/g	1.6	0.05
Selenium	ug/g	2.9	0.01
Silver	ug/g	0.02	0.01
Strontium	ug/g	21	0.05
Thallium	ug/g	0.035	0.005
Tin	ug/g	0.32	0.05
Titanium	ug/g	13	0.2
Uranium	ug/g	0.069	0.005
Vanadium	ug/g	1.8	0.1
Zinc	ug/g	150	0.5
Lab Section 6			
Moisture	%	93.63	0.02

The temperature of the cooler was 5.1 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11739

May 21, 2020

Minnow Environmental Inc.

Sample #: **2019046562**
Date Sampled: **Jun 14, 2019**
Sample Matrix: **TISSUE**
Description: **06/14/2019 RGT_T4-5_ZOOT_20190614**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Aug 20, 2019**

Analyte	Units	Result	DL
Lab Section 2			
Aluminum	ug/g	1500	20
Antimony	ug/g	0.15	0.01
Arsenic	ug/g	2.6	0.01
Barium	ug/g	44	0.02
Beryllium	ug/g	0.07	0.01
Boron	ug/g	3	1
Cadmium	ug/g	0.60	0.01
Chromium	ug/g	1.9	0.05
Cobalt	ug/g	1.5	0.01
Copper	ug/g	9.1	0.05
Iron	ug/g	2200	20
Lead	ug/g	2.1	0.01
Manganese	ug/g	127	0.1
Mercury	ug/g	0.038	0.005
Molybdenum	ug/g	0.33	0.02
Nickel	ug/g	4.0	0.05
Selenium	ug/g	3.1	0.01
Silver	ug/g	0.03	0.01
Strontium	ug/g	39	0.05
Thallium	ug/g	0.065	0.005
Tin	ug/g	0.17	0.05
Titanium	ug/g	22	0.2
Uranium	ug/g	0.56	0.005
Vanadium	ug/g	2.5	0.1
Zinc	ug/g	120	0.5
Lab Section 6			
Moisture	%	91.54	0.02

The temperature of the cooler was 5.1 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-11739

May 21, 2020

Minnow Environmental Inc.

Analyte Methods

Name	Units	Method
Silver	ug/g	PRP-034 / Chm-522
Aluminum	ug/g	PRP-034 / Chm-522
Arsenic	ug/g	PRP-034 / Chm-522
Boron	ug/g	PRP-034 / Chm-522
Barium	ug/g	PRP-034 / Chm-522
Beryllium	ug/g	PRP-034 / Chm-522
Cadmium	ug/g	PRP-034 / Chm-522
Cobalt	ug/g	PRP-034 / Chm-522
Chromium	ug/g	PRP-034 / Chm-522
Copper	ug/g	PRP-034 / Chm-522
Iron	ug/g	PRP-034 / Chm-522
Mercury	ug/g	PRP-034 / Chm-522
Manganese	ug/g	PRP-034 / Chm-522
Molybdenum	ug/g	PRP-034 / Chm-522
Nickel	ug/g	PRP-034 / Chm-522
Lead	ug/g	PRP-034 / Chm-522
Antimony	ug/g	PRP-034 / Chm-522
Selenium	ug/g	PRP-034 / Chm-522
Tin	ug/g	PRP-034 / Chm-522
Strontium	ug/g	PRP-034 / Chm-522
Titanium	ug/g	PRP-034 / Chm-522
Thallium	ug/g	PRP-034 / Chm-522
Uranium	ug/g	PRP-034 / Chm-522
Vanadium	ug/g	PRP-034 / Chm-522
Zinc	ug/g	PRP-034 / Chm-522
Moisture	%	PRP-010

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Aug 30, 2019

This report was generated for samples included in SRC Group # 2019-11739

Quality Control Report

Heidi Currier
Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Aluminum	ug/g	1280	1200
Arsenic	ug/g	6.87	6.47
Cadmium	ug/g	0.299	0.279
Chromium	ug/g	1.87	1.44
Copper	ug/g	15.7	12.7
Iron	ug/g	343	284
Lead	ug/g	0.404	0.365
Manganese	ug/g	3.17	2.51
Mercury	ug/g	0.412	0.332
Nickel	ug/g	1.34	1.08
Selenium	ug/g	3.45	3.50
Silver	ug/g	0.0252	0.0232
Zinc	ug/g	51.6	45.7

Please note, duplicates could not be analyzed for ICP due to insufficient sample available.

All quality control results were within the specified limits and considered acceptable.

Roxane Ortmann - Quality Assurance Supervisor

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Heidi Currier

Date Samples Received: Sep-19-2019 Client P.O.: VPO00616225 Ref#19-08

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 2 authorized by Keith Gipman, Supervisor
Results from Lab Section 6 authorized by Marion McConnell, Supervisor

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

2 Lamb Street
Georgetown, ON L7G 3M9
Attn: Heidi Currier

Sample #: **2019053248**
Date Sampled: **Aug 26, 2019**
Sample Matrix: **TISSUE**
Description: **08/26/2019 RG_SC-KO-01_M_20190826**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	<50		50	0.013
Antimony	ug/g	<0.1		0.1	0.013
Arsenic	ug/g	<0.5		0.5	0.013
Barium	ug/g	<5		5	0.013
Beryllium	ug/g	<0.02		0.02	0.013
Boron	ug/g	<50		50	0.013
Cadmium	ug/g	<0.02		0.02	0.013
Chromium	ug/g	<5		5	0.013
Cobalt	ug/g	<5		5	0.013
Copper	ug/g	<5		5	0.013
Iron	ug/g	<50		50	0.013
Lead	ug/g	<0.5		0.5	0.013
Manganese	ug/g	<5		5	0.013
Mercury	ug/g	0.18	0.06	0.02	0.013
Molybdenum	ug/g	<0.5		0.5	0.013
Nickel	ug/g	<5		5	0.013
Selenium	ug/g	1.6	0.9	0.5	0.013
Silver	ug/g	<0.02		0.02	0.013
Strontium	ug/g	2	1	1	0.013
Thallium	ug/g	<0.1		0.1	0.013
Tin	ug/g	<2		2	0.013
Titanium	ug/g	<5		5	0.013
Uranium	ug/g	<0.1		0.1	0.013
Vanadium	ug/g	<1		1	0.013
Zinc	ug/g	110	70	50	0.013
Lab Section 6					
Moisture	%	57.83	6	0.02	0.013

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053249**
Date Sampled: **Aug 26, 2019**
Sample Matrix: **TISSUE**
Description: **08/26/2019 RG_SC-KO-02_M_20190826**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	<50		50	0.0131
Antimony	ug/g	<0.1		0.1	0.0131
Arsenic	ug/g	<0.5		0.5	0.0131
Barium	ug/g	<5		5	0.0131
Beryllium	ug/g	<0.02		0.02	0.0131
Boron	ug/g	<50		50	0.0131
Cadmium	ug/g	<0.02		0.02	0.0131
Chromium	ug/g	<5		5	0.0131
Cobalt	ug/g	<5		5	0.0131
Copper	ug/g	<5		5	0.0131
Iron	ug/g	<50		50	0.0131
Lead	ug/g	<0.5		0.5	0.0131
Manganese	ug/g	<5		5	0.0131
Mercury	ug/g	0.15	0.05	0.02	0.0131
Molybdenum	ug/g	<0.5		0.5	0.0131
Nickel	ug/g	<5		5	0.0131
Selenium	ug/g	1.6	0.9	0.5	0.0131
Silver	ug/g	<0.02		0.02	0.0131
Strontium	ug/g	1	1	1	0.0131
Thallium	ug/g	<0.1		0.1	0.0131
Tin	ug/g	<2		2	0.0131
Titanium	ug/g	<5		5	0.0131
Uranium	ug/g	<0.1		0.1	0.0131
Vanadium	ug/g	<1		1	0.0131
Zinc	ug/g	130	80	50	0.0131
Lab Section 6					
Moisture	%	74.41	7	0.02	0.0131

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053250**
Date Sampled: **Aug 26, 2019**
Sample Matrix: **TISSUE**
Description: **08/26/2019 RG_SC-KO-03_M_20190826**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	<50		50	0.0118
Antimony	ug/g	<0.1		0.1	0.0118
Arsenic	ug/g	<0.5		0.5	0.0118
Barium	ug/g	<5		5	0.0118
Beryllium	ug/g	<0.02		0.02	0.0118
Boron	ug/g	<50		50	0.0118
Cadmium	ug/g	<0.02		0.02	0.0118
Chromium	ug/g	<5		5	0.0118
Cobalt	ug/g	<5		5	0.0118
Copper	ug/g	<5		5	0.0118
Iron	ug/g	<50		50	0.0118
Lead	ug/g	<0.5		0.5	0.0118
Manganese	ug/g	<5		5	0.0118
Mercury	ug/g	0.16	0.05	0.02	0.0118
Molybdenum	ug/g	<0.5		0.5	0.0118
Nickel	ug/g	<5		5	0.0118
Selenium	ug/g	1.6	0.9	0.5	0.0118
Silver	ug/g	<0.02		0.02	0.0118
Strontium	ug/g	<1		1	0.0118
Thallium	ug/g	<0.1		0.1	0.0118
Tin	ug/g	<2		2	0.0118
Titanium	ug/g	<5		5	0.0118
Uranium	ug/g	<0.1		0.1	0.0118
Vanadium	ug/g	<1		1	0.0118
Zinc	ug/g	120	80	50	0.0118
Lab Section 6					
Moisture	%	73.95	7	0.02	0.0118

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053251**
Date Sampled: **Aug 26, 2019**
Sample Matrix: **TISSUE**
Description: **08/26/2019 RG_ER-KO-04_M_20190826**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	<50		50	0.0124
Antimony	ug/g	<0.1		0.1	0.0124
Arsenic	ug/g	<0.5		0.5	0.0124
Barium	ug/g	<5		5	0.0124
Beryllium	ug/g	<0.02		0.02	0.0124
Boron	ug/g	<50		50	0.0124
Cadmium	ug/g	<0.02		0.02	0.0124
Chromium	ug/g	<5		5	0.0124
Cobalt	ug/g	<5		5	0.0124
Copper	ug/g	<5		5	0.0124
Iron	ug/g	<50		50	0.0124
Lead	ug/g	<0.5		0.5	0.0124
Manganese	ug/g	<5		5	0.0124
Mercury	ug/g	0.18	0.06	0.02	0.0124
Molybdenum	ug/g	<0.5		0.5	0.0124
Nickel	ug/g	<5		5	0.0124
Selenium	ug/g	1.8	0.9	0.5	0.0124
Silver	ug/g	<0.02		0.02	0.0124
Strontium	ug/g	<1		1	0.0124
Thallium	ug/g	<0.1		0.1	0.0124
Tin	ug/g	<2		2	0.0124
Titanium	ug/g	<5		5	0.0124
Uranium	ug/g	<0.1		0.1	0.0124
Vanadium	ug/g	<1		1	0.0124
Zinc	ug/g	170	90	50	0.0124
Lab Section 6					
Moisture	%	73.82	7	0.02	0.0124

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053252**
Date Sampled: **Aug 21, 2019**
Sample Matrix: **TISSUE**
Description: **08/21/2019 RG_T4_INV_20190821**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	820	200	50	0.0146
Antimony	ug/g	<0.1		0.1	0.0146
Arsenic	ug/g	12	2	0.5	0.0146
Barium	ug/g	26	5	5	0.0146
Beryllium	ug/g	0.03	0.02	0.02	0.0146
Boron	ug/g	<50		50	0.0146
Cadmium	ug/g	0.31	0.08	0.02	0.0146
Chromium	ug/g	<5		5	0.0146
Cobalt	ug/g	<5		5	0.0146
Copper	ug/g	18	9	5	0.0146
Iron	ug/g	5000	500	50	0.0146
Lead	ug/g	0.7	0.6	0.5	0.0146
Manganese	ug/g	45	10	5	0.0146
Mercury	ug/g	<0.02		0.02	0.0146
Molybdenum	ug/g	<0.5		0.5	0.0146
Nickel	ug/g	<5		5	0.0146
Selenium	ug/g	1.5	0.8	0.5	0.0146
Silver	ug/g	0.06	0.03	0.02	0.0146
Strontium	ug/g	230	20	1	0.0146
Thallium	ug/g	<0.1		0.1	0.0146
Tin	ug/g	<2		2	0.0146
Titanium	ug/g	9	5	5	0.0146
Uranium	ug/g	<0.1		0.1	0.0146
Vanadium	ug/g	2	1	1	0.0146
Zinc	ug/g	<50		50	0.0146
Lab Section 6					
Moisture	%	42.39	4	0.02	0.0146

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053253**
Date Sampled: **Aug 22, 2019**
Sample Matrix: **TISSUE**
Description: **08/22/2019 RG_TN_INV_20190822**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	3700	600	50	0.0093
Antimony	ug/g	0.2	0.1	0.1	0.0093
Arsenic	ug/g	10	2	0.5	0.0093
Barium	ug/g	40	5	5	0.0093
Beryllium	ug/g	0.16	0.03	0.02	0.0093
Boron	ug/g	<50		50	0.0093
Cadmium	ug/g	0.23	0.06	0.02	0.0093
Chromium	ug/g	<5		5	0.0093
Cobalt	ug/g	<5		5	0.0093
Copper	ug/g	22	10	5	0.0093
Iron	ug/g	5200	500	50	0.0093
Lead	ug/g	8.0	2	0.5	0.0093
Manganese	ug/g	96	20	5	0.0093
Mercury	ug/g	0.05	0.03	0.02	0.0093
Molybdenum	ug/g	<0.5		0.5	0.0093
Nickel	ug/g	<5		5	0.0093
Selenium	ug/g	2.9	1	0.5	0.0093
Silver	ug/g	0.06	0.03	0.02	0.0093
Strontium	ug/g	44	7	1	0.0093
Thallium	ug/g	<0.1		0.1	0.0093
Tin	ug/g	<2		2	0.0093
Titanium	ug/g	60	20	5	0.0093
Uranium	ug/g	0.5	0.2	0.1	0.0093
Vanadium	ug/g	5	2	1	0.0093
Zinc	ug/g	110	70	50	0.0093
Lab Section 6					
Moisture	%	86.30	9	0.02	0.0093

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053254**
Date Sampled: **Aug 21, 2019**
Sample Matrix: **TISSUE**
Description: **08/21/2019 RG_T4-1-ZOOT_20190821**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	2200	200	5	0.0393
Antimony	ug/g	0.21	0.05	0.02	0.0393
Arsenic	ug/g	3.0	0.4	0.05	0.0393
Barium	ug/g	51	5	0.5	0.0393
Beryllium	ug/g	0.08	0.02	0.02	0.0393
Boron	ug/g	<5		5	0.0393
Cadmium	ug/g	1.3	0.2	0.02	0.0393
Chromium	ug/g	2.4	1	0.5	0.0393
Cobalt	ug/g	1.0	0.5	0.5	0.0393
Copper	ug/g	9.1	2	0.5	0.0393
Iron	ug/g	1700	200	5	0.0393
Lead	ug/g	2.0	0.3	0.05	0.0393
Manganese	ug/g	96	10	0.5	0.0393
Mercury	ug/g	0.03	0.02	0.01	0.0393
Molybdenum	ug/g	0.45	0.1	0.05	0.0393
Nickel	ug/g	2.7	0.5	0.5	0.0393
Selenium	ug/g	3.5	0.5	0.05	0.0393
Silver	ug/g	0.04	0.03	0.02	0.0393
Strontium	ug/g	90	9	0.1	0.0393
Thallium	ug/g	0.07	0.02	0.01	0.0393
Tin	ug/g	0.4	0.2	0.2	0.0393
Titanium	ug/g	46	7	0.5	0.0393
Uranium	ug/g	0.33	0.08	0.02	0.0393
Vanadium	ug/g	2.8	0.7	0.2	0.0393
Zinc	ug/g	110	20	5	0.0393
Lab Section 6					
Moisture	%	99.78	10	0.02	0.0393

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053255**
Date Sampled: **Aug 21, 2019**
Sample Matrix: **TISSUE**
Description: **08/21/2019 RG_T4-2-ZOOT_20190821**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	1700	200	5	0.0625
Antimony	ug/g	0.11	0.04	0.02	0.0625
Arsenic	ug/g	3.1	0.5	0.05	0.0625
Barium	ug/g	41	6	0.5	0.0625
Beryllium	ug/g	0.07	0.02	0.02	0.0625
Boron	ug/g	<5		5	0.0625
Cadmium	ug/g	1.3	0.2	0.02	0.0625
Chromium	ug/g	1.9	1	0.5	0.0625
Cobalt	ug/g	0.9	0.5	0.5	0.0625
Copper	ug/g	10	2	0.5	0.0625
Iron	ug/g	1200	100	5	0.0625
Lead	ug/g	1.3	0.2	0.05	0.0625
Manganese	ug/g	78	8	0.5	0.0625
Mercury	ug/g	0.03	0.02	0.01	0.0625
Molybdenum	ug/g	0.39	0.1	0.05	0.0625
Nickel	ug/g	2.8	0.5	0.5	0.0625
Selenium	ug/g	3.4	0.5	0.05	0.0625
Silver	ug/g	0.04	0.03	0.02	0.0625
Strontium	ug/g	77	8	0.1	0.0625
Thallium	ug/g	0.06	0.02	0.01	0.0625
Tin	ug/g	0.3	0.2	0.2	0.0625
Titanium	ug/g	34	5	0.5	0.0625
Uranium	ug/g	0.23	0.06	0.02	0.0625
Vanadium	ug/g	2.2	0.6	0.2	0.0625
Zinc	ug/g	100	20	5	0.0625
Lab Section 6					
Moisture	%	99.67	10	0.02	0.0625

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053256**
Date Sampled: **Aug 21, 2019**
Sample Matrix: **TISSUE**
Description: **08/21/2019 RG_T4-3-ZOOT_20190821**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	1600	200	5	0.0752
Antimony	ug/g	0.11	0.04	0.02	0.0752
Arsenic	ug/g	3.4	0.5	0.05	0.0752
Barium	ug/g	42	6	0.5	0.0752
Beryllium	ug/g	0.06	0.02	0.02	0.0752
Boron	ug/g	<5		5	0.0752
Cadmium	ug/g	1.4	0.2	0.02	0.0752
Chromium	ug/g	1.8	0.9	0.5	0.0752
Cobalt	ug/g	0.9	0.5	0.5	0.0752
Copper	ug/g	9.9	2	0.5	0.0752
Iron	ug/g	1100	100	5	0.0752
Lead	ug/g	1.5	0.2	0.05	0.0752
Manganese	ug/g	77	8	0.5	0.0752
Mercury	ug/g	0.04	0.02	0.01	0.0752
Molybdenum	ug/g	0.41	0.1	0.05	0.0752
Nickel	ug/g	2.4	0.5	0.5	0.0752
Selenium	ug/g	3.7	0.6	0.05	0.0752
Silver	ug/g	0.04	0.03	0.02	0.0752
Strontium	ug/g	73	7	0.1	0.0752
Thallium	ug/g	0.06	0.02	0.01	0.0752
Tin	ug/g	0.4	0.2	0.2	0.0752
Titanium	ug/g	27	4	0.5	0.0752
Uranium	ug/g	0.21	0.05	0.02	0.0752
Vanadium	ug/g	2.1	0.5	0.2	0.0752
Zinc	ug/g	100	20	5	0.0752
Lab Section 6					
Moisture	%	99.61	10	0.02	0.0752

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053257**
Date Sampled: **Aug 21, 2019**
Sample Matrix: **TISSUE**
Description: **08/21/2019 RG_T4-4-ZOOT_20190821**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	1200	100	5	0.0861
Antimony	ug/g	0.13	0.05	0.02	0.0861
Arsenic	ug/g	3.2	0.5	0.05	0.0861
Barium	ug/g	36	5	0.5	0.0861
Beryllium	ug/g	0.05	0.02	0.02	0.0861
Boron	ug/g	<5		5	0.0861
Cadmium	ug/g	1.3	0.2	0.02	0.0861
Chromium	ug/g	1.4	0.8	0.5	0.0861
Cobalt	ug/g	0.8	0.5	0.5	0.0861
Copper	ug/g	9.0	2	0.5	0.0861
Iron	ug/g	940	90	5	0.0861
Lead	ug/g	2.1	0.3	0.05	0.0861
Manganese	ug/g	66	7	0.5	0.0861
Mercury	ug/g	0.04	0.02	0.01	0.0861
Molybdenum	ug/g	0.39	0.1	0.05	0.0861
Nickel	ug/g	2.0	0.5	0.5	0.0861
Selenium	ug/g	3.6	0.5	0.05	0.0861
Silver	ug/g	0.04	0.03	0.02	0.0861
Strontium	ug/g	70	7	0.1	0.0861
Thallium	ug/g	0.05	0.02	0.01	0.0861
Tin	ug/g	0.4	0.2	0.2	0.0861
Titanium	ug/g	21	3	0.5	0.0861
Uranium	ug/g	0.18	0.06	0.02	0.0861
Vanadium	ug/g	1.7	0.6	0.2	0.0861
Zinc	ug/g	100	20	5	0.0861
Lab Section 6					
Moisture	%	99.53	10	0.02	0.0861

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053258**
Date Sampled: **Aug 21, 2019**
Sample Matrix: **TISSUE**
Description: **08/21/2019 RG_T4-5-ZOOT_20190821**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	1100	100	5	0.0896
Antimony	ug/g	0.13	0.05	0.02	0.0896
Arsenic	ug/g	3.1	0.5	0.05	0.0896
Barium	ug/g	35	5	0.5	0.0896
Beryllium	ug/g	0.04	0.02	0.02	0.0896
Boron	ug/g	<5		5	0.0896
Cadmium	ug/g	1.5	0.2	0.02	0.0896
Chromium	ug/g	1.5	0.8	0.5	0.0896
Cobalt	ug/g	0.7	0.5	0.5	0.0896
Copper	ug/g	9.2	2	0.5	0.0896
Iron	ug/g	860	90	5	0.0896
Lead	ug/g	10	1	0.05	0.0896
Manganese	ug/g	65	6	0.5	0.0896
Mercury	ug/g	0.04	0.02	0.01	0.0896
Molybdenum	ug/g	0.38	0.1	0.05	0.0896
Nickel	ug/g	2.2	0.5	0.5	0.0896
Selenium	ug/g	3.6	0.5	0.05	0.0896
Silver	ug/g	0.08	0.04	0.02	0.0896
Strontium	ug/g	71	7	0.1	0.0896
Thallium	ug/g	0.05	0.02	0.01	0.0896
Tin	ug/g	1.6	0.2	0.2	0.0896
Titanium	ug/g	22	3	0.5	0.0896
Uranium	ug/g	0.20	0.05	0.02	0.0896
Vanadium	ug/g	1.6	0.5	0.2	0.0896
Zinc	ug/g	130	20	5	0.0896
Lab Section 6					
Moisture	%	99.46	10	0.02	0.0896

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053259**
Date Sampled: **Aug 22, 2019**
Sample Matrix: **TISSUE**
Description: **08/22/2019 RG_TN-1-ZOOT_20190822**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	1300	100	5	0.036
Antimony	ug/g	0.18	0.06	0.02	0.036
Arsenic	ug/g	2.7	0.4	0.05	0.036
Barium	ug/g	43	6	0.5	0.036
Beryllium	ug/g	0.05	0.02	0.02	0.036
Boron	ug/g	<5		5	0.036
Cadmium	ug/g	1.3	0.2	0.02	0.036
Chromium	ug/g	1.7	0.9	0.5	0.036
Cobalt	ug/g	0.7	0.5	0.5	0.036
Copper	ug/g	8.7	2	0.5	0.036
Iron	ug/g	950	100	5	0.036
Lead	ug/g	1.8	0.3	0.05	0.036
Manganese	ug/g	58	6	0.5	0.036
Mercury	ug/g	0.04	0.02	0.01	0.036
Molybdenum	ug/g	0.43	0.1	0.05	0.036
Nickel	ug/g	2.0	0.5	0.5	0.036
Selenium	ug/g	3.1	0.5	0.05	0.036
Silver	ug/g	0.04	0.03	0.02	0.036
Strontium	ug/g	108	10	0.1	0.036
Thallium	ug/g	0.05	0.02	0.01	0.036
Tin	ug/g	1.1	0.2	0.2	0.036
Titanium	ug/g	22	3	0.5	0.036
Uranium	ug/g	0.31	0.08	0.02	0.036
Vanadium	ug/g	1.7	0.6	0.2	0.036
Zinc	ug/g	100	20	5	0.036
Lab Section 6					
Moisture	%	99.78	10	0.02	0.036

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053260**
Date Sampled: **Aug 22, 2019**
Sample Matrix: **TISSUE**
Description: **08/22/2019 RG_TN-2-ZOOT_20190822**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	1400	100	5	0.0302
Antimony	ug/g	0.15	0.05	0.02	0.0302
Arsenic	ug/g	2.4	0.4	0.05	0.0302
Barium	ug/g	46	7	0.5	0.0302
Beryllium	ug/g	0.05	0.02	0.02	0.0302
Boron	ug/g	<5		5	0.0302
Cadmium	ug/g	1.2	0.2	0.02	0.0302
Chromium	ug/g	1.8	0.9	0.5	0.0302
Cobalt	ug/g	0.7	0.5	0.5	0.0302
Copper	ug/g	8.2	2	0.5	0.0302
Iron	ug/g	990	100	5	0.0302
Lead	ug/g	1.5	0.2	0.05	0.0302
Manganese	ug/g	64	6	0.5	0.0302
Mercury	ug/g	0.03	0.02	0.01	0.0302
Molybdenum	ug/g	0.72	0.2	0.05	0.0302
Nickel	ug/g	7.1	2	0.5	0.0302
Selenium	ug/g	3.0	0.4	0.05	0.0302
Silver	ug/g	0.04	0.03	0.02	0.0302
Strontium	ug/g	96	10	0.1	0.0302
Thallium	ug/g	0.05	0.02	0.01	0.0302
Tin	ug/g	0.6	0.2	0.2	0.0302
Titanium	ug/g	28	4	0.5	0.0302
Uranium	ug/g	0.36	0.09	0.02	0.0302
Vanadium	ug/g	1.8	0.6	0.2	0.0302
Zinc	ug/g	100	20	5	0.0302
Lab Section 6					
Moisture	%	99.83	10	0.02	0.0302

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053261**
Date Sampled: **Aug 22, 2019**
Sample Matrix: **TISSUE**
Description: **08/22/2019 RG_TN-3-ZOOT_20190822**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	2100	300	50	0.0185
Antimony	ug/g	0.1	0.1	0.1	0.0185
Arsenic	ug/g	2.8	0.5	0.5	0.0185
Barium	ug/g	62	20	5	0.0185
Beryllium	ug/g	0.09	0.02	0.02	0.0185
Boron	ug/g	<50		50	0.0185
Cadmium	ug/g	1.3	0.2	0.02	0.0185
Chromium	ug/g	<5		5	0.0185
Cobalt	ug/g	<5		5	0.0185
Copper	ug/g	9	7	5	0.0185
Iron	ug/g	1600	200	50	0.0185
Lead	ug/g	2.4	1	0.5	0.0185
Manganese	ug/g	84	20	5	0.0185
Mercury	ug/g	0.02	0.02	0.02	0.0185
Molybdenum	ug/g	<0.5		0.5	0.0185
Nickel	ug/g	12	5	5	0.0185
Selenium	ug/g	3.1	1	0.5	0.0185
Silver	ug/g	0.03	0.02	0.02	0.0185
Strontium	ug/g	130	10	1	0.0185
Thallium	ug/g	<0.1		0.1	0.0185
Tin	ug/g	<2		2	0.0185
Titanium	ug/g	36	10	5	0.0185
Uranium	ug/g	0.5	0.2	0.1	0.0185
Vanadium	ug/g	3	2	1	0.0185
Zinc	ug/g	120	80	50	0.0185
Lab Section 6					
Moisture	%	99.85	10	0.02	0.0185

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053262**
Date Sampled: **Aug 22, 2019**
Sample Matrix: **TISSUE**
Description: **08/22/2019 RG_TN-4-ZOOT_20190822**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	1100	100	5	0.0283
Antimony	ug/g	0.08	0.04	0.02	0.0283
Arsenic	ug/g	2.6	0.4	0.05	0.0283
Barium	ug/g	38	6	0.5	0.0283
Beryllium	ug/g	0.04	0.02	0.02	0.0283
Boron	ug/g	<5		5	0.0283
Cadmium	ug/g	1.4	0.2	0.02	0.0283
Chromium	ug/g	1.3	0.8	0.5	0.0283
Cobalt	ug/g	0.7	0.5	0.5	0.0283
Copper	ug/g	7.5	2	0.5	0.0283
Iron	ug/g	940	90	5	0.0283
Lead	ug/g	1.4	0.2	0.05	0.0283
Manganese	ug/g	62	6	0.5	0.0283
Mercury	ug/g	0.03	0.02	0.01	0.0283
Molybdenum	ug/g	0.46	0.1	0.05	0.0283
Nickel	ug/g	1.7	0.5	0.5	0.0283
Selenium	ug/g	3.1	0.5	0.05	0.0283
Silver	ug/g	0.03	0.02	0.02	0.0283
Strontium	ug/g	91	9	0.1	0.0283
Thallium	ug/g	0.04	0.02	0.01	0.0283
Tin	ug/g	0.4	0.2	0.2	0.0283
Titanium	ug/g	16	2	0.5	0.0283
Uranium	ug/g	0.35	0.09	0.02	0.0283
Vanadium	ug/g	1.4	0.5	0.2	0.0283
Zinc	ug/g	93	20	5	0.0283
Lab Section 6					
Moisture	%	99.83	10	0.02	0.0283

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

SRC Group # 2019-13453

Oct 17, 2019

Minnow Environmental Inc.

Sample #: **2019053263**
Date Sampled: **Aug 22, 2019**
Sample Matrix: **TISSUE**
Description: **08/22/2019 RG_TN-5-ZOOT_20190822**

Client PO #: **VPO00616225 Ref#19-08**
Date Received: **Sep 19, 2019**

Analyte	Units	Result	+/-	DL	Weight (g)
Lab Section 2					
Aluminum	ug/g	1100	200	50	0.0237
Antimony	ug/g	<0.1		0.1	0.0237
Arsenic	ug/g	2.6	0.5	0.5	0.0237
Barium	ug/g	39	5	5	0.0237
Beryllium	ug/g	0.06	0.02	0.02	0.0237
Boron	ug/g	<50		50	0.0237
Cadmium	ug/g	1.2	0.2	0.02	0.0237
Chromium	ug/g	<5		5	0.0237
Cobalt	ug/g	<5		5	0.0237
Copper	ug/g	7	6	5	0.0237
Iron	ug/g	1200	200	50	0.0237
Lead	ug/g	1.2	0.8	0.5	0.0237
Manganese	ug/g	60	20	5	0.0237
Mercury	ug/g	0.03	0.02	0.02	0.0237
Molybdenum	ug/g	<0.5		0.5	0.0237
Nickel	ug/g	<5		5	0.0237
Selenium	ug/g	3.1	1	0.5	0.0237
Silver	ug/g	0.03	0.02	0.02	0.0237
Strontium	ug/g	97	10	1	0.0237
Thallium	ug/g	<0.1		0.1	0.0237
Tin	ug/g	<2		2	0.0237
Titanium	ug/g	120	20	5	0.0237
Uranium	ug/g	0.3	0.2	0.1	0.0237
Vanadium	ug/g	2	1	1	0.0237
Zinc	ug/g	80	60	50	0.0237
Lab Section 6					
Moisture	%	99.83	10	0.02	0.0237

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 3.5 °C upon receipt.

Results are reported on a dry basis.
Variability in detection limits due to sample size.
There was no sample remaining to perform rechecks due to limited sample weight submitted to the laboratory.

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Oct 17, 2019

This report was generated for samples included in SRC Group # 2019-13453

Quality Control Report

Heidi Currier
Minnow Environmental Inc.
2 Lamb Street
Georgetown, ON L7G 3M9

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Aluminum	ug/g	1340	1210
Arsenic	ug/g	6.87	6.84
Cadmium	ug/g	0.299	0.323
Chromium	ug/g	1.57	1.48
Copper	ug/g	14.4	13.8
Iron	ug/g	312	288
Lead	ug/g	0.404	0.389
Manganese	ug/g	2.70	2.53
Mercury	ug/g	0.364	0.328
Nickel	ug/g	1.20	1.15
Selenium	ug/g	3.74	3.64
Silver	ug/g	0.0245	0.0262
Zinc	ug/g	47.8	43.5

Please note, duplicates could not be analyzed for ICP due to insufficient sample available.

All quality control results were within the specified limits and considered acceptable.

Roxane Ortmann - Quality Assurance Supervisor

TABLE 1: BENTHIC MACROINVERTEBRATES COLLECTED FROM TECK KOOCANUSA, 2018
(Densities expressed per sampled area)

Station	TN					T4				
	1	2	3	4	5	1	2	3	4	5
ROUNDWORMS										
P. Nemata	4	4	8	2	4	1	1	8	-	-
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Naididae										
S.F. Naidinae										
Dero	-	-	-	-	-	-	-	14	-	-
S.F. Tubificinae										
Aulodrilus limnobius	-	44	45	91	163	2	-	72	-	-
Limnodrilus hoffmeisteri	-	-	-	-	-	1	2	-	-	3
Limnodrilus udekemianus	12	44	13	33	8	-	-	-	-	-
Tubifex tubifex	-	13	19	8	-	-	1	29	13	9
immatures with hair chaetae	28	19	32	49	15	16	5	130	185	9
immatures without hair chaetae	16	6	19	17	-	5	10	43	66	37
ARTHROPODS										
P. Arthropoda										
SEED SHRIMPS										
Cl. Ostracoda										
indeterminate	-	-	-	-	-	-	-	-	-	1
F. Candonidae										
Candona	12	8	8	5	12	-	1	-	8	-
F. Cyprididae										
Isocypris	-	4	4	2	2	-	-	-	-	1
F. Cytherideidae										
Cytherissa lacustris	-	6	-	4	4	2	-	-	4	2
INSECTS										
Cl. Insecta										
TRUE FLIES										
O. Diptera										
PHANTOM MIDGE										
F. Chaoboridae										
Chaoborus flavicans	-	-	-	-	-	-	1	-	-	-
MIDGES										
F. Chironomidae										
chironomid pupae	-	-	**4**	**2**	-	-	**1**	-	-	**2**
S.F. Chironominae										
Chironomus	24	14	12	7	28	2	5	-	-	1
Harnischia	4	-	-	-	6	-	-	-	4	-
Phaenopsectra	-	2	8	-	2	2	3	-	4	-
Tanytarsus	20	12	4	2	10	5	7	24	8	-
S.F. Prodiamesinae										
Monodiamesa	-	4	-	-	2	-	1	-	-	-
S.F. Tanypodinae										
Procladius	80	66	40	36	46	22	34	104	68	52
MOLLUSCS										
P. Mollusca										
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium (Cyclocalyx)	-	-	-	-	-	-	-	-	-	1

TABLE 1: BENTHIC MACROINVERTEBRATES COLLECTED FROM TECK KOOCANUSA, 2018
(Densities expressed per sampled area)

Station	TN					T4				
	1	2	3	4	5	1	2	3	4	5
Pisidium (Cyclocalyx)/Neopisidium	12	-	-	2	-	-	4	-	4	-
TOTAL NUMBER OF ORGANISMS	212	246	216	260	302	58	76	424	364	118
TOTAL NUMBER OF TAXA [a]	10	14	12	13	13	10	13	8	10	10

[a] Bold entries excluded from taxa count

TABLE 1: CALCULATION OF SUBSAMPLING ERROR FOR BENTHIC MACROINVERTEBRATE SAMPLES FROM TECK KOOCANUSA (2018).

Station	Whole Organisms	Number of Organisms in Fraction 1	Number of Organisms in Fraction 2	Number of Organisms in Fraction 3	Number of Organisms in Fraction 4	Actual Density*	Precision % range		Accuracy min	Accuracy max
TN-4	-	125	135	-	-	260	7.4	-	3.8	-

* whole large organisms excluded in calculations.
min = minimum absolute % error
max = maximum absolute % error

TABLE 2: PERCENT RECOVERY OF BENTHIC MACROINVERTEBRATES FROM SAMPLES COLLECTED FROM TECK KOOCANUSA (2018).

Station	Number of Organisms Recovered (initial sort)	Number of Organisms in Re-sort	Percent Recovery
TN-5[a]	123	151	81.5%
T4-2	72	76	94.7%
		Average % Recovery	88.1%

[a] all samples sorted by this person were re-sorted to ensure a > 90% recovery

TABLE 3: SAMPLE FRACTIONS SORTED FROM TECK KOOCANUSA (2018).

Station	Fraction Sorted	Station	Fraction Sorted
TN-1	1/4	T4-2	Whole
TN-2	1/2	T4-3	Whole
TN-3	1/4	T4-4	1/8
TN-4	Whole[a]	T4-5	1/4
TN-5	1/2	T4-6	Whole

[a] two halves sorted for subsampling error calculations.

QA/QC Notes

Pupae were not counted toward total number of taxa unless they were the sole representative of their taxa group.
Immatures were not counted toward total number of taxa unless they were the sole representative of their taxa group.

2018 Phytoplnakton Biomass for Minnow Environmental--- project: 18-07 Teck Koocanusa

R= QA/QC recount

Station	Date	Cyanobacteria mg m^{-3}	Chlorophyte mg m^{-3}	Euglenophyte mg m^{-3}	Chrysophyte mg m^{-3}	Diatom mg m^{-3}	Cryptophyte mg m^{-3}	Dinoflagellate mg m^{-3}	Total mg m^{-3}
T4-1	30/Aug/18	0.00	5.51	0.00	52.49	563.82	50.67	0.76	673.25
T4-2	30/Aug/18	0.00	1.24	0.00	52.06	648.01	72.00	13.93	787.24
T4-3	30/Aug/18	0.00	1.96	0.00	52.31	471.93	43.09	32.48	601.76
T4-4	31/Aug/18	0.00	2.63	0.00	78.16	397.31	71.75	15.14	564.99
T4-5	31/Aug/18	0.00	2.87	0.00	96.32	390.28	48.68	81.45	619.60
TN-1	31/Aug/18	0.00	1.25	0.00	51.56	768.95	58.33	19.45	899.54
TN-2	31/Aug/18	0.00	6.95	0.00	45.30	1086.73	81.58	14.85	1235.40
TN-2R	31/Aug/18	0.00	4.41	0.00	35.77	1026.85	83.56	17.36	1167.94
TN-3	31/Aug/18	0.00	2.66	0.00	64.54	460.07	35.02	10.98	573.26
TN-4	31/Aug/18	0.00	1.74	0.00	230.62	469.66	84.97	1.68	788.67
TN-5	31/Aug/18	0.00	4.17	0.00	61.22	344.01	29.53	14.68	453.62

2018 PhytoplnaktonCell density for Minnow Environmental--- project:18-07 Teck Koocanusa

R= QA/QC recount

Station	Date	Cyanobacteria Cells L^{-1}	Chlorophyte Cells L^{-1}	Euglenophyte Cells L^{-1}	Chrysophyte Cells L^{-1}	Diatom Cells L^{-1}	Cryptophyte Cells L^{-1}	Dinoflagellate Cells L^{-1}	Total Cells L^{-1}
T4-1	30/Aug/18	0	93592	0	474544	3965616	259440	200	4793392
T4-2	30/Aug/18	0	28736	0	503480	4161584	330096	800	5024696
T4-3	30/Aug/18	0	35920	0	539000	3773232	149496	1200	4498848
T4-4	31/Aug/18	0	43304	0	705032	3504456	244904	1000	4498696
T4-5	31/Aug/18	0	43304	0	762504	2890712	185216	3600	3885336
TN-1	31/Aug/18	0	50288	0	475144	4371088	237304	1400	5135224
TN-2	31/Aug/18	0	144080	0	395320	4814696	383984	1000	5739080
TN-2R	31/Aug/18	0	64856	0	352216	4558672	410120	1600	5387464
TN-3	31/Aug/18	0	72440	0	581904	3793384	125344	600	4573672
TN-4	31/Aug/18	0	28736	0	3060784	1999200	334312	400	5423432
TN-5	31/Aug/18	0	72840	0	654344	2784624	82640	800	3595248

2018 Phytoplnakton Species data for Minnow Environmental--- project: 18-07 Teck Koocanusa

** 1st number in **species code** = group 1=cyanophyte 2=chlorophyte
3= Euglenophyte 4=chrysophyte 5=diatoms 6=Cryptophyte 7=Dinoflagellates

** total daily biomass is sum of all species on a date.

R= QA/QC recount

Station	Date	Species Code	Species Name	Density Cell $^{L-1}$	Biomass mg m^{-3}	Length µm	Width µm	Cell Volume $µm^3$
T4-1	30-Aug-18	2105	Chlamydomonas spp.	21552	0.92	5.10	4.00	42.70
T4-1	30-Aug-18	2121	Oocystis lacustris Chodat	14368	0.41	6.00	3.00	28.30
T4-1	30-Aug-18	2206	Botryococcus braunii Kutzing	200	0.10	10.00	10.00	523.60
T4-1	30-Aug-18	2235	Ankistrodesmus spiralis Lemmermann	57472	4.08	41.00	2.10	71.00
T4-1	30-Aug-18	4351	Small chrysophyceae	71840	0.92	2.90	2.90	12.80
T4-1	30-Aug-18	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
T4-1	30-Aug-18	4355	Chrysochromulina parva Lackey	7184	0.47	5.00	5.00	65.40
T4-1	30-Aug-18	4357	Chrysococcus sp.	100576	6.58	5.00	5.00	65.40
T4-1	30-Aug-18	4362	Kephyrion sp.	71840	1.12	3.10	3.10	15.60
T4-1	30-Aug-18	4381	Dinobryon mucronatom Nygaard	28736	3.76	10.00	5.00	130.90
T4-1	30-Aug-18	4383	Dinobryon bavaricum Imhof	136496	30.88	12.00	6.00	226.20
T4-1	30-Aug-18	4388	Dinobryon sertularia Ehrenberg	400	0.50	0.00	0.00	1250.00
T4-1	30-Aug-18	4396	Chrysolykos skuja (Nauwerck) Willen	7184	0.20	5.60	3.10	28.20
T4-1	30-Aug-18	4411	Bitrichia chodatii (Reverdin) Chodat	7184	0.36	6.00	4.00	50.30
T4-1	30-Aug-18	4413	Chrysochromulina laurentiana Kling	14368	5.67	9.10	9.10	394.60
T4-1	30-Aug-18	4418	Salpingoeca frequentissima (Zach.) Lemmermann	21552	0.74	6.00	3.30	34.20
T4-1	30-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	9400	18.60	10.80	21.60	1978.80
T4-1	30-Aug-18	5508	Cyclotella pseudostelligera	2500032	505.76	5.05	10.10	202.30
T4-1	30-Aug-18	5513	Tabellaria fenestrata (Lyngbye) Kutzing	400	0.30	80.00	6.00	754.00
T4-1	30-Aug-18	5515	Fragilaria crotonensis Kitton	10600	4.44	100.00	4.00	418.90
T4-1	30-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	600	3.69	235.00	10.00	6152.30
T4-1	30-Aug-18	5524	Asterionella formosa Hassall	400	0.03	79.00	2.00	82.70
T4-1	30-Aug-18	5551	Cyclotella michiganiana Skvortzow	1443984	29.46	2.35	4.70	20.40
T4-1	30-Aug-18	5720	Cyclotella bodanica Eulenst.	200	1.54	17.00	34.00	7717.30
T4-1	30-Aug-18	6554	Rhodomonas minuta Skuja	237072	35.75	12.00	6.00	150.80
T4-1	30-Aug-18	6558	Cryptomonas erosa Ehrenberg	8000	14.18	25.90	14.00	1772.00
T4-1	30-Aug-18	6568	Katablepharis ovalis Skuja	14368	0.74	8.60	4.00	51.60
T4-1	30-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	200	0.76	19.40	19.40	3823.00
T4-2	30-Aug-18	2105	Chlamydomonas spp.	21552	1.08	6.00	4.00	50.30
T4-2	30-Aug-18	2167	Elakatothrix gelatinosa Willen	7184	0.16	14.00	2.00	22.00
T4-2	30-Aug-18	4351	Small chrysophyceae	129312	1.19	2.60	2.60	9.20
T4-2	30-Aug-18	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
T4-2	30-Aug-18	4355	Chrysochromulina parva Lackey	57472	3.76	5.00	5.00	65.40
T4-2	30-Aug-18	4357	Chrysococcus sp.	122128	7.99	5.00	5.00	65.40
T4-2	30-Aug-18	4362	Kephyrion sp.	14368	0.27	3.30	3.30	18.80
T4-2	30-Aug-18	4368	Mallomonas crassisquama (Asmund) Fott	400	0.42	20.00	10.00	1047.20
T4-2	30-Aug-18	4381	Dinobryon mucronatom Nygaard	21552	2.82	10.00	5.00	130.90
T4-2	30-Aug-18	4383	Dinobryon bavaricum Imhof	114944	26.00	12.00	6.00	226.20
T4-2	30-Aug-18	4388	Dinobryon sertularia Ehrenberg	21552	4.88	12.00	6.00	226.20
T4-2	30-Aug-18	4388	Dinobryon sertularia Ehrenberg	200	0.25	0.00	0.00	1250.00
T4-2	30-Aug-18	4411	Bitrichia chodatii (Reverdin) Chodat	7184	0.36	6.00	4.00	50.30
T4-2	30-Aug-18	4413	Chrysochromulina laurentiana Kling	7184	2.83	9.10	9.10	394.60
T4-2	30-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	12600	24.93	10.80	21.60	1978.80
T4-2	30-Aug-18	5508	Cyclotella pseudostelligera	2370720	554.51	5.30	10.60	233.90
T4-2	30-Aug-18	5513	Tabellaria fenestrata (Lyngbye) Kutzing	2600	2.01	82.00	6.00	772.80
T4-2	30-Aug-18	5515	Fragilaria crotonensis Kitton	5200	2.18	100.00	4.00	418.90
T4-2	30-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	2200	16.41	285.00	10.00	7461.30
T4-2	30-Aug-18	5524	Asterionella formosa Hassall	400	0.04	91.00	2.00	95.30
T4-2	30-Aug-18	5551	Cyclotella michiganiana Skvortzow	1767264	43.30	2.50	5.00	24.50
T4-2	30-Aug-18	5720	Cyclotella bodanica Eulenst.	600	4.63	17.00	34.00	7717.30
T4-2	30-Aug-18	6554	Rhodomonas minuta Skuja	316096	47.67	12.00	6.00	150.80
T4-2	30-Aug-18	6558	Cryptomonas erosa Ehrenberg	14000	24.33	25.40	14.00	1737.80
T4-2	30-Aug-18	7632	Gymnodinium sp.	200	2.30	28.00	28.00	11494.00
T4-2	30-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	400	1.58	19.60	19.60	3942.50
T4-2	30-Aug-18	7644	Ceratium hirundinella (Muller) Schrank	200	10.05	60.00	40.00	50265.50
T4-3	30-Aug-18	2105	Chlamydomonas spp.	14368	0.72	6.00	4.00	50.30
T4-3	30-Aug-18	2132	Scenedesmus denticulatus Lagerhiem	14368	1.08	8.60	5.00	75.00
T4-3	30-Aug-18	2167	Elakatothrix gelatinosa Willen	7184	0.16	14.00	2.00	22.00

T4-3	30-Aug-18	4351	Small chrysophyceae	86208	0.79	2.60	2.60	9.20
T4-3	30-Aug-18	4352	Large chrysophyceae	35920	6.45	7.00	7.00	179.60
T4-3	30-Aug-18	4355	Chrysochromulina parva Lackey	172416	11.28	5.00	5.00	65.40
T4-3	30-Aug-18	4357	Chrysococcus sp.	93392	6.11	5.00	5.00	65.40
T4-3	30-Aug-18	4362	Kephyrion sp.	21552	0.53	3.60	3.60	24.40
T4-3	30-Aug-18	4368	Mallomonas crassisquama (Asmund) Fott	200	0.21	20.00	10.00	1047.20
T4-3	30-Aug-18	4381	Dinobryon mucronatom Nygaard	14368	1.88	10.00	5.00	130.90
T4-3	30-Aug-18	4383	Dinobryon bavaricum Imhof	86208	19.50	12.00	6.00	226.20
T4-3	30-Aug-18	4388	Dinobryon sertularia Ehrenberg	21552	4.88	12.00	6.00	226.20
T4-3	30-Aug-18	4400	Ochromonas sp.	7184	0.70	10.00	4.30	96.80
T4-3	30-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	11600	26.29	11.30	22.60	2266.50
T4-3	30-Aug-18	5508	Cyclotella pseudostelligera	1479904	376.34	5.45	10.90	254.30
T4-3	30-Aug-18	5511	Rhizosolenia eriense H.L. Smith	7184	0.46	9.00	3.00	63.60
T4-3	30-Aug-18	5515	Fragilaria crotonensis Kitton	2000	0.85	101.00	4.00	423.10
T4-3	30-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	200	1.36	260.00	10.00	6806.80
T4-3	30-Aug-18	5524	Asterionella formosa Hassall	1600	0.15	91.00	2.00	95.30
T4-3	30-Aug-18	5551	Cyclotella michiganiana Skvortzow	2270144	62.66	2.60	5.20	27.60
T4-3	30-Aug-18	5720	Cyclotella bodanica Eulenst.	600	3.82	15.95	31.90	6373.90
T4-3	30-Aug-18	6554	Rhodomonas minuta Skuja	136496	20.58	12.00	6.00	150.80
T4-3	30-Aug-18	6558	Cryptomonas erosa Ehrenberg	13000	22.50	25.30	14.00	1730.90
T4-3	30-Aug-18	7632	Gymnodinium sp.	200	2.30	28.00	28.00	11494.00
T4-3	30-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	400	1.58	19.60	19.60	3942.50
T4-3	30-Aug-18	7644	Ceratium hirundinella (Muller) Schrank	600	28.60	56.90	40.00	47668.40
T4-4	31-Aug-18	2105	Chlamydomonas spp.	28736	1.45	6.00	4.00	50.30
T4-4	31-Aug-18	2125	Paulschulzia pseudovolvox (Schulz and Teiling) Skuja	200	0.54	0.00	0.00	2680.00
T4-4	31-Aug-18	2132	Scenedesmus denticulatus Lagerhiem	14368	0.65	8.10	4.00	45.20
T4-4	31-Aug-18	4351	Small chrysophyceae	43104	0.55	2.90	2.90	12.80
T4-4	31-Aug-18	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
T4-4	31-Aug-18	4355	Chrysochromulina parva Lackey	165232	10.81	5.00	5.00	65.40
T4-4	31-Aug-18	4357	Chrysococcus sp.	93392	6.11	5.00	5.00	65.40
T4-4	31-Aug-18	4362	Kephyrion sp.	100576	1.73	3.20	3.20	17.20
T4-4	31-Aug-18	4368	Mallomonas crassisquama (Asmund) Fott	600	0.63	20.00	10.00	1047.20
T4-4	31-Aug-18	4381	Dinobryon mucronatom Nygaard	14368	1.81	9.60	5.00	125.70
T4-4	31-Aug-18	4383	Dinobryon bavaricum Imhof	193968	43.88	12.00	6.00	226.20
T4-4	31-Aug-18	4383	Dinobryon bavaricum Imhof	200	0.68	0.00	0.00	3390.00
T4-4	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	21552	4.88	12.00	6.00	226.20
T4-4	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	200	0.25	0.00	0.00	1250.00
T4-4	31-Aug-18	4396	Chrysolykos skuja (Nauwerck) Willen	50288	1.42	5.60	3.10	28.20
T4-4	31-Aug-18	4411	Bitrichia chodatii (Reverdin) Chodat	7184	1.02	10.00	5.20	141.60
T4-4	31-Aug-18	4413	Chrysochromulina laurentiana Kling	7184	3.12	9.40	9.40	434.90
T4-4	31-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	16200	35.27	11.15	22.30	2177.40
T4-4	31-Aug-18	5508	Cyclotella pseudostelligera	1278752	282.48	5.20	10.40	220.90
T4-4	31-Aug-18	5515	Fragilaria crotonensis Kitton	8400	3.73	106.00	4.00	444.00
T4-4	31-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	1400	8.80	240.00	10.00	6283.20
T4-4	31-Aug-18	5551	Cyclotella michiganiana Skvortzow	2198304	57.16	2.55	5.10	26.00
T4-4	31-Aug-18	5720	Cyclotella bodanica Eulenst.	1400	9.88	16.50	33.00	7056.20
T4-4	31-Aug-18	6554	Rhodomonas minuta Skuja	215520	32.50	12.00	6.00	150.80
T4-4	31-Aug-18	6558	Cryptomonas erosa Ehrenberg	22200	38.88	25.60	14.00	1751.50
T4-4	31-Aug-18	6568	Katablepharis ovalis Skuja	7184	0.37	8.60	4.00	51.60
T4-4	31-Aug-18	7632	Gymnodinium sp.	200	2.83	30.00	30.00	14137.20
T4-4	31-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	600	2.26	19.30	19.30	3764.20
T4-4	31-Aug-18	7644	Ceratium hirundinella (Muller) Schrank	200	10.05	60.00	40.00	50265.50
T4-5	31-Aug-18	2105	Chlamydomonas spp.	28736	1.45	6.00	4.00	50.30
T4-5	31-Aug-18	2113	Pediastrum duplex Meyen	200	0.75	0.00	0.00	3735.00
T4-5	31-Aug-18	2132	Scenedesmus denticulatus Lagerhiem	14368	0.67	8.40	4.00	46.90
T4-5	31-Aug-18	4351	Small chrysophyceae	79024	0.44	2.20	2.20	5.60
T4-5	31-Aug-18	4355	Chrysochromulina parva Lackey	193968	12.69	5.00	5.00	65.40
T4-5	31-Aug-18	4357	Chrysococcus sp.	100576	6.58	5.00	5.00	65.40
T4-5	31-Aug-18	4362	Kephyrion sp.	43104	0.81	3.30	3.30	18.80
T4-5	31-Aug-18	4368	Mallomonas crassisquama (Asmund) Fott	200	0.21	20.00	10.00	1047.20
T4-5	31-Aug-18	4381	Dinobryon mucronatom Nygaard	43104	5.13	9.10	5.00	119.10
T4-5	31-Aug-18	4383	Dinobryon bavaricum Imhof	265808	60.13	12.00	6.00	226.20
T4-5	31-Aug-18	4383	Dinobryon bavaricum Imhof	800	1.00	0.00	0.00	1250.00
T4-5	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	28736	6.50	12.00	6.00	226.20
T4-5	31-Aug-18	4413	Chrysochromulina laurentiana Kling	7184	2.83	9.10	9.10	394.60
T4-5	31-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	14000	33.01	11.45	22.90	2358.00
T4-5	31-Aug-18	5508	Cyclotella pseudostelligera	1343408	279.97	5.10	10.20	208.40
T4-5	31-Aug-18	5513	Tabellaria fenestrata (Lyngbye) Kutzing	800	0.60	80.00	6.00	754.00
T4-5	31-Aug-18	5515	Fragilaria crotonensis Kitton	45600	19.67	103.00	4.00	431.40
T4-5	31-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	1200	9.90	315.00	10.00	8246.70
T4-5	31-Aug-18	5524	Asterionella formosa Hassall	4400	0.47	101.00	2.00	105.80
T4-5	31-Aug-18	5551	Cyclotella michiganiana Skvortzow	1479904	38.48	2.55	5.10	26.00
T4-5	31-Aug-18	5720	Cyclotella bodanica Eulenst.	1400	8.19	15.50	31.00	5849.40

T4-5	31-Aug-18	6554	Rhodomonas minuta Skuja	172416	26.00	12.00	6.00	150.80
T4-5	31-Aug-18	6558	Cryptomonas erosa Ehrenberg	12800	22.68	25.90	14.00	1772.00
T4-5	31-Aug-18	7632	Gymnodinium sp.	200	3.43	32.00	32.00	17157.30
T4-5	31-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	2000	7.65	19.40	19.40	3823.00
T4-5	31-Aug-18	7644	Ceratium hirundinella (Muller) Schrank	1400	70.37	60.00	40.00	50265.50
TN-1	31-Aug-18	2121	Oocystis lacustris Chodat	43104	1.22	6.00	3.00	28.30
TN-1	31-Aug-18	2215	Tetraedron caudatum (Corda) Hansgrig	7184	0.03	3.00	3.00	4.70
TN-1	31-Aug-18	4351	Small chrysophyceae	79024	0.81	2.70	2.70	10.30
TN-1	31-Aug-18	4352	Large chrysophyceae	14368	2.58	7.00	7.00	179.60
TN-1	31-Aug-18	4355	Chrysochromulina parva Lackey	43104	2.82	5.00	5.00	65.40
TN-1	31-Aug-18	4357	Chrysococcus sp.	122128	7.99	5.00	5.00	65.40
TN-1	31-Aug-18	4362	Kephyrion sp.	71840	1.75	3.60	3.60	24.40
TN-1	31-Aug-18	4368	Mallomonas crassisquama (Asmund) Fott	400	0.41	19.60	10.00	1026.30
TN-1	31-Aug-18	4383	Dinobryon bavaricum Imhof	79024	17.88	12.00	6.00	226.20
TN-1	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	57472	13.00	12.00	6.00	226.20
TN-1	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	600	1.19	0.00	0.00	1991.00
TN-1	31-Aug-18	4413	Chrysochromulina laurentiana Kling	7184	3.12	9.40	9.40	434.90
TN-1	31-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	3600	7.73	11.10	22.20	2148.30
TN-1	31-Aug-18	5508	Cyclotella pseudostelligera	2485664	704.19	5.65	11.30	283.30
TN-1	31-Aug-18	5513	Tabellaria fenestrata (Lyngbye) Kutzing	200	0.17	88.00	6.00	829.40
TN-1	31-Aug-18	5514	Tabellaria flocculosa (Roth) Kutzing	400	0.51	25.00	14.00	1282.80
TN-1	31-Aug-18	5515	Fragilaria crotonensis Kitton	5400	2.28	101.00	4.00	423.10
TN-1	31-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	600	3.77	240.00	10.00	6283.20
TN-1	31-Aug-18	5551	Cyclotella michiganiana Skvortzow	1875024	48.75	2.55	5.10	26.00
TN-1	31-Aug-18	5720	Cyclotella bodanica Eulenst.	200	1.54	17.00	34.00	7717.30
TN-1	31-Aug-18	6554	Rhodomonas minuta Skuja	215520	32.50	12.00	6.00	150.80
TN-1	31-Aug-18	6558	Cryptomonas erosa Ehrenberg	14600	25.37	25.40	14.00	1737.80
TN-1	31-Aug-18	6568	Katablepharis ovalis Skuja	7184	0.46	9.60	4.00	64.30
TN-1	31-Aug-18	7632	Gymnodinium sp.	400	6.24	31.00	31.00	15598.50
TN-1	31-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	800	3.15	19.60	19.60	3942.50
TN-1	31-Aug-18	7644	Ceratium hirundinella (Muller) Schrank	200	10.05	60.00	40.00	50265.50
TN-2	31-Aug-18	2105	Chlamydomonas spp.	93392	4.38	5.60	4.00	46.90
TN-2	31-Aug-18	2107	Chlorogonium maximum Skuja	200	0.46	81.00	6.00	2290.20
TN-2	31-Aug-18	2112	Sphaerocystis schroeteri Chodat	35920	0.56	3.10	3.10	15.60
TN-2	31-Aug-18	2132	Scenedesmus denticulatus Lagerhiem	14368	1.02	8.10	5.00	70.70
TN-2	31-Aug-18	2154	Coelastrum microporum Naegeli	200	0.54	0.00	0.00	2680.00
TN-2	31-Aug-18	4351	Small chrysophyceae	43104	0.18	2.00	2.00	4.20
TN-2	31-Aug-18	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
TN-2	31-Aug-18	4355	Chrysochromulina parva Lackey	107760	7.05	5.00	5.00	65.40
TN-2	31-Aug-18	4357	Chrysococcus sp.	43104	2.20	4.60	4.60	51.00
TN-2	31-Aug-18	4362	Kephyrion sp.	35920	1.12	3.90	3.90	31.10
TN-2	31-Aug-18	4363	Spiniferomonas serrata	14368	1.88	6.30	6.30	130.90
TN-2	31-Aug-18	4383	Dinobryon bavaricum Imhof	64656	14.63	12.00	6.00	226.20
TN-2	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	57472	13.00	12.00	6.00	226.20
TN-2	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	200	0.40	0.00	0.00	1991.00
TN-2	31-Aug-18	4411	Bitrichia chodatii (Reverdin) Chodat	14368	0.72	6.00	4.00	50.30
TN-2	31-Aug-18	4413	Chrysochromulina laurentiana Kling	7184	2.83	9.10	9.10	394.60
TN-2	31-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	4800	10.17	11.05	22.10	2119.40
TN-2	31-Aug-18	5508	Cyclotella pseudostelligera	3354928	1028.29	5.80	11.60	306.50
TN-2	31-Aug-18	5513	Tabellaria fenestrata (Lyngbye) Kutzing	1000	0.76	81.00	6.00	763.40
TN-2	31-Aug-18	5515	Fragilaria crotonensis Kitton	1000	0.41	97.00	4.00	406.30
TN-2	31-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	1800	11.55	245.00	10.00	6414.10
TN-2	31-Aug-18	5551	Cyclotella michiganiana Skvortzow	1451168	35.55	2.50	5.00	24.50
TN-2	31-Aug-18	6554	Rhodomonas minuta Skuja	323280	48.75	12.00	6.00	150.80
TN-2	31-Aug-18	6558	Cryptomonas erosa Ehrenberg	17600	30.22	25.10	14.00	1717.30
TN-2	31-Aug-18	6568	Katablepharis ovalis Skuja	43104	2.60	9.30	4.00	60.40
TN-2	31-Aug-18	7632	Gymnodinium sp.	200	3.12	31.00	31.00	15598.50
TN-2	31-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	600	2.51	20.00	20.00	4188.80
TN-2	31-Aug-18	7644	Ceratium hirundinella (Muller) Schrank	200	9.22	55.00	40.00	46076.70
TN-2R	31-Aug-18	2132	Scenedesmus denticulatus Lagerhiem	43104	3.05	8.10	5.00	70.70
TN-2R	31-Aug-18	2178	Cosmarium sp.	200	0.37	22.00	22.00	1858.40
TN-2R	31-Aug-18	2199	Spondylosium planum (Wolle) W. and G.S. West	14368	0.54	6.00	6.00	37.70
TN-2R	31-Aug-18	2235	Ankistrodesmus spiralis Lemmermann	7184	0.45	36.00	2.10	62.30
TN-2R	31-Aug-18	4351	Small chrysophyceae	21552	0.09	2.00	2.00	4.20
TN-2R	31-Aug-18	4355	Chrysochromulina parva Lackey	86208	5.64	5.00	5.00	65.40
TN-2R	31-Aug-18	4357	Chrysococcus sp.	50288	2.56	4.60	4.60	51.00
TN-2R	31-Aug-18	4362	Kephyrion sp.	93392	4.38	5.60	4.00	46.90
TN-2R	31-Aug-18	4383	Dinobryon bavaricum Imhof	50288	11.38	12.00	6.00	226.20
TN-2R	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	35920	8.13	12.00	6.00	226.20
TN-2R	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	200	0.40	0.00	0.00	1991.00
TN-2R	31-Aug-18	4411	Bitrichia chodatii (Reverdin) Chodat	7184	0.36	6.00	4.00	50.30
TN-2R	31-Aug-18	4413	Chrysochromulina laurentiana Kling	7184	2.83	9.10	9.10	394.60
TN-2R	31-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	6000	12.72	11.05	22.10	2119.40

TN-2R	31-Aug-18	5508	Cyclotella pseudostelligera	3153776	966.63	5.80	11.60	306.50
TN-2R	31-Aug-18	5513	Tabellaria fenestrata (Lyngbye) Kutzing	1200	0.92	81.00	6.00	763.40
TN-2R	31-Aug-18	5515	Fragilaria crotonensis Kitton	2200	0.89	97.00	4.00	406.30
TN-2R	31-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	1800	11.55	245.00	10.00	6414.10
TN-2R	31-Aug-18	5551	Cyclotella michiganiana Skvortzow	1393696	34.15	2.50	5.00	24.50
TN-2R	31-Aug-18	6554	Rhodomonas minuta Skuja	366384	55.25	12.00	6.00	150.80
TN-2R	31-Aug-18	6558	Cryptomonas erosa Ehrenberg	15000	25.76	25.10	14.00	1717.30
TN-2R	31-Aug-18	6568	Katablepharis ovalis Skuja	28736	2.55	9.20	6.00	88.60
TN-2R	31-Aug-18	7632	Gymnodinium sp.	200	3.12	31.00	31.00	15598.50
TN-2R	31-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	1200	5.03	20.00	20.00	4188.80
TN-2R	31-Aug-18	7644	Ceratium hirundinella (Muller) Schrank	200	9.22	55.00	40.00	46076.70
TN-3	31-Aug-18	2105	Chlamydomonas spp.	14368	0.72	6.00	4.00	50.30
TN-3	31-Aug-18	2121	Oocystis lacustris Chodat	57472	1.63	6.00	3.00	28.30
TN-3	31-Aug-18	2206	Botryococcus braunii Kutzing	600	0.31	10.00	10.00	523.60
TN-3	31-Aug-18	4351	Small chrysophyceae	43104	0.44	2.70	2.70	10.30
TN-3	31-Aug-18	4352	Large chrysophyceae	7184	1.29	7.00	7.00	179.60
TN-3	31-Aug-18	4355	Chrysochromulina parva Lackey	186784	12.22	5.00	5.00	65.40
TN-3	31-Aug-18	4357	Chrysococcus sp.	71840	4.70	5.00	5.00	65.40
TN-3	31-Aug-18	4362	Kephyrion sp.	71840	1.35	3.30	3.30	18.80
TN-3	31-Aug-18	4363	Spiniferomonas serrata	7184	0.66	5.60	5.60	92.00
TN-3	31-Aug-18	4383	Dinobryon bavaricum Imhof	114944	26.00	12.00	6.00	226.20
TN-3	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	79024	17.88	12.00	6.00	226.20
TN-3	31-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	2400	5.66	11.45	22.90	2358.00
TN-3	31-Aug-18	5508	Cyclotella pseudostelligera	1803184	386.96	5.15	10.30	214.60
TN-3	31-Aug-18	5515	Fragilaria crotonensis Kitton	10000	4.19	100.00	4.00	418.90
TN-3	31-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	2000	13.61	260.00	10.00	6806.80
TN-3	31-Aug-18	5551	Cyclotella michiganiana Skvortzow	1975600	48.40	2.50	5.00	24.50
TN-3	31-Aug-18	5720	Cyclotella bodanica Eulenst.	200	1.24	15.80	31.60	6195.70
TN-3	31-Aug-18	6554	Rhodomonas minuta Skuja	114944	17.33	12.00	6.00	150.80
TN-3	31-Aug-18	6558	Cryptomonas erosa Ehrenberg	10200	17.24	24.70	14.00	1689.90
TN-3	31-Aug-18	6565	Cryptomonas rostratiformis Skuja	200	0.45	33.00	14.00	2257.80
TN-3	31-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	400	1.58	19.60	19.60	3942.50
TN-3	31-Aug-18	7644	Ceratium hirundinella (Muller) Schrank	200	9.40	56.10	40.00	46998.20
TN-4	31-Aug-18	2101	Carteria spp.	7184	0.66	7.00	5.00	91.60
TN-4	31-Aug-18	2105	Chlamydomonas spp.	14368	0.72	6.00	4.00	50.30
TN-4	31-Aug-18	2121	Oocystis lacustris Chodat	7184	0.36	6.00	4.00	50.30
TN-4	31-Aug-18	4351	Small chrysophyceae	129312	1.82	3.00	3.00	14.10
TN-4	31-Aug-18	4351	Small chrysophyceae	2212672	144.71	5.00	5.00	65.40
TN-4	31-Aug-18	4352	Large chrysophyceae	28736	5.16	7.00	7.00	179.60
TN-4	31-Aug-18	4355	Chrysochromulina parva Lackey	301728	19.73	5.00	5.00	65.40
TN-4	31-Aug-18	4357	Chrysococcus sp.	79024	5.17	5.00	5.00	65.40
TN-4	31-Aug-18	4362	Kephyrion sp.	64656	1.58	3.60	3.60	24.40
TN-4	31-Aug-18	4368	Mallomonas crassisquama (Asmund) Fott	400	0.41	19.60	10.00	1026.30
TN-4	31-Aug-18	4381	Dinobryon mucronatom Nygaard	7184	0.94	10.00	5.00	130.90
TN-4	31-Aug-18	4383	Dinobryon bavaricum Imhof	100576	22.75	12.00	6.00	226.20
TN-4	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	122128	27.63	12.00	6.00	226.20
TN-4	31-Aug-18	4411	Bitrichia chodatii (Reverdin) Chodat	14368	0.72	6.00	4.00	50.30
TN-4	31-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	8400	18.79	11.25	22.50	2236.50
TN-4	31-Aug-18	5508	Cyclotella pseudostelligera	1975600	436.41	5.20	10.40	220.90
TN-4	31-Aug-18	5513	Tabellaria fenestrata (Lyngbye) Kutzing	200	0.17	88.00	6.00	829.40
TN-4	31-Aug-18	5514	Tabellaria flocculosa (Roth) Kutzing	200	0.24	23.00	14.00	1180.20
TN-4	31-Aug-18	5515	Fragilaria crotonensis Kitton	9400	3.94	100.00	4.00	418.90
TN-4	31-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	1200	8.17	260.00	10.00	6806.80
TN-4	31-Aug-18	5524	Asterionella formosa Hassall	2000	0.20	96.00	2.00	100.50
TN-4	31-Aug-18	5720	Cyclotella bodanica Eulenst.	200	1.41	16.50	33.00	7056.20
TN-4	31-Aug-18	5916	Fragilaria capucina Grunow	2000	0.34	41.00	4.00	171.70
TN-4	31-Aug-18	6554	Rhodomonas minuta Skuja	258624	39.00	12.00	6.00	150.80
TN-4	31-Aug-18	6558	Cryptomonas erosa Ehrenberg	25200	43.10	25.00	14.00	1710.40
TN-4	31-Aug-18	6565	Cryptomonas rostratiformis Skuja	200	0.45	33.00	14.00	2257.80
TN-4	31-Aug-18	6568	Katablepharis ovalis Skuja	50288	2.42	8.30	4.00	48.10
TN-4	31-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	400	1.68	20.00	20.00	4188.80
TN-5	31-Aug-18	2105	Chlamydomonas spp.	14368	0.64	5.30	4.00	44.40
TN-5	31-Aug-18	2121	Oocystis lacustris Chodat	28736	1.45	6.00	4.00	50.30
TN-5	31-Aug-18	2132	Scenedesmus denticulatus Lagerhiem	14368	0.67	8.30	4.00	46.40
TN-5	31-Aug-18	2206	Botryococcus braunii Kutzing	1000	0.52	10.00	10.00	523.60
TN-5	31-Aug-18	2235	Ankistrodesmus spiralis Lemmermann	14368	0.90	36.00	2.10	62.30
TN-5	31-Aug-18	4351	Small chrysophyceae	71840	0.83	2.80	2.80	11.50
TN-5	31-Aug-18	4355	Chrysochromulina parva Lackey	265808	17.38	5.00	5.00	65.40
TN-5	31-Aug-18	4357	Chrysococcus sp.	172416	11.28	5.00	5.00	65.40
TN-5	31-Aug-18	4362	Kephyrion sp.	7184	0.11	3.10	3.10	15.60
TN-5	31-Aug-18	4383	Dinobryon bavaricum Imhof	93392	21.13	12.00	6.00	226.20
TN-5	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	43104	9.75	12.00	6.00	226.20
TN-5	31-Aug-18	4388	Dinobryon sertularia Ehrenberg	600	0.75	0.00	0.00	1250.00

TN-5	31-Aug-18	5507	Cyclotella stelligera Cleve and Grunow	7200	16.32	11.30	22.60	2266.50
TN-5	31-Aug-18	5508	Cyclotella pseudostelligera	1185360	277.26	5.30	10.60	233.90
TN-5	31-Aug-18	5511	Rhizosolenia eriense H.L. Smith	7184	0.46	9.00	3.00	63.60
TN-5	31-Aug-18	5513	Tabellaria fenestrata (Lyngbye) Kutzing	200	0.15	82.00	6.00	772.80
TN-5	31-Aug-18	5514	Tabellaria flocculosa (Roth) Kutzing	400	0.51	25.00	14.00	1282.80
TN-5	31-Aug-18	5515	Fragilaria crotonensis Kitton	1200	0.51	101.00	4.00	423.10
TN-5	31-Aug-18	5523	Synedra ulna (Nitzsch) Ehrenberg	2400	15.39	245.00	10.00	6414.10
TN-5	31-Aug-18	5551	Cyclotella michiganiana Skvortzow	1580480	32.24	2.35	4.70	20.40
TN-5	31-Aug-18	5720	Cyclotella bodanica Eulenst.	200	1.17	15.50	31.00	5849.40
TN-5	31-Aug-18	6554	Rhodomonas minuta Skuja	71840	10.83	12.00	6.00	150.80
TN-5	31-Aug-18	6558	Cryptomonas erosa Ehrenberg	10600	18.28	25.20	14.00	1724.10
TN-5	31-Aug-18	6565	Cryptomonas rostratiformis Skuja	200	0.42	31.00	14.00	2120.90
TN-5	31-Aug-18	7632	Gymnodinium sp.	200	3.12	31.00	31.00	15598.50
TN-5	31-Aug-18	7639	Peridinium pusillum (Penard) Lemmermann	400	1.68	20.00	20.00	4188.80
TN-5	31-Aug-18	7644	Ceratium hirundinella (Muller) Schrank	200	9.89	59.00	40.00	49427.70

2018 Minnow Zooplankton Abundance Individuals/L	Analytical #	1	2	3	4	5	5x	6
	Lake	Miin	Miin	Miin	Miin	Miin	Miin	Miin
	Station	TN1	TN2	TN3	TN4	TN5	TN5	T42
	Year	2018	2018	2018	2018	2018	2018	2018
	Month	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE
	Day	11	11	11	11	11	11	9
	Time	AM	AM	AM	AM	AM	AM	AM
	Depth	10.0	8.5	10.0	9.0	9.0	9.0	20.0
	Collect	Miin	Miin	Miin	Miin	Miin	Miin	Miin
	Gear	WJ	WJ	WJ	WJ	WJ	WJ	WJ
	Sub-sample Fraction #1	20.0	20.0	20.0	20.0	20.0	20.0	80.0
	Sub-sample Fraction #2	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	Sub-sample Fraction#3	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Net Mouth Area (cm2)	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASS		Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L
COPEPODA								
CALANOIDA								
Epischura nevadensis Lilljeborg								
E.n. adult female		0.111	0.021	0.028	0.059	0.051	0.047	
E.n. adult male		0.037	0.025	0.060	0.090	0.043	0.039	0.004
E.n. immature 0.5-1.0 mm					0.078	0.078	0.078	
Total E. nevadensis		**0.15**	**0.05**	**0.09**	**0.23**	**0.17**	**0.16**	**0.00**
Diaptomus pallidus Herrick								
D.p. adult female		0.148	0.087	0.071	0.124	0.124	0.206	0.002
D.p. gravid female				0.042	0.027	0.027	0.027	
D.p. adult male		0.111	0.131	0.353	0.165	0.247	0.165	
D.p. immature 2.0 mm								
D.p. immature 1.0 mm		0.185	0.044		0.078	0.078	0.157	
D.p. immature 0.75 mm			0.083					
D.p. immature 0.5 mm		0.037	0.083	0.071				
Total D. pallidus		**0.48**	**0.43**	**0.54**	**0.39**	**0.48**	**0.55**	**0.00**
Diaptomus tyrrelli Poppe								
D.t. adult female						0.012	0.016	
D.t. gravid female		0.014	0.004	0.141				0.019
D.t. adult male		0.007		0.004	0.004	0.055	0.059	0.002
D.t. immature 2.0 mm		0.111	0.131	0.071	0.041			0.037
D.t. immature 1.0 mm								
D.t. immature 0.75 mm			0.166	0.212				
D.t. immature 0.5 mm								
Total D. tyrrelli		**0.13**	**0.30**	**0.43**	**0.05**	**0.07**	**0.07**	**0.06**
Calanoid nauplius								
small		0.565	0.664	0.011	0.784	0.470	0.314	0.565
large		0.071						
Total Calanoid nauplii		**0.64**	**0.66**	**0.01**	**0.78**	**0.47**	**0.31**	**0.56**
Total Calanoida ind/L		**1.40**	**1.44**	**1.06**	**1.45**	**1.19**	**1.83**	**0.63**
CYLOPOIDA								
Cyclops bicuspidatus thomasi S.A.Forbes								
C. b. t. adult female		0.071		0.212		0.078	0.078	2.541
C. b. t. gravid female				0.004	0.004	0.004	0.041	0.282
C. b. t. adult male		0.071		0.141	0.078			2.964
C. b. t. immature 1.0 mm			0.083	0.071	0.078			2.823
C. b. t. immatue 0.75 mm		1.059	0.249	1.764	0.235	0.392	0.627	23.994
C. b. t. immature 0.5 mm		0.282	0.083	2.470	0.863	0.706	0.706	38.673
Total C. b. thomasi		**1.48**	**0.42**	**4.66**	**1.26**	**1.18**	**1.45**	
Acanthocyclops vernalis (?) immature								
0.5mm		0.141	0.083	0.071				0.282
Total A. vernalis		**0.141**	**0.083**	**0.071**				**0.282**
Cyclopoid nauplius			**0.083**	**0.071**	**0.157**	**0.078**		**8.186**
Total Cyclopoida ind/L		**1.62**	**0.58**	**4.80**	**1.42**	**1.26**	**1.45**	**79.75**
CLADOCERA								
Daphnia schoedleri Sars								
D. s. 2.0 mm					0.235	0.157	0.078	0.565
D. s. 1.5 mm								
D. s. 1.0 mm					0.235	0.235	0.157	0.282
D. s. 0.5 mm								
Total D. schoedleri					**0.47**	**0.39**	**0.24**	**0.85**
Daphnia galeata mendotae Birge								
D. g. m. 2.0 mm								
D. g. m. 1.5 mm		0.141	0.249	1.341	0.941	0.706	0.235	0.988
D. g. m. 1.0 mm		1.764	1.827	3.599	3.372	2.039	1.411	2.541
D. g. m. 0.5 mm		0.494	1.162	3.740	1.960	1.255	1.176	2.399
Total D. g. mendotae		**2.40**	**3.24**	**8.68**	**6.27**	**4.00**	**2.82**	**5.93**
Daphnia retrocurva Forbes								
D. r. 2.0 mm				0.071				
D. r. 1.0 mm								
D. r. 0.5 mm								
Total D. retrocurva				**0.07**				

2018 Minnow Zooplankton Abundance Individuals/L	Analytical #	1	2	3	4	5	5x	6
	Lake	Miin	Miin	Miin	Miin	Miin	Miin	Miin
	Station	TN1	TN2	TN3	TN4	TN5	TN5	T42
	Year	2018	2018	2018	2018	2018	2018	2018
	Month	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE
	Day	11	11	11	11	11	11	9
	Time	AM	AM	AM	AM	AM	AM	AM
	Depth	10.0	8.5	10.0	9.0	9.0	9.0	20.0
	Collect	Miin	Miin	Miin	Miin	Miin	Miin	Miin
	Gear	WJ	WJ	WJ	WJ	WJ	WJ	WJ
	Sub-sample Fraction #1	20.0	20.0	20.0	20.0	20.0	20.0	80.0
	Sub-sample Fraction #2	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	Sub-sample Fraction#3	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Net Mouth Area (cm2)	283.4	283.4	283.4	283.4	283.4	283.4	283.4
Holopedium gibberum Zaddach 0.5 mm								
Bosmina longirostris O.F. Mueller								
B. l. 1.0 mm								
B. l. 0.75 mm								
B. l. 0.5 mm								
B. l. 0.25 mm				1.059				5.505
Total B. longirostris				**1.06**				**5.50**
Scapholeberis kingii Sars		**0.037**						
Leptodora kindtii Focke		**0.004**		**0.004**	**0.004**	**0.004**	**0.004**	
Diaphanosoma leuchtenbergianum Fisher								
Total Cladocera ind/L		**2.44**	**3.24**	**9.81**	**6.75**	**4.40**	**3.06**	**12.28**
TOTAL CRUSTACEA ind/L		**5.46**	**5.26**	**15.68**	**9.61**	**6.84**	**6.35**	**92.65**
ROTIFERA								
Kellicottia sps		1.553	0.747	2.117	1.176	1.019	0.941	49.400
Keratella sps		0.776	0.332	1.341	0.078	0.549	0.784	170.219
Polyarthra sps					0.078			1.694
Conochilus sps								
Gastropus sps								
Synchaeta sps (at least 2 forms)								
Brachionus sps								
Total Rotifera ind/L		**2.33**	**1.08**	**3.46**	**1.33**	**1.57**	**1.73**	**221.31**
Total Calanoida ind/L		**1.40**	**1.44**	**1.06**	**1.45**	**1.19**	**1.83**	**0.63**
Total Cyclopoida ind/L		**1.62**	**0.58**	**4.80**	**1.42**	**1.26**	**1.45**	**79.75**
Total Cladocera ind/L		**2.44**	**3.24**	**9.81**	**6.75**	**4.40**	**3.06**	**12.28**
Total Rotifera ind/L		**2.33**	**1.08**	**3.46**	**1.33**	**1.57**	**1.73**	**221.31**
TOTAL ZOOPLANKTON ind/L		**7.79**	**6.34**	**19.14**	**10.95**	**8.41**	**8.07**	**313.97**
Diptera (adults, exuvia, larvae DA, DE, DL)			1					
Specimens counted in sample		181	100	322	203	158	159	2234

***all specimens dead before trapped**

2018 Minnow Zooplankton Abundance Individuals/L		7	8	9	10	11	12	13	14
		Miin	Miin	Miin	Miin	Miin	Miin	Miin	Miin
		T43	T44	T45	T46	TN1	TN2	TN3	TN4
		2018	2018	2018	2018	2018	2018	2018	2018
		JUNE	JUNE	JUNE	JUNE	AUGUST	AUGUST	AUGUST	AUGUST
		8	9	9	8	31	31	31	31
		AM	AM	AM	AM	9:30:00	10:30:00	11:15:00	12:00:00
		18.0	18.0	18.0	19.0	10.0	10.0	10.0	10.0
		Miin	Miin	Miin	Miin	Miin	Miin	Miin	Miin
		WJ	WJ	WJ	WJ	WJ60	WJ60	WJ60	WJ60
	Sub-sa	160.0	160.0	160.0	160.0	40.0	40.0	40.0	40.0
	Sub-sa	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	Sub-s	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Net M	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASS		Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L
COPEPODA									
CALANOIDA									
Epischura nevadensis Lilljeborg									
E.n. adult female		0.010	0.002	0.002	0.002	0.148	0.148	0.148	0.222
E.n. adult male		0.002	0.002	0.021	0.002	0.222	0.141	0.259	0.148
E.n. immature 0.5-1.0 mm		0.002			0.002	0.847	0.423	0.282	0.423
Total E. nevadensis		**0.01**	**0.00**	**0.02**	**0.01**	**1.22**	**0.71**	**0.69**	**0.79**
Diaptomus pallidus Herrick									
D.p. adult female		0.021	0.314	0.062	0.039	0.282	0.141		0.141
D.p. gravid female			0.002				0.074		0.011
D.p. adult male		0.103				0.282	0.423		0.074
D.p. immature 2.0 mm									
D.p. immature 1.0 mm			0.314	0.314			0.282		0.141
D.p. immature 0.75 mm				0.314	0.297	0.141	0.706	0.141	0.282
D.p. immature 0.5 mm			0.314			0.282	0.565		
Total D. pallidus		**0.12**	**0.94**	**0.69**	**0.34**	**0.99**	**2.19**	**0.14**	**0.65**
Diaptomus tyrrelli Poppe									
D.t. adult female							0.141	0.141	0.111
D.t. gravid female		0.041	0.010	0.062	0.006		0.039	0.014	0.018
D.t. adult male		0.021	0.002			0.004		0.141	0.185
D.t. immature 2.0 mm		0.062	0.002	0.041	0.017	0.037	0.282		0.141
D.t. immature 1.0 mm					0.297		0.141	0.141	0.141
D.t. immature 0.75 mm						0.282			
D.t. immature 0.5 mm									
Total D. tyrrelli		**0.12**	**0.01**	**0.10**	**0.32**	**0.32**	**0.60**	**0.44**	**0.60**
Calanoid nauplius									
small		1.255	0.314		0.297	0.141	0.988	0.565	0.282
large					0.297				
Total Calanoid nauplii		**1.25**	**0.31**		**0.59**	**0.14**	**0.99**	**0.56**	**0.28**
Total Calanoida ind/L		**1.52**	**1.27**	**0.81**	**1.26**	**2.67**	**4.50**	**1.83**	**2.32**
CYLOPOIDA									
Cyclops bicuspidatus thomasi S.A.Forbes									
C. b. t. adult female		0.627	3.764	1.882	4.160	0.141	0.847	0.565	0.423
C. b. t. gravid female		0.165	0.247	0.124	0.078		0.141		
C. b. t. adult male		0.627	1.882	1.255	1.486	0.423	0.847	0.282	0.847
C. b. t. immature 1.0 mm		0.941	2.196	0.941	0.891	0.282			
C. b. t. immatue 0.75 mm		9.410	11.919	28.542	16.937	5.222	2.682	3.105	3.529
C. b. t. immature 0.5 mm		12.860	32.620	38.579	35.954	6.493	4.093	3.952	3.811
Total C. b. thomasi		**24.63**	**52.63**	**71.32**	**59.51**	**12.56**	**8.61**	**7.90**	**8.61**
Acanthocyclops vernalis (?) immature									
0.5mm		0.941	0.314	0.314		0.706	0.282	0.141	0.141
Total A. vernalis		**0.941**	**0.314**	**0.314**		**0.706**	**0.282**	**0.141**	**0.141**
Cyclopoid nauplius		**6.587**	**13.173**	**10.664**	**2.377**	**1.694**	**2.399**	**3.529**	**2.258**
Total Cyclopoida ind/L		**32.16**	**66.11**	**82.30**	**61.88**	**14.96**	**11.29**	**11.57**	**11.01**
CLADOCERA									
Daphnia schoedleri Sars									
D. s. 2.0 mm		0.314	0.627	0.627	0.297	0.706	0.037	0.074	0.423
D. s. 1.5 mm							0.037	0.111	
D. s. 1.0 mm		0.627	1.568	3.450	1.189	0.141		0.141	0.141
D. s. 0.5 mm		1.255	1.255	1.255	2.080		0.037	0.423	
Total D. schoedleri		**2.20**	**3.45**	**5.33**	**3.57**	**0.85**	**0.11**	**0.75**	**0.56**
Daphnia galeata mendotae Birge									
D. g. m. 2.0 mm						0.282	1.129	0.282	0.565
D. g. m. 1.5 mm				0.627	1.189				
D. g. m. 1.0 mm		1.255	2.196	1.882	4.160			0.141	0.565
D. g. m. 0.5 mm		0.627	1.882	3.137	5.349		0.141	0.141	0.282
Total D. g. mendotae		**1.88**	**4.08**	**5.65**	**10.70**	**0.28**	**1.27**	**0.56**	**1.41**
Daphnia retrocurva Forbes									
D. r. 2.0 mm					0.297	0.282	0.148	0.018	0.282
D. r. 1.0 mm						0.141			
D. r. 0.5 mm						0.141	0.141		
Total D. retrocurva					**0.30**	**0.56**	**0.29**	**0.02**	**0.28**

2018 Minnow Zooplankton Abundance Individuals/L		7 Miin T43 2018 JUNE 8 AM 18.0 Miin WJ	8 Miin T44 2018 JUNE 9 AM 18.0 Miin WJ	9 Miin T45 2018 JUNE 9 AM 18.0 Miin WJ	10 Miin T46 2018 JUNE 8 AM 19.0 Miin WJ	11 Miin TN1 2018 AUGUST 31 9:30:00 10.0 Miin WJ60	12 Miin TN2 2018 AUGUST 31 10:30:00 10.0 Miin WJ60	13 Miin TN3 2018 AUGUST 31 11:15:00 10.0 Miin WJ60	14 Miin TN4 2018 AUGUST 31 12:00:00 10.0 Miin WJ60
	Sub-sa	160.0	160.0	160.0	160.0	40.0	40.0	40.0	40.0
	Sub-sa	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	Sub-s	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Net M	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
Holopedium gibberum Zaddach 0.5 mm		**0.627**							
Bosmina longirostris O.F. Mueller									
B. l. 1.0 mm					0.297				
B. l. 0.75 mm									
B. l. 0.5 mm		0.314	0.314	1.255	0.891				
B. l. 0.25 mm		3.764	4.391	11.919	11.886				
Total B. longirostris		**4.08**	**4.70**	**13.17**	**13.07**				
Scapholeberis kingii Sars									
Leptodora kindtii Focke		**0.008**	**0.002**	**0.018**		**0.021**	**0.011**		
Diaphanosoma leuchtenbergianum Fisher						**0.007**	**0.111**	**0.282**	**0.074**
Total Cladocera ind/L		**8.79**	**12.23**	**24.17**	**27.63**	**1.72**	**1.79**	**1.61**	**2.33**
TOTAL CRUSTACEA ind/L		**42.46**	**79.62**	**107.28**	**90.77**	**19.35**	**17.58**	**15.02**	**15.66**
ROTIFERA									
Kellicottia sps		17.878	24.778	32.620	12.777	1.270	0.706	0.847	0.847
Keratella sps		104.132	212.656	150.553	106.377	1.129	1.129	1.553	1.976
Polyarthra sps		7.214	11.291	5.646	4.457	0.282	0.847	1.553	2.117
Conochilus sps			0.627	0.941	0.594				
Gastropus sps						2.541	3.670	3.952	2.964
Synchaeta sps (at least 2 forms)		0.314	1.882	0.627			0.141		0.074
Brachionus sps									
Total Rotifera ind/L		**129.54**	**251.24**	**190.39**	**124.21**	**5.22**	**6.49**	**7.90**	**7.98**
Total Calanoida ind/L		**1.52**	**1.27**	**0.81**	**1.26**	**2.67**	**4.50**	**1.83**	**2.32**
Total Cyclopoida ind/L		**32.16**	**66.11**	**82.30**	**61.88**	**14.96**	**11.29**	**11.57**	**11.01**
Total Cladocera ind/L		**8.79**	**12.23**	**24.17**	**27.63**	**1.72**	**1.79**	**1.61**	**2.33**
Total Rotifera ind/L		**129.54**	**251.24**	**190.39**	**124.21**	**5.22**	**6.49**	**7.90**	**7.98**
TOTAL ZOOPLANKTON ind/L		**172.00**	**330.86**	**297.67**	**214.98**	**24.57**	**24.07**	**22.93**	**23.64**
Diptera (adults, exuvia, larvae DA, DE, DL)									
Specimens counted in sample		581	1079	975	744	195	202	186	193

***all specimens dead before trapped**

2018 Minnow Zooplankton Abundance Individuals/L		14x		15	16	17	18	19	20	21
		Miin		Miin	Miin	Miin	Miin	Miin	Miin	Miin
		TN4		TN5	T41	T42	T43	T44	T45	TN1
		2018		2018	2018	2018	2018	2018	2018	2018
		AUGUST		AUGUST	AUGUST	AUGUST	AUGUST	AUGUST	AUGUST	EPTEMBE
		31		31	30	30	30	31	31	4
		12:00:00		13:00:00	11:00:00	12:30:00	14:00:00	15:30:00	16:30:00	11:00:00
		10.0		10.0	10.0	10.0	10.0	10.0	10.0	14.0
		Miin		Miin	Miin	Miin	Miin	Miin	Miin	Miin
		WJ60		WJ60	WJ60	WJ60	WJ60	WJ60	WJ60	WJ60
	Sub-sa	40.0		20.0	40.0	40.0	40.0	40.0	40.0	40.0
	Sub-sa	10.5		10.5	10.5	10.5	10.5	10.5	10.5	10.5
	Sub-s	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Net M	283.4		283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASS		Ind/L		Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L
COPEPODA										
CALANOIDA										
Epischura nevadensis Lilljeborg										
E.n. adult female		0.074		0.004	0.074	0.074	0.037	0.037	0.037	0.053
E.n. adult male		0.074				0.074	0.074	0.037	0.185	0.053
E.n. immature 0.5-1.0 mm		0.141		0.004		0.141		0.141	0.565	0.202
Total E. nevadensis		**0.29**		**0.01**	**0.07**	**0.29**	**0.11**	**0.22**	**0.79**	**0.31**
Diaptomus pallidus Herrick										
D.p. adult female									0.282	0.101
D.p. gravid female		0.014			0.004			0.007	0.037	0.005
D.p. adult male		0.148			0.141	0.141	0.141	0.282	0.141	0.026
D.p. immature 2.0 mm		0.141							0.141	0.101
D.p. immature 1.0 mm		0.141							0.565	
D.p. immature 0.75 mm					0.282	0.847	0.282			0.202
D.p. immature 0.5 mm		0.141			0.282	0.141	0.282	0.282	0.141	
Total D. pallidus		**0.59**			**0.71**	**1.13**	**0.71**	**0.57**	**1.31**	**0.43**
Diaptomus tyrrelli Poppe										
D.t. adult female		0.148			0.141	0.037	0.423	0.141		0.053
D.t. gravid female		0.025			0.053	0.060	0.074	0.035	0.037	0.018
D.t. adult male		0.148			1.129	1.129	0.847	0.847	0.565	0.159
D.t. immature 2.0 mm		0.423			0.282	0.141	0.141	0.141		
D.t. immature 1.0 mm						1.129	0.423			
D.t. immature 0.75 mm					0.282					
D.t. immature 0.5 mm		0.111								
Total D. tyrrelli		**0.86**			**1.89**	**2.50**	**1.91**	**1.16**	**0.60**	**0.23**
Calanoid nauplius										
small		0.847			1.270	0.141	0.706	0.988	0.988	0.605
large										
Total Calanoid nauplii		**0.85**			**1.27**	**0.14**	**0.71**	**0.99**	**0.99**	**0.60**
Total Calanoida ind/L		**2.58**		**0.01**	**3.94**	**4.06**	**3.43**	**2.94**	**3.68**	**1.58**
CYLOPOIDA										
Cyclops bicuspidatus thomasi S.A.Forbes										
C. b. t. adult female		0.565		0.007	1.553	1.270	2.682	1.270	1.411	
C. b. t. gravid female		0.004			0.004	0.011	0.074	0.004	0.141	0.005
C. b. t. adult male		0.565			1.270	0.988	2.823	0.282	0.847	0.202
C. b. t. immature 1.0 mm		0.141								
C. b. t. immatue 0.75 mm		2.117		0.004	7.481	7.481	9.174	6.069	11.715	1.411
C. b. t. immature 0.5 mm		2.682			12.844	12.279	13.691	17.219	28.370	0.605
Total C. b. thomasi		**6.07**		**0.01**	**23.15**	**22.03**	**28.44**	**24.84**	**42.48**	**2.22**
Acanthocyclops vernalis (?) immature										
0.5mm		0.141			0.282			0.282	0.282	0.101
Total A. vernalis		**0.141**			**0.282**			**0.282**	**0.282**	**0.101**
Cyclopoid nauplius		**2.823**		**0.071**	**1.129**	**2.258**	**2.541**	**3.246**	**2.541**	**2.218**
Total Cyclopoida ind/L		**9.04**		**0.08**	**24.56**	**24.29**	**30.98**	**28.37**	**45.31**	**4.54**
CLADOCERA										
Daphnia schoedleri Sars										
D. s. 2.0 mm		0.141			0.141	0.037				0.159
D. s. 1.5 mm		0.141		0.004		0.141				0.026
D. s. 1.0 mm										
D. s. 0.5 mm					0.423		0.141			
Total D. schoedleri		**0.28**		**0.00**	**0.56**	**0.18**	**0.14**			**0.19**
Daphnia galeata mendotae Birge										
D. g. m. 2.0 mm		1.129		0.007			0.282	0.423	0.282	0.053
D. g. m. 1.5 mm										
D. g. m. 1.0 mm		0.423			0.565	1.129	1.270	0.423	0.423	0.106
D. g. m. 0.5 mm		0.565			0.565	0.847	1.835	0.847	0.847	0.605
Total D. g. mendotae		**2.12**		**0.01**	**1.13**	**1.98**	**3.39**	**1.69**	**1.55**	**0.76**
Daphnia retrocurva Forbes										
D. r. 2.0 mm		0.141			0.282	0.111		0.141	0.141	0.053
D. r. 1.0 mm					0.282		0.141		0.141	
D. r. 0.5 mm					0.141		0.282	0.141	0.141	0.101
Total D. retrocurva		**0.14**			**0.71**	**0.11**	**0.42**	**0.28**	**0.42**	**0.15**

2018 Minnow Zooplankton Abundance Individuals/L		14x Miin TN4 2018 AUGUST 31 12:00:00 10.0 Miin WJ60	15 Miin TN5 2018 AUGUST 31 13:00:00 10.0 Miin WJ60	16 Miin T41 2018 AUGUST 30 11:00:00 10.0 Miin WJ60	17 Miin T42 2018 AUGUST 30 12:30:00 10.0 Miin WJ60	18 Miin T43 2018 AUGUST 30 14:00:00 10.0 Miin WJ60	19 Miin T44 2018 AUGUST 31 15:30:00 10.0 Miin WJ60	20 Miin T45 2018 AUGUST 31 16:30:00 10.0 Miin WJ60	21 Miin TN1 2018 EPTEMBE 4 11:00:00 14.0 Miin WJ60
	Sub-sa	40.0	20.0	40.0	40.0	40.0	40.0	40.0	40.0
	Sub-sa	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	Sub-s	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Net M	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
Holopedium gibberum Zaddach 0.5 mm									
Bosmina longirostris O.F. Mueller									
B. l. 1.0 mm									
B. l. 0.75 mm									
B. l. 0.5 mm									
B. l. 0.25 mm									
Total B. longirostris									
Scapholeberis kingii Sars				**0.007**	**0.004**		**0.007**		
Leptodora kindtii Focke				**0.011**		**0.011**		**0.007**	**0.018**
Diaphanosoma leuchtenbergianum Fisher		**0.282**			**0.706**	**0.988**	**0.222**	**0.185**	**0.504**
Total Cladocera ind/L		**2.82**	**0.01**	**2.42**	**2.97**	**4.95**	**2.21**	**2.17**	**1.62**
TOTAL CRUSTACEA ind/L		**14.44**	**0.10**	**30.92**	**31.32**	**39.37**	**33.52**	**51.16**	**7.74**
ROTIFERA									
Kellicottia sps		0.988	0.141	1.835	1.835	3.246	4.234	2.823	0.302
Keratella sps		1.553	0.071	4.234	3.105	5.363	6.210	7.057	1.311
Polyarthra sps		1.129		0.423	0.282		0.988	0.706	0.403
Conochilus sps									
Gastropus sps		3.670		6.210	6.351	6.916	3.246	3.952	1.916
Synchaeta sps (at least 2 forms)		0.282					0.141		
Brachionus sps									
Total Rotifera ind/L		**7.62**	**0.21**	**12.70**	**11.57**	**15.53**	**14.82**	**14.54**	**3.93**
Total Calanoida ind/L		**2.58**	**0.01**	**3.94**	**4.06**	**3.43**	**2.94**	**3.68**	**1.58**
Total Cyclopoida ind/L		**9.04**	**0.08**	**24.56**	**24.29**	**30.98**	**28.37**	**45.31**	**4.54**
Total Cladocera ind/L		**2.82**	**0.01**	**2.42**	**2.97**	**4.95**	**2.21**	**2.17**	**1.62**
Total Rotifera ind/L		**7.62**	**0.21**	**12.70**	**11.57**	**15.53**	**14.82**	**14.54**	**3.93**
TOTAL ZOOPLANKTON ind/L		**22.06**	**0.31**	**43.62**	**42.89**	**54.89**	**48.34**	**65.70**	**11.67**
Diptera (adults, exuvia, larvae DA, DE, DL)				1					
Specimens counted in sample		187	14*	337	332	399	372	480	165

***all specimens dead before trapped**

2018 Minnow Zooplankton Abundance Individuals/L		21x	22	23	24	25	26	27	28
		Miin	Miin	Miin	Miin	Miin	Miin	Miin	Miin
		TN1	TN2	TN3	TN4	TN5	T41	T42	T43
		2018	2018	2018	2018	2018	2018	2018	2018
		EPTEMBE	EPTEMBE	EPTEMBE	EPTEMBE	EPTEMBE	EPTEMBE	EPTEMBE	EPTEMBE
		4	4	4	4	4	4	4	4
		11:00:00	11:15:00	11:30:00	11:45:00	12:00:00	12:30:00	12:45:00	13:00:00
		14.0	11.5	12.5	12.0	12.0	21.0	22.0	22.0
		Miin	Miin	Miin	Miin	Miin	Miin	Miin	Miin
		WJ60	WJ60	WJ60	WJ60	WJ60	WJ60	WJ60	WJ60
	Sub-sa	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Sub-sa	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	Sub-s	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Net M	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASS		Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L
COPEPODA									
CALANOIDA									
Epischura nevadensis Lilljeborg									
E.n. adult female		0.053	0.055	0.089	0.247	0.247	0.035	0.101	0.034
E.n. adult male		0.026	0.071	0.178	0.371	0.185	0.018	0.017	0.034
E.n. immature 0.5-1.0 mm		0.302	0.123	0.226	0.118	0.235	0.202	0.064	0.064
Total E. nevadensis		**0.38**	**0.25**	**0.49**	**0.74**	**0.67**	**0.25**	**0.18**	**0.13**
Diaptomus pallidus Herrick									
D.p. adult female		0.403	0.245	0.113	0.031	0.118			
D.p. gravid female		0.010	0.009	0.003	0.003	0.003	0.003		
D.p. adult male			0.123		0.031			0.192	
D.p. immature 2.0 mm									
D.p. immature 1.0 mm									
D.p. immature 0.75 mm							0.067		
D.p. immature 0.5 mm							0.067	0.064	0.064
Total D. pallidus		**0.41**	**0.38**	**0.12**	**0.06**	**0.12**	**0.14**	**0.26**	**0.06**
Diaptomus tyrrelli Poppe									
D.t. adult female		0.079	0.123	0.059	0.031	0.118	0.053		0.064
D.t. gravid female		0.018	0.006	0.008	0.003	0.009	0.013	0.011	0.003
D.t. adult male		0.053	0.123	0.113	0.706	0.235	0.212	0.449	0.064
D.t. immature 2.0 mm			0.123					0.128	
D.t. immature 1.0 mm								0.064	0.064
D.t. immature 0.75 mm									
D.t. immature 0.5 mm				0.059					
Total D. tyrrelli		**0.15**	**0.37**	**0.24**	**0.74**	**0.36**	**0.28**	**0.65**	**0.20**
Calanoid nauplius									
small		1.008	1.350	0.339	0.706	0.823	0.807	2.053	1.026
large									0.064
Total Calanoid nauplii		**1.01**	**1.35**	**0.34**	**0.71**	**0.82**	**0.81**	**2.05**	**1.09**
Total Calanoida ind/L		**1.95**	**2.35**	**1.19**	**2.25**	**1.97**	**1.48**	**3.14**	**1.48**
CYLOPOIDA									
Cyclops bicuspidatus thomasi S.A.Forbes									
C. b. t. adult female		0.302	0.368	0.113			0.941	0.898	0.385
C. b. t. gravid female		0.008				0.031	0.035	0.002	0.051
C. b. t. adult male		0.202	0.123	0.339	0.118	0.118	0.134	1.026	0.128
C. b. t. immature 1.0 mm		0.302				0.118		0.064	
C. b. t. immatue 0.75 mm		1.916	0.123	0.339	0.470	0.470	3.092	3.593	1.668
C. b. t. immature 0.5 mm		0.101	1.227	0.113	0.470	0.470	3.629	4.106	2.759
Total C. b. thomasi		**2.83**	**1.84**	**0.90**	**1.06**	**1.21**	**7.83**	**9.69**	**4.99**
Acanthocyclops vernalis (?) immature									
0.5mm		0.101	0.736	0.113	0.235	0.118	0.269	0.128	0.064
Total A. vernalis		**0.101**	**0.736**	**0.113**	**0.235**	**0.118**	**0.269**	**0.128**	**0.064**
Cyclopoid nauplius		**3.327**	**3.068**	**2.936**	**3.411**	**2.000**	**3.293**	**3.978**	**3.144**
Total Cyclopoida ind/L		**6.26**	**5.65**	**3.95**	**4.70**	**3.32**	**11.39**	**13.80**	**8.20**
CLADOCERA									
Daphnia schoedleri Sars									
D. s. 2.0 mm		0.053	0.032	0.089		0.003	0.134		0.006
D. s. 1.5 mm		0.053		0.089	0.031	0.031	0.067		0.003
D. s. 1.0 mm		0.026	0.064	0.059		0.031		0.064	
D. s. 0.5 mm				0.030				0.064	0.017
Total D. schoedleri		**0.13**	**0.10**	**0.27**	**0.03**	**0.06**	**0.20**	**0.13**	**0.03**
Daphnia galeata mendotae Birge									
D. g. m. 2.0 mm		0.079	0.129	0.267	0.247	0.216		0.064	0.064
D. g. m. 1.5 mm									
D. g. m. 1.0 mm		0.132	0.064	0.119	0.062	0.031	0.067	0.064	
D. g. m. 0.5 mm			0.123	0.113	0.235	0.235		0.257	0.128
Total D. g. mendotae		**0.21**	**0.32**	**0.50**	**0.54**	**0.48**	**0.07**	**0.38**	**0.19**
Daphnia retrocurva Forbes									
D. r. 2.0 mm		0.132	0.064	0.237	0.216	0.185	0.269	0.192	0.064
D. r. 1.0 mm		0.026		0.059					
D. r. 0.5 mm		0.026		0.113		0.062		0.064	0.064
Total D. retrocurva		**0.19**	**0.06**	**0.41**	**0.22**	**0.25**	**0.27**	**0.26**	**0.13**

2018 Minnow Zooplankton Abundance Individuals/L		21x	22	23	24	25	26	27	28
		Miin	Miin	Miin	Miin	Miin	Miin	Miin	Miin
		TN1	TN2	TN3	TN4	TN5	T41	T42	T43
		2018	2018	2018	2018	2018	2018	2018	2018
		EPTEMBE	EPTEMBE	EPTEMBE	EPTEMBE	EPTEMBE	EPTEMBE	EPTEMBE	EPTEMBE
		4	4	4	4	4	4	4	4
		11:00:00	11:15:00	11:30:00	11:45:00	12:00:00	12:30:00	12:45:00	13:00:00
		14.0	11.5	12.5	12.0	12.0	21.0	22.0	22.0
		Miin	Miin	Miin	Miin	Miin	Miin	Miin	Miin
		WJ60	WJ60	WJ60	WJ60	WJ60	WJ60	WJ60	WJ60
	Sub-sa	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Sub-sa	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	Sub-s	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Net M	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
Holopedium gibberum Zaddach 0.5 mm									
Bosmina longirostris O.F. Mueller									
B. l. 1.0 mm									
B. l. 0.75 mm							0.067		
B. l. 0.5 mm									
B. l. 0.25 mm									
Total B. longirostris							**0.07**		
Scapholeberis kingii Sars					**0.003**	**0.003**			
Leptodora kindtii Focke		**0.020**	**0.018**	**0.014**	**0.003**	**0.006**	**0.002**		
Diaphanosoma leuchtenbergianum Fisher		**0.212**	**0.129**	**0.059**	**0.185**	**0.124**	**0.134**	**0.449**	**0.513**
Total Cladocera ind/L		**0.76**	**0.62**	**1.25**	**0.98**	**0.93**	**0.74**	**1.22**	**0.86**
TOTAL CRUSTACEA ind/L		**8.97**	**8.62**	**6.39**	**7.93**	**6.22**	**13.61**	**18.16**	**10.54**
ROTIFERA									
Kellicottia sps		0.605	0.736	0.903	0.941	0.706	2.420	2.951	1.796
Keratella sps		1.109	1.473	1.016	1.529	2.352	3.092	2.823	2.374
Polyarthra sps		0.706	8.837	1.920	1.411	0.941	0.739	1.411	1.026
Conochilus sps									
Gastropus sps		2.218	2.086	2.484	1.411	1.294	1.613	1.476	0.577
Synchaeta sps (at least 2 forms)		0.101	0.368		0.118	0.118			
Brachionus sps									
Total Rotifera ind/L		**4.74**	**13.50**	**6.32**	**5.41**	**5.41**	**7.86**	**8.66**	**5.77**
Total Calanoida ind/L		**1.95**	**2.35**	**1.19**	**2.25**	**1.97**	**1.48**	**3.14**	**1.48**
Total Cyclopoida ind/L		**6.26**	**5.65**	**3.95**	**4.70**	**3.32**	**11.39**	**13.80**	**8.20**
Total Cladocera ind/L		**0.76**	**0.62**	**1.25**	**0.98**	**0.93**	**0.74**	**1.22**	**0.86**
Total Rotifera ind/L		**4.74**	**13.50**	**6.32**	**5.41**	**5.41**	**7.86**	**8.66**	**5.77**
TOTAL ZOOPLANKTON ind/L		**13.71**	**22.12**	**12.71**	**13.34**	**11.63**	**21.48**	**26.82**	**16.31**
Diptera (adults, exuvia, larvae DA, DE, DL)									
Specimens counted in sample		207	257	164	165	148	355	425	273

***all specimens dead before trapped**

2018 Minnow Zooplankton Abundance Individuals/L		29 Miin T44 2018 EPTEMBE 4 13:15:00 22.0 Miin WJ60	30 Miin T45 2018 EPTEMBER 4 13:30:00 22.0 Miin WJ60
	Sub-sa	40.0	40.0
	Sub-sa	10.5	10.5
	Sub-s	1.0	1.0
	Net M	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASS		Ind/L	Ind/L
COPEPODA			
CALANOIDA			
Epischura nevadensis Lilljeborg			
E.n. adult female		0.034	0.067
E.n. adult male		0.017	0.051
E.n. immature 0.5-1.0 mm		0.064	0.321
Total E. nevadensis		**0.11**	**0.44**
Diaptomus pallidus Herrick			
D.p. adult female			
D.p. gravid female			
D.p. adult male			
D.p. immature 2.0 mm			0.002
D.p. immature 1.0 mm			
D.p. immature 0.75 mm		0.064	0.064
D.p. immature 0.5 mm			0.064
Total D. pallidus		**0.06**	**0.13**
Diaptomus tyrrelli Poppe			
D.t. adult female		0.128	0.321
D.t. gravid female		0.010	0.030
D.t. adult male		0.192	0.257
D.t. immature 2.0 mm			0.064
D.t. immature 1.0 mm			0.128
D.t. immature 0.75 mm			0.064
D.t. immature 0.5 mm			
Total D. tyrrelli		**0.33**	**0.86**
Calanoid nauplius			
small		1.989	1.155
large			
Total Calanoid nauplii		**1.99**	**1.15**
Total Calanoida ind/L		**2.50**	**2.59**
CYLOPOIDA			
Cyclops bicuspidatus thomasi S.A.Forbes			
C. b. t. adult female		0.192	0.385
C. b. t. gravid female		0.005	0.192
C. b. t. adult male		0.128	0.642
C. b. t. immature 1.0 mm			
C. b. t. immatue 0.75 mm		1.219	2.887
C. b. t. immature 0.5 mm		3.272	3.785
Total C. b. thomasi		**4.82**	**7.89**
Acanthocyclops vernalis (?) immature			
0.5mm		0.192	0.192
Total A. vernalis		**0.192**	**0.192**
Cyclopoid nauplius		**4.170**	**4.619**
Total Cyclopoida ind/L		**9.18**	**12.70**
CLADOCERA			
Daphnia schoedleri Sars			
D. s. 2.0 mm		0.002	
D. s. 1.5 mm		0.003	0.008
D. s. 1.0 mm			
D. s. 0.5 mm		0.192	
Total D. schoedleri		**0.20**	**0.01**
Daphnia galeata mendotae Birge			
D. g. m. 2.0 mm		0.064	0.192
D. g. m. 1.5 mm			
D. g. m. 1.0 mm		0.192	0.064
D. g. m. 0.5 mm		0.064	0.064
Total D. g. mendotae		**0.32**	**0.32**
Daphnia retrocurva Forbes			
D. r. 2.0 mm		0.064	0.128
D. r. 1.0 mm			0.064
D. r. 0.5 mm			0.064
Total D. retrocurva		**0.06**	**0.26**

2018 Minnow Zooplankton Abundance Individuals/L		29 Miin T44 2018 EPTEMBE 4 13:15:00 22.0 Miin WJ60	30 Miin T45 2018 EPTEMBER 4 13:30:00 22.0 Miin WJ60
	Sub-sa	40.0	40.0
	Sub-sa	10.5	10.5
	Sub-s	1.0	1.0
	Net M	283.4	283.4
Holopedium gibberum Zaddach 0.5 mm			
Bosmina longirostris O.F. Mueller			
B. l. 1.0 mm			
B. l. 0.75 mm			
B. l. 0.5 mm			
B. l. 0.25 mm			
Total B. longirostris			
Scapholeberis kingii Sars			
Leptodora kindtii Focke			
Diaphanosoma leuchtenbergianum Fisher		**0.257**	**0.192**
Total Cladocera ind/L		**0.84**	**0.78**
TOTAL CRUSTACEA ind/L		**12.52**	**16.07**
ROTIFERA			
Kellicottia sps		1.989	1.925
Keratella sps		1.925	2.374
Polyarthra sps		1.796	1.026
Conochilus sps			
Gastropus sps		0.898	1.861
Synchaeta sps (at least 2 forms)		0.128	0.064
Brachionus sps		0.064	
Total Rotifera ind/L		**6.80**	**7.25**
Total Calanoida ind/L		**2.50**	**2.59**
Total Cyclopoida ind/L		**9.18**	**12.70**
Total Cladocera ind/L		**0.84**	**0.78**
Total Rotifera ind/L		**6.80**	**7.25**
TOTAL ZOOPLANKTON ind/L		**19.32**	**23.32**
Diptera (adults, exuvia, larvae DA, DE, DL)			
Specimens counted in sample		317	399

***all specimens dead before trapped**

2018 Minnow Zooplankton Wet Weight ug/L

	LAKE Mean LENGTH Lmm	Malley et al 1989* Regression LnL	#	Lna	b	Calculate LnW	Calculate DryWt ug	Formula Wet Weight ug	Wet Weight ug	Analytical # / Lake / Station / Year / Month / Day / Time / Depth / Collect Gear / Sub-sample Fraction #1 / Sub-sample Fraction #2 / Sub-sample Fraction#3 / Net Mouth Area (cm2)
INSTAR IDENTIFICATION & SIZE CLASSES										
COPEPODA										
CALANOIDA										
Epischura nevadensis Lilljeborg										
E.n. adult female	1.7	0.531	32	1.134	2.7882	2.613	13.643	194.89	194.89	
E.n. adult male	1.6	0.470	32	1.134	2.7882	2.444	11.521	164.58	164.58	
E.n. immature 0.5-1.3 mm	1.05	0.0488	32	1.134	2.7882	1.27	3.5599	50.856	50.856	
Total E. nevadensis										
Diaptomus pallidus Herrick										
D.p. adult female	1.29	0.255	30	0.977	2.538	1.623	5.071	72.439	72.439	
D.p. gravid female	1.29	0.255	30	0.977	2.538	1.623	5.071	72.439	72.439	
D.p. adult male	1.07	0.068	30	0.977	2.538	1.150	3.158	45.108	45.108	
D.p. immature 2.0 mm	1.04	0.039	30	0.977	2.538	1.077	2.935	41.930	41.930	
D.p. immature 1.0 mm	0.99	-0.010	30	0.977	2.538	0.952	2.590	37.006	37.006	
D.p. immature 0.75 mm	0.75	-0.288	30	0.977	2.538	0.246	1.279	18.275	18.275	
D.p. immature 0.5 mm	0.5	-0.693	30	0.977	2.538	-0.782	0.458	6.538	6.538	
Total D. pallidus										
Diaptomus tyrrelli Poppe										
D.t. adult female	1.4	0.336	30	0.977	2.538	1.831	6.242	89.171	89.171	
D.t. gravid female	1.4	0.336	30	0.977	2.538	1.831	6.242	89.171	89.171	
D.t. adult male	1.2	0.182	30	0.977	2.538	1.440	4.221	60.296	60.296	
D.t. immature 2.0 mm	1.18	0.166	30	0.977	2.538	1.397	4.044	57.778	57.778	
D.t. immature 1.0 mm	0.99	-0.010	30	0.977	2.538	0.952	2.590	37.001	37.001	
D.t. immature 0.75 mm	0.75	-0.288	30	0.977	2.538	0.247	1.280	18.287	18.287	
D.t. immature 0.5 mm	0.5	-0.693	30	0.977	2.538	-0.782	0.457	6.534	6.534	
Total D. tyrrelli										
Calanoid nauplius										
small	0.293	-1.228	6	0.993	2.0997	-1.585	0.205	2.928	2.928	
large	0.330	-1.109	6	0.993	2.0997	-1.336	0.263	3.756	3.756	
Total Calanoid nauplii										
Total Calanoida ug/L										
CYLOPOIDA										
Cyclops bicuspidatus thomasi S. A. Forbes										
C.b.t. female	0.890	-0.117	68	0.761	3.9145	0.303	1.353	19.334	19.334	
C.b.t. gravid	0.89	-0.117	68	0.761	3.9145	0.303	1.353	19.334	19.334	
C.b.t. male	0.75	-0.288	68	0.761	3.9145	-0.367	0.693	9.899	9.899	
C.b.t. immature 1.0	0.99	-0.010	51	0.903	2.7307	0.876	2.401	34.300	34.300	
C.b.t. immature .75	0.75	-0.288	51	0.903	2.7307	0.117	1.124	16.055	16.055	
C.b.t. immature .5	0.5	-0.693	51	0.903	2.7307	-0.989	0.372	5.313	5.313	
Total C. b. thomasi										
Acanthocyclops vernalis Fischer ?										
A.v. Immature 0.5	0.5	-0.693	92	0.834	2.576	-0.95	0.3863	5.5185	5.519	
Total A. vernalis										
Cyclopoid nauplius	0.14	-1.966	49	1.639	2.4474	-1.649	0.192	2.747	2.747	
Total Cyclopoida ug/L										
CLADOCERA										
Daphnia schoedleri Sars										
D. s. 2.0 mm	2.000	0.693	)sL88	1.393	3.0114	3.481	32.481	464.01	464.01	
D. s. 1.5 mm	1.500	0.405	)sL88	1.393	3.0114	2.614	13.658	195.11	195.11	
D. s. 1.0 mm	0.990	-0.010	)sL88	1.393	3.0114	1.363	3.908	55.829	55.829	
D. s. 0.5 mm	0.500	-0.693	)sL88	1.393	3.0114	-0.69	0.4996	7.136	7.136	
Total D. schoedleri										
Daphnia galeata mendotae Birge										
D. g. m. 2.0 mm	1.95	0.6678	L223	1.08	2.7188	3.44	31.182	445.46	445.46	
D. g. m. 1.5 mm	1.5	0.4055	L223	1.08	2.7188	3.157	23.49	335.57	335.57	
D. g. m. 1.0 mm	1.01	0.010	L223	1.08	2.7188	1.108	3.027	43.243	43.243	
D. g. m. 0.5 mm	0.38	-0.968	L223	1.08	2.7188	-1.619	0.198	2.830	2.830	
Total D. g. mendotae										

2018 Minnow Zooplankton Wet Weight ug/L

										Analytical #
										Lake
										Station
										Year
										Month
										Day
										Time
										Depth
										Collect
	LAKE							**Formula**		**Gear**
	Mean	**Malley et al 1989***					**Calculate**	**Wet**	**Wet**	**Sub-sample Fraction #1**
	LENGTH	**Regression**				**Calculate**	**DryWt**	**Weight**	**Weight**	**Sub-sample Fraction #2**
	Lmm	**LnL**	**#**	**Lna**	**b**	**LnW**	**ug**	**ug**	**ug**	**Sub-sample Fraction#3**
										Net Mouth Area (cm2)
INSTAR IDENTIFICATION & SIZE CLASSES										
Daphnia retrocurva Forbes										
D. r. 2.0 mm	1.99	0.6881	L227	0.864	3.1262	3.015	20.388	291.26	291.26	
D. r. 1.0 mm	0.8	-0.223	L227	0.864	3.1262	0.167	1.181	16.875	16.875	
D. r. 0.5 mm	0.5	-0.693	L227	0.864	3.1262	-1.303	0.272	3.883	3.883	
Total D. retrocurva										
Holopedium gibberum Zaddach 0,5 mm	0.500	-0.693	223H	2.117	2.6972	0.247	1.2806	18.295	18.295	
Bosmina longirostris O.F.Muller										
B. l. 1.0mm	0.99	-0.010	.223B	2.475	3.3614	2.441	11.488	164.12	164.12	
B. l. 0.75mm	0.750	-0.288	.223B	2.475	3.3614	1.508	4.518	64.544	64.544	
B. l. 0.5mm	0.5	-0.693	.223B	2.475	3.3614	0.145	1.156	16.517	16.517	
B. l. 0.25mm	0.250	-1.386	.223B	2.475	3.3614	-2.185	0.113	1.607	1.607	
Total B. longirostris										
Scapholeberis kingii Sars******	0.99	-0.01	Clay	2.729	3.337	2.695	14.806	211.52	211.52	
Leptodora kindtii Focke							12**	171.43	171.43	
Diaphanosoma leuchtenbergianum Fisher***	0.73	-0.315	L223	1.274	3.2454	0.253	1.2874	18.392	18.392	
Total Cladocera ug/L										
TOTAL CRUSTACEA ug/L										
ROTIFERA										
Kellicottia sps	0.128	-2.056	L224				0.015	0.214	0.214	
Keratella sps	0.102	-2.283	L224				0.011	0.157	0.157	
Polyarthra sps**	0.126	-2.071	L227				0.041	0.586	0.586	
Conochilus sps	0.186	-1.682	L223				0.042	0.600	0.600	
Gastropus sps	0.05	-2.996	L224				0.015	0.214	0.214	
Synchaeta sp	0.156	-1.858	L227				0.07	1.000	1.000	
Brachionus sps***	0.2	-1.609	Clay				0.044	0.629	0.629	
Total Rotifera ug/L										
Total Calanoida ug/L										
Total Cyclopoida ug/L										
Total Cladocera ug/L										
Total Rotifera ug/L										
TOTAL ZOOPLANKTON ug/L										

*Length/DryWeight Regressions in form Lnw = Lna + bLnL from Malley et al. 1989
R6 LnW= 0.9926-2.0997 LnL
R27 LnW = 1.0542 -2.748 LnL
R30 LnW =0.9772-2.5384 LnL
R32 LnW = 1.1337 + 2.7882 LnL
R49 LnW= 1.6388 - 2.4474 LnL
R77 LnW= 1.3472+3.0087LnL
R92 LnW= 0.8344-2.5760 LnL
R94 LnW = 1.3169 - 2.7197 LnL
DsL885 LnW = 1.3933 - 3.0114 LnL
RL302 LnW = 1.6274 - 3.3367 LnL
RL223Hg LnW = 2.1169 + 2.6972 LnL
RL223Bl LnW = 2.4751 - 3.3614 LnL
RL223Cs LnW = 3.1270 -3.3678 LnL
** Table A2 Malley et al. 1989 Lake Ontario
***used formula for Diaphanosoma birgei Table 10 Malley et al 1989.
****Table 10 Malley et al 1989 Lake 227
***** used formula for Keratella cochlearis Clay Lake Table 11 Malley et all 1989
******used formula for Ceriodaphnia lacustris Clay Lake Table 10 Malley et al 1989

2018 Minnow Zooplankton Wet Weight ug/L		1	2	3	4	5	5x	6	7	8
		Min	Min	Min	Min	Min	Min	Min	Min	Min
		TN1	TN2	TN3	TN4	TN5	TN5	T42	T43	T44
		2018	2018	2018	2018	2018	2018	2018	2018	2018
		JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE
		11	11	11	11	11	11	9	8	9
		AM	AM	AM	AM	AM	AM	AM	AM	AM
		10.0	8.5	10.0	9.0	9.0	9.0	20.0	18.0	18.0
		Min	Min	Min	Min	Min	Min	Min	Min	Min
		WJ	WJ	WJ	WJ	WJ	WJ	WJ	WJ	WJ
		20.0	20.0	20.0	20.0	20.0	20.0	80.0	160.0	160.0
	L	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASSES		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COPEPODA										
CALANOIDA										
Epischura nevadensis Lilljeborg										
E.n. adult female		21.66	4.05	5.50	11.46	9.93	9.17		1.91	0.38
E.n. adult male		6.10	4.10	9.87	14.84	7.10	6.45	0.58	0.32	0.32
E.n. immature 0.5-1.3 mm					3.99	3.99	3.99		0.10	
Total E. nevadensis		**27.76**	**8.14**	**15.37**	**30.29**	**21.02**	**19.61**	**0.58**	**2.33**	**0.70**
Diaptomus pallidus Herrick										
D.p. adult female		10.74	6.31	5.11	8.95	8.95	14.91	0.13	1.49	22.72
D.p. gravid female				3.07	1.99	1.99	1.99			0.14
D.p. adult male		5.01	5.90	15.92	7.43	11.14	7.43		4.64	
D.p. immature 2.0 mm										
D.p. immature 1.0 mm		6.86	1.61		2.90	2.90	5.80			11.61
D.p. immature 0.75 mm			1.52							
D.p. immature 0.5 mm		0.24	0.54	0.46						2.05
Total D. pallidus		**22.85**	**15.89**	**24.56**	**21.26**	**24.98**	**30.13**	**0.13**	**6.13**	**36.52**
Diaptomus tyrrelli Poppe										
D.t. adult female						1.05	1.40			
D.t. gravid female		1.26	0.37	12.59				1.65	3.67	0.87
D.t. adult male		0.43		0.21	0.24	3.316	3.557	0.11	1.24	0.12
D.t. immature 2.0 mm		6.42	7.56	4.08	2.38			2.14	3.57	0.11
D.t. immature 1.0 mm										
D.t. immature 0.75 mm			3.04	3.87						
D.t. immature 0.5 mm										
Total D. tyrrelli		**8.11**	**10.96**	**20.75**	**2.61**	**4.36**	**4.96**	**3.90**	**8.48**	**1.11**
Calanoid nauplius										
small		1.65	1.94	0.03	2.30	1.38	0.92	1.65	3.67	0.92
large		0.27								
Total Calanoid nauplii		**1.92**	**1.94**	**0.03**	**2.30**	**1.38**	**0.92**	**1.65**	**3.67**	**0.92**
Total Calanoida ug/L		**60.63**	**36.94**	**60.71**	**56.47**	**51.74**	**55.61**	**6.26**	**20.62**	**39.25**
CYLOPOIDA										
Cyclops bicuspidatus thomasi S. A. Forbes										
C.b.t. female		1.36		4.09		1.52	1.52	49.12	12.13	72.77
C.b.t. gravid				0.07	0.08	0.08	0.80	5.46	3.18	4.78
C.b.t. male		0.70		1.40	0.78			29.34	6.21	18.63
C.b.t. immature 1.0			2.85	2.42	2.69			96.83	32.28	75.31
C.b.t. immature .75		17.00	4.00	28.33	3.78	6.29	10.07	385.23	151.07	191.36
C.b.t. immature .5		1.50	0.44	13.12	4.58	3.75	3.75	205.46	68.32	173.30
Total C. b. thomasi		**20.56**	**7.29**	**49.43**	**11.90**	**11.64**	**16.13**	**771.43**	**273.19**	**536.14**
Acanthocyclops vernalis Fischer ?										
A.v. Immature 0.5		0.78	0.46	0.39				1.56	5.19	1.73
Total A. vernalis		**0.78**	**0.46**	**0.39**				**1.56**	**5.19**	**1.73**
Cyclopoid nauplius			**0.23**	**0.19**	**0.43**	**0.22**		**22.49**	**18.10**	**36.19**
Total Cyclopoida ug/L		**21.34**	**7.97**	**50.01**	**12.33**	**11.85**	**16.13**	**795.48**	**296.47**	**574.06**
CLADOCERA										
Daphnia schoedleri Sars										
D. s. 2.0 mm					109.15	72.77	36.38	261.97	145.54	291.07
D. s. 1.5 mm										
D. s. 1.0 mm					13.13	13.13	8.76	15.76	35.02	87.55
D. s. 0.5 mm									8.95	8.95
Total D. schoedleri					**122.29**	**85.90**	**45.14**	**277.73**	**189.51**	**387.58**
Daphnia galeata mendotae Birge										
D. g. m. 2.0 mm										
D. g. m. 1.5 mm		47.36	83.58	449.96	315.76	236.82	78.94	331.55		
D. g. m. 1.0 mm		76.29	78.99	155.64	145.81	88.16	61.03	109.86	54.25	94.94
D. g. m. 0.5 mm		1.40	3.29	10.58	5.55	3.55	3.33	6.79	1.78	5.33
Total D. g. mendotae		**125.06**	**165.86**	**616.18**	**467.11**	**328.53**	**143.30**	**448.20**	**56.03**	**100.27**

2018 Minnow Zooplankton Wet Weight ug/L		1	2	3	4	5	5x	6	7	8
		Min	Min	Min	Min	Min	Min	Min	Min	Min
		TN1	TN2	TN3	TN4	TN5	TN5	T42	T43	T44
		2018	2018	2018	2018	2018	2018	2018	2018	2018
		JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE
		11	11	11	11	11	11	9	8	9
		AM	AM	AM	AM	AM	AM	AM	AM	AM
		10.0	8.5	10.0	9.0	9.0	9.0	20.0	18.0	18.0
		Min	Min	Min	Min	Min	Min	Min	Min	Min
		WJ	WJ	WJ	WJ	WJ	WJ	WJ	WJ	WJ
		20.0	20.0	20.0	20.0	20.0	20.0	80.0	160.0	160.0
	L	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASSES		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Daphnia retrocurva Forbes										
D. r. 2.0 mm				20.55						
D. r. 1.0 mm										
D. r. 0.5 mm										
Total D. retrocurva				**20.55**						
Holopedium gibberum Zaddach 0,5 mm									**11.48**	
Bosmina longirostris O.F.Muller										
B. l. 1.0mm										
B. l. 0.75mm										
B. l. 0.5mm									5.18	5.18
B. l. 0.25mm				1.70				8.85	6.05	7.06
Total B. longirostris				**1.70**				**8.85**	**11.23**	**12.24**
Scapholeberis kingii Sars******		**7.84**								
Leptodora kindtii Focke		**0.60**		**0.60**	**0.67**	**0.67**	**0.67**		**1.34**	**0.34**
Diaphanosoma leuchtenbergianum Fisher***										
Total Cladocera ug/L		**133.50**	**165.86**	**639.04**	**590.07**	**415.11**	**189.11**	**734.77**	**269.59**	**500.42**
TOTAL CRUSTACEA ug/L		**215.47**	**210.77**	**749.76**	**658.87**	**478.70**	**260.86**	**1536.51**	**586.68**	**1113.73**
ROTIFERA										
Kellicottia sps		0.33	0.16	0.45	0.25	0.22	0.20	10.59	3.83	5.31
Keratella sps		0.12	0.05	0.21	0.01	0.09	0.12	26.75	16.36	33.42
Polyarthra sps**					0.05			0.99	4.23	6.62
Conochilus sps										0.38
Gastropus sps										
Synchaeta sp									0.31	1.88
Brachionus sps***										
Total Rotifera ug/L		**0.45**	**0.21**	**0.66**	**0.31**	**0.30**	**0.32**	**38.33**	**24.74**	**47.60**
Total Calanoida ug/L		**60.63**	**36.94**	**60.71**	**56.47**	**51.74**	**55.61**	**6.26**	**20.62**	**39.25**
Total Cyclopoida ug/L		**21.34**	**7.97**	**50.01**	**12.33**	**11.85**	**16.13**	**795.48**	**296.47**	**574.06**
Total Cladocera ug/L		**133.50**	**165.86**	**639.04**	**590.07**	**415.11**	**189.11**	**734.77**	**269.59**	**500.42**
Total Rotifera ug/L		**0.45**	**0.21**	**0.66**	**0.31**	**0.30**	**0.32**	**38.33**	**24.74**	**47.60**
TOTAL ZOOPLANKTON ug/L		**215.92**	**210.98**	**729.87**	**659.18**	**479.00**	**261.19**	**1574.84**	**611.42**	**1161.33**

*Length/DryWeight Regressions in form Lnw = Lna + bLnL
R6 LnW= 0.9926-2.0997 LnL
R27 LnW = 1.0542 -2.748 LnL
R30 LnW =0.9772-2.5384 LnL
R32 LnW = 1.1337 + 2.7882 LnL
R49 LnW= 1.6388 - 2.4474 LnL
R77 LnW= 1.3472+3.0087LnL
R92 LnW= 0.8344-2.5760 LnL
R94 LnW = 1.3169 - 2.7197 LnL
DsL885 LnW = 1.3933 - 3.0114 LnL
RL302 LnW = 1.6274 - 3.3367 LnL
RL223Hg LnW = 2.1169 + 2.6972 LnL
RL223Bl LnW = 2.4751 - 3.3614 LnL
RL223Cs LnW = 3.1270 -3.3678 LnL
** Table A2 Malley et al. 1989 Lake Ontario
***used formula for Diaphanosoma birgei Table 10 Malley e
****Table 10 Malley et al 1989 Lake 227
***** used formula for Keratella cochlearis Clay Lake Table
******used formula for Ceriodaphnia lacustris Clay Lake Tab

2018 Minnow Zooplankton Wet Weight ug/L		9	10	11	12	13	14	14x	15	16
		Min	Min	Min	Min	Min	Min	Min	Min	Min
		T45	T46	TN1	TN2	TN3	TN4	TN4	TN5	T41
		2018	2018	2018	2018	2018	2018	2018	2018	2018
		JUNE	JUNE	AUGUST	AUGUST	AUGUST	AUGUST	AUGUST	AUGUST	AUGUST
		9	8	31	31	31	31	31	31	30
		AM	AM	9:30:00	10:30:00	11:15:00	12:00:00	12:00:00	13:00:00	11:00:00
		18.0	19.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
		Min	Min	Min	Min	Min	Min	Min	Min	Min
		WJ	WJ	WJ60	WJ60	WJ60	WJ60	WJ60	WJ60	WJ60
		160.0	160.0	40.0	40.0	40.0	40.0	40.0	20.0	40.0
	L	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASSES		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COPEPODA										
CALANOIDA										
Epischura nevadensis Lilljeborg										
E.n. adult female		0.38	0.36	28.88	28.88	28.88	43.33	14.44	0.69	14.44
E.n. adult male		3.39	0.31	36.59	23.23	42.69	24.39	12.20		
E.n. immature 0.5-1.3 mm			0.09	43.07	21.53	14.36	21.53	7.18	0.18	
Total E. nevadensis		**3.77**	**0.76**	**108.54**	**73.65**	**85.92**	**89.25**	**33.82**	**0.87**	**14.44**
Diaptomus pallidus Herrick										
D.p. adult female		4.47	2.83	20.45	10.22		10.22			
D.p. gravid female					5.37		0.77	1.02		0.26
D.p. adult male				12.73	19.10		3.34	6.69		6.37
D.p. immature 2.0 mm								5.92		
D.p. immature 1.0 mm		11.61			10.45		5.22	5.22		
D.p. immature 0.75 mm		5.73	5.43	2.58	12.90	2.58	5.16			5.16
D.p. immature 0.5 mm				1.85	3.69			0.92		1.85
Total D. pallidus		**21.81**	**8.26**	**37.61**	**61.73**	**2.58**	**24.72**	**19.77**		**13.63**
Diaptomus tyrrelli Poppe										
D.t. adult female					12.59	12.59	9.91	13.22		12.59
D.t. gravid female		5.51	0.50		3.46	1.26	1.57	2.20		4.72
D.t. adult male				0.21		8.51	11.17	8.94		68.08
D.t. immature 2.0 mm		2.38	0.97	2.14	16.31		8.15	24.46		16.31
D.t. immature 1.0 mm			10.99		5.22	5.22	5.22			
D.t. immature 0.75 mm				5.16						5.16
D.t. immature 0.5 mm								0.73		
Total D. tyrrelli		**7.88**	**12.46**	**7.52**	**37.58**	**27.58**	**36.03**	**49.54**		**106.86**
Calanoid nauplius										
small			0.87	0.41	2.89	1.65	0.83	2.48		3.72
large			1.12							
Total Calanoid nauplii			**1.99**	**0.41**	**2.89**	**1.65**	**0.83**	**2.48**		**3.72**
Total Calanoida ug/L		**33.47**	**23.46**	**154.07**	**175.85**	**117.73**	**150.82**	**105.61**	**0.87**	**138.65**
CYLOPOIDA										
Cyclops bicuspidatus thomasi S. A. Forbes										
C.b.t. female		36.38	80.43	2.73	16.37	10.92	8.19	10.92	0.14	30.02
C.b.t. gravid		2.39	1.51		2.73			0.07		0.07
C.b.t. male		12.42	14.71	4.19	8.38	2.79	8.38	5.59		12.58
C.b.t. immature 1.0		32.28	30.58	9.68				4.84		
C.b.t. immature .75		458.25	271.93	83.84	43.05	49.85	56.65	33.99	0.06	120.10
C.b.t. immature .5		204.96	191.01	34.49	21.75	21.00	20.25	14.25		68.24
Total C. b. thomasi		**746.67**	**590.16**	**134.94**	**92.29**	**84.56**	**93.47**	**69.65**	**0.19**	**231.00**
Acanthocyclops vernalis Fischer ?										
A.v. Immature 0.5		1.73		3.89	1.56	0.78	0.78	0.78		1.56
Total A. vernalis		**1.73**		**3.89**	**1.56**	**0.78**	**0.78**	**0.78**		**1.56**
Cyclopoid nauplius		**29.30**	**6.53**	**4.65**	**6.59**	**9.69**	**6.20**	**7.76**	**0.19**	**3.10**
Total Cyclopoida ug/L		**777.70**	**596.69**	**143.49**	**100.44**	**95.03**	**100.45**	**78.19**	**0.39**	**235.66**
CLADOCERA										
Daphnia schoedleri Sars										
D. s. 2.0 mm		291.07	137.88	327.46	17.19	34.38	196.48	65.49		65.49
D. s. 1.5 mm					7.23	21.69		27.54	0.69	
D. s. 1.0 mm		192.62	66.36	7.88		7.88	7.88			
D. s. 0.5 mm		8.95	14.84		0.26	3.02				3.02
Total D. schoedleri		**492.65**	**219.08**	**335.34**	**24.68**	**66.97**	**204.36**	**93.03**	**0.69**	**68.51**
Daphnia galeata mendotae Birge										
D. g. m. 2.0 mm				125.75	502.99	125.75	251.50	502.99	3.14	
D. g. m. 1.5 mm		210.51	398.85							
D. g. m. 1.0 mm		81.38	179.89			6.10	24.41	18.31		24.41
D. g. m. 0.5 mm		8.88	15.13		0.40	0.40	0.80	1.60		1.60
Total D. g. mendotae		**300.76**	**593.88**	**125.75**	**503.39**	**132.25**	**276.71**	**522.90**	**3.14**	**26.01**

2018 Minnow Zooplankton Wet Weight ug/L		9 Min T45 2018 JUNE 9 AM 18.0 Min WJ 160.0	10 Min T46 2018 JUNE 8 AM 19.0 Min WJ 160.0	11 Min TN1 2018 AUGUST 31 9:30:00 10.0 Min WJ60 40.0	12 Min TN2 2018 AUGUST 31 10:30:00 10.0 Min WJ60 40.0	13 Min TN3 2018 AUGUST 31 11:15:00 10.0 Min WJ60 40.0	14 Min TN4 2018 AUGUST 31 12:00:00 10.0 Min WJ60 40.0	14x Min TN4 2018 AUGUST 31 12:00:00 10.0 Min WJ60 40.0	15 Min TN5 2018 AUGUST 31 13:00:00 10.0 Min WJ60 20.0	16 Min T41 2018 AUGUST 30 11:00:00 10.0 Min WJ60 40.0
	L	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASSES		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Daphnia retrocurva Forbes										
D. r. 2.0 mm			86.55	82.22	43.16	5.14	82.22	41.11		82.22
D. r. 1.0 mm				2.38						4.76
D. r. 0.5 mm				0.55	0.55					0.55
Total D. retrocurva			**86.55**	**85.15**	**43.71**	**5.14**	**82.22**	**41.11**		**87.53**
Holopedium gibberum Zaddach 0,5 mm										
Bosmina longirostris O.F.Muller										
B. l. 1.0mm			48.77							
B. l. 0.75mm										
B. l. 0.5mm		20.72	14.72							
B. l. 0.25mm		19.16	19.10							
Total B. longirostris		**39.88**	**82.59**							
Scapholeberis kingii Sars******										**1.49**
Leptodora kindtii Focke		**3.02**		**3.63**	**1.81**					**1.81**
Diaphanosoma leuchtenbergianum Fisher***				**0.13**	**2.04**	**5.19**	**1.36**	**5.19**		
Total Cladocera ug/L		**836.31**	**982.10**	**549.99**	**575.65**	**209.55**	**564.65**	**662.23**	**3.83**	**185.36**
TOTAL CRUSTACEA ug/L		**1647.48**	**1602.25**	**847.56**	**851.93**	**422.32**	**815.92**	**846.03**	**5.09**	**559.67**
ROTIFERA										
Kellicottia sps		6.99	2.74	0.27	0.15	0.18	0.18	0.21	0.03	0.39
Keratella sps		23.66	16.72	0.18	0.18	0.24	0.31	0.24	0.01	0.67
Polyarthra sps**		3.31	2.61	0.17	0.50	0.91	1.24	0.66		0.25
Conochilus sps		0.56	0.36							
Gastropus sps				0.54	0.79	0.85	0.64	0.79		1.33
Synchaeta sp		0.63			0.14		0.07	0.28		
Brachionus sps***										
Total Rotifera ug/L		**35.15**	**22.42**	**1.16**	**1.75**	**2.18**	**2.44**	**2.19**	**0.04**	**2.64**
Total Calanoida ug/L		**33.47**	**23.46**	**154.07**	**175.85**	**117.73**	**150.82**	**105.61**	**0.87**	**138.65**
Total Cyclopoida ug/L		**777.70**	**596.69**	**143.49**	**100.44**	**95.03**	**100.45**	**78.19**	**0.39**	**235.66**
Total Cladocera ug/L		**836.31**	**982.10**	**549.99**	**575.65**	**209.55**	**564.65**	**662.23**	**3.83**	**185.36**
Total Rotifera ug/L		**35.15**	**22.42**	**1.16**	**1.75**	**2.18**	**2.44**	**2.19**	**0.04**	**2.64**
TOTAL ZOOPLANKTON ug/L		**1682.63**	**1538.13**	**766.50**	**810.52**	**419.36**	**736.14**	**807.11**	**5.13**	**480.09**

*Length/DryWeight Regressions in form Lnw = Lna + bLnL
R6 LnW= 0.9926-2.0997 LnL
R27 LnW = 1.0542 -2.748 LnL
R30 LnW =0.9772-2.5384 LnL
R32 LnW = 1.1337 + 2.7882 LnL
R49 LnW= 1.6388 - 2.4474 LnL
R77 LnW= 1.3472+3.0087LnL
R92 LnW= 0.8344-2.5760 LnL
R94 LnW = 1.3169 - 2.7197 LnL
DsL885 LnW = 1.3933 - 3.0114 LnL
RL302 LnW = 1.6274 - 3.3367 LnL
RL223Hg LnW = 2.1169 + 2.6972 LnL
RL223Bl LnW = 2.4751 - 3.3614 LnL
RL223Cs LnW = 3.1270 -3.3678 LnL
** Table A2 Malley et al. 1989 Lake Ontario
***used formula for Diaphanosoma birgei Table 10 Malley e
****Table 10 Malley et al 1989 Lake 227
***** used formula for Keratella cochlearis Clay Lake Table
******used formula for Ceriodaphnia lacustris Clay Lake Tat

2018 Minnow Zooplankton Wet Weight ug/L	17 Min T42 2018 AUGUST 30 12:30:00 10.0 Min WJ60 40.0	18 Min T43 2018 AUGUST 30 14:00:00 10.0 Min WJ60 40.0	19 Min T44 2018 AUGUST 31 15:30:00 10.0 Min WJ60 40.0	20 Min T45 2018 AUGUST 31 16:30:00 10.0 Min WJ60 40.0	21 Min TN1 2018 SEPTEMBER 4 11:00:00 14.0 Min WJ60 40.0	21x Min TN1 2018 SEPTEMBER 4 11:00:00 14.0 Min WJ60 40.0	22 Min TN2 2018 SEPTEMBER 4 11:15:00 11.5 Min WJ60 40.0	23 Min TN3 2018 SEPTEMBER 4 11:30:00 12.5 Min WJ60 40.0	24 Min TN4 2018 SEPTEMBER 4 11:45:00 12.0 Min WJ60 40.0
	L 10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASSES	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COPEPODA									
CALANOIDA									
Epischura nevadensis Lilljeborg									
E.n. adult female	14.44	7.22	7.22	7.22	10.32	10.32	10.76	17.33	48.14
E.n. adult male	12.20	12.20	6.10	30.49	8.71	4.36	11.61	29.27	60.98
E.n. immature 0.5-1.3 mm	7.18		7.18	28.71	10.25	15.38	6.24	11.48	5.98
Total E. nevadensis	**33.82**	**19.42**	**20.50**	**66.42**	**29.28**	**30.05**	**28.62**	**58.08**	**115.10**
Diaptomus pallidus Herrick									
D.p. adult female				20.45	7.30	29.21	17.78	8.18	2.24
D.p. gravid female			0.51	2.68	0.37	0.73	0.67	0.20	0.21
D.p. adult male	6.37	6.37	12.73	6.37	1.19		5.54		1.39
D.p. immature 2.0 mm				5.92	4.23				
D.p. immature 1.0 mm				20.89					
D.p. immature 0.75 mm	15.48	5.16			3.68				
D.p. immature 0.5 mm	0.92	1.85	1.85	0.92					
Total D. pallidus	**22.77**	**13.37**	**15.09**	**57.23**	**16.77**	**29.94**	**23.98**	**8.38**	**3.84**
Diaptomus tyrrelli Poppe									
D.t. adult female	3.30	37.76	12.59		4.72	7.08	10.94	5.29	2.75
D.t. gravid female	5.35	6.61	3.15	3.30	1.57	1.57	0.55	0.76	0.26
D.t. adult male	68.08	51.06	51.06	34.04	9.57	3.19	7.40	6.81	42.55
D.t. immature 2.0 mm	8.15	8.15	8.15				7.09		
D.t. immature 1.0 mm	41.78	15.67							
D.t. immature 0.75 mm									
D.t. immature 0.5 mm								0.39	
Total D. tyrrelli	**126.67**	**119.25**	**74.95**	**37.35**	**15.87**	**11.84**	**25.98**	**13.24**	**45.57**
Calanoid nauplius									
small	0.41	2.07	2.89	2.89	1.77	2.95	3.95	0.99	2.07
large									
Total Calanoid nauplii	**0.41**	**2.07**	**2.89**	**2.89**	**1.77**	**2.95**	**3.95**	**0.99**	**2.07**
Total Calanoida ug/L	**183.66**	**154.10**	**113.43**	**163.89**	**63.69**	**74.79**	**82.54**	**80.70**	**166.58**
CYLOPOIDA									
Cyclops bicuspidatus thomasi S. A. Forbes									
C.b.t. female	24.56	51.85	24.56	27.29		5.85	7.12	2.18	
C.b.t. gravid	0.20	1.43	0.07	2.73	0.10	0.15			
C.b.t. male	9.78	27.94	2.79	8.38	2.00	2.00	1.21	3.35	1.16
C.b.t. immature 1.0						10.37			
C.b.t. immature .75	120.10	147.29	97.44	188.08	22.66	30.75	1.97	5.44	7.55
C.b.t. immature .5	65.24	72.73	91.48	150.72	3.21	0.54	6.52	0.60	2.50
Total C. b. thomasi	**219.88**	**301.25**	**216.34**	**377.20**	**27.97**	**49.65**	**16.82**	**11.57**	**11.22**
Acanthocyclops vernalis Fischer ?									
A.v. Immature 0.5			1.56	1.56	0.56	0.56	4.06	0.62	1.30
Total A. vernalis			**1.56**	**1.56**	**0.56**	**0.56**	**4.06**	**0.62**	**1.30**
Cyclopoid nauplius	**6.20**	**6.98**	**8.92**	**6.98**	**6.09**	**9.14**	**8.43**	**8.07**	**9.37**
Total Cyclopoida ug/L	**226.09**	**308.23**	**226.82**	**385.74**	**34.62**	**59.35**	**29.32**	**20.26**	**21.89**
CLADOCERA									
Daphnia schoedleri Sars									
D. s. 2.0 mm	17.19				73.68	24.56	14.95	41.26	
D. s. 1.5 mm	27.54				5.16	10.33		17.35	6.02
D. s. 1.0 mm						1.48	3.60	3.31	
D. s. 0.5 mm		1.01						0.21	
Total D. schoedleri	**44.73**	**1.01**			**78.84**	**36.36**	**18.55**	**62.13**	**6.02**
Daphnia galeata mendotae Birge									
D. g. m. 2.0 mm		125.75	188.62	125.75	23.58	35.37	57.41	118.83	110.03
D. g. m. 1.5 mm									
D. g. m. 1.0 mm	48.83	54.93	18.31	18.31	4.58	5.72	2.79	5.13	2.67
D. g. m. 0.5 mm	2.40	5.19	2.40	2.40	1.71		0.35	0.32	0.67
Total D. g. mendotae	**51.22**	**185.87**	**209.33**	**146.46**	**29.87**	**41.09**	**60.54**	**124.28**	**113.37**

2018 Minnow Zooplankton Wet Weight ug/L		17 Min T42 2018 AUGUST 30 12:30:00 10.0 Min WJ60 40.0	18 Min T43 2018 AUGUST 30 14:00:00 10.0 Min WJ60 40.0	19 Min T44 2018 AUGUST 31 15:30:00 10.0 Min WJ60 40.0	20 Min T45 2018 AUGUST 31 16:30:00 10.0 Min WJ60 40.0	21 Min TN1 2018 SEPTEMBE 4 11:00:00 14.0 Min WJ60 40.0	21x Min TN1 2018 SEPTEMBE 4 11:00:00 14.0 Min WJ60 40.0	22 Min TN2 2018 SEPTEMBE 4 11:15:00 11.5 Min WJ60 40.0	23 Min TN3 2018 SEPTEMBE 4 11:30:00 12.5 Min WJ60 40.0	24 Min TN4 2018 SEPTEMBE 4 11:45:00 12.0 Min WJ60 40.0
	L	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASSES		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Daphnia retrocurva Forbes										
D. r. 2.0 mm		32.37		41.11	41.11	15.42	38.54	18.77	69.06	62.95
D. r. 1.0 mm			2.38		2.38		0.45		1.00	
D. r. 0.5 mm			1.10	0.55	0.55	0.39	0.10		0.44	
Total D. retrocurva		**32.37**	**3.48**	**41.66**	**44.04**	**15.81**	**39.09**	**18.77**	**70.50**	**62.95**
Holopedium gibberum Zaddach 0,5 mm										
Bosmina longirostris O.F.Muller										
B. l. 1.0mm										
B. l. 0.75mm										
B. l. 0.5mm										
B. l. 0.25mm										
Total B. longirostris										
Scapholeberis kingii Sars******		**0.75**		**1.49**						**0.62**
Leptodora kindtii Focke			**1.81**		**1.21**	**3.02**	**3.46**	**3.16**	**2.42**	**0.50**
Diaphanosoma leuchtenbergianum Fisher***		**12.98**	**18.17**	**4.09**	**3.41**	**9.27**	**3.89**	**2.37**	**1.09**	**3.41**
Total Cladocera ug/L		**142.05**	**210.34**	**256.57**	**195.11**	**136.81**	**123.89**	**103.38**	**260.42**	**186.87**
TOTAL CRUSTACEA ug/L		**551.80**	**672.68**	**596.82**	**744.74**	**235.12**	**258.03**	**215.24**	**361.38**	**375.33**
ROTIFERA										
Kellicottia sps		0.39	0.70	0.91	0.60	0.06	0.13	0.16	0.19	0.20
Keratella sps		0.49	0.84	0.98	1.11	0.21	0.17	0.23	0.16	0.24
Polyarthra sps******		0.17		0.58	0.41	0.24	0.41	5.18	1.12	0.83
Conochilus sps										
Gastropus sps		1.36	1.48	0.70	0.85	0.41	0.48	0.45	0.53	0.30
Synchaeta sp				0.14			0.10	0.37		0.12
Brachionus sps*******										
Total Rotifera ug/L		**2.41**	**3.02**	**3.30**	**2.97**	**0.92**	**1.29**	**6.38**	**2.01**	**1.69**
Total Calanoida ug/L		**183.66**	**154.10**	**113.43**	**163.89**	**63.69**	**74.79**	**82.54**	**80.70**	**166.58**
Total Cyclopoida ug/L		**226.09**	**308.23**	**226.82**	**385.74**	**34.62**	**59.35**	**29.32**	**20.26**	**21.89**
Total Cladocera ug/L		**142.05**	**210.34**	**256.57**	**195.11**	**136.81**	**123.89**	**103.38**	**260.42**	**186.87**
Total Rotifera ug/L		**2.41**	**3.02**	**3.30**	**2.97**	**0.92**	**1.29**	**6.38**	**2.01**	**1.69**
TOTAL ZOOPLANKTON ug/L		**521.84**	**675.70**	**559.01**	**706.61**	**220.62**	**220.79**	**202.86**	**294.33**	**314.07**

*Length/DryWeight Regressions in form Lnw = Lna + bLnL
R6 LnW= 0.9926-2.0997 LnL
R27 LnW = 1.0542 -2.748 LnL
R30 LnW =0.9772-2.5384 LnL
R32 LnW = 1.1337 + 2.7882 LnL
R49 LnW= 1.6388 - 2.4474 LnL
R77 LnW= 1.3472+3.0087LnL
R92 LnW= 0.8344-2.5760 LnL
R94 LnW = 1.3169 - 2.7197 LnL
DsL885 LnW = 1.3933 - 3.0114 LnL
RL302 LnW = 1.6274 - 3.3367 LnL
RL223Hg LnW = 2.1169 + 2.6972 LnL
RL223Bl LnW = 2.4751 - 3.3614 LnL
RL223Cs LnW = 3.1270 -3.3678 LnL
** Table A2 Malley et al. 1989 Lake Ontario
***used formula for Diaphanosoma birgei Table 10 Malley e
****Table 10 Malley et al 1989 Lake 227
***** used formula for Keratella cochlearis Clay Lake Table
******used formula for Ceriodaphnia lacustris Clay Lake Tat

2018 Minnow Zooplankton Wet Weight ug/L	25 Min TN5 2018 EPTEMBE 4 12:00:00 12.0 Min WJ60 40.0 **L** 10.5 1.0 283.4 ug/L	26 Min T41 2018 EPTEMBE 4 12:30:00 21.0 Min WJ60 40.0 10.5 1.0 283.4 ug/L	27 Min T42 2018 EPTEMBE 4 12:45:00 22.0 Min WJ60 40.0 10.5 1.0 283.4 ug/L	28 Min T43 2018 EPTEMBE 4 13:00:00 22.0 Min WJ60 40.0 10.5 1.0 283.4 ug/L	29 Min T44 2018 EPTEMBE 4 13:15:00 22.0 Min WJ60 40.0 10.5 1.0 283.4 ug/L	30 Min T45 2018 EPTEMBER 4 13:30:00 22.0 Min WJ60 40.0 10.5 1.0 283.4 ug/L
INSTAR IDENTIFICATION & SIZE CLASSES						
COPEPODA						
CALANOIDA						
Epischura nevadensis Lilljeborg						
E.n. adult female	48.14	6.88	19.69	6.56	6.56	13.13
E.n. adult male	30.49	2.90	2.77	5.54	2.77	8.32
E.n. immature 0.5-1.3 mm	11.96	10.25	3.26	3.26	3.26	16.31
Total E. nevadensis	**90.59**	**20.04**	**25.73**	**15.37**	**12.60**	**37.76**
Diaptomus pallidus Herrick						
D.p. adult female	8.52					
D.p. gravid female	0.21	0.24				
D.p. adult male			8.68			
D.p. immature 2.0 mm						0.07
D.p. immature 1.0 mm						
D.p. immature 0.75 mm		1.23			1.17	1.17
D.p. immature 0.5 mm		0.44	0.42	0.42		0.42
Total D. pallidus	**8.73**	**1.91**	**9.10**	**0.42**	**1.17**	**1.66**
Diaptomus tyrrelli Poppe						
D.t. adult female	10.49	4.72		5.72	11.44	28.60
D.t. gravid female	0.79	1.20	1.00	0.29	0.86	2.72
D.t. adult male	14.18	12.77	27.08	3.87	11.61	15.47
D.t. immature 2.0 mm			7.41			3.71
D.t. immature 1.0 mm			2.37	2.37		4.75
D.t. immature 0.75 mm						1.17
D.t. immature 0.5 mm						
Total D. tyrrelli	**25.46**	**18.68**	**37.87**	**12.25**	**23.90**	**56.42**
Calanoid nauplius						
small	2.41	2.36	6.01	3.01	5.82	3.38
large				0.24		
Total Calanoid nauplii	**2.41**	**2.36**	**6.01**	**3.25**	**5.82**	**3.38**
Total Calanoida ug/L	**127.19**	**42.99**	**78.71**	**31.29**	**43.50**	**99.22**
CYLOPOIDA						
Cyclops bicuspidatus thomasi S. A. Forbes						
C.b.t. female		18.19	17.37	7.44	3.72	7.44
C.b.t. gravid	0.60	0.68	0.03	0.98	0.09	3.72
C.b.t. male	1.16	1.33	10.16	1.27	1.27	6.35
C.b.t. immature 1.0	4.03		2.20			
C.b.t. immature .75	7.55	49.64	57.68	26.78	19.57	46.35
C.b.t. immature .5	2.50	19.28	21.81	14.66	17.38	20.11
Total C. b. thomasi	**15.85**	**89.12**	**109.25**	**51.13**	**42.04**	**83.98**
Acanthocyclops vernalis Fischer ?						
A.v. Immature 0.5	0.65	1.48	0.71	0.35	1.06	1.06
Total A. vernalis	**0.65**	**1.48**	**0.71**	**0.35**	**1.06**	**1.06**
Cyclopoid nauplius	**5.49**	**9.05**	**10.93**	**8.64**	**11.46**	**12.69**
Total Cyclopoida ug/L	**21.99**	**99.66**	**120.89**	**60.12**	**54.56**	**97.73**
CLADOCERA						
Daphnia schoedleri Sars						
D. s. 2.0 mm	1.36	62.37		2.98	0.74	
D. s. 1.5 mm	6.02	13.11		0.63	0.63	1.56
D. s. 1.0 mm	1.72		3.58			
D. s. 0.5 mm			0.46	0.12	1.37	
Total D. schoedleri	**9.11**	**75.49**	**4.04**	**3.72**	**2.74**	**1.56**
Daphnia galeata mendotae Birge						
D. g. m. 2.0 mm	96.28		28.58	28.58	28.58	85.74
D. g. m. 1.5 mm						
D. g. m. 1.0 mm	1.34	2.91	2.77		8.32	2.77
D. g. m. 0.5 mm	0.67		0.73	0.36	0.18	0.18
Total D. g. mendotae	**98.28**	**2.91**	**32.08**	**28.94**	**37.08**	**88.69**

2018 Minnow Zooplankton Wet Weight ug/L	25 Min TN5 2018 EPTEMBE 4 12:00:00 12.0 Min WJ60 40.0 L 10.5 1.0 283.4 ug/L	26 Min T41 2018 EPTEMBE 4 12:30:00 21.0 Min WJ60 40.0 10.5 1.0 283.4 ug/L	27 Min T42 2018 EPTEMBE 4 12:45:00 22.0 Min WJ60 40.0 10.5 1.0 283.4 ug/L	28 Min T43 2018 EPTEMBE 4 13:00:00 22.0 Min WJ60 40.0 10.5 1.0 283.4 ug/L	29 Min T44 2018 EPTEMBE 4 13:15:00 22.0 Min WJ60 40.0 10.5 1.0 283.4 ug/L	30 Min T45 2018 EPTEMBER 4 13:30:00 22.0 Min WJ60 40.0 10.5 1.0 283.4 ug/L
INSTAR IDENTIFICATION & SIZE CLASSES						
Daphnia retrocurva Forbes						
D. r. 2.0 mm	53.96	78.30	56.06	18.69	18.69	37.37
D. r. 1.0 mm						1.08
D. r. 0.5 mm	0.24		0.25	0.25		0.25
Total D. retrocurva	**54.20**	**78.30**	**56.31**	**18.93**	**18.69**	**38.70**
Holopedium gibberum Zaddach 0,5 mm						
Bosmina longirostris O.F.Muller						
B. l. 1.0mm						
B. l. 0.75mm		4.34				
B. l. 0.5mm						
B. l. 0.25mm						
Total B. longirostris		**4.34**				
Scapholeberis kingii Sars******	**0.62**					
Leptodora kindtii Focke	**1.01**	**0.29**				
Diaphanosoma leuchtenbergianum Fisher***	**2.27**	**2.47**	**8.26**	**9.44**	**4.72**	**3.54**
Total Cladocera ug/L	**165.49**	**163.79**	**100.69**	**61.04**	**63.23**	**132.50**
TOTAL CRUSTACEA ug/L	**314.67**	**306.44**	**300.28**	**152.44**	**161.29**	**329.45**
ROTIFERA						
Kellicottia sps	0.15	0.52	0.63	0.38	0.43	0.41
Keratella sps	0.37	0.49	0.44	0.37	0.30	0.37
Polyarthra sps******	0.55	0.43	0.83	0.60	1.05	0.60
Conochilus sps						
Gastropus sps	0.28	0.35	0.32	0.12	0.19	0.40
Synchaeta sp	0.12				0.13	0.06
Brachionus sps*******					0.04	
Total Rotifera ug/L	**1.47**	**1.78**	**2.22**	**1.48**	**2.14**	**1.85**
Total Calanoida ug/L	**127.19**	**42.99**	**78.71**	**31.29**	**43.50**	**99.22**
Total Cyclopoida ug/L	**21.99**	**99.66**	**120.89**	**60.12**	**54.56**	**97.73**
Total Cladocera ug/L	**165.49**	**163.79**	**100.69**	**61.04**	**63.23**	**132.50**
Total Rotifera ug/L	**1.47**	**1.78**	**2.22**	**1.48**	**2.14**	**1.85**
TOTAL ZOOPLANKTON ug/L	**262.18**	**229.92**	**246.44**	**135.24**	**144.75**	**293.93**

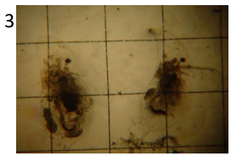
*Length/DryWeight Regressions in form Lnw = Lna + bLnL
R6 LnW= 0.9926-2.0997 LnL
R27 LnW = 1.0542 -2.748 LnL
R30 LnW =0.9772-2.5384 LnL
R32 LnW = 1.1337 + 2.7882 LnL
R49 LnW= 1.6388 - 2.4474 LnL
R77 LnW= 1.3472+3.0087LnL
R92 LnW= 0.8344-2.5760 LnL
R94 LnW = 1.3169 - 2.7197 LnL
DsL885 LnW = 1.3933 - 3.0114 LnL
RL302 LnW = 1.6274 - 3.3367 LnL
RL223Hg LnW = 2.1169 + 2.6972 LnL
RL223Bl LnW = 2.4751 - 3.3614 LnL
RL223Cs LnW = 3.1270 -3.3678 LnL
** Table A2 Malley et al. 1989 Lake Ontario
***used formula for Diaphanosoma birgei Table 10 Malley e
****Table 10 Malley et al 1989 Lake 227
***** used formula for Keratella cochlearis Clay Lake Table
******used formula for Ceriodaphnia lacustris Clay Lake Tab

Images of identified specimens

1 Diaptomus tyrrelli male 5th leg
2 Diaptomus tyrrelli female
3 Daphnia retrocurva females
4 Scaphloleris kingii
5 Daphnia schoedleri females
6 Daphnia galeata mendotae females
7 Cyclops bicuspidatus thomasi various instars
8 Leptodora kindtii
9 Gastropus variety rotifer
10 Diaptomus pallidus female
11 Diaptomus pallidus male
12 Synchaeta type rotifers
13 Diaptomus tyrrelli male
14 Epischura nevadensis female

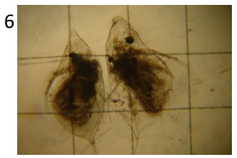
1 

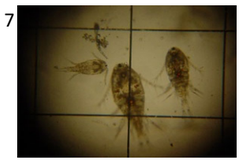
2 

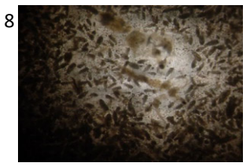
3 

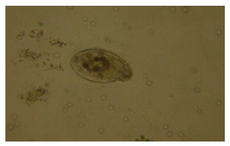
4 

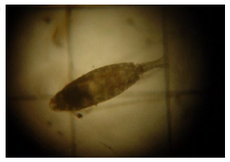
5 

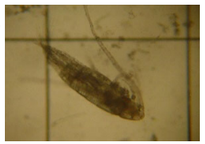
6 

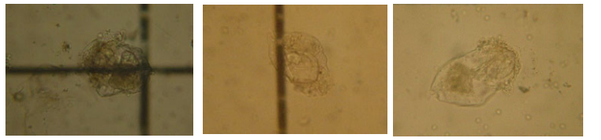
7 

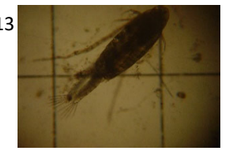
8 

9 

10 

11 

12 

13 

14 

2019 Minnow Zooplankton Individuals/L	1	2	3	4	5	6	7	8
			Lake?	Lake?	Lake?	Lake?	Lake?	Lake?
	RGTN1	RGTN2	RGTN3	RGTN4	RGTN5	RGT41	RGT42	RGT43
	2019	2019	2019	2019	2019	2019	2019	2019
	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE
	12	12	12	12	12	14	14	14
	AM	AM	AM	AM	AM	AM	AM	AM
	6	6	6	6	6	16	16	16
	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	80.0	80.0	40.0	40.0	40.0	80.0	80.0	160.0
	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASS	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L
COPEPODA								
CALANOIDA								
Epischura nevadensis Lilljeborg								
E.n. adult female 2.0mm						0.05	0.09	0.05
E.n. adult male 1.8mm	0.01					0.05	0.16	
E.n. immature 0.5-1.0 mm						0.12	0.35	0.07
Total E. nevadensis	**0.01**					**0.21**	**0.61**	**0.12**
Diaptomus pallidus Herrick								
D.p. adult female 1.25mm								
D.p. gravid female								
D.p. adult male 0.97mm								
D.p. immature 2.0 mm								
D.p. immature 1.0 mm								
D.p. immature 0.75 mm						0.18		
D.p. immature 0.5 mm								
Total D. pribilofensis						**0.18**		
Diaptomus tyrrelli Poppe								
D.p. adult female 1.39mm						0.12		0.16
D.p. gravid female 1.39 mm						0.03	0.09	0.02
D.p. adult male 1.21mm						0.12	0.23	0.19
D.p. immature 1.16mm								
D.p. immature 1.0 mm						0.35		
D.p. immature 0.75 mm								0.35
D.p. immature 0.5 mm								
Total D. tyrrelli ind/L						**0.62**	**0.32**	**0.72**
Calanoid nauplius 0.3mm						**0.18**		
Total Calanoida ind/L	**0.01**					**1.18**	**0.93**	**0.84**
CYLOPOIDA								
Cyclops bicuspidatus thomasi S.A.Forbes								
C. b. t. adult female 0.92mm						1.41	1.59	2.47
C. b. t. gravid female 0.92mm						0.01	0.12	0.12
C. b. t. adult male 0.77mm						0.88	2.82	2.12
C. b. t. immature 1.0 mm						0.35	0.18	1.06
C. b. t. immatue 0.75 mm					0.24	3.18	5.47	4.94
C. b. t. immature 0.5 mm					0.01	4.06	8.82	4.59
Total C. b. thomasi					**0.24**	**9.89**	**18.99**	**15.29**
C.vernalis (?) immature 0.5 mm						**0.18**		
Eucyclops agilis (?) immature 0.87mm	**0.01**	**0.01**	**0.01**					
Cyclops capillatus (?) dried out1.2mm					**0.01**			
Cyclopoid nauplius 0.2mm					**0.24**	**4.23**	**8.29**	**7.06**
Total Cyclopoida ind/L	**0.01**	**0.01**	**0.01**	**0.48**	**14.30**	**27.29**	**22.35**	
CLADOCERA								
Daphnia schoedleri Sars 1.25mm						**0.18**	**0.12**	

2019 Minnow Zooplankton Individuals/L	1	2	3	4	5	6	7	8
			Lake?	Lake?	Lake?	Lake?	Lake?	Lake?
	RGTN1	RGTN2	RGTN3	RGTN4	RGTN5	RGT41	RGT42	RGT43
	2019	2019	2019	2019	2019	2019	2019	2019
	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE
	12	12	12	12	12	14	14	14
	AM	AM	AM	AM	AM	AM	AM	AM
	6	6	6	6	6	16	16	16
	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	80.0	80.0	40.0	40.0	40.0	80.0	80.0	160.0
	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
Daphnia galeata mendotae Birge								
D. g. m. 2.5 mm								0.71
D. g. m. 2.0 mm								
D. g. m. 1.5 mm	0.06				0.01	0.35	0.05	0.05
D. g. m. 1.0 mm						0.09		0.05
D. g. m. 0.5 mm						0.18	0.35	
Total D. g. mendotae	**0.06**				**0.01**	**0.62**	**0.40**	**0.80**
Bosmina longirostris O.F. Mueller								
B. l. 0.5 mm			0.01		0.01	4.06	7.06	3.88
B. l. 0.25 mm					0.24	38.99	70.04	46.93
Total B. longirostris			**0.01**		**0.24**	**43.05**	**77.10**	**50.81**
Daphnia retrocurva Forbes								
D. r. 1.52 mm						0.07	0.02	0.02
D. r. 1.24 mm						0.07	0.18	0.07
D. r. 0.8 mm								
Total D. retrocurva						**0.14**	**0.20**	**0.09**
Scapholeberis kingii Sars 1.0mm								
Sida crystallina O.F.Mueller 1.3mm								
Leptodora kindtii Focke 5.1mm						**0.05**	**0.12**	**0.00**
Diaphanosoma leuchtenbergianum Fisher 0.8mm								**0.02**
Alona sps (?) 0.5mm	**0.01**	**0.12**						
Chydorus sps (?) 0.4mm					**0.02**			
Total Cladocera Ind/L	**0.07**	**0.12**	**0.01**		**0.26**	**44.03**	**77.93**	**51.73**
TOTAL CRUSTACEA ind/L	**0.08**	**0.13**	**0.02**	**0.01**	**0.75**	**59.51**	**106.15**	**74.91**
ROTIFERA								
Kellicottia sps					**0.47**	**30.88**	**35.11**	**36.34**
Keratella sps					**0.24**	**1.94**	**3.88**	**3.18**
Polyarthra sps						**0.53**	**1.59**	**0.35**
Gastropus sps								
Brachionus sps							**0.53**	
Asplanchna sps					**0.24**	**3.71**	**3.88**	**1.76**
Unknown rotifer		**0.47**						
Total Rotifera ind/L		**0.47**			**0.94**	**37.05**	**44.99**	**41.64**
Total Calanoida ind/L	**0.01**					**1.18**	**0.93**	**0.84**
Total Cyclopoida ind/L		**0.01**	**0.01**	**0.01**	**0.48**	**14.30**	**27.29**	**22.35**
Total Cladocera ind/L	**0.07**	**0.12**	**0.01**		**0.26**	**44.03**	**77.93**	**51.73**
Total Rotifera ind/L		**0.47**			**0.94**	**37.05**	**44.99**	**41.64**
Total zooplankton ind/L		**0.60**	**0.02**	**0.01**	**1.69**	**96.56**	**151.14**	**116.55**
Diptera (adults, exuvia, larvae DA, DE, DL)	0.01	0.02				0.00	0.02	
Specimens counted in sample	5	9	3	2	14	598	897	371

2019 Minnow Zooplankton Individuals/L	9	10	11	12	13	14	14x	15
	Lake?	Lake?	Lake?	Lake?	Lake?	Lake?	Lake?	Lake?
	RGT44	RGT45	RGTN1	RGTN2	RGTN3	RGTN4	RTTN4	RGTN5
	2019	2019	2019	2019	2019	2019	2019	2019
	JUNE	JUNE	AUGUST	AUG	AUG	AUG	AUG	AUG
	14	14	22	22	22	22	22	22
	AM	AM	AM	AM	AM	AM	AM	AM
	16	16	13	13	13	13	13	13
	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	160.0	80.0	40.0	40.0	40.0	40.0	40.0	40.0
	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASS	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L
COPEPODA								
CALANOIDA								
Epischura nevadensis Lilljeborg								
E.n. adult female 2.0mm		0.07	0.01		0.01	0.02	0.03	0.06
E.n. adult male 1.8mm	0.07	0.05	0.01	0.01	0.01	0.01	0.06	0.11
E.n. immature 0.5-1.0 mm	0.05	0.35	0.00	0.03		0.22	0.11	
Total E. nevadensis	**0.12**	**0.47**	**0.02**	**0.03**	**0.02**	**0.25**	**0.19**	**0.17**
Diaptomus pallidus Herrick								
D.p. adult female 1.25mm					0.22		0.11	
D.p. gravid female								
D.p. adult male 0.97mm								
D.p. immature 2.0 mm								0.11
D.p. immature 1.0 mm			0.00			0.11		
D.p. immature 0.75 mm			0.43			0.22		
D.p. immature 0.5 mm			0.11		0.54	0.11		0.11
Total D. pribilofensis			**0.55**		**0.76**	**0.43**	**0.11**	**0.22**
Diaptomus tyrrelli Poppe								
D.p. adult female 1.39mm	0.16	0.18	0.03	0.03	0.00	0.11	0.11	0.06
D.p. gravid female 1.39 mm	0.02	0.09		0.01	0.00			0.03
D.p. adult male 1.21mm	0.30	0.53	0.06	0.03	0.06	0.33	0.22	0.17
D.p. immature 1.16mm	0.35				0.03		0.11	
D.p. immature 1.0 mm	0.02		0.11				0.11	0.11
D.p. immature 0.75 mm		0.35					0.11	
D.p. immature 0.5 mm								0.03
Total D. tyrrelli ind/L	**0.86**	**1.15**	**0.19**	**0.06**	**0.09**	**0.43**	**0.65**	**0.39**
Calanoid nauplius 0.3mm	**0.71**	**0.35**	**0.11**		**0.43**	**0.43**	**0.33**	**0.54**
Total Calanoida ind/L	**1.68**	**1.97**	**0.86**	**0.10**	**1.30**	**1.55**	**1.28**	**1.32**
CYLOPOIDA								
Cyclops bicuspidatus thomasi S.A.Forbes								
C. b. t. adult female 0.92mm	2.12	1.94	0.65	0.33	0.22	0.43	0.43	0.54
C. b. t. gravid female 0.92mm	0.07	0.21	0.09	0.06				0.11
C. b. t. adult male 0.77mm	1.06	0.88	0.33	0.11	0.43	0.33	0.43	0.11
C. b. t. immature 1.0 mm	0.71	0.88	0.11	0.11	0.11	0.22	0.43	
C. b. t. immatue 0.75 mm	4.94	3.53	1.09	2.17	1.41	3.91	3.80	3.26
C. b. t. immature 0.5 mm	2.82	2.47	2.61	2.82	1.63	4.34	5.54	4.78
Total C. b. thomasi	**11.71**	**9.91**	**4.86**	**5.59**	**3.80**	**9.23**	**10.64**	**8.80**
C.vernalis (?) immature 0.5 mm						**0.11**		
Eucyclops agilis (?) immature 0.87mm								
Cyclops capillatus (?) dried out1.2mm								
Cyclopoid nauplius 0.2mm	**6.70**	**8.29**	**1.95**	**0.98**	**2.28**	**1.09**	**2.50**	**2.50**
Total Cyclopoida ind/L	**18.42**	**18.20**	**6.82**	**6.57**	**6.08**	**10.42**	**13.14**	**11.30**
CLADOCERA								
Daphnia schoedleri Sars 1.25mm	**0.07**	**0.14**	**0.11**				**0.00**	

2019 Minnow Zooplankton Individuals/L	9	10	11	12	13	14	14x	15
	Lake?	Lake?	Lake?	Lake?	Lake?	Lake?	Lake?	Lake?
	RGT44	RGT45	RGTN1	RGTN2	RGTN3	RGTN4	RTTN4	RGTN5
	2019	2019	2019	2019	2019	2019	2019	2019
	JUNE	JUNE	AUGUST	AUG	AUG	AUG	AUG	AUG
	14	14	22	22	22	22	22	22
	AM	AM	AM	AM	AM	AM	AM	AM
	16	16	13	13	13	13	13	13
	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	160.0	80.0	40.0	40.0	40.0	40.0	40.0	40.0
	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
Daphnia galeata mendotae Birge								
D. g. m. 2.5 mm								
D. g. m. 2.0 mm			0.01	0.01	0.03	0.03	0.03	0.01
D. g. m. 1.5 mm	0.02		0.76	0.22	0.14	0.54	0.43	0.33
D. g. m. 1.0 mm	0.02	0.05	0.33	0.22	0.22	0.11		0.54
D. g. m. 0.5 mm		0.18	0.65	0.33	0.33	0.98	0.65	0.76
Total D. g. mendotae	**0.05**	**0.22**	**1.75**	**0.77**	**0.71**	**1.66**	**1.11**	**1.63**
Bosmina longirostris O.F. Mueller								
B. l. 0.5 mm	2.82	2.12						
B. l. 0.25 mm	35.64	14.82	0.11					0.11
Total B. longirostris	**38.46**	**16.94**	**0.11**					**0.11**
Daphnia retrocurva Forbes								
D. r. 1.52 mm	0.07					0.11		0.11
D. r. 1.24 mm	0.02	0.02	0.11					
D. r. 0.8 mm								0.11
Total D. retrocurva	**0.09**	**0.02**	**0.11**			**0.11**		**0.22**
Scapholeberis kingii Sars 1.0mm				**0.03**	**0.00**	**0.06**	**0.06**	**0.02**
Sida crystallina O.F.Mueller 1.3mm					**0.00**			
Leptodora kindtii Focke 5.1mm	**0.01**	**0.01**		**0.00**		**0.00**	**0.01**	**0.01**
Diaphanosoma leuchtenbergianum Fisher 0.8m		**0.02**	**0.00**			**0.00**	**0.00**	
Alona sps (?) 0.5mm								
Chydorus sps (?) 0.4mm								
Total Cladocera Ind/L	**38.68**	**17.35**	**2.07**	**0.80**	**0.72**	**1.83**	**1.18**	**1.98**
TOTAL CRUSTACEA ind/L	**58.79**	**37.53**	**9.76**	**7.46**	**8.10**	**13.80**	**15.60**	**14.60**
ROTIFERA								
Kellicottia sps	**38.11**	**14.82**	**0.43**	**0.22**	**0.11**	**0.54**	**0.54**	**0.87**
Keratella sps	**2.12**	**1.24**	**0.98**	**0.65**	**1.52**	**0.98**	**0.65**	**0.98**
Polyarthra sps	**1.06**	**1.06**	**0.76**	**0.65**	**1.30**	**0.87**	**1.52**	**1.52**
Gastropus sps			**0.11**		**0.33**	**0.33**	**0.98**	**0.87**
Brachionus sps		**0.18**						
Asplanchna sps	**2.82**	**0.35**						
Unknown rotifer								
Total Rotifera ind/L	**44.11**	**17.64**	**2.28**	**1.52**	**3.26**	**2.71**	**3.69**	**4.23**
Total Calanoida ind/L	**1.68**	**1.97**	**0.86**	**0.10**	**1.30**	**1.55**	**1.28**	**1.32**
Total Cyclopoida ind/L	**18.42**	**18.20**	**6.82**	**6.57**	**6.08**	**10.42**	**13.14**	**11.30**
Total Cladocera ind/L	**38.68**	**17.35**	**2.07**	**0.80**	**0.72**	**1.83**	**1.18**	**1.98**
Total Rotifera ind/L	**44.11**	**17.64**	**2.28**	**1.52**	**3.26**	**2.71**	**3.69**	**4.23**
Total zooplankton ind/L	**102.89**	**55.17**	**12.04**	**8.98**	**11.36**	**16.52**	**19.29**	**18.84**
Diptera (adults, exuvia, larvae DA, DE, DL)		0.07						
Specimens counted in sample	341	348	127	96	126	169	187	203

2019 Minnow Zooplankton Individuals/L	16	17	17x	18	19	20
	Lake?	Lake?	Lake?	Lake?	Lake?	Lake?
	RGT41	RGT42	RGT43	RG4T3	RG4T4	RGT45
	2019	2019	2019	2019	2019	2019
	AUG	AUG	AUG	AUG	AUG	AUG
	21	21	21	21	21	21
	AM	AM	AM	AM	AM	AM
	23	23	23	23	23	23
	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	40.0	80.0	80.0	80.0	160.0	160.0
	10.5	10.5	10.5	10.5	10.5	10.5
	1.0	1.0	1.0	1.0	1.0	1.0
	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASS	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L	Ind/L
COPEPODA						
CALANOIDA						
Epischura nevadensis Lilljeborg						
E.n. adult female 2.0mm	0.01	0.02	0.02	0.02	0.02	0.02
E.n. adult male 1.8mm		0.01	0.01	0.02	0.06	0.03
E.n. immature 0.5-1.0 mm	0.00	0.01	0.01		0.03	0.03
Total E. nevadensis	**0.01**	**0.04**	**0.03**	**0.03**	**0.11**	**0.08**
Diaptomus pallidus Herrick						
D.p. adult female 1.25mm			0.12		0.02	
D.p. gravid female						
D.p. adult male 0.97mm						
D.p. immature 2.0 mm						
D.p. immature 1.0 mm	0.06				0.25	
D.p. immature 0.75 mm			0.25	0.12	0.25	
D.p. immature 0.5 mm	0.31	0.12		0.12	0.49	
Total D. pribilofensis	**0.37**	**0.12**	**0.37**	**0.25**	**1.00**	
Diaptomus tyrrelli Poppe						
D.p. adult female 1.39mm	0.02	0.10	0.03		0.03	0.05
D.p. gravid female 1.39 mm		0.00	0.00	0.01	0.02	0.01
D.p. adult male 1.21mm	0.06	0.27	0.21	0.10	0.21	0.13
D.p. immature 1.16mm			0.12			
D.p. immature 1.0 mm	0.06		0.25	0.12		
D.p. immature 0.75 mm	0.06		0.12			
D.p. immature 0.5 mm						
Total D. tyrrelli ind/L	**0.20**	**0.37**	**0.74**	**0.23**	**0.26**	**0.18**
Calanoid nauplius 0.3mm	**0.37**	**0.37**	**0.49**	**0.86**		
Total Calanoida ind/L	**0.95**	**0.90**	**1.63**	**1.36**	**1.37**	**0.27**
CYLOPOIDA						
Cyclops bicuspidatus thomasi S.A.Forbes						
C. b. t. adult female 0.92mm	0.31	0.25	0.12	0.25	0.25	0.49
C. b. t. gravid female 0.92mm	0.02	0.03	0.03	0.03	0.05	0.02
C. b. t. adult male 0.77mm	0.12	0.12	0.25	0.61	0.49	0.25
C. b. t. immature 1.0 mm	0.12			0.25		
C. b. t. immatue 0.75 mm	0.98	0.98	0.98	1.96	3.93	1.72
C. b. t. immature 0.5 mm	2.64	2.70	3.44	5.77	6.63	5.15
Total C. b. thomasi	**4.19**	**4.08**	**4.82**	**8.87**	**11.34**	**7.63**
C.vernalis (?) immature 0.5 mm	**0.06**					
Eucyclops agilis (?) immature 0.87mm						
Cyclops capillatus (?) dried out1.2mm						
Cyclopoid nauplius 0.2mm	**3.50**	**3.19**	**4.30**	**3.68**	**1.96**	**6.38**
Total Cyclopoida ind/L	**7.75**	**7.27**	**9.11**	**12.55**	**13.30**	**14.01**
CLADOCERA						
Daphnia schoedleri Sars 1.25mm				**0.00**		

2019 Minnow Zooplankton Individuals/L	16 Lake? RGT41 2019 AUG 21 AM 23 MINNOW WJ19CM 40.0 10.5 1.0 283.4	17 Lake? RGT42 2019 AUG 21 AM 23 MINNOW WJ19CM 80.0 10.5 1.0 283.4	17x Lake? RGT43 2019 AUG 21 AM 23 MINNOW WJ19CM 80.0 10.5 1.0 283.4	18 Lake? RG4T3 2019 AUG 21 AM 23 MINNOW WJ19CM 80.0 10.5 1.0 283.4	19 Lake? RG4T4 2019 AUG 21 AM 23 MINNOW WJ19CM 160.0 10.5 1.0 283.4	20 Lake? RGT45 2019 AUG 21 AM 23 MINNOW WJ19CM 160.0 10.5 1.0 283.4
Daphnia galeata mendotae Birge						
D. g. m. 2.5 mm						
D. g. m. 2.0 mm	0.02		0.00			0.03
D. g. m. 1.5 mm	0.25	0.37	0.98	0.25	0.23	0.98
D. g. m. 1.0 mm	0.25	0.49	0.61	0.37	0.25	0.25
D. g. m. 0.5 mm	0.37	0.12	0.12			0.25
Total D. g. mendotae	**0.88**	**0.98**	**1.72**	**0.61**	**0.47**	**1.51**
Bosmina longirostris O.F. Mueller						
B. l. 0.5 mm	0.02				0.25	
B. l. 0.25 mm				0.02		
Total B. longirostris	**0.02**			**0.02**	**0.25**	
Daphnia retrocurva Forbes						
D. r. 1.52 mm	0.06	0.12				
D. r. 1.24 mm	0.06	0.12				
D. r. 0.8 mm						
Total D. retrocurva	**0.12**	**0.25**				
Scapholeberis kingii Sars 1.0mm		**0.12**	**0.02**			
Sida crystallina O.F.Mueller 1.3mm					**0.00**	
Leptodora kindtii Focke 5.1mm		**0.00**	**0.00**	**0.00**		**0.00**
Diaphanosoma leuchtenbergianum Fisher 0.8m						
Alona sps (?) 0.5mm						
Chydorus sps (?) 0.4mm						
Total Cladocera Ind/L	**1.01**	**1.35**	**1.74**	**0.63**	**0.72**	**1.51**
TOTAL CRUSTACEA ind/L	**9.71**	**9.52**	**12.48**	**14.55**	**15.39**	**15.78**
ROTIFERA						
Kellicottia sps	**1.23**	**2.33**	**2.21**	**0.98**	**0.74**	**1.72**
Keratella sps	**1.66**	**3.19**	**4.66**	**1.96**	**3.93**	**4.66**
Polyarthra sps	**0.74**	**0.37**	**0.49**	**0.61**		**0.25**
Gastropus sps	**0.31**	**0.98**	**1.23**	**0.49**	**0.49**	**1.72**
Brachionus sps						
Asplanchna sps						
Unknown rotifer			**0.25**		**0.25**	
Total Rotifera ind/L	**3.93**	**6.87**	**8.84**	**4.05**	**5.40**	**8.35**
Total Calanoida ind/L	**0.95**	**0.90**	**1.63**	**1.36**	**1.37**	**0.27**
Total Cyclopoida ind/L	**7.75**	**7.27**	**9.11**	**12.55**	**13.30**	**14.01**
Total Cladocera ind/L	**1.01**	**1.35**	**1.74**	**0.63**	**0.72**	**1.51**
Total Rotifera ind/L	**3.93**	**6.87**	**8.84**	**4.05**	**5.40**	**8.35**
Total zooplankton ind/L	**13.64**	**16.40**	**21.32**	**18.60**	**20.79**	**24.13**
Diptera (adults, exuvia, larvae DA, DE, DL)				0.02		
Specimens counted in sample	236	182	226	171	126	126

2019 Minnow Zooplankton Wet Weight ug/L

	LAKE Mean LENGTH Lmm	Malley et al 1989* Regression LnL	#	Lna	b	Calculated LnW	Calculated DryWt ug	Formula Wet Weight ug
INSTAR IDENTIFICATION & SIZE CLASSES								
COPEPODA								
CALANOIDA								
Epischura nevadensis Lilljeborg								
E.n. adult female	1.7	0.531	32	1.1337	2.7882	2.6132	13.6426	194.89
E.n. adult male	1.6	0.470	32	1.1337	2.7882	2.44416	11.5209	164.58
E.n. immature 0.5-1.3 mm	1.13	0.122	32	1.1337	2.7882	1.47447	4.36871	62.41
Total E. nevadensis								
Diaptomus pallidus Herrick								
D.p. adult female	1.25	0.223	30	0.9772	2.538	1.54354	4.68112	66.87
D.p. gravid female	1.25	0.223	30	0.9772	2.538	1.54354	4.68112	66.87
D.p. adult male	0.97	-0.030	30	0.9772	2.538	0.89989	2.45934	35.13
D.p. immature 2.0 mm	1.15	0.140	30	0.9772	2.538	1.33192	3.78829	54.12
D.p. immature 1.0 mm	0.99	-0.010	30	0.9772	2.538	0.95169	2.59009	37.00
D.p. immature 0.75 mm	0.75	-0.288	30	0.9772	2.538	0.24706	1.28026	18.29
D.p. immature 0.5 mm	0.5	-0.693	30	0.9772	2.538	-0.782	0.45749	6.54
Total D. pallidus								
Diaptomus tyrrelli Poppe								
D.t. adult female	1.4	0.336	30	0.977	2.538	1.8313	6.242	89.17
D.t. gravid female	1.4	0.336	30	0.977	2.538	1.8313	6.242	89.17
D.t. adult male	1.2	0.182	30	0.977	2.538	1.44001	4.22072	60.30
D.t. immature 2.0 mm	1.18	0.166	30	0.977	2.538	1.39734	4.04443	57.78
D.t. immature 1.0 mm	0.99	-0.010	30	0.977	2.538	0.95169	2.59008	37.00
D.t. immature 0.75 mm	0.75	-0.288	30	0.977	2.538	0.24695	1.28011	18.29
D.t. immature 0.5 mm	0.5	-0.693	30	0.977	2.538	-0.7823	0.45736	6.53
Total D. tyrrelli								
Calanoid nauplii	**0.293**	**-1.228**	**6**	**0.9926**	**2.0997**	**-1.585**	**0.20496**	**2.93**
Total Calanoida ug/L								
CYLOPOIDA								
Cyclops bicuspidatus thomasi S. A. Forbes								
C.b.t. female	0.920	-0.083	68	0.7606	3.9145	0.4342	1.54373	22.05
C.b.t. gravid	0.92	-0.083	68	0.7606	3.9145	0.4342	1.54373	22.05
C.b.t. male	0.77	-0.261	68	0.7606	3.9145	-0.2625	0.76912	10.99
C.b.t. immature 1.0	0.99	-0.010	51	0.9032	2.7307	0.876	2.401	34.300
C.b.t. immature .75	0.75	-0.288	51	0.9032	2.7307	0.117	1.124	16.055
C.b.t. immature .5	0.5	-0.693	51	0.9032	2.7307	-0.989	0.372	5.313
Total C. b. thomasi								
Acanthocyclops vernalis Fischer ?	**0.5**	**-0.6931**	**92**	**0.8344**	**2.576**	**-0.9511**	**0.3863**	**5.51854**
Eucyclops agilis (?) immature 0.87mm	**0.87**	**-0.139**	**68**	**0.7606**	**3.9145**	**0.21546**	**1.24043**	**17.72**
Cyclops capillatus (?) dried out1.2mm	**1.2**	**0.182**	**68**	**0.7606**	**3.9145**	**1.4743**	**4.36797**	**62.40**
Cyclopoid nauplius	**0.14**	**-1.966**	**49**	**1.6388**	**2.4474**	**-1.649**	**0.192**	**2.747**
Total Cyclopoida ug/L								
CLADOCERA								
Daphnia schoedleri Sars 1.25mm	**1.250**	**0.223**	**DsL885**	**1.3933**	**3.0114**	**2.06527**	**7.88746**	**112.68**
Daphnia galeata mendotae Birge								
D. g. m. 2.5 mm	2.50	0.916	L223	1.0797	2.7188	3.57091	35.549	507.84
D. g. m. 2.0 mm	1.95	0.66783	L223	1.0797	2.7188	3.43986	31.1824	445.464
D. g. m. 1.5 mm	1.5	0.40547	L223	1.0797	2.7188	3.15658	23.4901	335.573
D. g. m. 1.0 mm	1.01	0.010	L223	1.0797	2.7188	1.108	3.027	43.243
D. g. m. 0.5 mm	0.38	-0.968	L223	1.0797	2.7188	-1.619	0.198	2.830
Total D. g. mendotae								
Bosmina longirostris O.F.Muller								

2019 Minnow Zooplankton Wet Weight ug/L

	LAKE Mean LENGTH Lmm	Malley et al 1989* Regression LnL	#	Lna	b	Calculated LnW	Calculated DryWt ug	Formula Wet Weight ug
B. l. 0.5mm	0.5	-0.693	L223Bl	2.4751	3.3614	0.145	1.156	16.517
B. l. 0.25mm	0.250	-1.386	L223Bl	2.4751	3.3614	-2.185	0.113	1.607
Total B. longirostris								

2019 Minnow Zooplankton Wet Weight ug/L

	LAKE Mean LENGTH Lmm	Malley et al 1989* Regression LnL	#	Lna	b	Calculated LnW	Calculated DryWt ug	Formula Wet Weight ug
Daphnia retrocurva Forbes								
D. r. 2.0 mm	1.52	0.419	L227	0.8637	3.1262	2.17267	8.78172	125.45
D. r. 1.0 mm	1.24	0.215	L227	0.8637	3.1262	1.53618	4.64681	66.38
D. r. 0.5 mm	0.8	-0.223	L227	0.8637	3.1262	0.16611	1.1807	16.87
Total D. retrocurva								
Scapholeberis kingii Sars******	**0.99**	**-0.0101**	**Clay**	**2.7286**	**3.337**	**2.69506**	**14.8064**	**211.521**
Sida crystallina O.F.Mueller 1.3mm							**25******* **	**357.14**
Leptodora kindtii Focke							**12** **	**171.43**
Diaphanosoma leuchtenbergianum Fisher* **	**0.73**	**-0.3147**	**L223**	**1.274**	**3.2454**	**0.25264**	**1.28742**	**18.3917**
Alona sps (?) 0.5mm							**.708******* ***	**10.1143**
Chydorus sps (?) 0.4mm							**.741******* ***	**10.5857**
Total Cladocera ug/L								
TOTAL CRUSTACEA ug/L								
ROTIFERA								
Kellicottia sps	**0.128**	**-2.056**	**L224**				**0.015**	**0.214**
Keratella sps	**0.102**	**-2.283**	**L224**				**0.011**	**0.157**
Polyarthra sps** **	**0.126**	**-2.071**	**L227**				**0.041**	**0.586**
Gastropus sps	**0.05**	**-2.996**	**L224**				**0.015**	**0.214**
Brachionus sps*** **	**0.2**	**-1.6094**	**Clay**				**0.044**	**0.629**
Asplanchna sps** **	**0.500**		**302**					
Unknown rotifer (Gastropus like) ?	**0.05**	**-2.996**	**L224**				**0.015**	**0.214**
Total Rotifera ug/L								

Total Calanoida ug/L
Total Cyclopoida ug/L
Total Cladocera ug/L
Total Rotifera ug/L

TOTAL ZOOPLANKTON ug/L

*Length/DryWeight Regressions in form Lnw = Lna + bLnL from Malley et al. 1989
R6 LnW= 0.9926-2.0997 LnL
R27 LnW = 1.0542 -2.748 LnL
R30 LnW =0.9772-2.5384 LnL
R32 LnW = 1.1337 + 2.7882 LnL
R49 LnW= 1.6388 - 2.4474 LnL
R77 LnW= 1.3472+3.0087LnL
R92 LnW= 0.8344-2.5760 LnL
R94 LnW = 1.3169 - 2.7197 LnL
DsL885 LnW = 1.3933 - 3.0114 LnL **t**
RL302 LnW = 1.6274 - 3.3367 LnL
RL223Hg LnW = 2.1169 + 2.6972 LnL
RL223Bl LnW = 2.4751 - 3.3614 LnL
RL223Cs LnW = 3.1270 -3.3678 LnL
** Table A2 Malley et al. 1989 Lake Ontario
***used formula for Diaphanosoma birgei Table 10 Malley et al 1989.
****Table 11 Malley et al 1989
***** used formula for Keratella cochlearis Clay Lake Table 11 Malley et all 1989
******used formula for Ceriodaphnia lacustris Clay Lake Table 10 Malley et al 1989
*******Table A1 Malley et al 1989

2019 Minnow Zooplankton Wet Weight ug/L		1	2	3	4	5	6	7
		Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?
		RGTN1	RGTN2	RGTN3	RGTN4	RGTN5	RGT41	RGT42
		2019	2019	2019	2019	2019	2019	2019
		JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE
		12	12	12	12	12	14	14
		AM	AM	AM	AM	AM	AM	AM
		6	6	6	6	6	16	16
		MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
		WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	Wet	80	80	40	40	40	80	80
	Weight	11	11	11	11	11	11	11
	ug	1	1	1	1	1	1	1
		283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASSES		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COPEPODA								
CALANOIDA								
Epischura nevadensis Lilljeborg								
E.n. adult female	194.89						9.03	18.05
E.n. adult male	164.58	1.94					7.62	26.68
E.n. immature 0.5-1.3 mm	62.41						7.23	22.02
Total E. nevadensis		**1.94**					**23.87**	**66.75**
Diaptomus pallidus Herrick								
D.p. adult female	66.87							
D.p. gravid female	66.87							
D.p. adult male	35.13							
D.p. immature 2.0 mm	54.12							
D.p. immature 1.0 mm	37.00							
D.p. immature 0.75 mm	18.29						3.23	
D.p. immature 0.5 mm	6.54							
Total D. pallidus							**3.23**	
Diaptomus tyrrelli Poppe								
D.t. adult female	89.17						10.32	
D.t. gravid female	89.17						2.75	8.26
D.t. adult male	60.30						6.98	13.96
D.t. immature 2.0 mm	57.78							
D.t. immature 1.0 mm	37.00						13.06	
D.t. immature 0.75 mm	18.29							
D.t. immature 0.5 mm	6.53							
Total D. tyrrelli							**33.11**	**22.22**
Calanoid nauplii	**2.928**						**0.52**	
Total Calanoida ug/L		**1.94**					**60.73**	**88.97**
CYLOPOIDA								
Cyclops bicuspidatus thomasi S. A. Forbes								
C.b.t. female	22.05						31.13	35.02
C.b.t. gravid	22.05						0.15	2.55
C.b.t. male	10.99						9.69	31.02
C.b.t. immature 1.0	34.300						12.10	6.05
C.b.t. immature .75	16.055					3.78	50.99	87.81
C.b.t. immature .5	5.313					0.03	21.56	46.87
Total C. b. thomasi						**3.81**	**125.61**	**209.31**
Acanthocyclops vernalis Fischer ?	**5.519**						**0.97**	
Eucyclops agilis (?) immature 0.87mm	**17.72**		**0.10**	**0.21**	**0.21**			
Cyclops capillatus (?) dried out1.2mm	**62.40**					**0.37**		
Cyclopoid nauplius	**2.747**					**0.65**	**11.63**	**22.78**
Total Cyclopoida ug/L			**0.10**	**0.21**	**0.21**	**4.82**	**138.22**	**232.09**
CLADOCERA								
Daphnia schoedleri Sars 1.25mm	**112.68**						**19.88**	**13.05**
Daphnia galeata mendotae Birge								
D. g. m. 2.5 mm	507.84							
D. g. m. 2.0 mm	445.464							
D. g. m. 1.5 mm	335.573	20.72				1.97	118.41	15.54
D. g. m. 1.0 mm	43.243						4.01	
D. g. m. 0.5 mm	2.830						0.50	1.00
Total D. g. mendotae		**20.72**				**1.97**	**122.91**	**16.54**
Bosmina longirostris O.F.Muller								

2019 Minnow Zooplankton Wet Weight ug/L		1	2	3	4	5	6	7
		Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?
		RGTN1	RGTN2	RGTN3	RGTN4	RGTN5	RGT41	RGT42
		2019	2019	2019	2019	2019	2019	2019
		JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE
		12	12	12	12	12	14	14
		AM	AM	AM	AM	AM	AM	AM
		6	6	6	6	6	16	16
		MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
		WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	Wet	80	80	40	40	40	80	80
	Weight	11	11	11	11	11	11	11
	ug	1	1	1	1	1	1	1
		283.4	283.4	283.4	283.4	283.4	283.4	283.4
B. l. 0.5mm	16.517			0.10		0.10	67.03	116.57
B. l. 0.25mm	1.607					0.38	62.66	112.57
Total B. longirostris				**0.10**		**0.48**	**129.69**	**229.14**

2019 Minnow Zooplankton Wet Weight ug/L		1	2	3	4	5	6	7
		Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?
		RGTN1	RGTN2	RGTN3	RGTN4	RGTN5	RGT41	RGT42
		2019	2019	2019	2019	2019	2019	2019
		JUNE	JUNE	JUNE	JUNE	JUNE	JUNE	JUNE
		12	12	12	12	12	14	14
		AM	AM	AM	AM	AM	AM	AM
		6	6	6	6	6	16	16
		MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
		WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	Wet Weight ug	80	80	40	40	40	80	80
		11	11	11	11	11	11	11
		1	1	1	1	1	1	1
		283.4	283.4	283.4	283.4	283.4	283.4	283.4
Daphnia retrocurva Forbes								
D. r. 2.0 mm	125.45						8.72	2.91
D. r. 1.0 mm	66.38						4.61	11.71
D. r. 0.5 mm	16.87							
Total D. retrocurva							**13.33**	**14.62**
Scapholeberis kingii Sars******	**211.521**							
Sida crystallina O.F.Mueller 1.3mm	**357.14**							
Leptodora kindtii Focke	**171.43**						**7.94**	**19.85**
Diaphanosoma leuchtenbergianum Fisher***	**18.3917**							
Alona sps (?) 0.5mm	**10.1143**	**0.06**	**1.25**					
Chydorus sps (?) 0.4mm	**10.5857**					**0.19**		
Total Cladocera ug/L		**20.78**	**1.25**	**0.10**		**2.64**	**293.75**	**293.19**
TOTAL CRUSTACEA ug/L		**22.72**	**1.35**	**0.31**	**0.21**	**7.46**	**492.70**	**614.25**
ROTIFERA								
Kellicottia sps	**0.214**					**0.10**	**6.62**	**7.52**
Keratella sps	**0.157**					**0.04**	**0.30**	**0.61**
Polyarthra sps******	**0.586**						**0.31**	**0.93**
Gastropus sps	**0.214**							
Brachionus sps*******	**0.629**							**0.33**
Asplanchna sps******	**1.501**					**0.35**	**5.56**	**5.83**
Unknown rotifer (Gastropus like) ?	**0.214**		**0.10**					
Total Rotifera ug/L			**0.10**			**0.49**	**12.79**	**15.22**
Total Calanoida ug/L		**1.94**					**60.73**	**88.97**
Total Cyclopoida ug/L			**0.10**	**0.21**	**0.21**	**4.82**	**138.22**	**232.09**
Total Cladocera ug/L		**20.78**	**1.25**	**0.10**		**2.64**	**293.75**	**293.19**
Total Rotifera ug/L			**0.10**			**0.49**	**12.79**	**15.22**
TOTAL ZOOPLANKTON ug/L		**22.72**	**1.45**	**0.31**	**0.21**	**7.95**	**505.49**	**629.48**

*Length/DryWeight Regressions in form Lnw = Lr
R6 LnW= 0.9926-2.0997 LnL
R27 LnW = 1.0542 -2.748 LnL
R30 LnW =0.9772-2.5384 LnL
R32 LnW = 1.1337 + 2.7882 LnL
R49 LnW= 1.6388 - 2.4474 LnL
R77 LnW= 1.3472+3.0087LnL
R92 LnW= 0.8344-2.5760 LnL
R94 LnW = 1.3169 - 2.7197 LnL
DsL885 LnW = 1.3933 - 3.0114 LnL
RL302 LnW = 1.6274 - 3.3367 LnL
RL223Hg LnW = 2.1169 + 2.6972 LnL
RL223Bl LnW = 2.4751 - 3.3614 LnL
RL223Cs LnW = 3.1270 -3.3678 LnL
** Table A2 Malley et al. 1989 Lake Ontario
***used formula for Diaphanosoma birgei Table 1
****Table 11 Malley et al 1989
***** used formula for Keratella cochlearis Clay La
******used formula for Ceriodaphnia lacustris Clay
*******Table A1 Malley et al 1989

2019 Minnow Zooplankton Wet Weight ug/L	8	9	10	11	12	13	14	14x
	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?
	RGT43	RGT44	RGT45	RGTN1	RGTN2	RGTN3	RGTN4	RTTN4
	2019	2019	2019	2019	2019	2019	2019	2019
	JUNE	JUNE	JUNE	AUGUST	AUG	AUG	AUG	AUG
	14	14	14	22	22	22	22	22
	AM	AM	AM	AM	AM	AM	AM	AM
	16	16	16	13	13	13	13	13
	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	160	160	80	40	40	40	40	40
	11	11	11	11	11	11	11	11
	1	1	1	1	1	1	1	1
	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
INSTAR IDENTIFICATION & SIZE CLASSES	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COPEPODA								
CALANOIDA								
Epischura nevadensis Lilljeborg								
E.n. adult female	9.03		13.54	1.59		1.59	4.23	5.55
E.n. adult male		11.43	7.62	0.89	0.89	1.79	1.34	9.38
E.n. immature 0.5-1.3 mm	4.34	2.89	22.02	0.17	1.78		13.55	6.78
Total E. nevadensis	**13.36**	**14.32**	**43.18**	**2.65**	**2.67**	**3.37**	**19.12**	**21.71**
Diaptomus pallidus Herrick								
D.p. adult female						14.52		7.26
D.p. gravid female								
D.p. adult male								
D.p. immature 2.0 mm								
D.p. immature 1.0 mm				0.10			4.02	
D.p. immature 0.75 mm				7.94			3.97	
D.p. immature 0.5 mm				0.71		3.55	0.71	
Total D. pallidus				**8.75**		**18.07**	**8.70**	**7.26**
Diaptomus tyrrelli Poppe								
D.t. adult female	14.45	14.45	15.73	2.54	2.54	0.24	9.68	9.68
D.t. gravid female	2.06	2.06	8.26		0.48	0.24		
D.t. adult male	11.17	18.15	31.91	3.44	1.72	3.44	19.64	13.09
D.t. immature 2.0 mm		20.39				1.65		6.27
D.t. immature 1.0 mm		0.86		4.02				4.02
D.t. immature 0.75 mm	6.45		6.45					1.99
D.t. immature 0.5 mm								
Total D. tyrrelli	**34.14**	**55.91**	**62.36**	**10.00**	**4.74**	**5.57**	**29.32**	**35.05**
Calanoid nauplii		**2.07**	**1.03**	**0.32**		**1.27**	**1.27**	**0.95**
Total Calanoida ug/L	**47.50**	**72.30**	**106.58**	**21.72**	**7.42**	**28.28**	**58.41**	**64.98**
CYLOPOIDA								
Cyclops bicuspidatus thomasi S. A. Forbes								
C.b.t. female	54.47	46.69	42.80	14.37	7.18	4.79	9.58	9.58
C.b.t. gravid	2.55	1.53	4.60	1.89	1.26			
C.b.t. male	23.26	11.63	9.69	3.58	1.19	4.77	3.58	4.77
C.b.t. immature 1.0	36.31	24.21	30.26	3.72	3.72	3.72	7.45	14.90
C.b.t. immature .75	79.31	79.31	56.65	17.43	34.86	22.66	62.75	61.01
C.b.t. immature .5	24.37	15.00	13.12	13.84	15.00	8.65	23.07	29.42
Total C. b. thomasi	**220.28**	**178.37**	**157.12**	**54.83**	**63.22**	**44.60**	**106.43**	**119.67**
Acanthocyclops vernalis Fischer ?							**0.60**	
Eucyclops agilis (?) immature 0.87mm								
Cyclops capillatus (?) dried out1.2mm								
Cyclopoid nauplius	**19.39**	**18.42**	**22.78**	**5.37**	**2.68**	**6.26**	**2.98**	**6.86**
Total Cyclopoida ug/L	**239.67**	**196.79**	**179.90**	**60.20**	**65.90**	**50.86**	**110.01**	**126.53**
CLADOCERA								
Daphnia schoedleri Sars 1.25mm		**7.83**	**15.66**	**12.23**				**0.31**
Daphnia galeata mendotae Birge								
D. g. m. 2.5 mm	358.39							
D. g. m. 2.0 mm				3.63	2.42	12.70	12.70	12.70
D. g. m. 1.5 mm	15.54	7.77		255.04	72.87	47.82	182.17	145.74
D. g. m. 1.0 mm	2.00	1.00	2.00	14.08	9.39	9.39	4.69	
D. g. m. 0.5 mm			0.50	1.84	0.92	0.92	2.77	1.84
Total D. g. mendotae	**375.94**	**8.77**	**2.50**	**274.59**	**85.60**	**70.83**	**202.32**	**160.27**
Bosmina longirostris O.F.Muller								

2019 Minnow Zooplankton Wet Weight ug/L	8	9	10	11	12	13	14	14x
	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?
	RGT43	RGT44	RGT45	RGTN1	RGTN2	RGTN3	RGTN4	RTTN4
	2019	2019	2019	2019	2019	2019	2019	2019
	JUNE	JUNE	JUNE	AUGUST	AUG	AUG	AUG	AUG
	14	14	14	22	22	22	22	22
	AM	AM	AM	AM	AM	AM	AM	AM
	16	16	16	13	13	13	13	13
	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	160	160	80	40	40	40	40	40
	11	11	11	11	11	11	11	11
	1	1	1	1	1	1	1	1
	283.4	283.4	283.4	283.4	283.4	283.4	283.4	283.4
B. l. 0.5mm	64.11	46.63	34.97					
B. l. 0.25mm	75.42	57.28	23.82	0.17				
Total B. longirostris	**139.54**	**103.90**	**58.79**	**0.17**				

2019 Minnow Zooplankton Wet Weight ug/L	8 Lake ? RGT43 2019 JUNE 14 AM 16 MINNOW WJ19CM 160 11 1 283.4	9 Lake ? RGT44 2019 JUNE 14 AM 16 MINNOW WJ19CM 160 11 1 283.4	10 Lake ? RGT45 2019 JUNE 14 AM 16 MINNOW WJ19CM 80 11 1 283.4	11 Lake ? RGTN1 2019 AUGUST 22 AM 13 MINNOW WJ19CM 40 11 1 283.4	12 Lake ? RGTN2 2019 AUG 22 AM 13 MINNOW WJ19CM 40 11 1 283.4	13 Lake ? RGTN3 2019 AUG 22 AM 13 MINNOW WJ19CM 40 11 1 283.4	14 Lake ? RGTN4 2019 AUG 22 AM 13 MINNOW WJ19CM 40 11 1 283.4	14x Lake ? RTTN4 2019 AUG 22 AM 13 MINNOW WJ19CM 40 11 1 283.4
Daphnia retrocurva Forbes								
D. r. 2.0 mm	2.91	8.72					13.62	
D. r. 1.0 mm	4.61	1.54	1.54	7.21				
D. r. 0.5 mm								
Total D. retrocurva	**7.52**	**10.25**	**1.54**	**7.21**			**13.62**	
Scapholeberis kingii Sars******					**6.03**	**0.57**	**12.06**	**12.06**
Sida crystallina O.F.Mueller 1.3mm						**0.97**		
Leptodora kindtii Focke	**0.38**	**2.27**	**1.13**		**0.47**		**0.47**	**0.93**
Diaphanosoma leuchtenbergianum Fisher***	**0.43**		**0.43**	**0.05**			**0.05**	**0.05**
Alona sps (?) 0.5mm								
Chydorus sps (?) 0.4mm								
Total Cladocera ug/L	**523.79**	**133.02**	**80.04**	**294.26**	**92.09**	**72.37**	**228.52**	**173.62**
TOTAL CRUSTACEA ug/L	**810.96**	**402.12**	**366.52**	**376.17**	**165.41**	**151.51**	**396.94**	**365.13**
ROTIFERA								
Kellicottia sps	**7.79**	**8.17**	**3.18**	**0.09**	**0.05**	**0.02**	**0.12**	**0.12**
Keratella sps	**0.50**	**0.33**	**0.19**	**0.15**	**0.10**	**0.24**	**0.15**	**0.10**
Polyarthra sps******	**0.21**	**0.62**	**0.62**	**0.45**	**0.38**	**0.76**	**0.51**	**0.89**
Gastropus sps				**0.02**		**0.07**	**0.07**	**0.21**
Brachionus sps********			**0.11**					
Asplanchna sps******	**2.65**	**4.24**	**0.53**					
Unknown rotifer (Gastropus like) ?								
Total Rotifera ug/L	**11.14**	**13.36**	**4.63**	**0.72**	**0.53**	**1.10**	**0.85**	**1.32**
Total Calanoida ug/L	**47.50**	**72.30**	**106.58**	**21.72**	**7.42**	**28.28**	**58.41**	**64.98**
Total Cyclopoida ug/L	**239.67**	**196.79**	**179.90**	**60.20**	**65.90**	**50.86**	**110.01**	**126.53**
Total Cladocera ug/L	**523.79**	**133.02**	**80.04**	**294.26**	**92.09**	**72.37**	**228.52**	**173.62**
Total Rotifera ug/L	**11.14**	**13.36**	**4.63**	**0.72**	**0.53**	**1.10**	**0.85**	**1.32**
TOTAL ZOOPLANKTON ug/L	**822.10**	**415.47**	**371.15**	**376.89**	**165.94**	**152.61**	**397.79**	**366.44**

*Length/DryWeight Regressions in form Lnw = Lr
R6 LnW= 0.9926-2.0997 LnL
R27 LnW = 1.0542 -2.748 LnL
R30 LnW =0.9772-2.5384 LnL
R32 LnW = 1.1337 + 2.7882 LnL
R49 LnW= 1.6388 - 2.4474 LnL
R77 LnW= 1.3472+3.0087LnL
R92 LnW= 0.8344-2.5760 LnL
R94 LnW = 1.3169 - 2.7197 LnL
DsL885 LnW = 1.3933 - 3.0114 LnL
RL302 LnW = 1.6274 - 3.3367 LnL
RL223Hg LnW = 2.1169 + 2.6972 LnL
RL223Bl LnW = 2.4751 - 3.3614 LnL
RL223Cs LnW = 3.1270 -3.3678 LnL
** Table A2 Malley et al. 1989 Lake Ontario
***used formula for Diaphanosoma birgei Table 1
****Table 11 Malley et al 1989
***** used formula for Keratella cochlearis Clay La
******used formula for Ceriodaphnia lacustris Clay
*******Table A1 Malley et al 1989

2019 Minnow Zooplankton Wet Weight ug/L	15 Lake ? RGTN5 2019 AUG 22 AM 13 MINNOW WJ19CM 40 11 1 283.4	16 Lake ? RGT41 2019 AUG 21 AM 23 MINNOW WJ19CM 40 11 1 283.4	17 Lake ? RGT42 2019 AUG 21 AM 23 MINNOW WJ19CM 80 11 1 283.4	17x Lake ? RGT43 2019 AUG 21 AM 23 MINNOW WJ19CM 80 11 1 283.4	18 Lake ? RG4T3 2019 AUG 21 AM 23 MINNOW WJ19CM 80 11 1 283.4	19 Lake ? RG4T4 2019 AUG 21 AM 23 MINNOW WJ19CM 160 11 1 283.4	20 Lake ? RGT45 2019 AUG 21 AM 23 MINNOW WJ19CM 160 11 1 283.4
INSTAR IDENTIFICATION & SIZE CLASSES	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COPEPODA							
CALANOIDA							
Epischura nevadensis Lilljeborg							
E.n. adult female	11.11	1.50	4.19	3.89	3.14	3.14	3.14
E.n. adult male	18.76		1.51	1.01	2.65	10.60	5.30
E.n. immature 0.5-1.3 mm		0.10	0.38	0.38		2.01	2.01
Total E. nevadensis	**29.87**	**1.59**	**6.08**	**5.28**	**5.79**	**15.76**	**10.45**
Diaptomus pallidus Herrick							
D.p. adult female				8.21		1.08	
D.p. gravid female							
D.p. adult male							
D.p. immature 2.0 mm	5.88						
D.p. immature 1.0 mm		2.27				9.08	
D.p. immature 0.75 mm				4.49	2.24	4.49	
D.p. immature 0.5 mm	0.71	2.01	0.80		0.80	3.21	
Total D. pallidus	**6.59**	**4.28**	**0.80**	**12.70**	**3.05**	**17.86**	
Diaptomus tyrrelli Poppe							
D.t. adult female	5.08	1.44	8.62	2.87		2.87	4.31
D.t. gravid female	2.54		0.14	0.27	0.68	1.44	0.68
D.t. adult male	10.31	3.89	16.51	12.63	5.83	12.63	7.77
D.t. immature 2.0 mm				7.09			
D.t. immature 1.0 mm	4.02	2.27		9.08	4.54		
D.t. immature 0.75 mm		1.12		2.24			
D.t. immature 0.5 mm	0.19						
Total D. tyrrelli	**22.14**	**8.71**	**25.27**	**34.19**	**11.05**	**16.94**	**12.76**
Calanoid nauplii	**1.59**	**1.08**	**1.08**	**1.44**	**2.52**		
Total Calanoida ug/L	**60.18**	**15.66**	**33.23**	**53.61**	**22.41**	**50.55**	**23.22**
CYLOPOIDA							
Cyclops bicuspidatus thomasi S. A. Forbes							
C.b.t. female	11.97	6.77	5.41	2.71	5.41	5.41	10.83
C.b.t. gravid	2.51	0.36	0.71	0.71	0.71	1.07	0.36
C.b.t. male	1.19	1.35	1.35	2.70	6.74	5.39	2.70
C.b.t. immature 1.0		4.21			8.42		
C.b.t. immature .75	52.29	15.76	15.76	15.76	31.53	63.06	27.59
C.b.t. immature .5	25.38	14.02	14.34	18.26	30.65	35.21	27.39
Total C. b. thomasi	**93.35**	**42.46**	**37.58**	**40.14**	**83.46**	**110.14**	**68.85**
Acanthocyclops vernalis Fischer ?		**0.34**					
Eucyclops agilis (?) immature 0.87mm							
Cyclops capillatus (?) dried out1.2mm							
Cyclopoid nauplius	**6.86**	**9.61**	**8.77**	**11.80**	**10.12**	**5.40**	**17.53**
Total Cyclopoida ug/L	**100.21**	**52.41**	**46.35**	**51.94**	**93.57**	**115.53**	**86.38**
CLADOCERA							
Daphnia schoedleri Sars 1.25mm					**0.17**		
Daphnia galeata mendotae Birge							
D. g. m. 2.5 mm							
D. g. m. 2.0 mm	2.42	7.18		0.68			14.35
D. g. m. 1.5 mm	109.30	82.37	123.56	329.49	82.37	75.68	329.49
D. g. m. 1.0 mm	23.47	10.61	21.23	26.54	15.92	10.61	10.61
D. g. m. 0.5 mm	2.15	1.04	0.35	0.35			0.69
Total D. g. mendotae	**137.35**	**101.20**	**145.13**	**357.06**	**98.29**	**86.29**	**355.15**
Bosmina longirostris O.F.Muller							

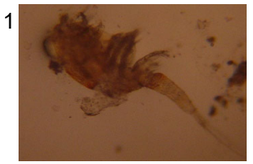
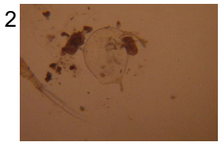
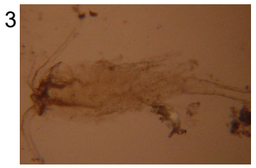
2019 Minnow Zooplankton Wet Weight ug/L	15	16	17	17x	18	19	20
	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?	Lake ?
	RGTN5	RGT41	RGT42	RGT43	RG4T3	RG4T4	RGT45
	2019	2019	2019	2019	2019	2019	2019
	AUG	AUG	AUG	AUG	AUG	AUG	AUG
	22	21	21	21	21	21	21
	AM	AM	AM	AM	AM	AM	AM
	13	23	23	23	23	23	23
	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW	MINNOW
	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM	WJ19CM
	40	40	80	80	80	160	160
	11	11	11	11	11	11	11
	1	1	1	1	1	1	1
	283.4	283.4	283.4	283.4	283.4	283.4	283.4
B. l. 0.5mm		0.27				4.05	
B. l. 0.25mm	0.17				0.03		
Total B. longirostris	**0.17**	**0.27**			**0.03**	**4.05**	

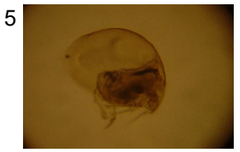
2019 Minnow Zooplankton Wet Weight ug/L	15 Lake ? RGTN5 2019 AUG 22 AM 13 MINNOW WJ19CM 40 11 1 283.4	16 Lake ? RGT41 2019 AUG 21 AM 23 MINNOW WJ19CM 40 11 1 283.4	17 Lake ? RGT42 2019 AUG 21 AM 23 MINNOW WJ19CM 80 11 1 283.4	17x Lake ? RGT43 2019 AUG 21 AM 23 MINNOW WJ19CM 80 11 1 283.4	18 Lake ? RG4T3 2019 AUG 21 AM 23 MINNOW WJ19CM 80 11 1 283.4	19 Lake ? RG4T4 2019 AUG 21 AM 23 MINNOW WJ19CM 160 11 1 283.4	20 Lake ? RGT45 2019 AUG 21 AM 23 MINNOW WJ19CM 160 11 1 283.4
Daphnia retrocurva Forbes							
D. r. 2.0 mm	13.62	7.70	15.40				
D. r. 1.0 mm		4.07	8.15				
D. r. 0.5 mm	1.83						
Total D. retrocurva	**15.45**	**11.77**	**23.54**				
Scapholeberis kingii Sars******	**3.44**		**25.96**	**3.41**			
Sida crystallina O.F.Mueller 1.3mm						**0.55**	
Leptodora kindtii Focke	**0.93**		**0.26**	**0.26**	**0.53**		**0.53**
Diaphanosoma leuchtenbergianum Fisher***							
Alona sps (?) 0.5mm							
Chydorus sps (?) 0.4mm							
Total Cladocera ug/L	**157.35**	**113.24**	**194.90**	**360.73**	**99.02**	**90.90**	**355.68**
TOTAL CRUSTACEA ug/L	**317.74**	**181.31**	**274.48**	**466.27**	**215.00**	**256.98**	**465.28**
ROTIFERA							
Kellicottia sps	**0.19**	**0.26**	**0.50**	**0.47**	**0.21**	**0.16**	**0.37**
Keratella sps	**0.15**	**0.26**	**0.50**	**0.73**	**0.31**	**0.62**	**0.73**
Polyarthra sps******	**0.89**	**0.43**	**0.22**	**0.29**	**0.36**		**0.14**
Gastropus sps	**0.19**	**0.07**	**0.21**	**0.26**	**0.11**	**0.11**	**0.37**
Brachionus sps*******							
Asplanchna sps******							
Unknown rotifer (Gastropus like) ?				**0.05**		**0.05**	
Total Rotifera ug/L	**1.42**	**1.02**	**1.43**	**1.81**	**0.98**	**0.93**	**1.61**
Total Calanoida ug/L	**60.18**	**15.66**	**33.23**	**53.61**	**22.41**	**50.55**	**23.22**
Total Cyclopoida ug/L	**100.21**	**52.41**	**46.35**	**51.94**	**93.57**	**115.53**	**86.38**
Total Cladocera ug/L	**157.35**	**113.24**	**194.90**	**360.73**	**99.02**	**90.90**	**355.68**
Total Rotifera ug/L	**1.42**	**1.02**	**1.43**	**1.81**	**0.98**	**0.93**	**1.61**
TOTAL ZOOPLANKTON ug/L	**319.16**	**182.33**	**275.91**	**468.08**	**215.98**	**257.91**	**466.89**

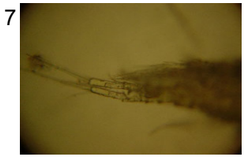
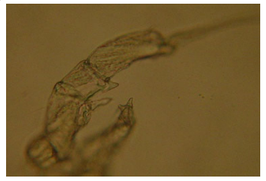
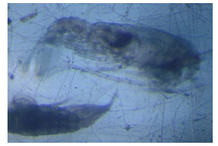
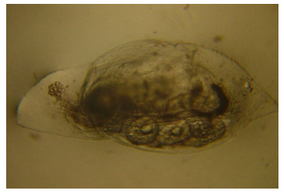
*Length/DryWeight Regressions in form Lnw = Lr
R6 LnW= 0.9926-2.0997 LnL
R27 LnW = 1.0542 -2.748 LnL
R30 LnW =0.9772-2.5384 LnL
R32 LnW = 1.1337 + 2.7882 LnL
R49 LnW= 1.6388 - 2.4474 LnL
R77 LnW= 1.3472+3.0087LnL
R92 LnW= 0.8344-2.5760 LnL
R94 LnW = 1.3169 - 2.7197 LnL
DsL885 LnW = 1.3933 - 3.0114 LnL
RL302 LnW = 1.6274 - 3.3367 LnL
RL223Hg LnW = 2.1169 + 2.6972 LnL
RL223Bl LnW = 2.4751 - 3.3614 LnL
RL223Cs LnW = 3.1270 -3.3678 LnL
** Table A2 Malley et al. 1989 Lake Ontario
***used formula for Diaphanosoma birgei Table 1
****Table 11 Malley et al 1989
***** used formula for Keratella cochlearis Clay La
******used formula for Ceriodaphnia lacustris Clay
*******Table A1 Malley et al 1989

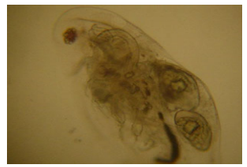
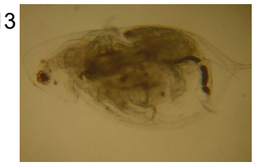
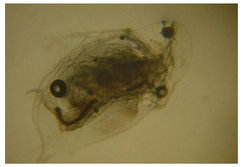
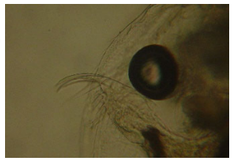
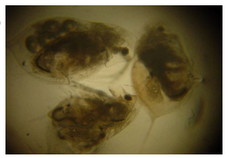
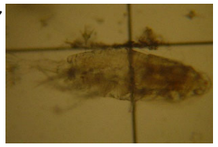
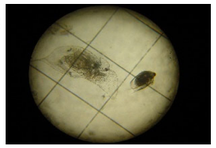
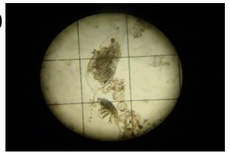
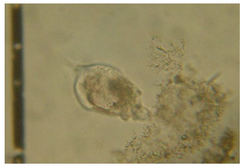
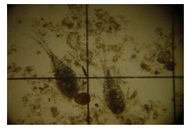
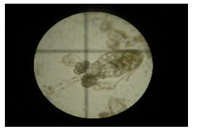
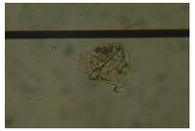
Images of identified specimens

1 Eucyclops sps? Immature
2 Bosmina longirostris
3 Dried Eucyclops sps ? immature
4 Eucyclops agilis (?)
5 Alona sps?
6 Daphnia galeata mendotae
7 Cyclops capillatus dried specimen
8 Diaptomus tyrelli male 5th leg
9 Epischura nevadensis male
10 Daphnia retrocurva
11 Diaptomus tyrrelli males and Daphnia
12 Daphnia galeata (round helmet form)
13 Daphnia galeata (pointed helmet form)
14 Daphnia schoedleri
15 D. schoedleri pecten
16 D. schoedleri and D. galeata m
17 Diaptomus pallidus female
18 Daphnia retrocurva and Scaphloleberis kingii
19 Daphnia galezgz mendotae
20 Rotifer sps? (gastropus forma)
21 Cyclops bicuspidatus thomasi female
22 C.b.thomasi gravid female
23 Rotifer sps unknown

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23


Sample ID	Species	Date Caught	Plus Growth	Ageing Method	Primary Ager	Age Estimate	CI	QAQC Ager	QAQC Age Estimate	CI	Final Age Estimate	Notes
ER-NSC-01	NPM	Jun-18	-	Read Whole	KM	10	F	MM	10	F	**10**	
ER-NSC-02	NPM	Jun-18	-	Read Whole	KM	9	F	MM	9	FG	**9**	
ER-NSC-03	NPM	Jun-18	-	Read Whole	KM	10	F	MM	9	F	**10**	
ER-NSC-04	NPM	Jun-18	-	Read Whole	KM	12	F	MM	12	F	**12**	
ER-NSC-05	NPM	Jun-18	-	Read Whole	KM	11	F	MM	11	FG	**11**	
ER-NSC-06	NPM	Jun-18	-	Read Whole	KM	6	F	MM	6	FG	**6**	
GC-NSC-01	NPM	Jun-18	-	Read Whole	KM	9	F	MM	9	FG	**9**	
GC-NSC-02	NPM	Jun-18	-	Read Whole	KM	9	F	MM	9	F	**9**	
GC-NSC-03	NPM	Jun-18	-	Read Whole	KM	15	F	MM	15	FG	**15**	
SC-NSC-01	NPM	Jun-18	-	Read Whole	KM	12	F				**12**	
SC-NSC-02	NPM	Jun-18	-	Read Whole	KM	13	F				**13**	
SC-NSC-03	NPM	Jun-18	-	Read Whole	KM	10	F				**10**	
SC-NSC-04	NPM	Jun-18	-	Read Whole	KM	9	F				**9**	
SC-NSC-05	NPM	Jun-18	-	Read Whole	KM	8	F				**8**	
SC-NSC-06	NPM	Jun-18	-	Read Whole	KM	11	F				**11**	
SC-NSC-07	NPM	Jun-18	-	Read Whole	KM	17	F	MM	17	F	**17**	
ERKR-PCC-01	PCC	Apr-18	-	Section	MM	12	FG				**12**	
ERKR-PCC-02	PCC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-PCC-03	PCC	Apr-18	-	Section	MM	7	F	KM	7	F	**7**	
ERKR-PCC-04	PCC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
ERKR-PCC-05	PCC	Apr-18	-	Section	KM	5	FG				**5**	
ERKR-PCC-06	PCC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
ERKR-PCC-07	PCC	Apr-18	-	Section	MM	7	F	KM	7	F	**7**	
ERKR-PCC-08	PCC	Apr-18	-	Section	MM	6	FG				**6**	
ERKR-PCC-09	PCC	Apr-18	-	Section	MM	11	F	KM	11	FG	**11**	
ERKR-PCC-11	PCC	Apr-18	-	Section	MM	11	F	KM	12	F	**11**	
ERKR-PCC-12	PCC	Apr-18	-	Section	MM	13	F	KM	13	FG	**13**	
ERKR-PCC-13	PCC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-PCC-14	PCC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-PCC-15	PCC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
ERKR-PCC-16	PCC	Apr-18	-	Section	MM	15	F	KM	15	FG	**15**	
ERKR-PCC-17	PCC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-PCC-18	PCC	Apr-18	-	Section	MM	7	FG				**7**	
ERKR-PCC-19	PCC	Apr-18	-	Section	MM	4	F	KM	3	FP	**4**	
ERKR-PCC-20	PCC	Apr-18	-	Section	MM	6	FG				**6**	
ERKR-PCC-21	PCC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-PCC-22	PCC	Apr-18	-	Section	MM	6	F	KM	5	FG	**5**	
ERKR-PCC-23	PCC	Apr-18	-	Section	MM	6	F	KM	6	F	**6**	
ERKR-PCC-24	PCC	Apr-18	-	Section	MM	5	F				**5**	
ERKR-PCC-25	PCC	Apr-18	-	Section	MM	5	FG	KM	5	FG	**5**	
ERKR-PCC-26	PCC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-PCC-27	PCC	Apr-18	-	Section	MM	15	F				**15**	
ERKR-PCC-28	PCC	Apr-18	-	Section	MM	5	F				**5**	
ERKR-PCC-29	PCC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-PCC-30	PCC	Apr-18	-	Section	MM	12	FP				**12**	
ERKR-PCC-31	PCC	Apr-18	-	Section	MM	5	FG	KM	5	FG	**5**	
ERKR-PCC-32	PCC	Apr-18	-	Section	MM	14	F	KM	14	F	**14**	
ERKR-PCC-33	PCC	Apr-18	-	Section	MM	6	FG				**6**	
ERKR-PCC-34	PCC	Apr-18	-	Section	MM	15	FG				**15**	
ERKR-PCC-35	PCC	Apr-18	-	Section	MM	5	FG	KM	5	F	**5**	
ERKR-PCC-36	PCC	Apr-18	-	Section	MM	14	F				**14**	
ERKR-PCC-37	PCC	Apr-18	-	Section	MM	6	FG				**6**	
ERKR-PCC-38	PCC	Apr-18	-	Section	MM	5	FG	KM	5	F	**5**	
ERKR-PCC-39	PCC	Apr-18	-	Section	MM	7	FG				**7**	
ERKR-PCC-40	PCC	Apr-18	-	Section	MM	6	F				**6**	
ERKR-PCC-41	PCC	Apr-18	-	Section	MM	5	F				**5**	
ERKR-PCC-42	PCC	Apr-18	-	Section	MM	6	F	KM	6	FG	**6**	
ERKR-PCC-43	PCC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-PCC-44	PCC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-PCC-45	PCC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-PCC-46	PCC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-PCC-47	PCC	Apr-18	-	Section	MM	6	FG	KM	6	FG	**6**	
ERKR-PCC-48	PCC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-PCC-49	PCC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-PCC-50	PCC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-PCC-51	PCC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-PCC-52	PCC	Apr-18	-	Section	MM	5	F	KM	5	FG	**5**	
ERKR-PCC-53	PCC	Apr-18	-	Section	KM	5	FP				**5**	
ERKR-PCC-54	PCC	Apr-18	-	Section	KM	5	FG				**5**	
ERKR-PCC-55	PCC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-PCC-56	PCC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-PCC-57	PCC	Apr-18	-	Section	KM	5	FG				**5**	
ERKR-PCC-58	PCC	Apr-18	-	Section	MM	5	FG	KM	5	FG	**5**	
GCKR-PCC-01	PCC	Apr-18	-	Section	MM	8	F				**8**	
GCKR-PCC-02	PCC	Apr-18	-	Section	MM	6	FG				**6**	
GCKR-PCC-03	PCC	Apr-18	-	Section	MM	6	F				**6**	
GCKR-PCC-04	PCC	Apr-18	-	Section	MM	7	FG				**7**	
GCKR-PCC-05	PCC	Apr-18	-	Section	MM	7	FG				**7**	
GCKR-PCC-06	PCC	Apr-18	-	Section	MM	4	FG				**4**	
GCKR-PCC-07	PCC	Apr-18	-	Section	MM	4	FG				**4**	
GCKR-PCC-08	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-09	PCC	Apr-18	-	Section	MM	9	FG				**9**	
GCKR-PCC-10	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-11	PCC	Apr-18	-	Section	MM	6	FG				**6**	
GCKR-PCC-12	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-13	PCC	Apr-18	-	Section	MM	8	FG				**8**	
GCKR-PCC-14	PCC	Apr-18	-	Section	MM	11	FG				**11**	

Sample ID	Species	Date Caught	Plus Growth	Ageing Method	Primary Ager	Age Estimate	CI	QAQC Ager	QAQC Age Estimate	CI	Final Age Estimate	Notes
GCKR-PCC-15	PCC	Apr-18	-	Section	MM	7	FG				**7**	
GCKR-PCC-16	PCC	Apr-18	-	Section	MM	7	FG				**7**	
GCKR-PCC-17	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-18	PCC	Apr-18	-	Section	MM	7	F	KM	7	FG	**7**	
GCKR-PCC-19	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-20	PCC	Apr-18	-	Section	MM	6	FG				**6**	
GCKR-PCC-21	PCC	Apr-18	-	Section	MM	6	FG				**6**	
GCKR-PCC-22	PCC	Apr-18	-	Section	MM	7	F				**7**	
GCKR-PCC-23	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-24	PCC	Apr-18	-	Section	MM	7	FG				**7**	
GCKR-PCC-25	PCC	Apr-18	-	Section	MM	11	F				**11**	
GCKR-PCC-26	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-27	PCC	Apr-18	-	Section	MM	7	F				**7**	
GCKR-PCC-28	PCC	Apr-18	-	Section	MM	7	F				**7**	
GCKR-PCC-29	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-30	PCC	Apr-18	-	Section	MM	11	FG				**11**	
GCKR-PCC-31	PCC	Apr-18	-	Section	MM	7	FG				**7**	
GCKR-PCC-32	PCC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
GCKR-PCC-33	PCC	Apr-18	-	Section	MM	6	FG				**6**	
GCKR-PCC-34	PCC	Apr-18	-	Section	MM	6	FG				**6**	
GCKR-PCC-35	PCC	Apr-18	-	Section	MM	7	F				**7**	
GCKR-PCC-36	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-37	PCC	Apr-18	-	Section	MM	4	FG				**4**	
GCKR-PCC-38	PCC	Apr-18	-	Section	MM	6	F				**6**	
GCKR-PCC-39	PCC	Apr-18	-	Section	MM	6	FG				**6**	
GCKR-PCC-40	PCC	Apr-18	-	Section	MM	6	F				**6**	
GCKR-PCC-41	PCC	Apr-18	-	Section	MM	6	FG				**6**	
GCKR-PCC-42	PCC	Apr-18	-	Section	MM	7	F	KM	6	F	**7**	
GCKR-PCC-43	PCC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
GCKR-PCC-44	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-45	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-46	PCC	Apr-18	-	Section	MM	4	FG				**4**	
GCKR-PCC-47	PCC	Apr-18	-	Section	MM	11	FG				**11**	
GCKR-PCC-48	PCC	Apr-18	-	Section	MM	9	F				**9**	
GCKR-PCC-49	PCC	Apr-18	-	Section	MM	5	FG	KM	5	FG	**5**	
GCKR-PCC-50	PCC	Apr-18	-	Section	MM	5	FG				**5**	
GCKR-PCC-51	PCC	Apr-18	-	Section	MM	4	FP	KM	4	FP	**4**	
GCKR-PCC-52	PCC	Apr-18	-	Section	MM	8	F				**8**	
GCKR-PCC-53	PCC	Apr-18	-	Section	MM	5	FG	KM	5	FG	**5**	
GCKR-PCC-54	PCC	Apr-18	-	Section	MM	6	FG	KM	6	F	**6**	
GCKR-PCC-55	PCC	Apr-18	-	Section	MM	6	FG	KM	6	FG	**6**	
GCKR-PCC-56	PCC	Apr-18	-	Section	MM	10	F	KM	10	FG	**10**	
GCKR-PCC-57	PCC	Apr-18	-	Section	MM	6	FG	KM	6	F	**6**	
GCKR-PCC-58	PCC	Apr-18	-	Section	MM	6	F	KM	6	F	**6**	
GCKR-PCC-59	PCC	Apr-18	-	Section	MM	5	F	KM	5	FG	**5**	
GCKR-PCC-60	PCC	Apr-18	-	Section	MM	8	F				**8**	
GCKR-PCC-61	PCC	Apr-18	-	Section	MM	5	FP				**5**	
SCKR-PCC-01	PCC	Apr-18	-	Section	MM	12	FG				**12**	
SCKR-PCC-02	PCC	Apr-18	-	Section	MM	11	F				**11**	
SCKR-PCC-03	PCC	Apr-18	-	Section	MM	11	FP				**11**	
SCKR-PCC-04	PCC	Apr-18	-	Section	MM	9	FG				**9**	
SCKR-PCC-05	PCC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
SCKR-PCC-06	PCC	Apr-18	-	Section	MM	8	FG				**8**	
SCKR-PCC-07	PCC	Apr-18	-	Section	MM	6	F				**6**	
SCKR-PCC-08	PCC	Apr-18	-	Section	MM	14	F				**14**	
SCKR-PCC-09	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-10	PCC	Apr-18	-	Section	MM	6	FG				**6**	
SCKR-PCC-11	PCC	Apr-18	-	Section	MM	7	FG				**7**	
SCKR-PCC-12	PCC	Apr-18	-	Section	MM	6	FG				**6**	
SCKR-PCC-13	PCC	Apr-18	-	Section	MM	7	F	KM	6	F	**7**	
SCKR-PCC-14	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-16	PCC	Apr-18	-	Section	MM	5	F				**5**	
SCKR-PCC-17	PCC	Apr-18	-	Section	MM	6	FG				**6**	
SCKR-PCC-18	PCC	Apr-18	-	Section	MM	7	F				**7**	
SCKR-PCC-19	PCC	Apr-18	-	Section	MM	5	F				**5**	
SCKR-PCC-20	PCC	Apr-18	-	Section	MM	10	FP				**10**	
SCKR-PCC-21	PCC	Apr-18	-	Section	MM	18	FP	KM	18	F	**18**	
SCKR-PCC-22	PCC	Apr-18	-	Section	MM	15	F				**15**	
SCKR-PCC-23	PCC	Apr-18	-	Section	MM	5	F				**5**	
SCKR-PCC-24	PCC	Apr-18	-	Section	MM	6	F				**6**	
SCKR-PCC-25	PCC	Apr-18	-	Section	MM	9	F				**9**	
SCKR-PCC-26	PCC	Apr-18	-	Section	MM	7	F				**7**	
SCKR-PCC-27	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-28	PCC	Apr-18	-	Section	MM	11	F				**11**	
SCKR-PCC-29	PCC	Apr-18	-	Section	MM	7	F	KM	5	FG	**5**	
SCKR-PCC-30	PCC	Apr-18	-	Section	MM	4	FG				**4**	
SCKR-PCC-31	PCC	Apr-18	-	Section	MM	6	F				**6**	
SCKR-PCC-33	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-34	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-35	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-36	PCC	Apr-18	-	Section	MM	5	FG	KM	5	FG	**5**	
SCKR-PCC-37	PCC	Apr-18	-	Section	MM	7	FG				**7**	
SCKR-PCC-38	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-39	PCC	Apr-18	-	Section	MM	6	FG				**6**	
SCKR-PCC-40	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-41	PCC	Apr-18	-	Section	MM	4	FG				**4**	
SCKR-PCC-42	PCC	Apr-18	-	Section	MM	5	FG				**5**	

Sample ID	Species	Date Caught	Plus Growth	Ageing Method	Primary Ager	Age Estimate	CI	QAQC Ager	QAQC Age Estimate	CI	Final Age Estimate	Notes
SCKR-PCC-43	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-44	PCC	Apr-18	-	Section	MM	11	F				**11**	
SCKR-PCC-45	PCC	Apr-18	-	Section	MM	7	F	KM	6	FP	**7**	
SCKR-PCC-46	PCC	Apr-18	-	Section	MM	6	F				**6**	
SCKR-PCC-47	PCC	Apr-18	-	Section	MM	7	F				**7**	
SCKR-PCC-48	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-49	PCC	Apr-18	-	Section	MM	6	FG				**6**	
SCKR-PCC-50	PCC	Apr-18	-	Section	MM	6	F				**6**	
SCKR-PCC-51	PCC	Apr-18	-	Section	MM	5	F				**5**	
SCKR-PCC-52	PCC	Apr-18	-	Section	MM	6	F	KM	6	FG	**6**	
SCKR-PCC-53	PCC	Apr-18	-	Section	MM	4	FG				**4**	
SCKR-PCC-54	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-55	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-56	PCC	Apr-18	-	Section	MM	5	FG				**5**	
SCKR-PCC-57	PCC	Apr-18	-	Section	MM	n/a	n/a				**n/a**	both otoliths crystallized, unable to age
SCKR-PCC-58	PCC	Apr-18	-	Section	MM	6	FG				**6**	
SCKR-PCC-59	PCC	Apr-18	-	Section	MM	11	FG				**11**	
SCKR-PCC-60	PCC	Apr-18	-	Section	MM	6	F	KM	6	F	**6**	
ERKR-RSC-01	RSC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-RSC-02	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-04	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-05	RSC	Apr-18	-	Section	MM	3	FG				**3**	
ERKR-RSC-06	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-07	RSC	Apr-18	-	Section	MM	4	F				**4**	
ERKR-RSC-08	RSC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-RSC-09	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-10	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-11	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-12	RSC	Apr-18	-	Section	MM	4	FP				**4**	
ERKR-RSC-13	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-14	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-15	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-16	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-17	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
ERKR-RSC-19	RSC	Apr-18	-	Section	MM	3	FG				**3**	
ERKR-RSC-21	RSC	Apr-18	-	Section	MM	3	FG				**3**	
ERKR-RSC-22	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-23	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-24	RSC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-RSC-25	RSC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
ERKR-RSC-26	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
ERKR-RSC-27	RSC	Apr-18	-	Section	MM	3	FG				**3**	
ERKR-RSC-28	RSC	Apr-18	-	Section	MM	3	FG	KM	3	F	**3**	
ERKR-RSC-29	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-30	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-31	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-32	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
ERKR-RSC-33	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-34	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
ERKR-RSC-35	RSC	Apr-18	-	Section	MM	4	F	KM	4	FG	**4**	
ERKR-RSC-36	RSC	Apr-18	-	Section	MM	4	FG	KM	4	FG	**4**	
ERKR-RSC-37	RSC	Apr-18	-	Section	MM	4	F				**4**	
ERKR-RSC-38	RSC	Apr-18	-	Section	MM	2	P	KM	2	FP	**2**	
ERKR-RSC-39	RSC	Apr-18	-	Section	MM	3	FP	KM	2	FP	**2**	
ERKR-RSC-40	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-41	RSC	Apr-18	-	Section	KM	3	F				**3**	
ERKR-RSC-42	RSC	Apr-18	-	Section	MM	3	FP	KM	3	F	**3**	
ERKR-RSC-43	RSC	Apr-18	-	Section	MM	3	P	KM	3	F	**3**	
ERKR-RSC-44	RSC	Apr-18	-	Section	MM	3	FG	KM	3	FG	**3**	
ERKR-RSC-45	RSC	Apr-18	-	Section	MM	5	FG	KM	5	FG	**5**	
ERKR-RSC-46	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
ERKR-RSC-47	RSC	Apr-18	-	Section	MM	2	FG	KM	2	F	**2**	
ERKR-RSC-48	RSC	Apr-18	-	Section	MM	5	F	KM	4	FG	**4**	
ERKR-RSC-49	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
ERKR-RSC-50	RSC	Apr-18	-	Section	MM	3	FG	KM	3	F	**3**	
ERKR-RSC-51	RSC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-RSC-52	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
ERKR-RSC-53	RSC	Apr-18	-	Section	MM	4	F	KM	4	FG	**4**	
ERKR-RSC-54	RSC	Apr-18	-	Section	MM	3	FG				**3**	
ERKR-RSC-55	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
ERKR-RSC-56	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
ERKR-RSC-57	RSC	Apr-18	-	Section	MM	8	F	KM	7	F	**7**	
ERKR-RSC-58	RSC	Apr-18	-	N/A	N/A	-	-	-	-	-	**n/a**	head cut off too close to front - otoliths no longer present
ERKR-RSC-59	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
ERKR-RSC-60	RSC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
ERKR-RSC-61	RSC	Apr-18	-	Section	MM	5	F				**5**	
ERKR-RSC-62	RSC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
ERKR-RSC-63	RSC	Apr-18	-	Section	MM	5	F				**5**	
ERKR-RSC-64	RSC	Apr-18	-	Section	MM	4	FP	KM	4	F	**4**	
ERKR-RSC-66	RSC	Apr-18	-	Section	MM	5	FG				**5**	
ERKR-RSC-67	RSC	Apr-18	-	Section	MM	4	FG				**4**	
ERKR-RSC-68	RSC	Apr-18	-	Section	MM	4	FP	KM	5	FP	**4**	otolith crystalized

Sample ID	Species	Date Caught	Plus Growth	Ageing Method	Primary Ager	Age Estimate	CI	QAQC Ager	QAQC Age Estimate	CI	Final Age Estimate	Notes
ERKR-RSC-69	RSC	Apr-18	-	Section	MM	3	FG				**3**	
ERKR-RSC-70	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-71	RSC	Apr-18	-	Section	MM	4	F	KM	4	FG	**4**	
ERKR-RSC-72	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
ERKR-RSC-73	RSC	Apr-18	-	Section	MM	3	F				**3**	
ERKR-RSC-74	RSC	Apr-18	-	Section	MM	3	F	KM	3	FG	**3**	
ERKR-RSC-75	RSC	Apr-18	-	Section	MM	4	FG	KM	4	FG	**4**	
ERKR-RSC-76	RSC	Apr-18	-	Section	MM	7	F	KM	7	F	**7**	
ERKR-RSC-77	RSC	Apr-18	-	Section	MM	4	FG	KM	4	F	**4**	
ERKR-RSC-78	RSC	Apr-18	-	Section	MM	4	F	KM	5	F	**5**	
ERKR-RSC-79	RSC	Apr-18	-	Section	MM	4	F	KM	4	FG	**4**	
ERKR-RSC-80	RSC	Apr-18	-	Section	MM	6	F	KM	5	F	**5**	
ERKR-RSC-81	RSC	Apr-18	-	Section	MM	4	F	KM	5	F	**5**	
ERKR-RSC-82	RSC	Apr-18	-	Section	MM	4	F	KM	4	FG	**4**	
ERKR-RSC-83	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
ERKR-RSC-84	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
ERKR-RSC-85	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
ERKR-RSC-86	RSC	Apr-18	-	Section	MM	3	F	KM	3	FG	**3**	
ERKR-RSC-87	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
GCKR-RSC-01	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
GCKR-RSC-02	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-04	RSC	Apr-18	-	Section	MM	3	FP	KM	3	FP	**3**	
GCKR-RSC-05	RSC	Apr-18	-	Section	MM	3	F	KM	3	FG	**3**	
GCKR-RSC-06	RSC	Apr-18	-	Section	MM	2	F	KM	2	FG	**2**	
GCKR-RSC-07	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-08	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-09	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
GCKR-RSC-10	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
GCKR-RSC-12	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-13	RSC	Apr-18	-	Section	MM	2	F	KM	2	F	**2**	
GCKR-RSC-14	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-15	RSC	Apr-18	-	Section	MM	4	FG	KM	4	FG	**4**	
GCKR-RSC-16	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-17	RSC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
GCKR-RSC-18	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
GCKR-RSC-19	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
GCKR-RSC-20	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
GCKR-RSC-21	RSC	Apr-18	-	Section	MM	4	F	KM	4	FG	**4**	
GCKR-RSC-22	RSC	Apr-18	-	Section	MM	3	FG	KM	3	F	**3**	
GCKR-RSC-23	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-24	RSC	Apr-18	-	Section	MM	3	FG	KM	3	F	**3**	
GCKR-RSC-25	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
GCKR-RSC-26	RSC	Apr-18	-	Section	MM	2	FP				**2**	
GCKR-RSC-27	RSC	Apr-18	-	Section	MM	3	FG	KM	3	FG	**3**	
GCKR-RSC-28	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
GCKR-RSC-29	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-30	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-31	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
GCKR-RSC-32	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-33	RSC	Apr-18	-	Section	MM	3	F	KM	3	FG	**3**	
GCKR-RSC-34	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-35	RSC	Apr-18	-	Section	MM	2	F	KM	2	F	**2**	
GCKR-RSC-36	RSC	Apr-18	-	Section	MM	3	FG	KM	3	FG	**3**	
GCKR-RSC-37	RSC	Apr-18	-	Section	MM	4	FG	KM	5	F	**4**	
GCKR-RSC-38	RSC	Apr-18	-	Section	MM	2	FG	KM	2	F	**2**	
GCKR-RSC-39	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-40	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-41	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-42	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-43	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-44	RSC	Apr-18	-	Section	MM	4	FG				**4**	
GCKR-RSC-45	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-46	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-47	RSC	Apr-18	-	Section	MM	4	FG				**4**	
GCKR-RSC-49	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-50	RSC	Apr-18	-	Section	KM	3	F				**3**	
GCKR-RSC-51	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-52	RSC	Apr-18	-	Section	MM	4	FP				**4**	
GCKR-RSC-53	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-54	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-55	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-56	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-57	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-58	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-59	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-60	RSC	Apr-18	-	Section	MM	4	F				**4**	
GCKR-RSC-62	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-63	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-64	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
GCKR-RSC-65	RSC	Apr-18	-	Section	MM	4	F				**4**	
GCKR-RSC-66	RSC	Apr-18	-	Section	MM	4	F				**4**	
GCKR-RSC-67	RSC	Apr-18	-	Section	MM	3	FG				**3**	
GCKR-RSC-68	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
GCKR-RSC-69	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
GCKR-RSC-70	RSC	Apr-18	-	Section	MM	4	F	KM	5	F	**5**	
GCKR-RSC-72	RSC	Apr-18	-	Section	MM	4	FG	KM	4	F	**4**	
GCKR-RSC-73	RSC	Apr-18	-	Section	MM	3	FG	KM	3	F	**3**	

Sample ID	Species	Date Caught	Plus Growth	Ageing Method	Primary Ager	Age Estimate	CI	QAQC Ager	QAQC Age Estimate	CI	Final Age Estimate	Notes
GCKR-RSC-74	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-75	RSC	Apr-18	-	Section	MM	4	FP	KM	4	F	**4**	
GCKR-RSC-76	RSC	Apr-18	-	Section	MM	3	FG	KM	3	FG	**3**	
GCKR-RSC-77	RSC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
GCKR-RSC-78	RSC	Apr-18	-	Section	MM	4	F	KM	3	FG	**3**	
GCKR-RSC-79	RSC	Apr-18	-	Section	MM	2	F	KM	2	FG	**2**	
GCKR-RSC-80	RSC	Apr-18	-	Section	MM	3	F	KM	2	FG	**2**	
GCKR-RSC-81	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-82	RSC	Apr-18	-	Section	MM	4	FP	KM	3	F	**3**	
GCKR-RSC-83	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
GCKR-RSC-84	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
GCKR-RSC-85	RSC	Apr-18	-	Section	MM	3	FG	KM	3	F	**3**	
GCKR-RSC-86	RSC	Apr-18	-	Section	MM	3	F				**3**	
GCKR-RSC-87	RSC	Apr-18	-	Section	MM	3	FP	KM	3	FP	**3**	
GCKR-RSC-88	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-02	RSC	Apr-18	-	Section	MM	4	F	KM	3	F	**3**	
SCKR-RSC-04	RSC	Apr-18	-	Section	MM	2	F				**2**	
SCKR-RSC-05	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-06	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-08	RSC	Apr-18	-	Section	MM	4	FP	KM	3	FP	**4**	
SCKR-RSC-09	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
SCKR-RSC-10	RSC	Apr-18	-	Section	MM	2	F				**2**	
SCKR-RSC-11	RSC	Apr-18	-	Section	MM	3	FG				**3**	
SCKR-RSC-12	RSC	Apr-18	-	Section	MM	3	FG				**3**	
SCKR-RSC-123	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-13	RSC	Apr-18	-	Section	MM	3	FP				**3**	
SCKR-RSC-14	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-15	RSC	Apr-18	-	Section	MM	3	FG				**3**	
SCKR-RSC-16	RSC	Apr-18	-	Section	MM	2	F				**2**	
SCKR-RSC-17	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-18	RSC	Apr-18	-	Section	MM	4	F				**4**	
SCKR-RSC-19	RSC	Apr-18	-	Section	MM	3	FG				**3**	
SCKR-RSC-20	RSC	Apr-18	-	Section	MM	4	F				**4**	
SCKR-RSC-21	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-22	RSC	Apr-18	-	Section	MM	3	FG	KM	4	F	**3**	
SCKR-RSC-23	RSC	Apr-18	-	Section	MM	3	F				**3**	Envelope labeled RSC-60
SCKR-RSC-24	RSC	Apr-18	-	Section	MM	4	FG	KM	4	FG	**4**	
SCKR-RSC-25	RSC	Apr-18	-	Section	MM	3	F	KM	4	F	**4**	
SCKR-RSC-26	RSC	Apr-18	-	Section	MM	3	FG				**3**	
SCKR-RSC-27	RSC	Apr-18	-	Section	MM	3	FG				**3**	
SCKR-RSC-28	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
SCKR-RSC-29	RSC	Apr-18	-	Section	MM	4	F	KM	4	FG	**4**	
SCKR-RSC-30	RSC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
SCKR-RSC-31	RSC	Apr-18	-	Section	MM	4	F	KM	5	F	**5**	
SCKR-RSC-32	RSC	Apr-18	-	Section	MM	3	F	KM	4	F	**4**	
SCKR-RSC-33	RSC	Apr-18	-	Section	MM	3	F	KM	4	F	**4**	
SCKR-RSC-34	RSC	Apr-18	-	Section	MM	4	FP	KM	4	F	**4**	
SCKR-RSC-35	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-36	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-37	RSC	Apr-18	-	Section	MM	3	FG				**3**	
SCKR-RSC-38	RSC	Apr-18	-	Section	MM	3	FG				**3**	
SCKR-RSC-39	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
SCKR-RSC-40	RSC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
SCKR-RSC-41	RSC	Apr-18	-	Section	MM	3	FG	KM	3	F	**3**	
SCKR-RSC-42	RSC	Apr-18	-	Section	MM	4	F				**4**	
SCKR-RSC-43	RSC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
SCKR-RSC-44	RSC	Apr-18	-	Section	MM	3	FG	KM	3	F	**3**	
SCKR-RSC-45	RSC	Apr-18	-	Section	MM	6	F				**6**	
SCKR-RSC-46	RSC	Apr-18	-	Section	MM	4	FG	KM	4	FG	**4**	
SCKR-RSC-47	RSC	Apr-18	-	Section	MM	5	F	KM	5	FG	**5**	
SCKR-RSC-48	RSC	Apr-18	-	Section	MM	n/a	n/a				**n/a**	Otoliths crystalized
SCKR-RSC-49	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
SCKR-RSC-50	RSC	Apr-18	-	Section	MM	3	FP				**3**	
SCKR-RSC-51	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-52	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
SCKR-RSC-53	RSC	Apr-18	-	Section	MM	3	F	KM	3	FG	**3**	
SCKR-RSC-54	RSC	Apr-18	-	Section	MM	3	FG				**3**	
SCKR-RSC-55	RSC	Apr-18	-	Section	MM	3	FG	KM	2	F	**3**	
SCKR-RSC-56	RSC	Apr-18	-	Section	MM	2	F	KM	2	F	**2**	
SCKR-RSC-57	RSC	Apr-18	-	Section	MM	4	FP	KM	3	F	**3**	
SCKR-RSC-58	RSC	Apr-18	-	Section	MM	4	F				**4**	
SCKR-RSC-59	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-60	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-61	RSC	Apr-18	-	Section	MM	5	F	KM	5	F	**5**	
SCKR-RSC-62	RSC	Apr-18	-	Section	MM	6	F				**6**	
SCKR-RSC-63	RSC	Apr-18	-	Section	MM	2	F				**2**	
SCKR-RSC-64	RSC	Apr-18	-	Section	MM	3	FG				**3**	
SCKR-RSC-65	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-66	RSC	Apr-18	-	Section	MM	5	FP				**5**	
SCKR-RSC-67	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-68	RSC	Apr-18	-	Section	MM	4	F	KM	4	F	**4**	
SCKR-RSC-69	RSC	Apr-18	-	Section	MM	3	FG	KM	3	F	**3**	
SCKR-RSC-70	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-71	RSC	Apr-18	-	Section	MM	4	FG	KM	4	F	**4**	
SCKR-RSC-72	RSC	Apr-18	-	Section	MM	5	FG	KM	5	F	**5**	
SCKR-RSC-73	RSC	Apr-18	-	Section	MM	3	F				**3**	

Sample ID	Species	Date Caught	Plus Growth	Ageing Method	Primary Ager	Age Estimate	CI	QAQC Ager	QAQC Age Estimate	CI	Final Age Estimate	Notes
SCKR-RSC-74	RSC	Apr-18	-	Section	MM	2	F				**2**	
SCKR-RSC-75	RSC	Apr-18	-	Section	MM	4	F				**4**	
SCKR-RSC-76	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
SCKR-RSC-77	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-78	RSC	Apr-18	-	Section	MM	3	FG	KM	3	FG	**3**	
SCKR-RSC-79	RSC	Apr-18	-	Section	MM	4	FG				**4**	
SCKR-RSC-80	RSC	Apr-18	-	Section	MM	3	F	KM	3	F	**3**	
SCKR-RSC-81	RSC	Apr-18	-	Section	MM	4	F				**4**	
SCKR-RSC-82	RSC	Apr-18	-	Section	MM	5	FG	KM	5	F	**5**	
SCKR-RSC-83	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-84	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-85	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-86	RSC	Apr-18	-	Section	MM	3	F				**3**	
SCKR-RSC-87	RSC	Apr-18	-	Section	MM	4	F				**4**	
SCKR-RT-02	RT	Apr-18	-	Read Whole	KM	3	FG	MM	3	FG	**3**	
GCKR-YP-01	YP	Apr-18	-	Read Whole	KM	6	F	MM	7	F	**7**	
GCKR-YP-02	YP	Apr-18	-	Section	KM	6	F				**6**	
GCKR-YP-03	YP	Apr-18	-	Read Whole	KM	4	F	MM	4	F	**4**	
GCKR-YP-04	YP	Apr-18	-	Fin Ray	KM	3	FG				**3**	
GCKR-YP-05	YP	Apr-18	-	Section	KM	3	FG				**3**	
GCKR-YP-06	YP	Apr-18	-	Section	KM	5	FG				**5**	
GCKR-YP-07	YP	Apr-18	-	Read Whole	KM	5	F	MM	5	F	**5**	
GCKR-YP-08	YP	Apr-18	-	Read Whole	KM	3	F	MM	3	F	**3**	
GCKR-YP-09	YP	Apr-18	-	Read Whole	KM	4	FG	MM	4	F	**4**	
SCKR-YP-01	YP	Apr-18	-	Read Whole	KM	5	F	MM	5	F	**5**	
SCKR-YP-02	YP	Apr-18	-	Read Whole	KM	3	F				**3**	

Sample ID	Species	Date Caught	Plus Growth	Ageing Method	Primary Ager	Age Estimate	CI	QAQC Ager	QAQC Age Estimate	CI	Final Age Estimate	Notes
SC-RSC-83	RSC	Aug-2018	+	Aged whole	MM	1	FG	CC	1	F	**1**	All otoliths aged whole due to very small otolith size - not able to section
SC-RSC-06	RSC	Aug-2018	+	Aged whole	MM	0	G	CC	0	FG	**0**	
SC-RSC-05	RSC	Aug-2018	+	Aged whole	MM	0	P	CC	0	FP	**0**	otolith crystalized, disc shaped - based on size, aged as 0
SC-RSC-49	RSC	Aug-2018	+	Aged whole	MM	0	FG	CC	0	FG	**0**	
SC-RSC-01	RSC	Aug-2018	+	Aged whole	MM	0	G	CC	0	FG	**0**	
ER-RSC-10	RSC	Aug-2018	+	Aged whole	MM	0	FG	CC	0	FG	**0**	
ER-RSC-14	RSC	Aug-2018	+	Aged whole	MM	0	G	CC	0	FG	**0**	
ER-RSC-15	RSC	Aug-2018	+	Aged whole	MM	0	G	CC	0	FG	**0**	
ER-RSC-17	RSC	Aug-2018	+	Aged whole	MM	0	P	CC	0	FP	**0**	otolith crystalized, disc shaped - based on size, aged as 0
ER-RSC-41	RSC	Aug-2018	+	Aged whole	MM	0	G	CC	0	FG	**0**	
GC-RSC-27	RSC	Aug-2018	+	Aged whole	MM	0	P	CC	0	P	**0**	otolith crystalized - based on size, aged as 0
GC-RSC-28	RSC	Aug-2018	+	Aged whole	MM	0	P	CC	0	P	**0**	otolith crystalized - based on size, aged as 0
GC-RSC-32	RSC	Aug-2018	+	Aged whole	MM	0	G	CC	0	FG	**0**	
GC-RSC-34	RSC	Aug-2018	+	Aged whole	MM	0	G	CC	0	FG	**0**	
GC-RSC-47	RSC	Aug-2018	+	Aged whole	MM	0	FG	CC	0	FG	**0**	

Sample ID	Species	Date Caught	Plus Growth	Ageing Structure	Ageing Method	Primary Ager	Age Estimate	CI	QAQC Ager 1	QAQC Age Estimate	CI	Final Age Estimate	Notes
RG_SC_PCC-01	Peamouth Chub	24-Apr-19	-	Otolith	Sectioning	TB	6	F				**6**	
RG_SC_PCC-02	Peamouth Chub	24-Apr-19	-	Otolith	Sectioning	TB	6	FG	CC	6	FG	**6**	
RG_SC_PCC-03	Peamouth Chub	24-Apr-19	-	Otolith	Sectioning	TB	6	F				**6**	
RG_SC_PCC-04	Peamouth Chub	24-Apr-19	-	Otolith	Sectioning	TB	6	FG	CC	6	FG	**6**	
RG_SC_PCC-05	Peamouth Chub	24-Apr-19	-	Otolith	Sectioning	TB	5	FG				**5**	
RG_SC_PCC-06	Peamouth Chub	24-Apr-19	-	Otolith	Sectioning	TB	7	F	CC	7	FG	**7**	
RG_SC_PCC-07	Peamouth Chub	24-Apr-19	-	Otolith	Sectioning	TB	6	F				**6**	
RG_SC_PCC-08	Peamouth Chub	24-Apr-19	-	Otolith	Sectioning	TB	6	F	CC	6	FG	**6**	
RG_SC_PCC-09	Peamouth Chub	24-Apr-19	-	Otolith	Sectioning	TB	6	F				**6**	
RG_SC_PCC-10	Peamouth Chub	24-Apr-19	-	Otolith	Sectioning	TB	5	FP	CC	5	F	**5**	
RG_SC_RSC-01	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	F				**2**	
RG_SC_RSC-02	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	3	F	CC	3	F	**3**	
RG_SC_RSC-03	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	FP				**2**	
RG_SC_RSC-04	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	3	F	CC	3	F	**3**	
RG_SC_RSC-05	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	3	F				**3**	
RG_SC_RSC-06	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	3	F	CC	3	F	**3**	
RG_SC_RSC-07	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	3	F				**3**	
RG_SC_RSC-08	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	FP	CC	2	F	**2**	
RG_SC_RSC-09	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	FP				**2**	
RG_SC_RSC-10	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	F	CC	2	FG	**2**	
RG_ER_PCC-01	Peamouth Chub	23-Apr-19	-	Otolith	Sectioning	TB	6	F				**6**	
RG_ER_PCC-02	Peamouth Chub	23-Apr-19	-	Otolith	Sectioning	TB	6	FG	CC	6	F	**6**	
RG_ER_PCC-03	Peamouth Chub	23-Apr-19	-	Otolith	Sectioning	TB	7	FG				**7**	
RG_ER_PCC-04	Peamouth Chub	23-Apr-19	-	Otolith	Sectioning	TB	6	FP	CC	6	FP	**6**	
RG_ER_PCC-05	Peamouth Chub	23-Apr-19	-	Otolith	Sectioning	TB	6	F				**6**	
RG_ER_PCC-06	Peamouth Chub	23-Apr-19	-	Otolith	Sectioning	TB	6	F	CC	6	FP	**6**	
RG_ER_PCC-07	Peamouth Chub	23-Apr-19	-	Otolith	Sectioning	TB	6	F				**6**	
RG_ER_PCC-08	Peamouth Chub	23-Apr-19	-	Otolith	Sectioning	TB	5	FG	CC	5	F	**6**	
RG_ER_PCC-09	Peamouth Chub	23-Apr-19	-	Otolith	Sectioning	TB	7	F				**7**	
RG_ER_PCC-10	Peamouth Chub	23-Apr-19	-	Otolith	Sectioning	TB	6	FG	CC	6	FG	**6**	
RG_ER_RSC-01	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	3	F				**3**	
RG_ER_RSC-02	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	F	CC	2	F	**2**	
RG_ER_RSC-03	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	FP				**2**	
RG_ER_RSC-04	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	F	CC	2	F	**2**	
RG_ER_RSC-05	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	F				**2**	
RG_ER_RSC-06	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	3	F	CC	3	FG	**3**	
RG_ER_RSC-07	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	F				**2**	
RG_ER_RSC-08	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	F	CC	2	F	**2**	
RG_ER_RSC-09	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	3	F				**3**	
RG_ER_RSC-10	Redside Shiner	24-Apr-19	-	Otolith	Sectioning	TB	2	F	CC	2	FG	**2**	
RG_GC_PCC-01	Peamouth Chub	25-Apr-19	-	Otolith	Sectioning	TB	8	FP				**8**	
RG_GC_PCC-02	Peamouth Chub	25-Apr-19	-	Otolith	Sectioning	TB	15	FP	CC	15	FP	**15**	
RG_GC_PCC-03	Peamouth Chub	25-Apr-19	-	Otolith	Sectioning	TB	6	F				**6**	
RG_GC_PCC-04	Peamouth Chub	25-Apr-19	-	Otolith	Sectioning	TB	7	F	CC	7	F	**7**	
RG_GC_PCC-05	Peamouth Chub	25-Apr-19	-	Otolith	Sectioning	TB	6	F				**6**	
RG_GC_PCC-06	Peamouth Chub	25-Apr-19	-	Otolith	Sectioning	TB	6	F	CC	6	F	**6**	
RG_GC_PCC-07	Peamouth Chub	25-Apr-19	-	Otolith	Sectioning	TB	6	F				**6**	
RG_GC_PCC-08	Peamouth Chub	25-Apr-19	-	Otolith	Sectioning	TB	6	F	CC	6	F	**6**	
RG_GC_PCC-09	Peamouth Chub	25-Apr-19	-	Otolith	Sectioning	TB	5	FG				**5**	
RG_GC_PCC-10	Peamouth Chub	25-Apr-19	-	Otolith	Sectioning	TB	6	F	CC	6	FG	**6**	
RG_GC_RSC-01	Redside Shiner	25-Apr-19	-	Otolith	Sectioning	TB	3	F				**3**	
RG_GC_RSC-02	Redside Shiner	25-Apr-19	-	Otolith	Sectioning	TB	3	F	CC	3	F	**3**	
RG_GC_RSC-03	Redside Shiner	25-Apr-19	-	Otolith	Sectioning	TB	3	F				**3**	
RG_GC_RSC-04	Redside Shiner	25-Apr-19	-	Otolith	Sectioning	TB	3	F	CC	3	F	**3**	
RG_GC_RSC-05	Redside Shiner	25-Apr-19	-	Otolith	Sectioning	TB	3	F				**3**	
RG_GC_RSC-06	Redside Shiner	25-Apr-19	-	Otolith	Sectioning	TB	3	F	CC	3	F	**3**	
RG_GC_RSC-07	Redside Shiner	25-Apr-19	-	Otolith	Sectioning	TB	3	F				**3**	
RG_GC_RSC-08	Redside Shiner	25-Apr-19	-	Otolith	Sectioning	TB	2	F	CC	2	FG	**2**	
RG_GC_RSC-09	Redside Shiner	25-Apr-19	-	Otolith	Sectioning	TB	3	F				**3**	
RG_GC_RSC-10	Redside Shiner	25-Apr-19	-	Otolith	Sectioning	TB	2	F	CC	2	F	**2**	

Sample ID	Species	Plus Growth	Ageing Structure	Ageing Method	Primary Ager	Age Estimate	CI	QAQC Ager 1	QAQC Age Estimate	CI	Final Age Estimate	NOTES
RG_SC-RSC-02	Redside Shiner	+	Otolith	Age Whole	CC	1	F	TB	1	FG	**1**	
RG_SC-RSC-31	Redside Shiner	+	Otolith	Age Whole	CC	0	FG	TB	0	FG	**0**	
RG_SC-RSC-32	Redside Shiner	+	Otolith	Age Whole	CC	0	FG	TB	0	F	**0**	
RG_SC-RSC-41	Redside Shiner	+	Otolith	Age Whole	CC	1	F	KM	2	FG	**2**	
RG_SC-RSC-47	Redside Shiner	+	Otolith	Age Whole	CC	1	F	TB	1	F	**1**	
RG_SC-RSC-49	Redside Shiner	+	Otolith	Age Whole	CC	1	F	TB	0	F	**1**	
RG_SC-RSC-52	Redside Shiner	+	Otolith	Age Whole	CC	1	F	TB	1	FG	**1**	
RG_SC-RSC-53	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_SC-RSC-54	Redside Shiner	+	Otolith	Age Whole	CC	1	F	TB	1	F	**1**	
RG_SC-RSC-55	Redside Shiner	+	Otolith	Age Whole	CC	1	F	TB	1	F	**1**	
RG_GC-RSC-01	Redside Shiner	+	Otolith	Age Whole	CC	0	FG	TB	0	F	**0**	
RG_GC-RSC-04	Redside Shiner	+	Otolith	Age Whole	CC	1	FG	TB	1	F	**1**	
RG_GC-RSC-06	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_GC-RSC-08	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_GC-RSC-10	Redside Shiner	+	Otolith	Age Whole	TB	0	F	CC	0	F	**0**	
RG_GC-RSC-12	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	FG	**0**	
RG_GC-RSC-15	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_GC-RSC-16	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	FG	**0**	
RG_GC-RSC-23	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_GC-RSC-42	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_ER-RSC-02	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	FG	**0**	
RG_ER-RSC-08	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_ER-RSC-10	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	FG	**0**	
RG_ER-RSC-13	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_ER-RSC-14	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_ER-RSC-15	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_ER-RSC-16	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	
RG_ER-RSC-17	Redside Shiner	+	Otolith	Age Whole	CC	1	F	TB	0	F	**1**	
RG_ER-RSC-18	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	FG	**0**	
RG_ER-RSC-72	Redside Shiner	+	Otolith	Age Whole	CC	0	F	TB	0	F	**0**	

APPENDIX B
WATER

FIGURES

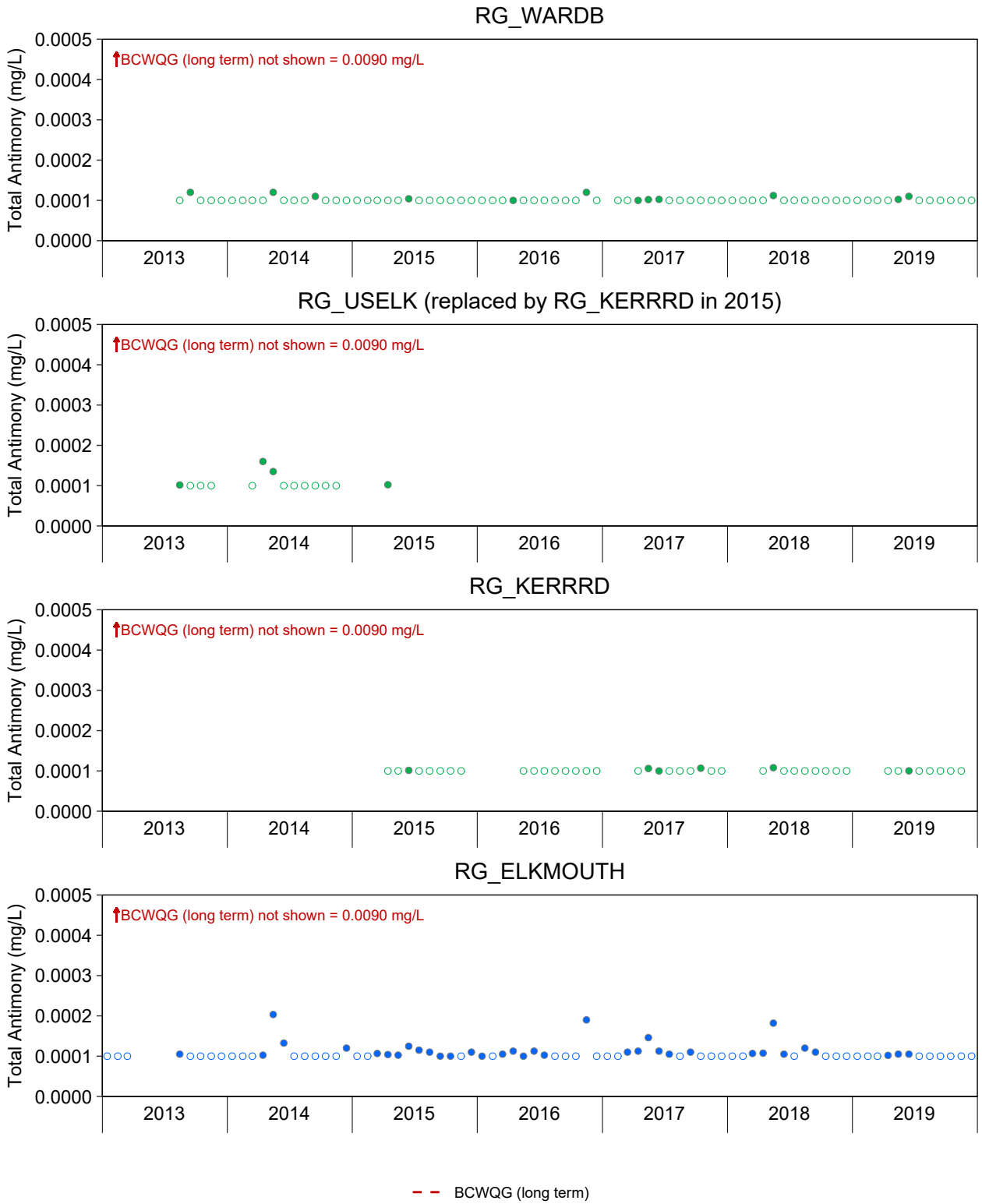


Figure B.1: Monthly Mean Total Antimony Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

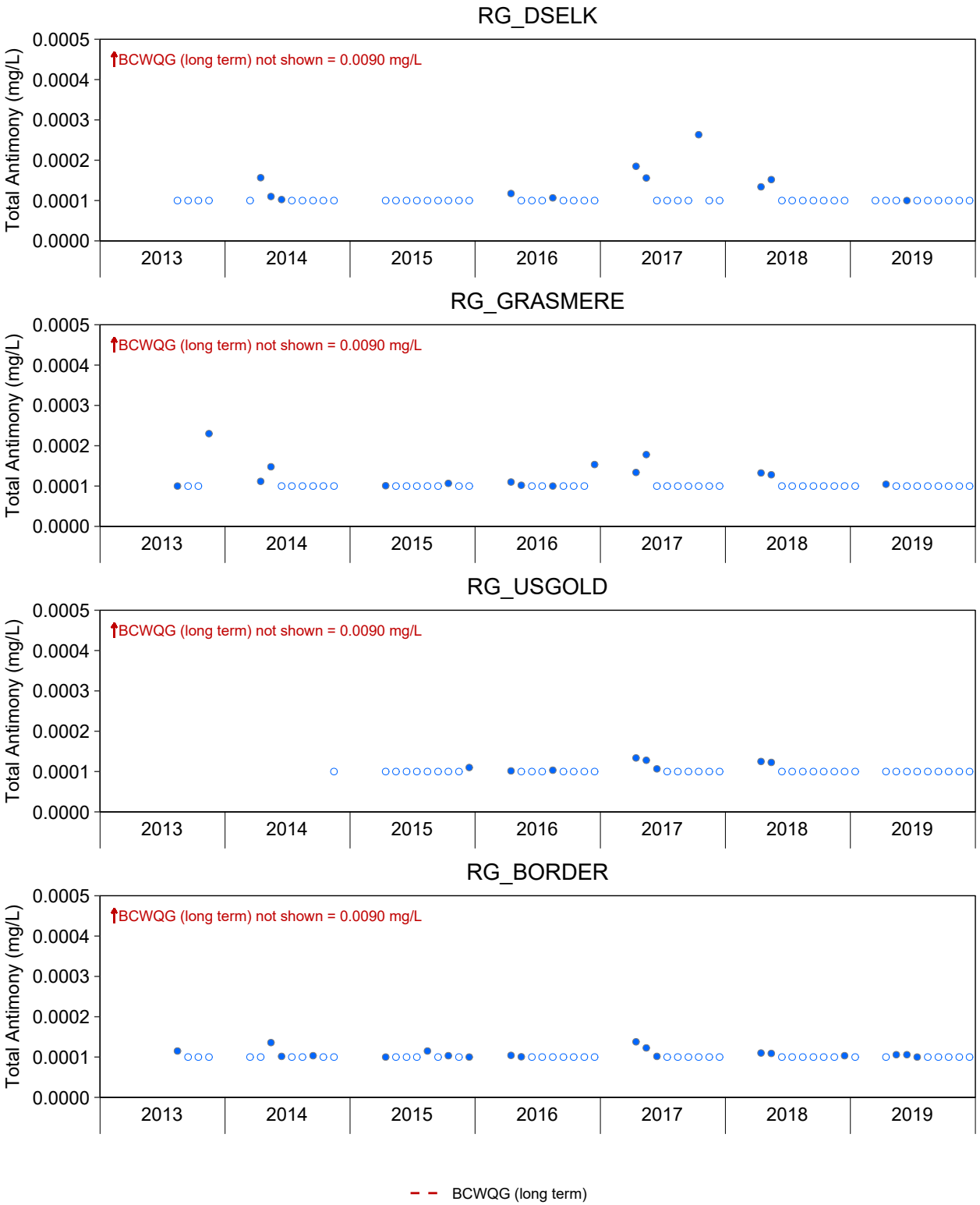


Figure B.1: Monthly Mean Total Antimony Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

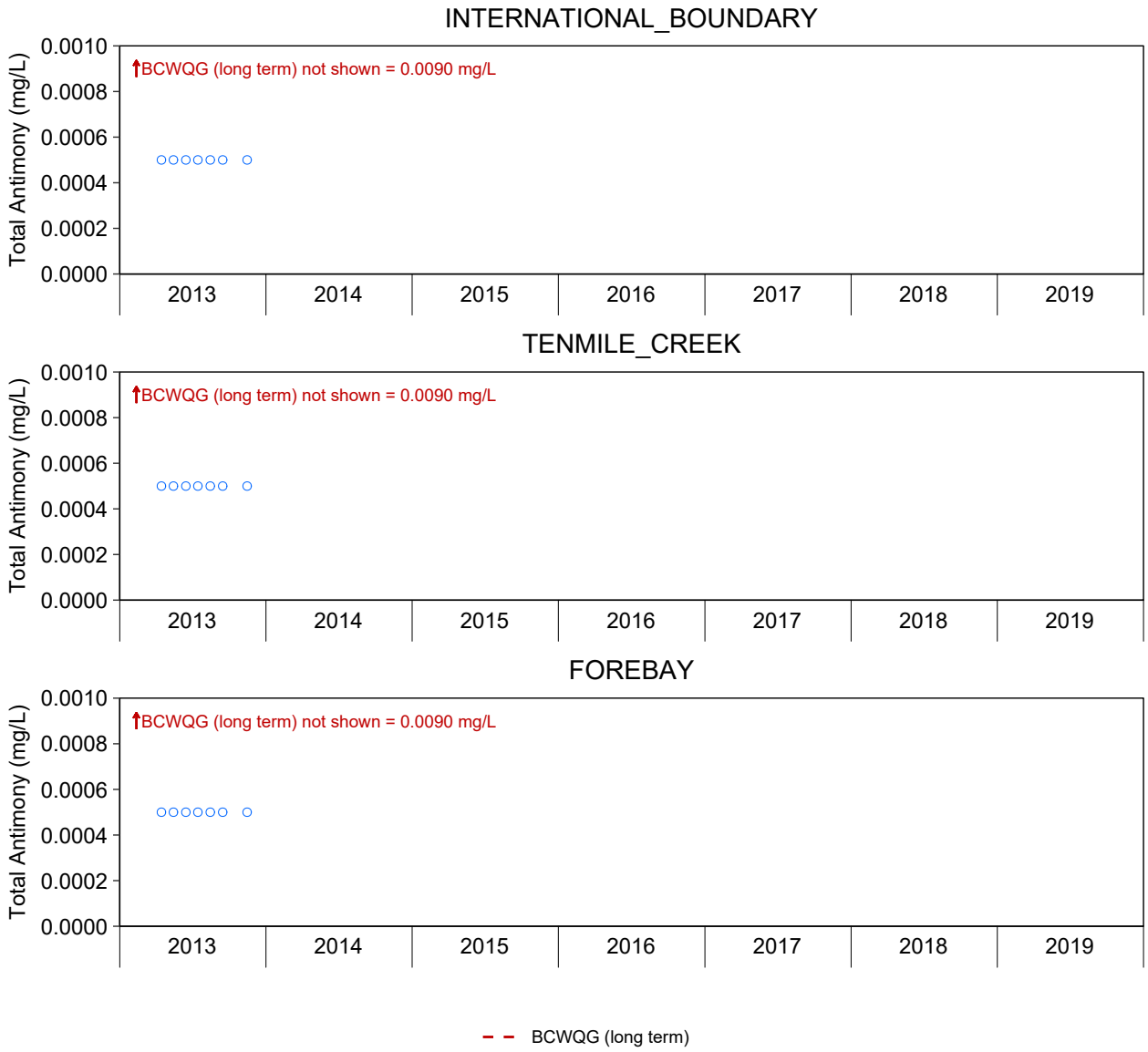


Figure B.1: Monthly Mean Total Antimony Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

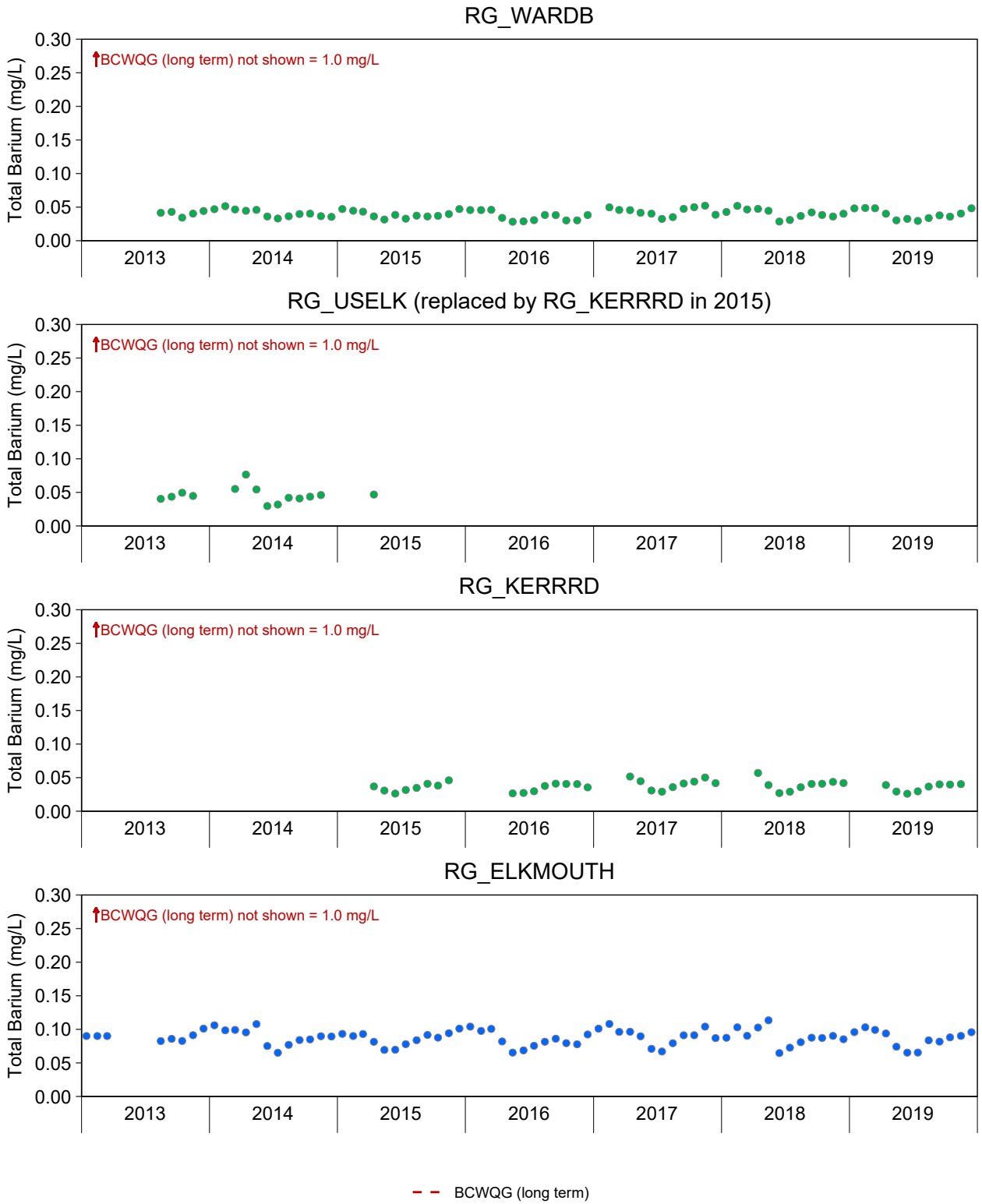


Figure B.2: Monthly Mean Total Barium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

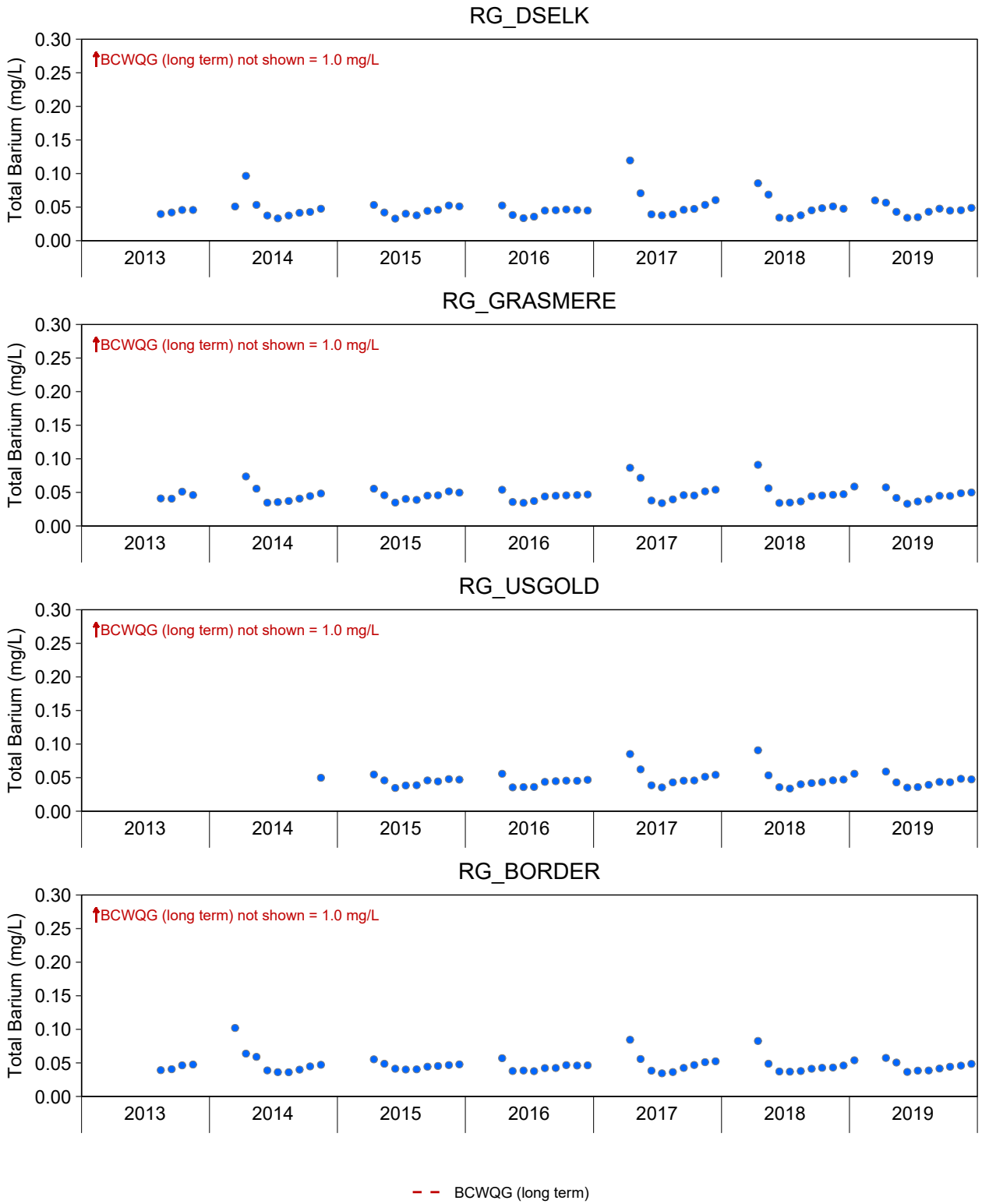


Figure B.2: Monthly Mean Total Barium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

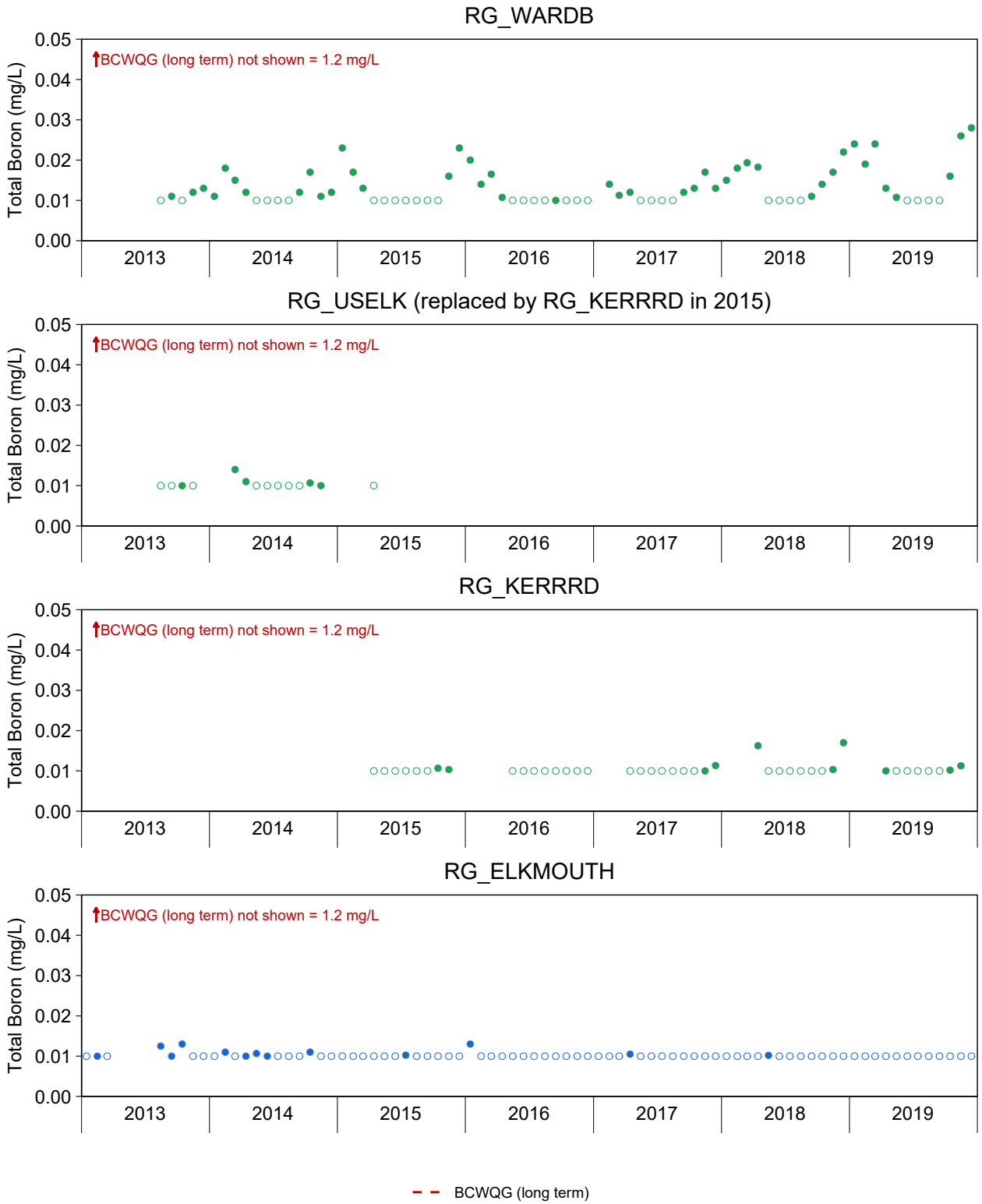


Figure B.3: Monthly Mean Total Boron Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

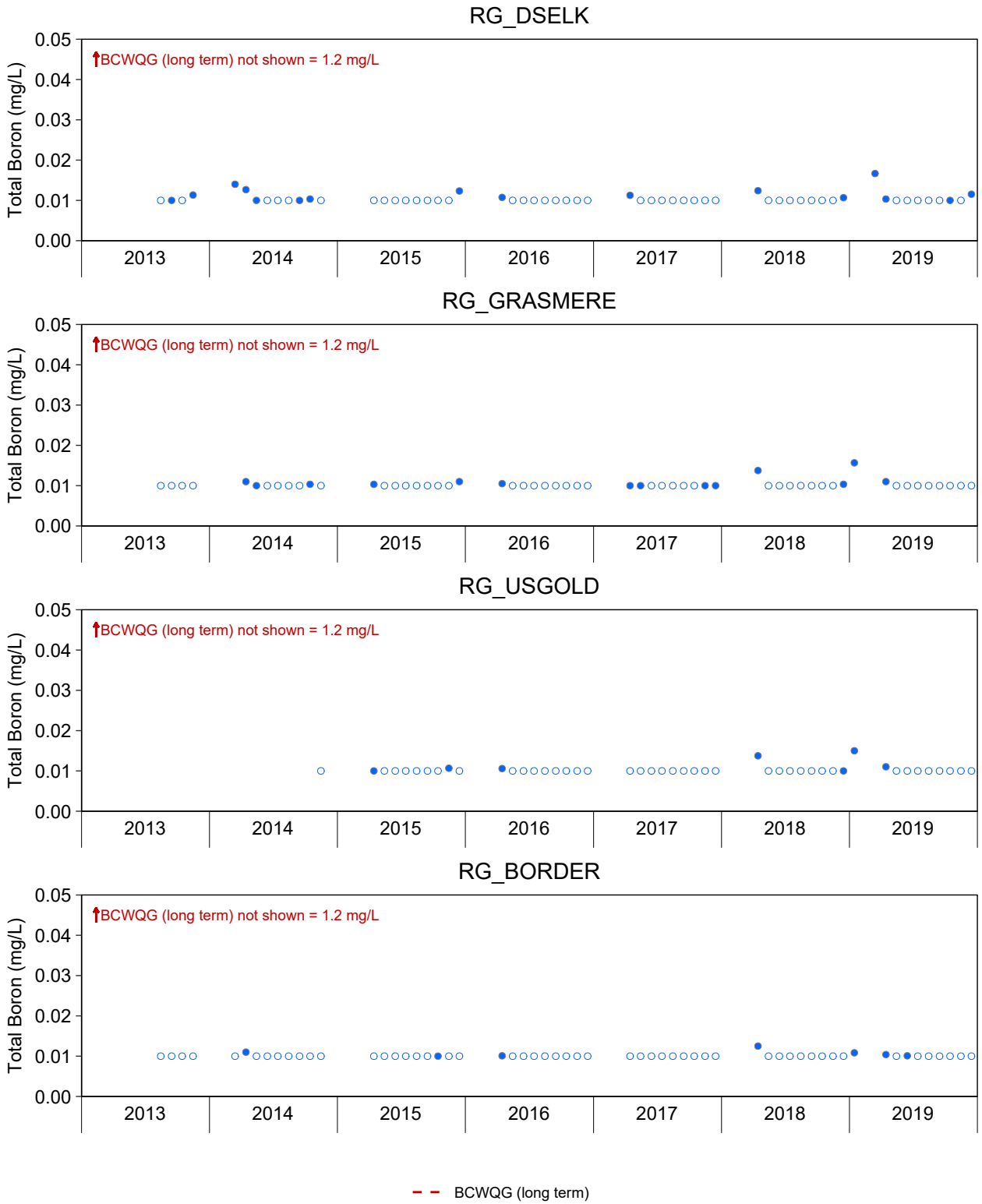


Figure B.3: Monthly Mean Total Boron Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

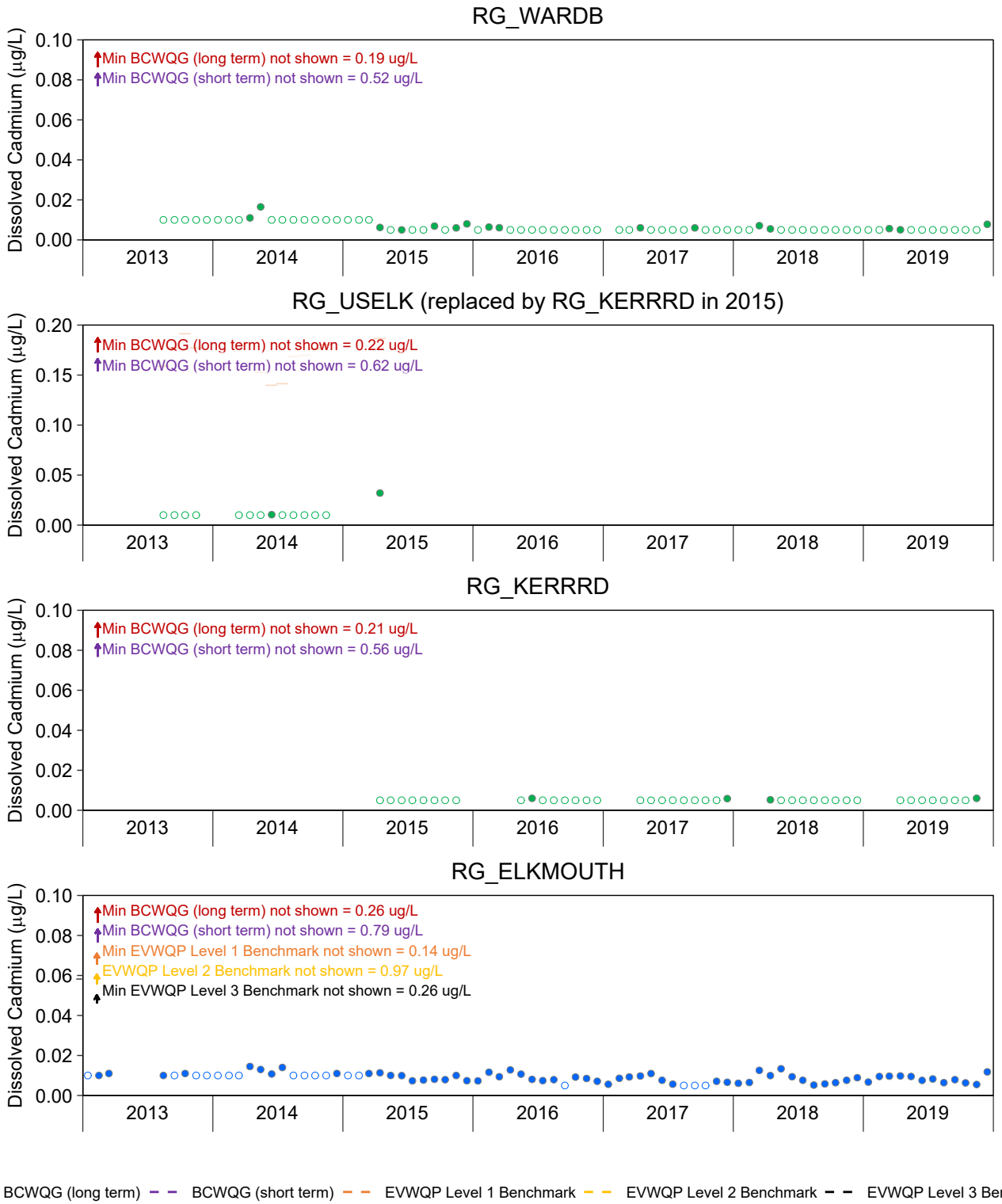


Figure B.4: Monthly Mean Dissolved Cadmium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL.
Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River.
Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).
Guidelines are dependent on water hardness.

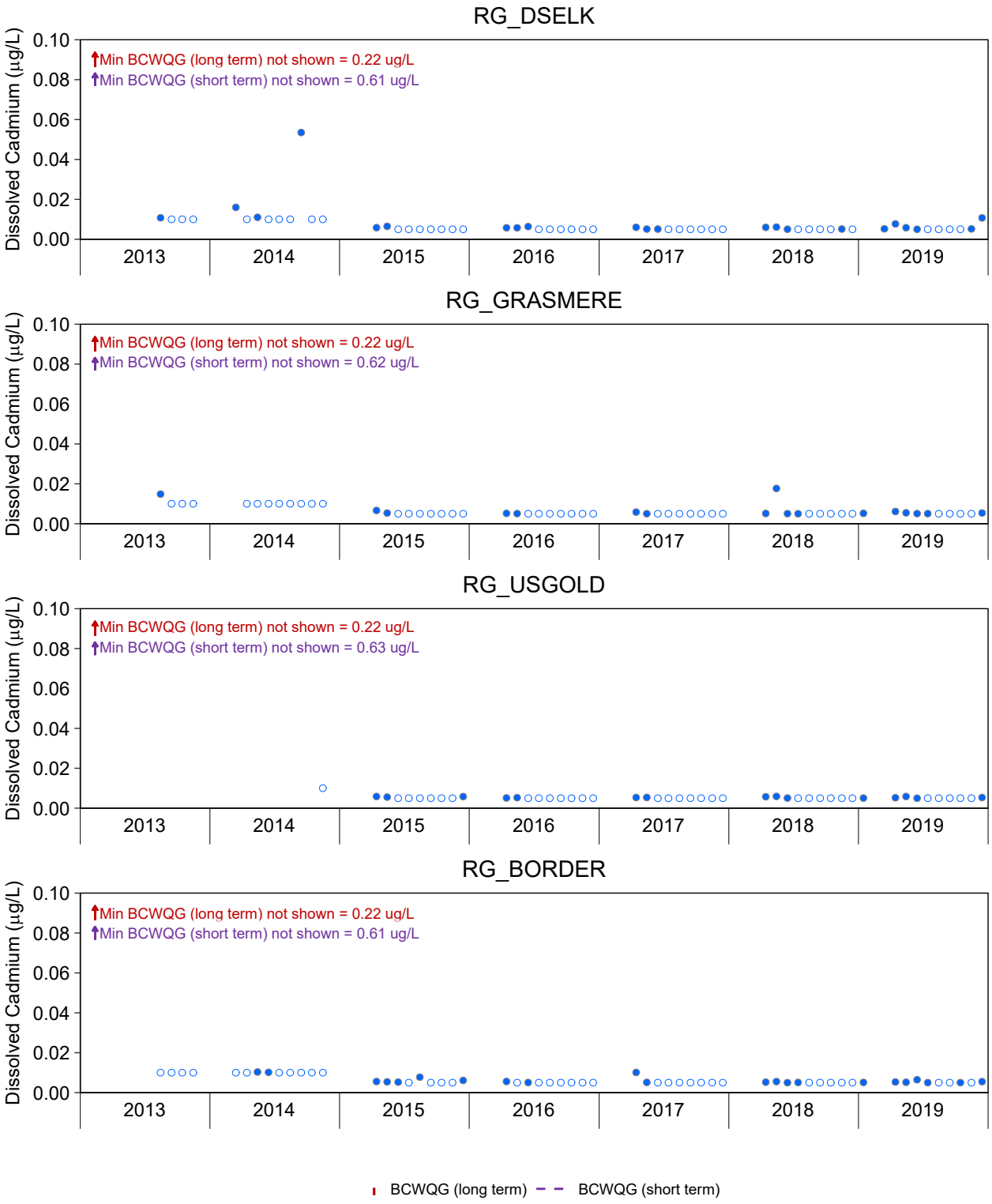


Figure B.4: Monthly Mean Dissolved Cadmium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL.
Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River.
Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).
Guidelines are dependent on water hardness.

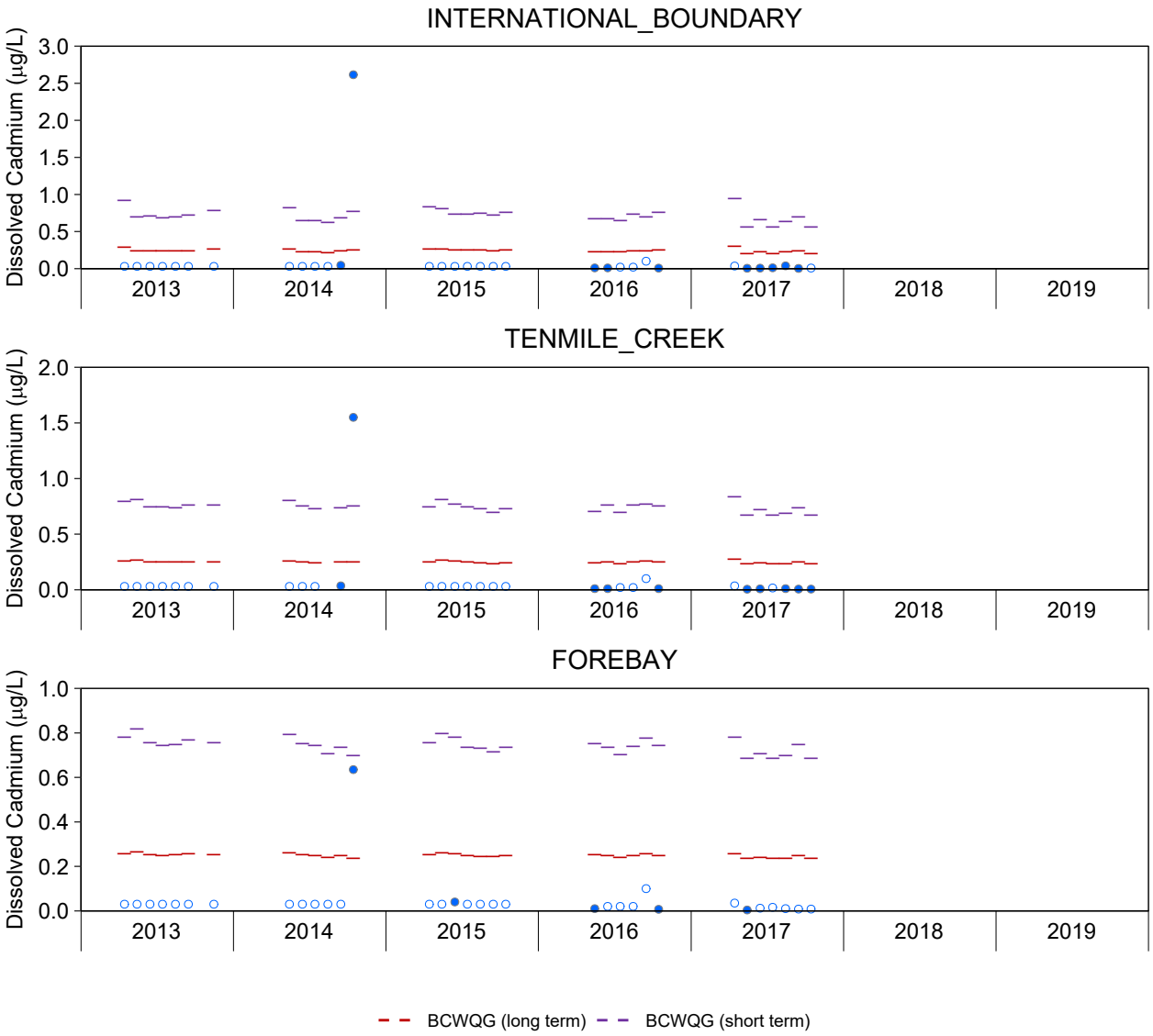


Figure B.4: Monthly Mean Dissolved Cadmium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL.
Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River.
Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).
Guidelines are dependent on water hardness.

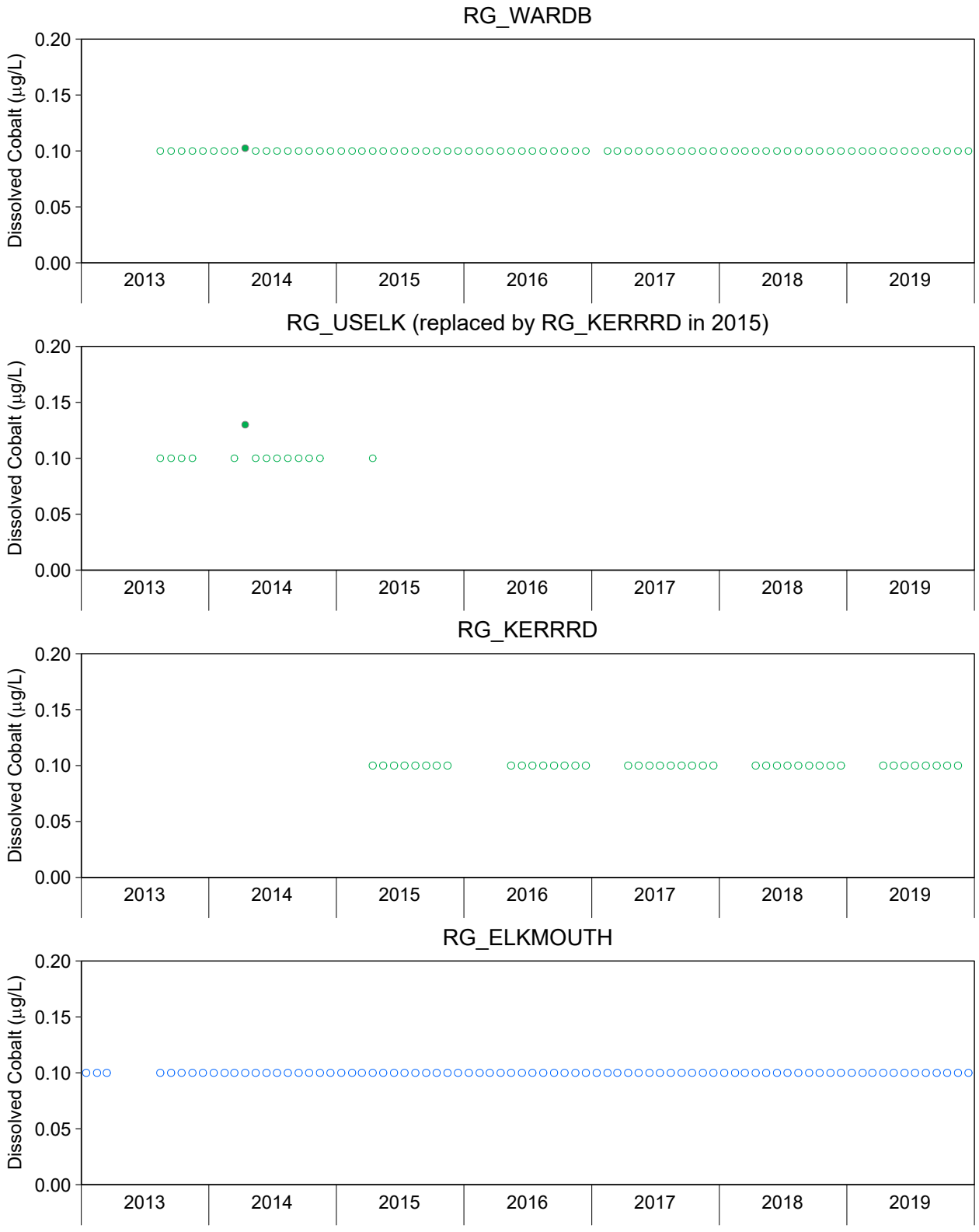


Figure B.5: Monthly Mean Dissolved Cobalt Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

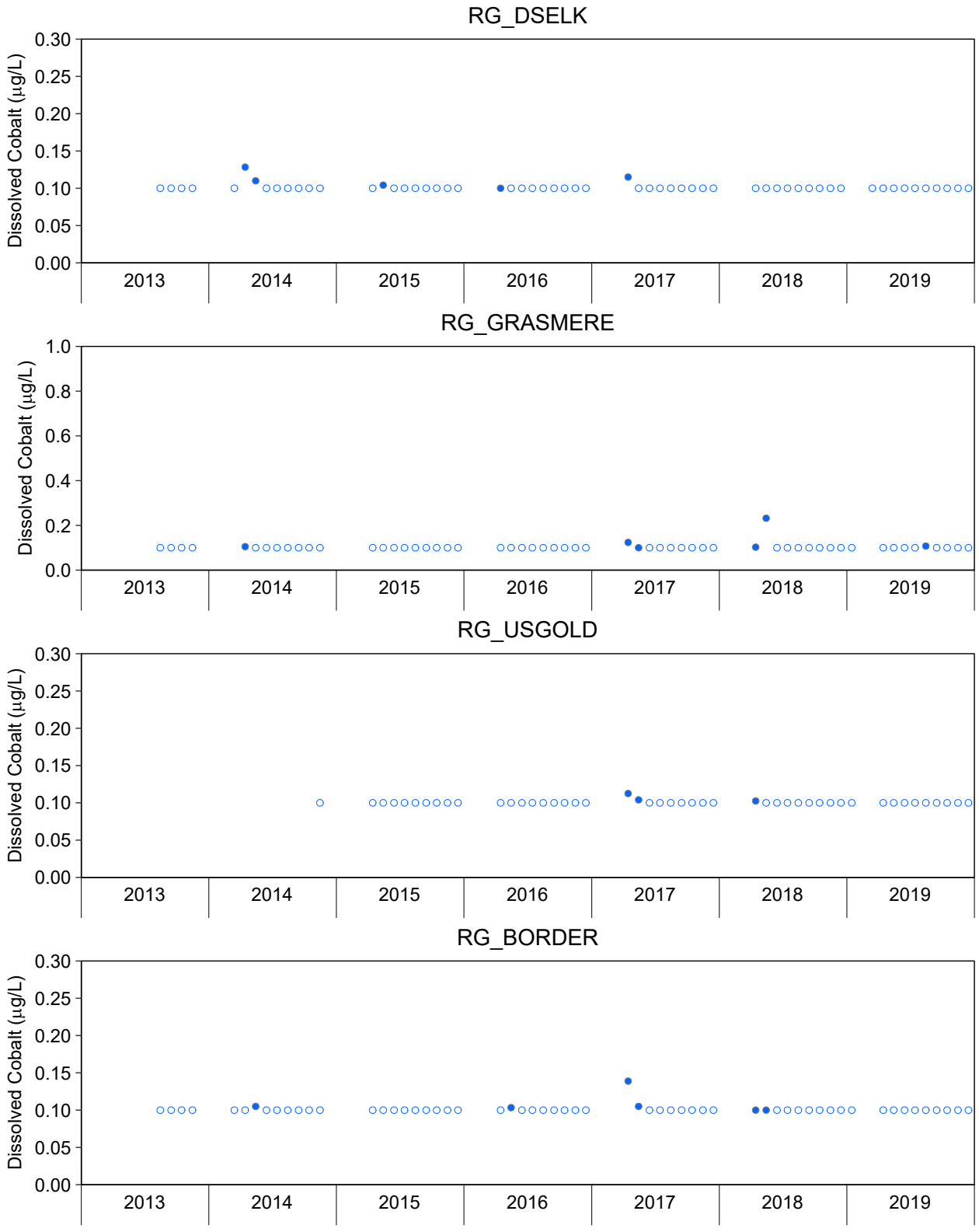


Figure B.5: Monthly Mean Dissolved Cobalt Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

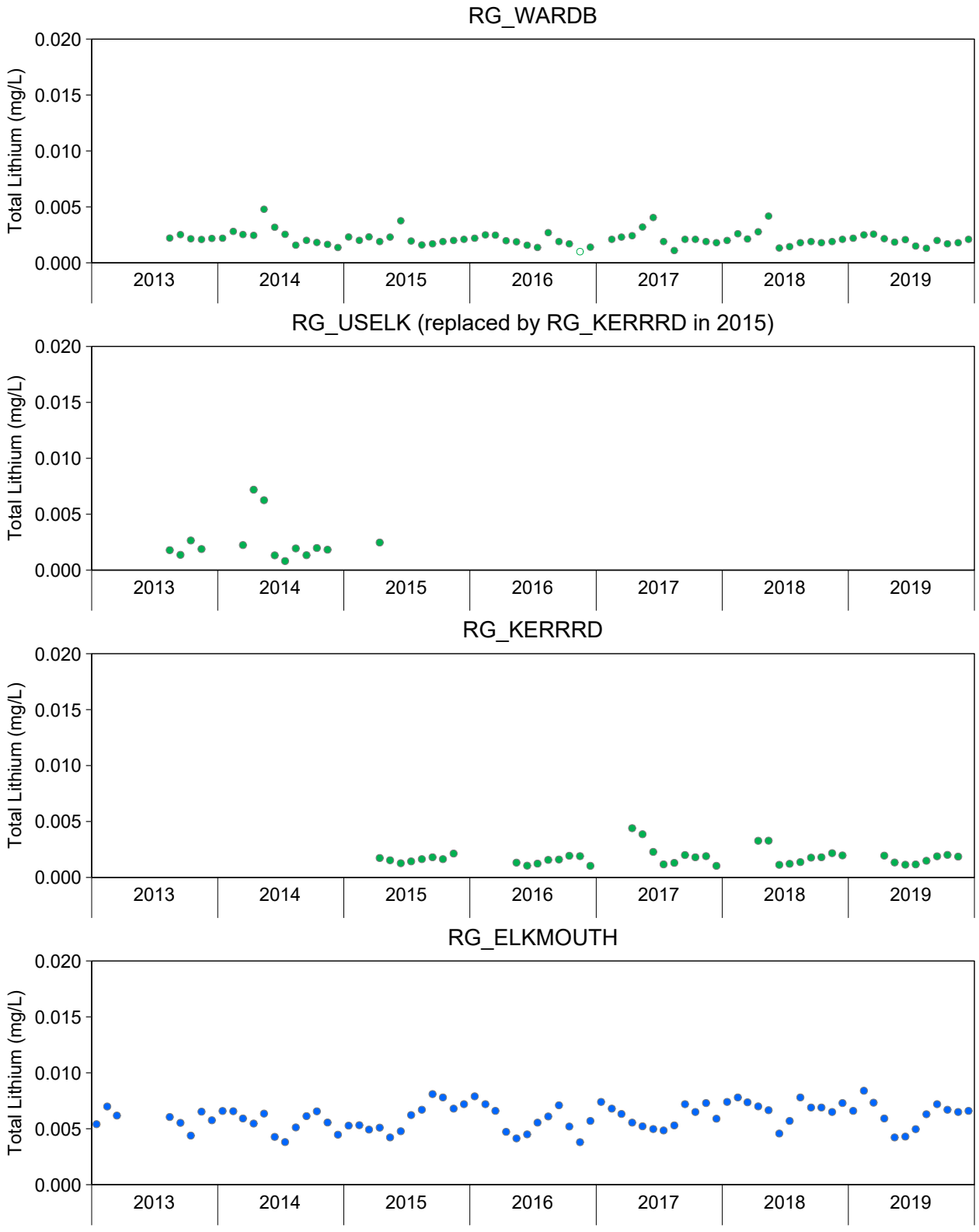


Figure B.6: Monthly Mean Total Lithium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

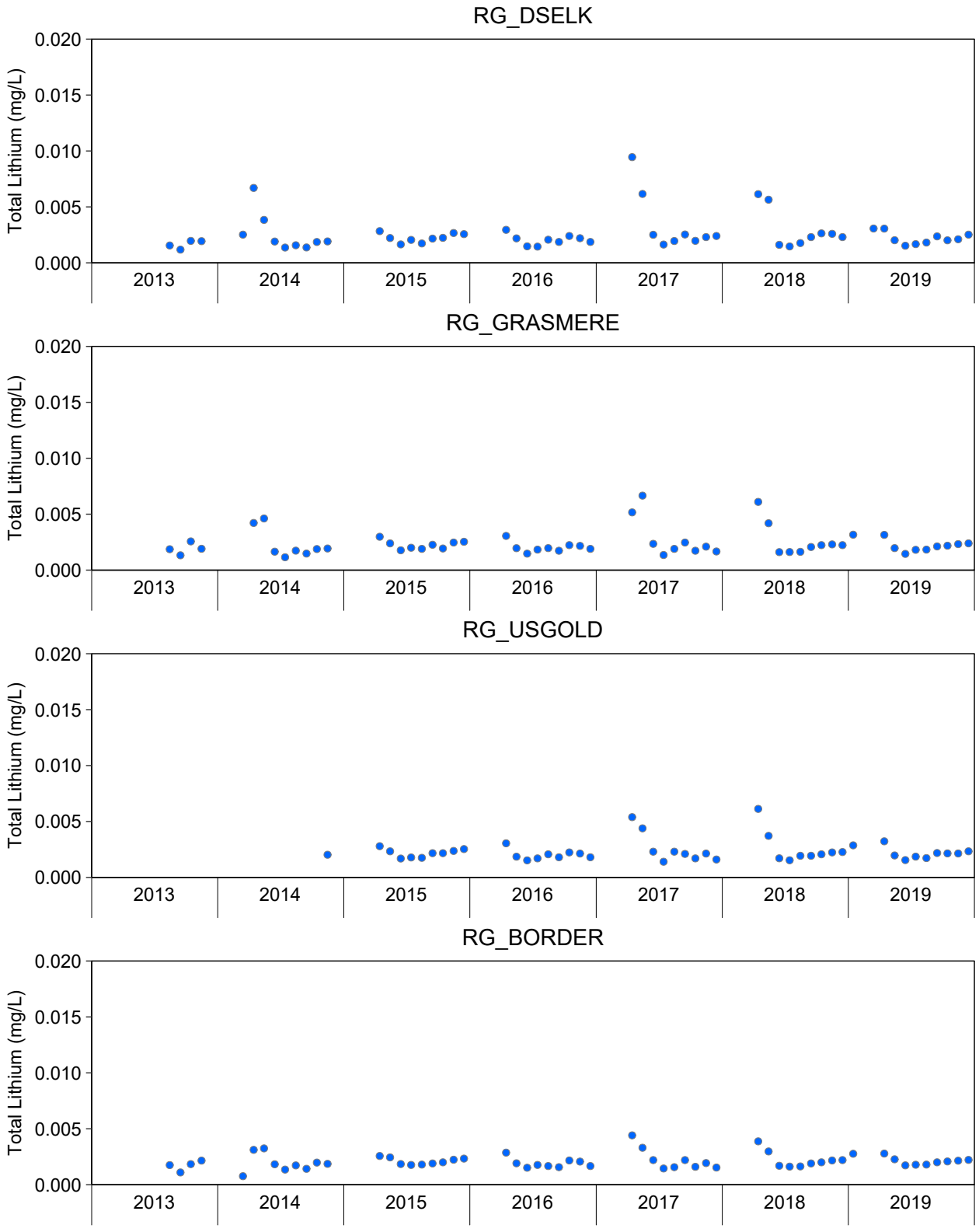


Figure B.6: Monthly Mean Total Lithium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

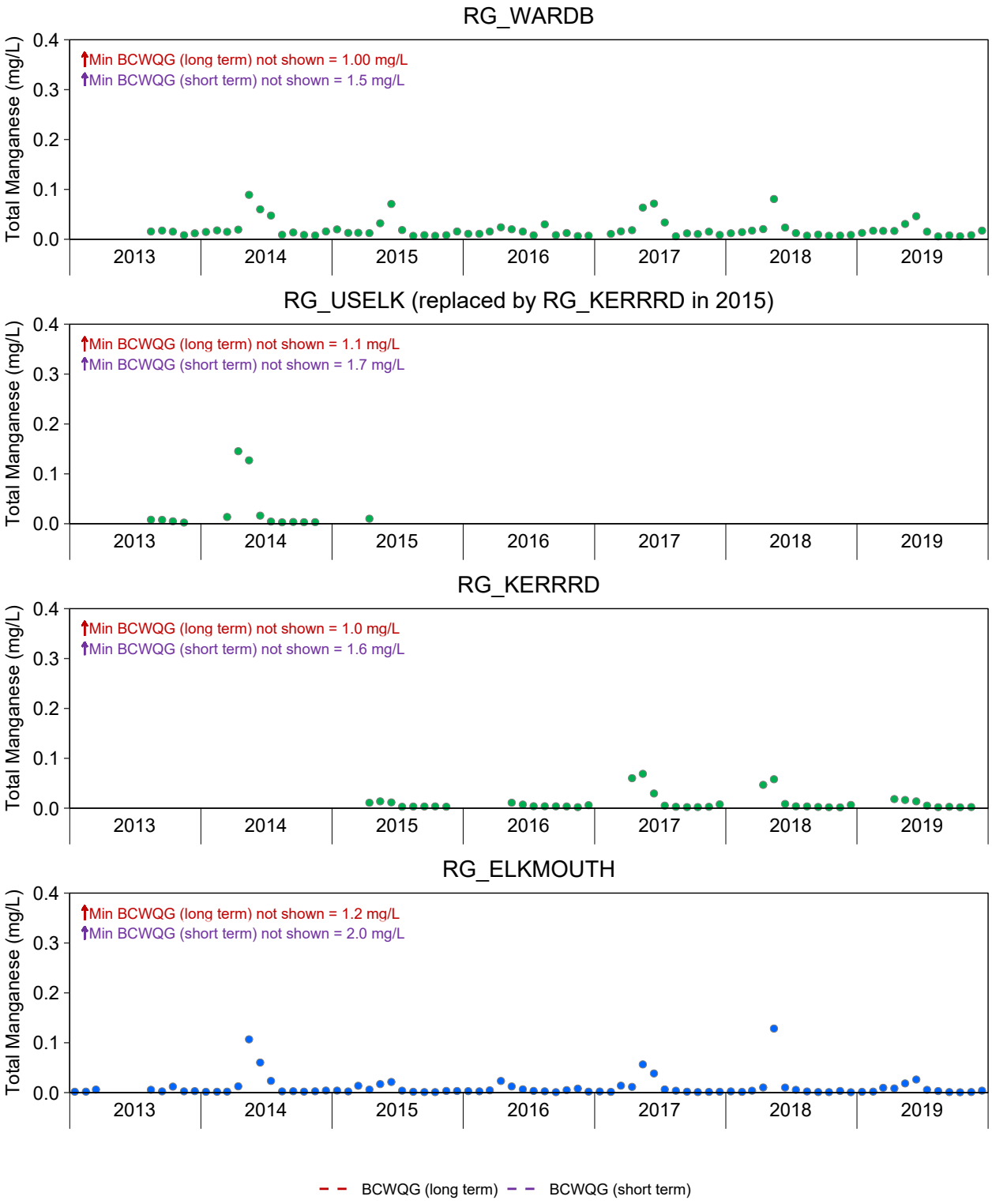


Figure B.7: Monthly Mean Total Manganese Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

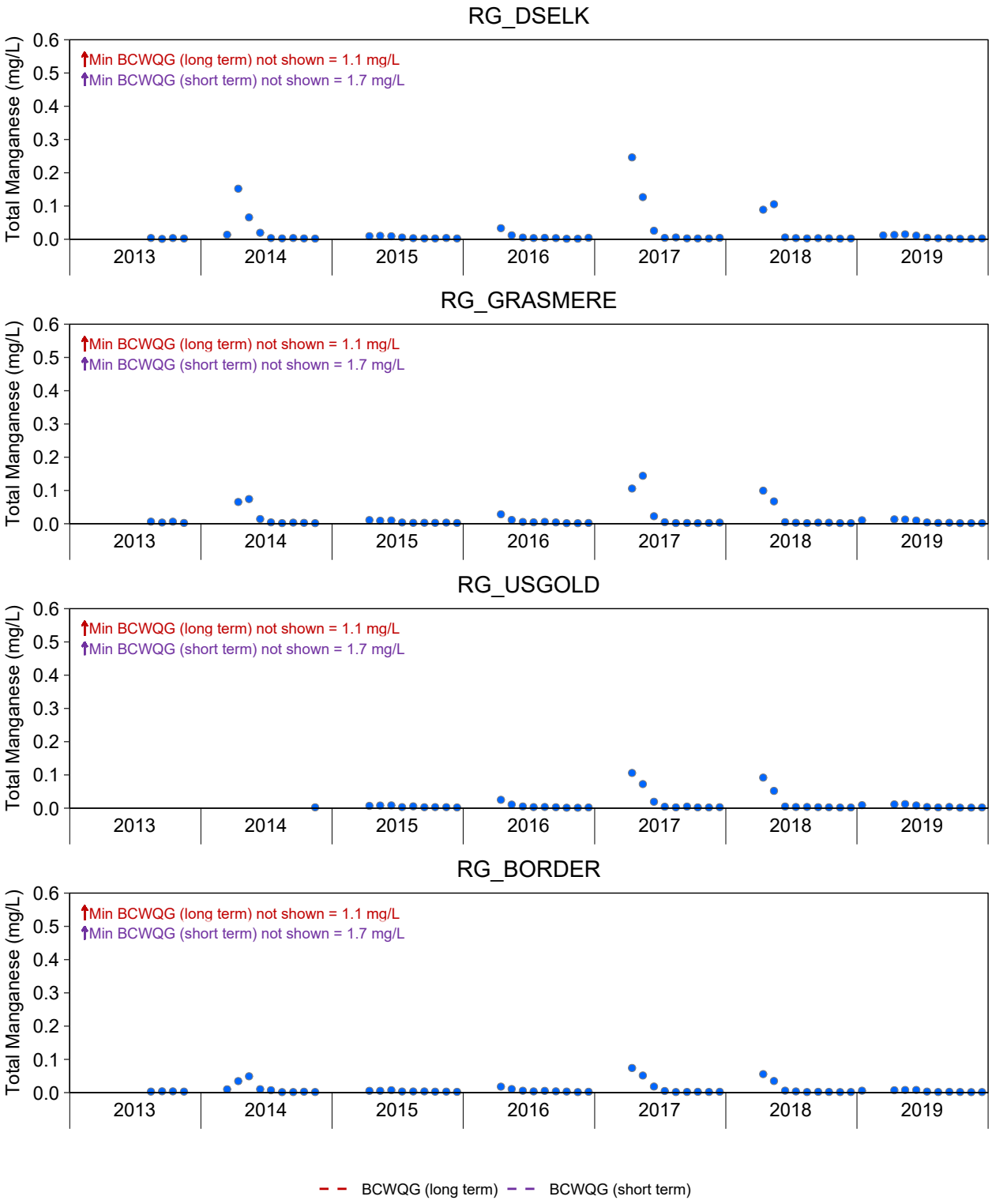


Figure B.7: Monthly Mean Total Manganese Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

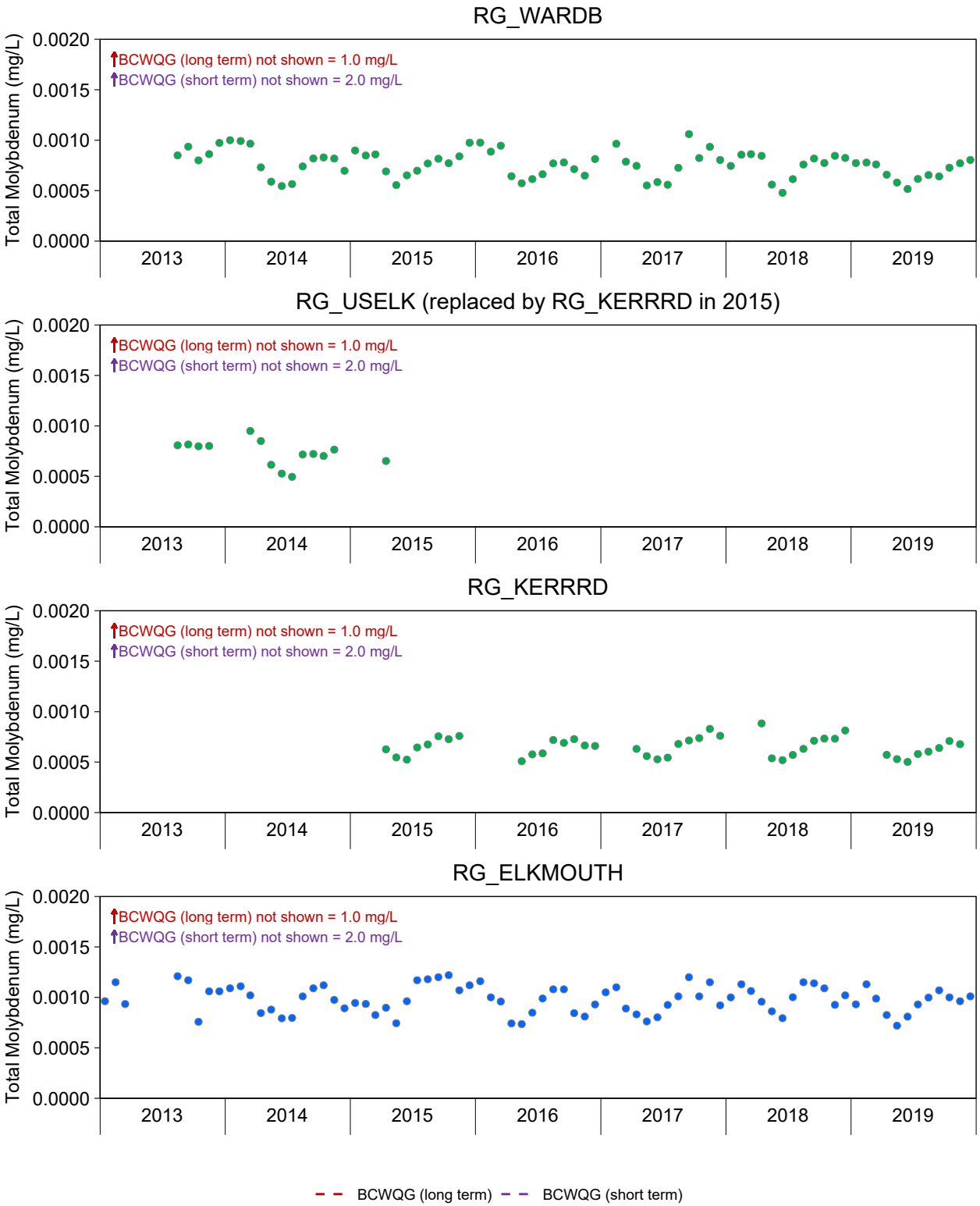


Figure B.8: Monthly Mean Total Molybdenum Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

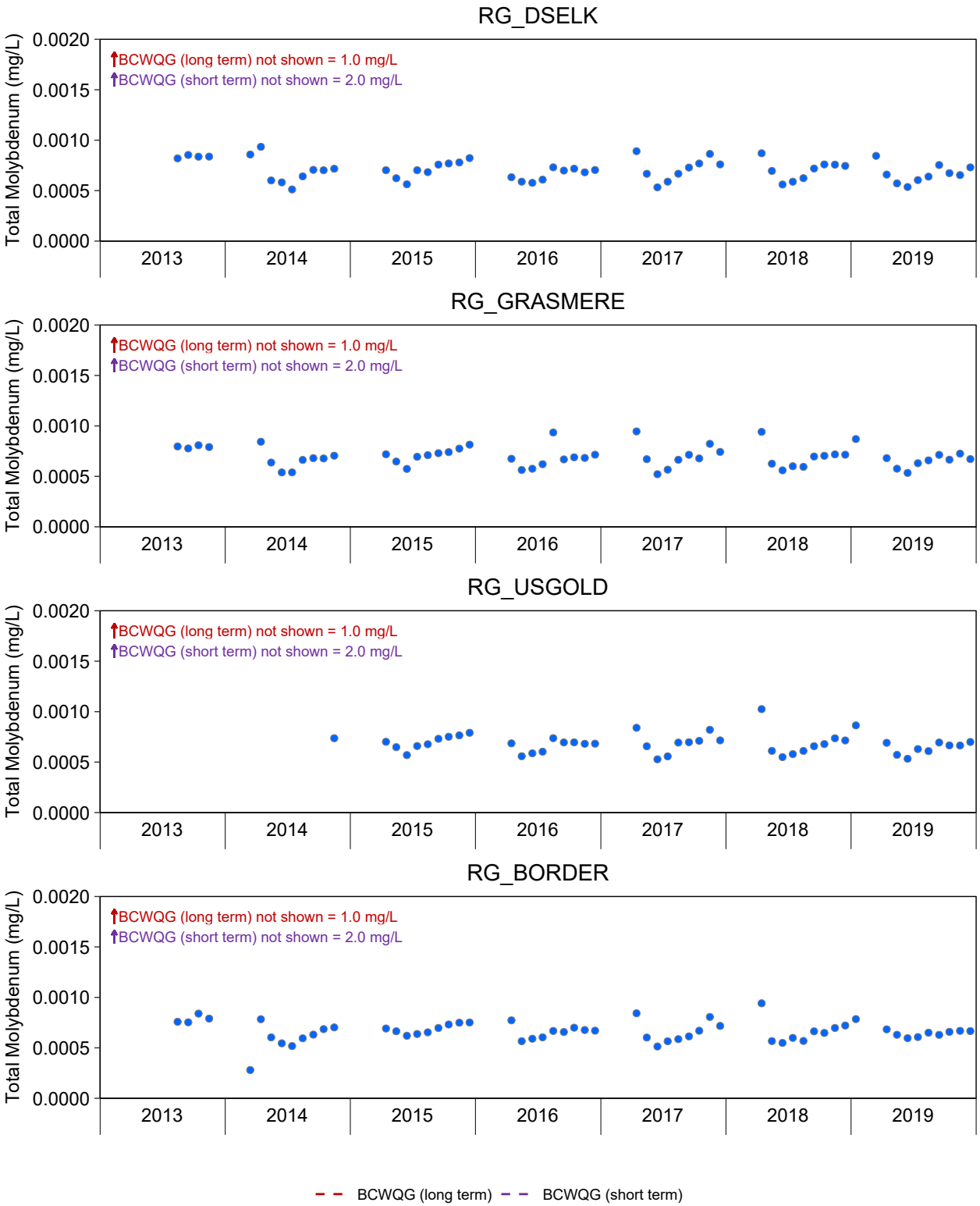


Figure B.8: Monthly Mean Total Molybdenum Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

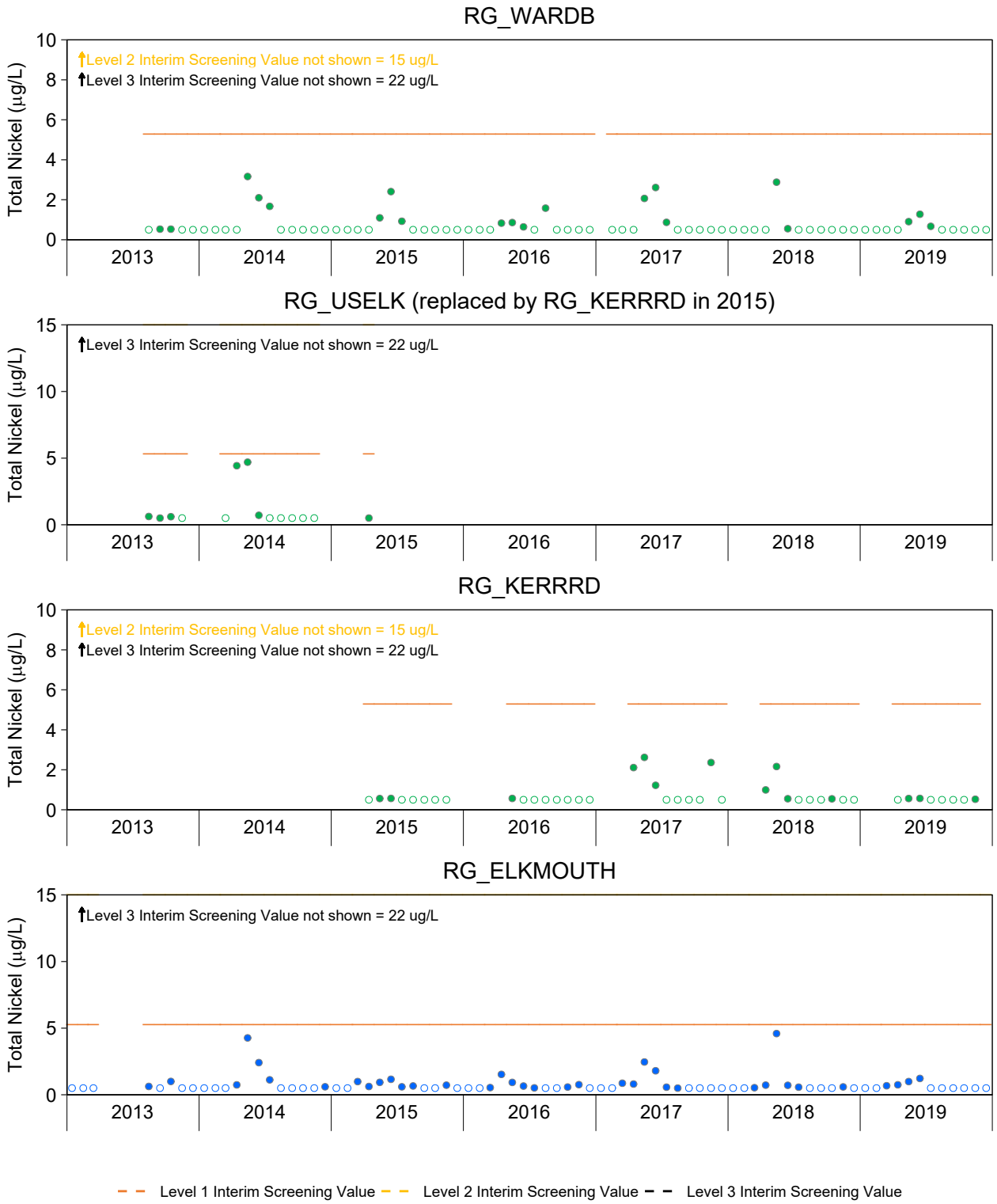


Figure B.9: Monthly Mean Total Nickel Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

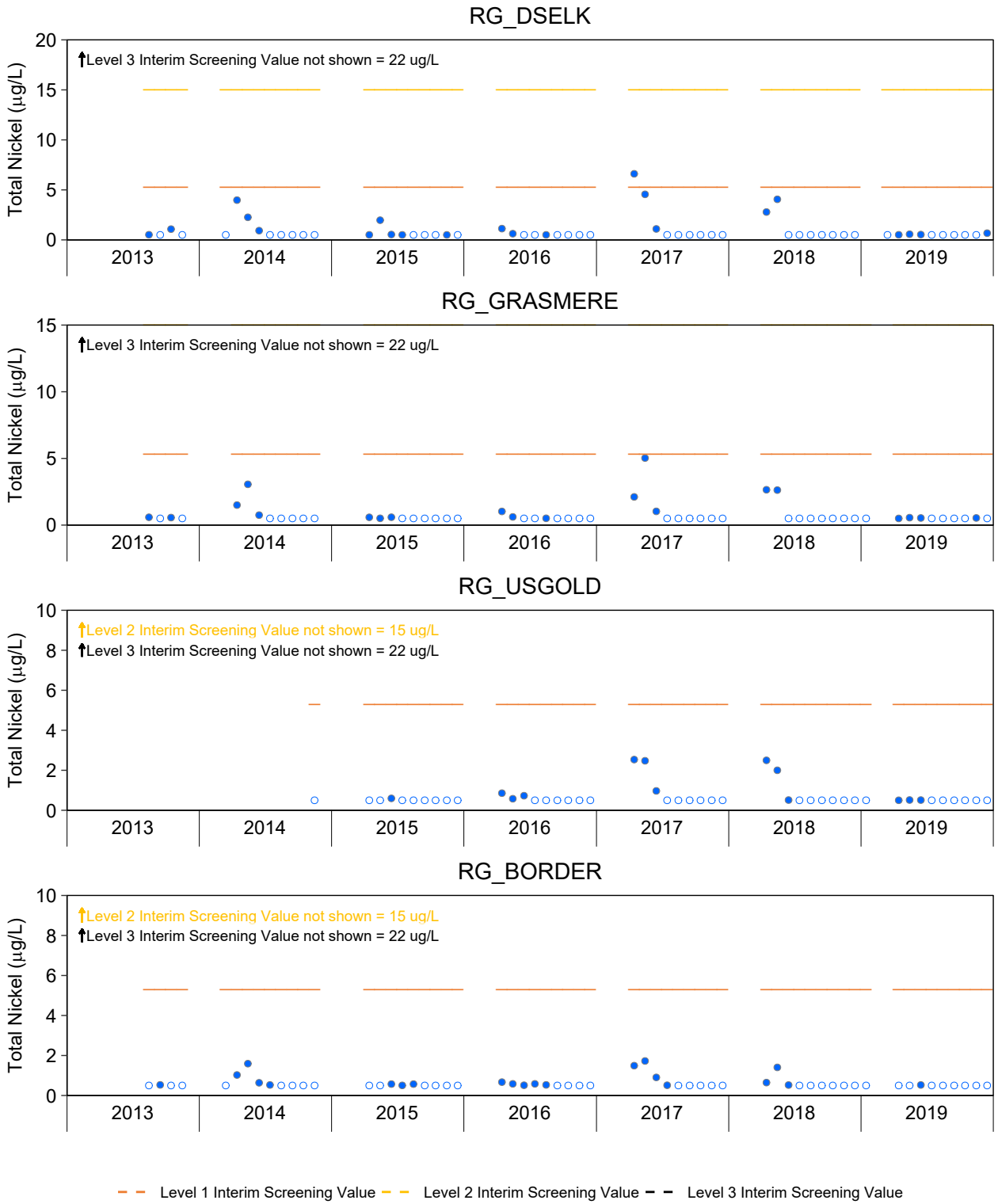


Figure B.9: Monthly Mean Total Nickel Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

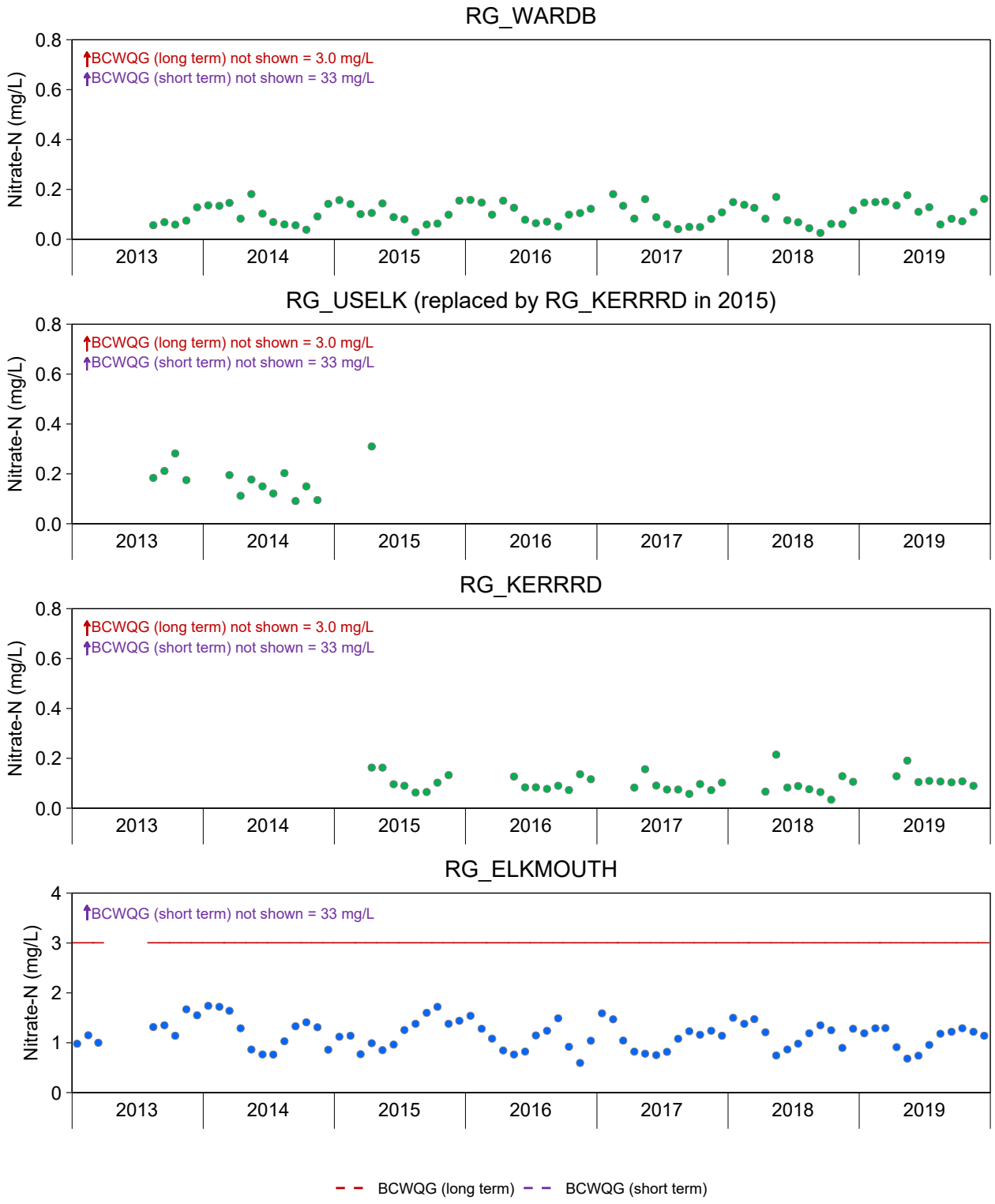


Figure B.10: Monthly Mean Nitrate-N Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

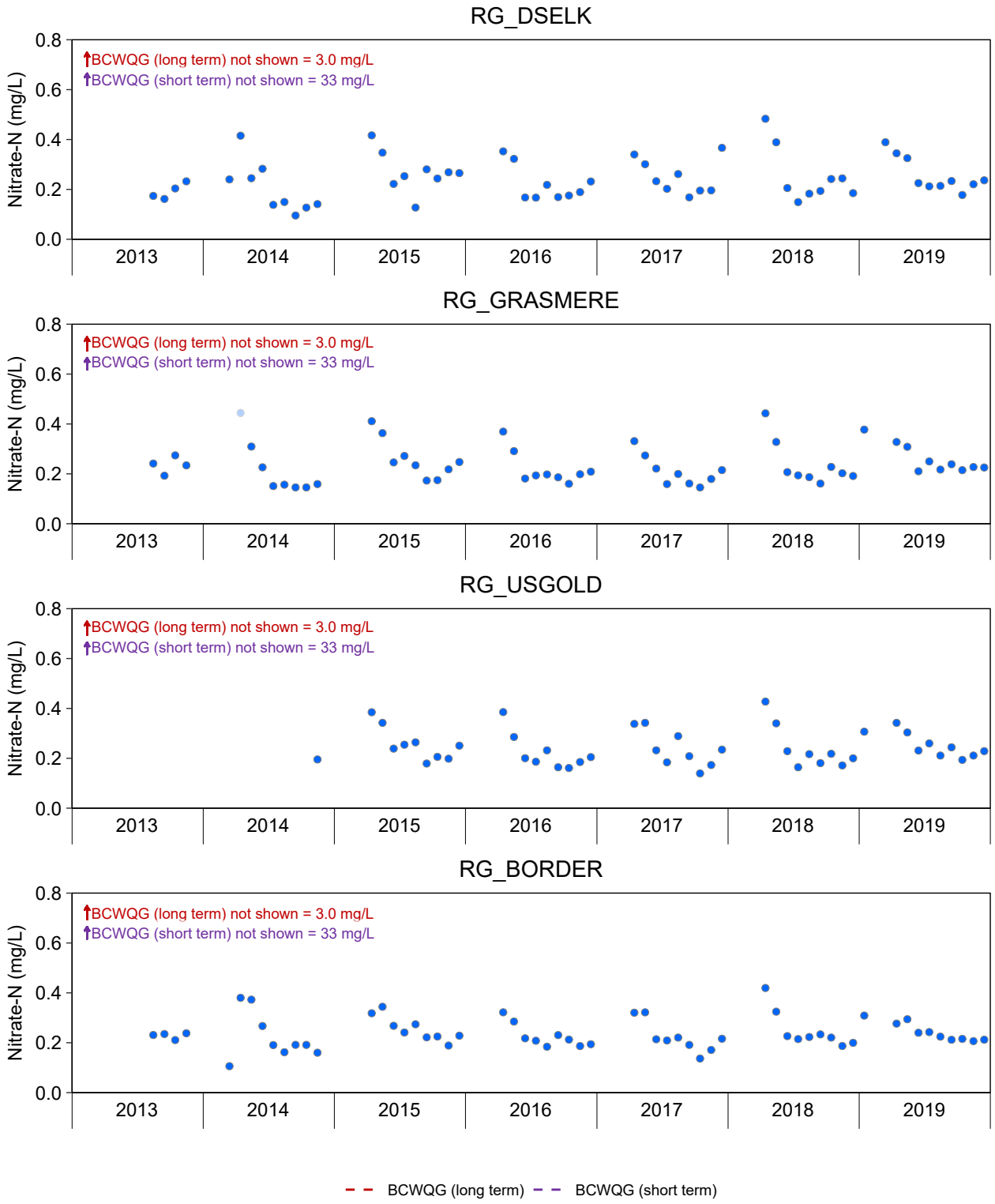


Figure B.10: Monthly Mean Nitrate-N Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

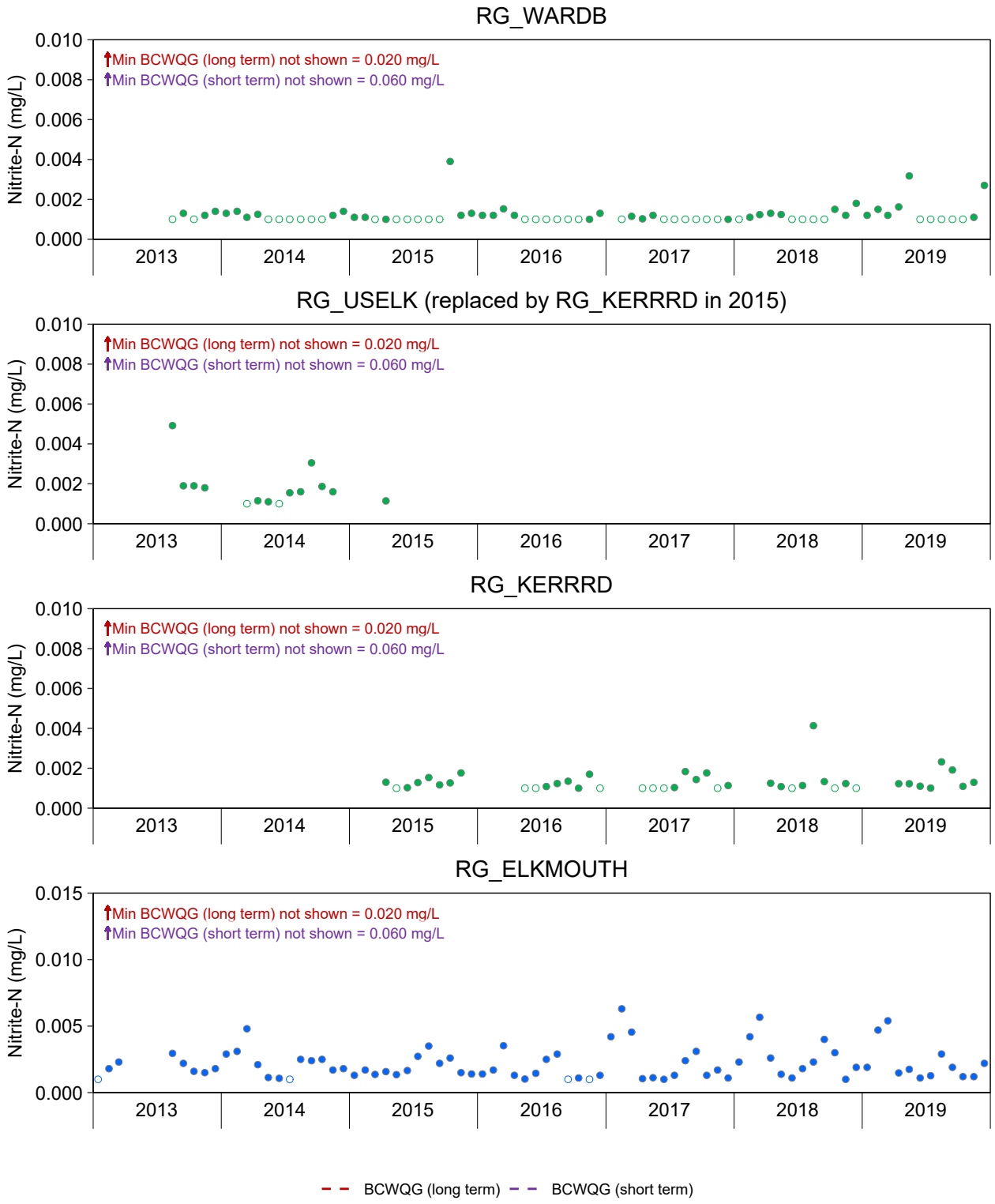


Figure B.11: Monthly Mean Nitrite-N Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water chloride concentrations.

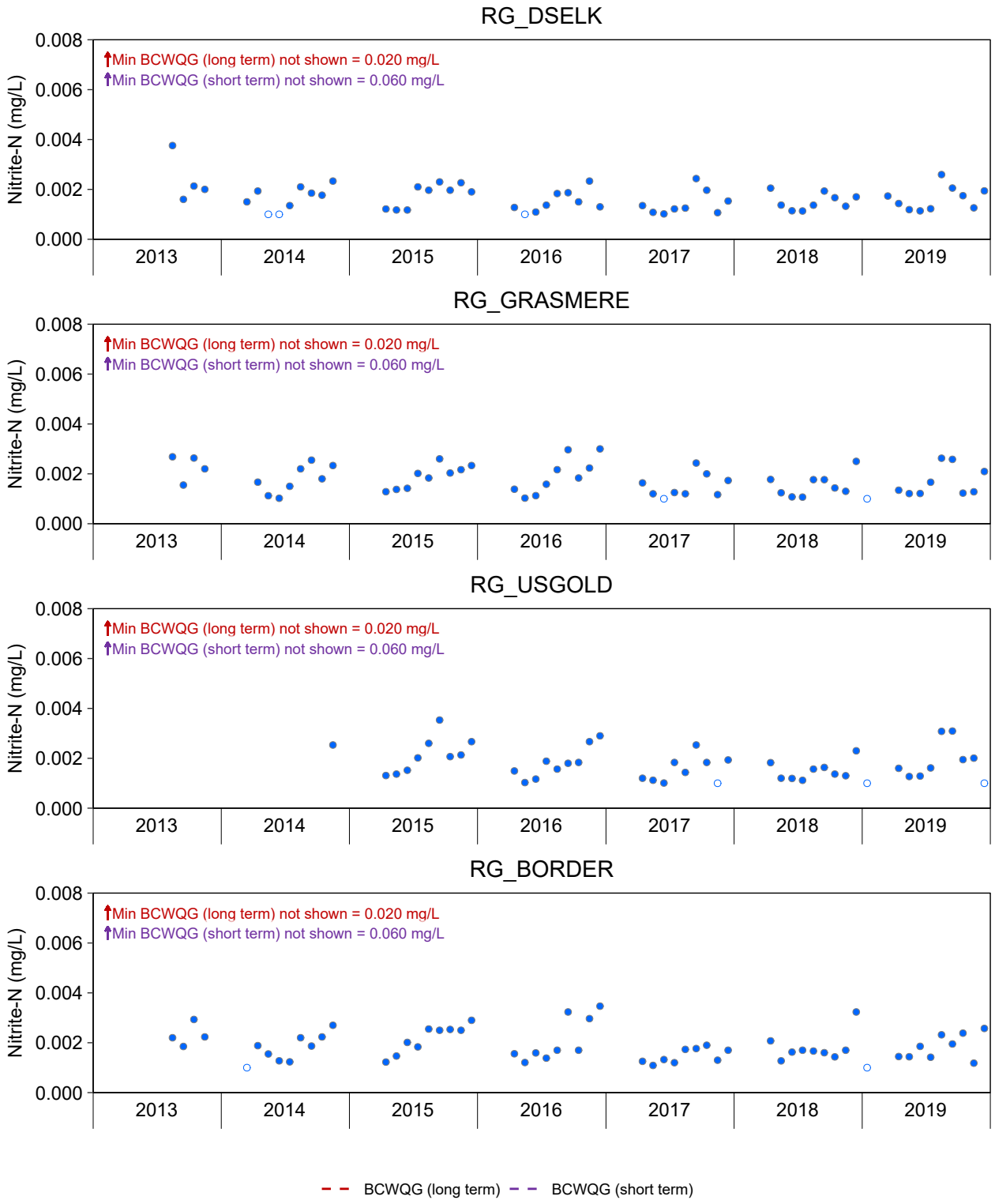


Figure B.11: Monthly Mean Nitrite-N Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water chloride concentrations.

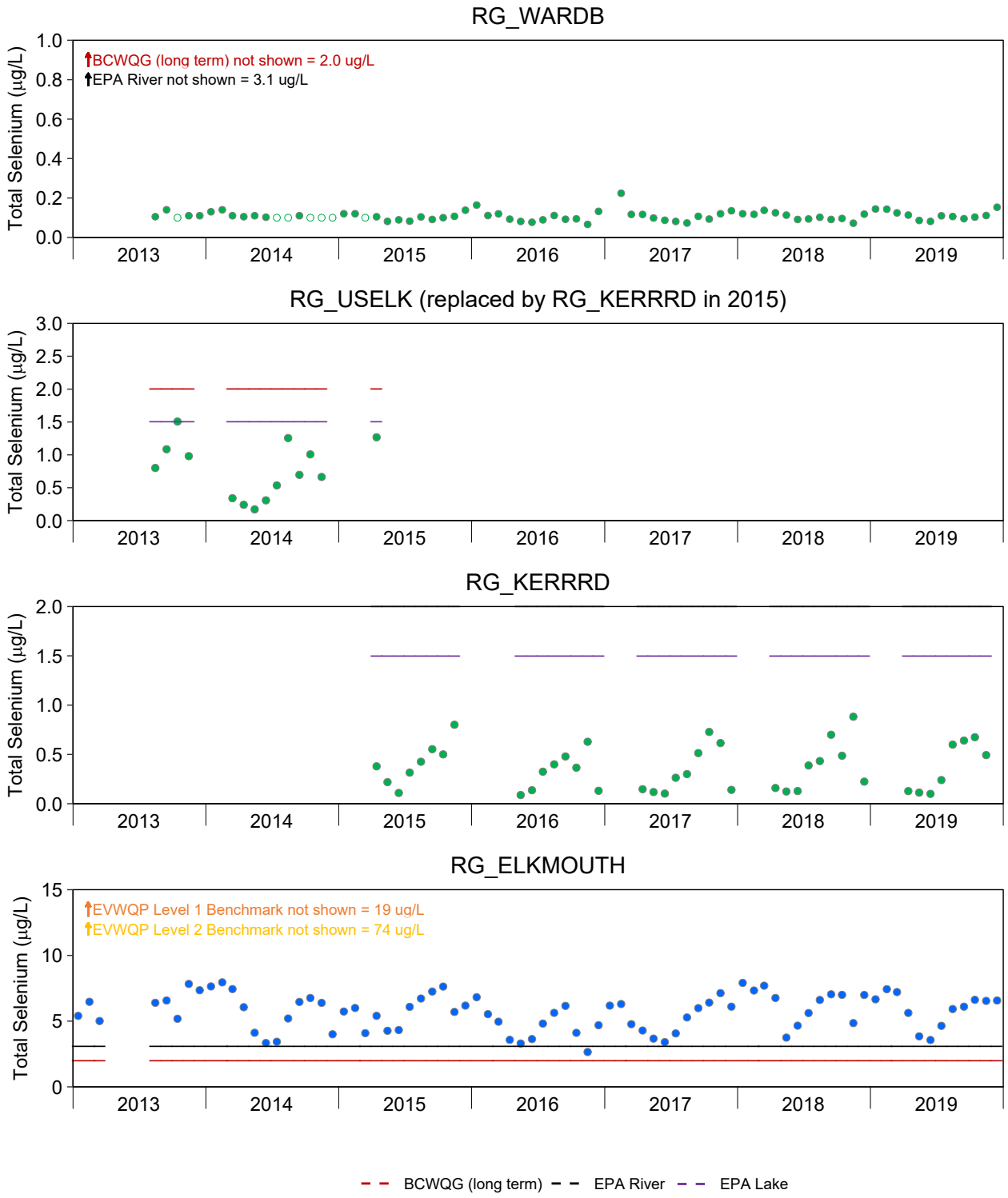


Figure B.12: Monthly Mean Total Selenium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). EPA Criterion is for the dissolved fraction.

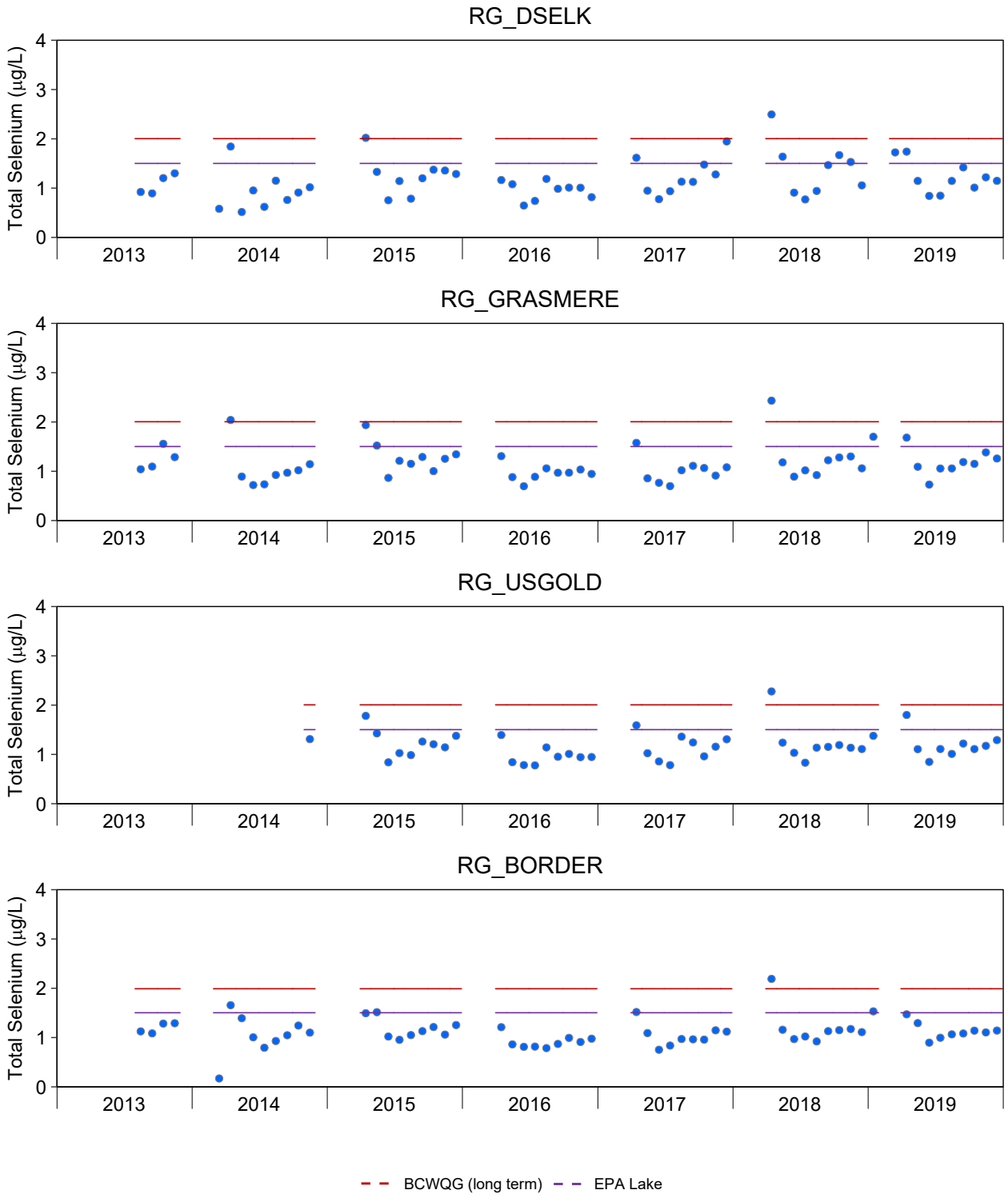


Figure B.12: Monthly Mean Total Selenium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). EPA Criterion is for the dissolved fraction.

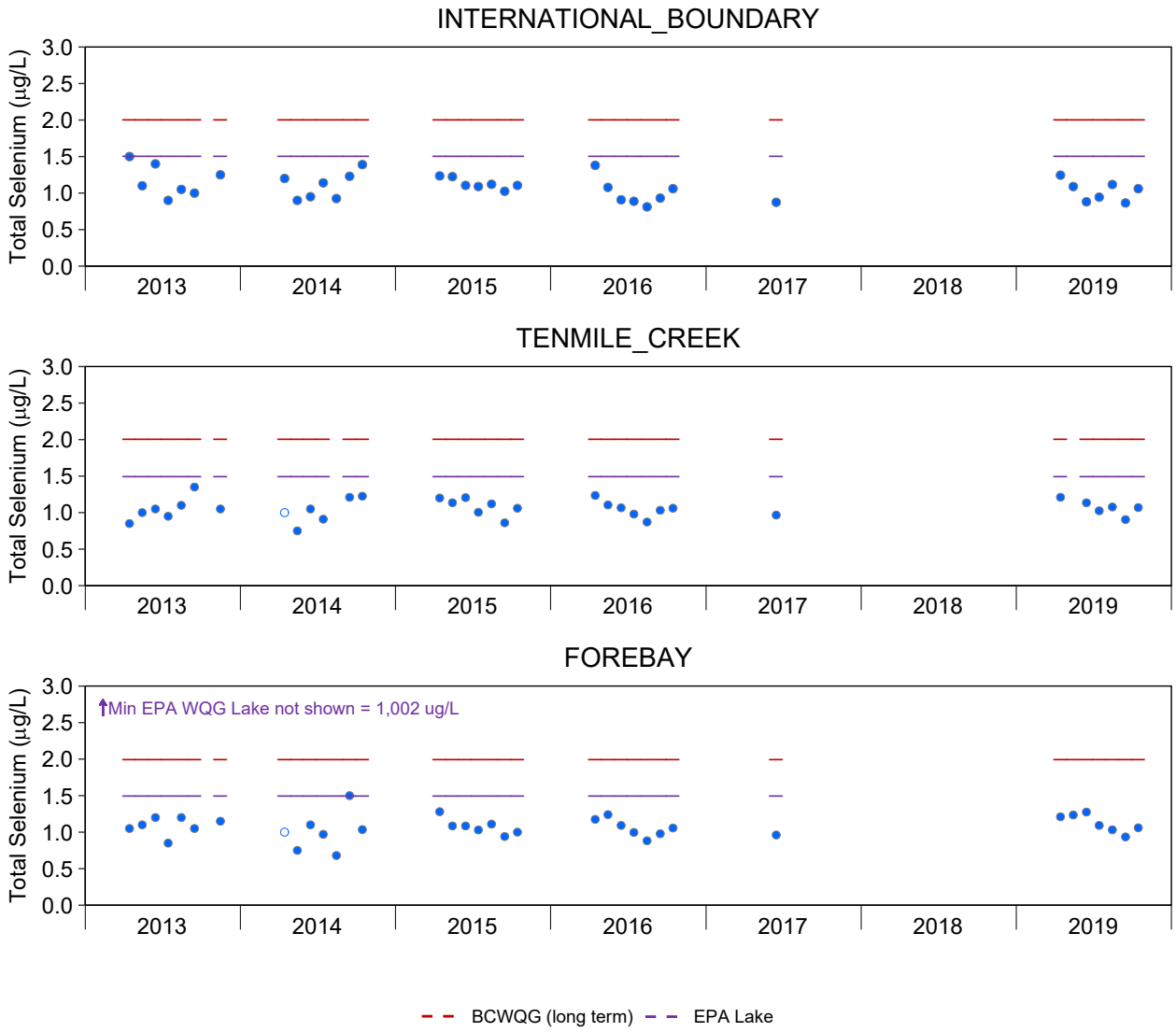


Figure B.12: Monthly Mean Total Selenium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). EPA Criterion is for the dissolved fraction.

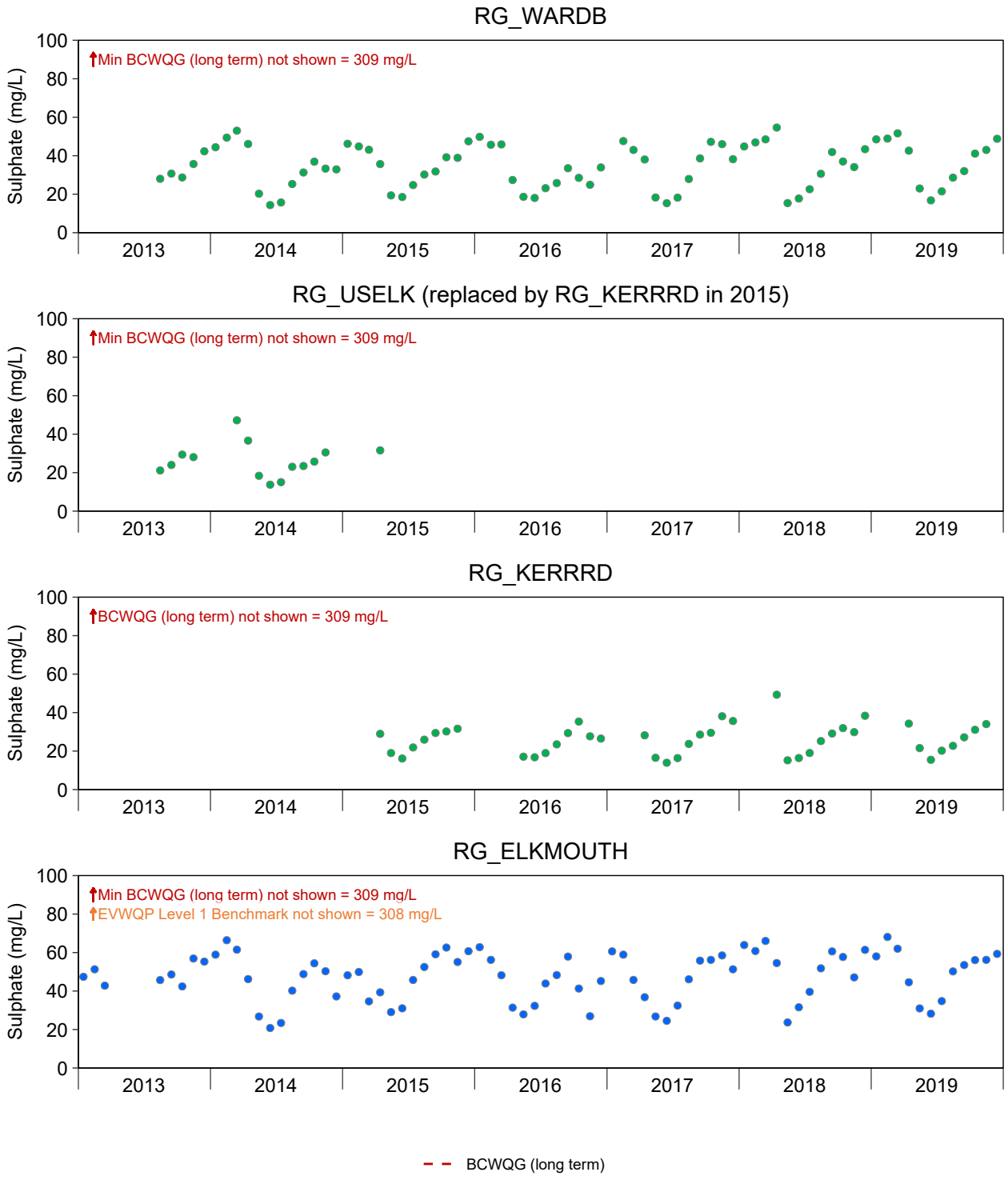


Figure B.13: Monthly Mean Sulphate Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

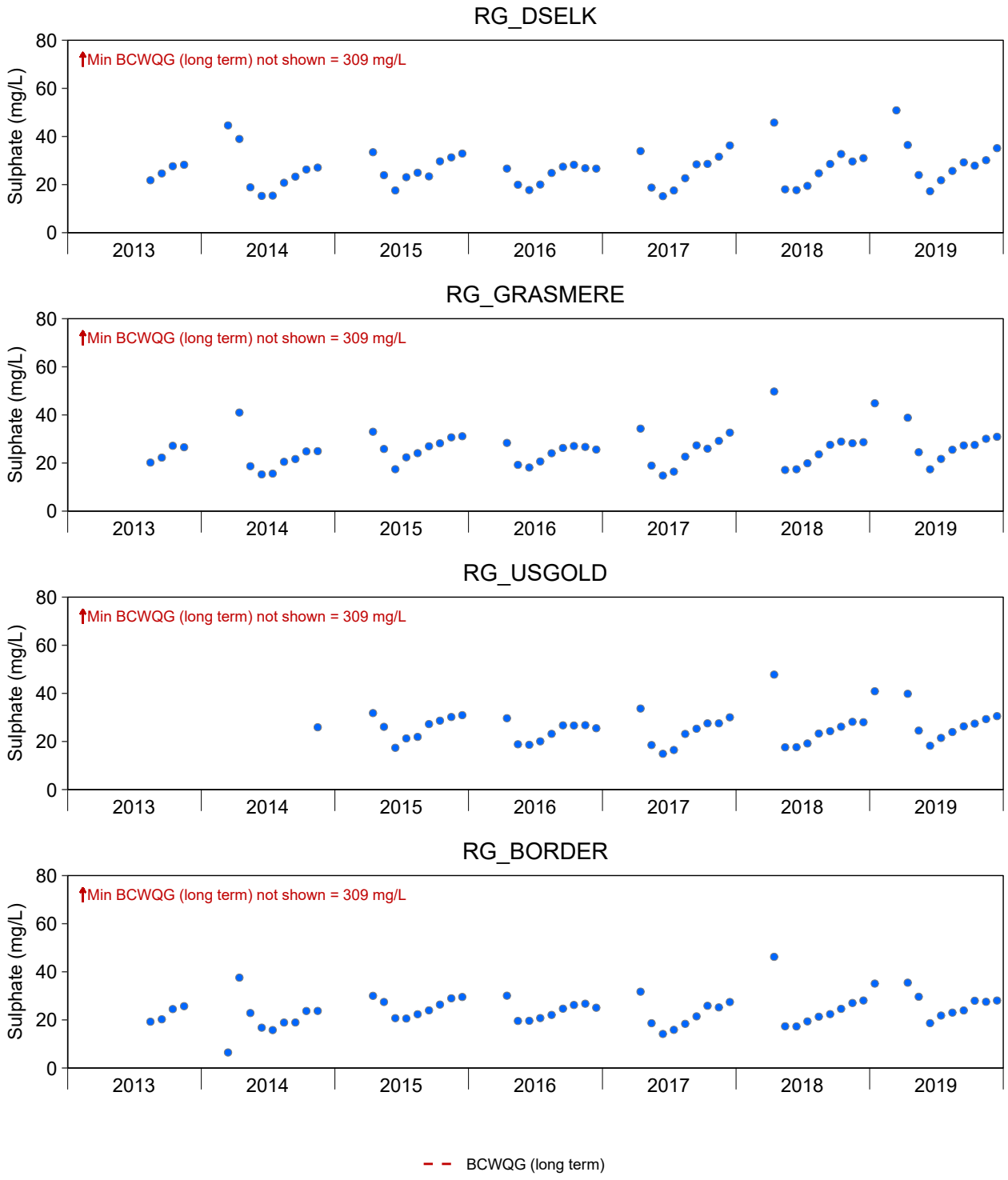


Figure B.13: Monthly Mean Sulphate Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

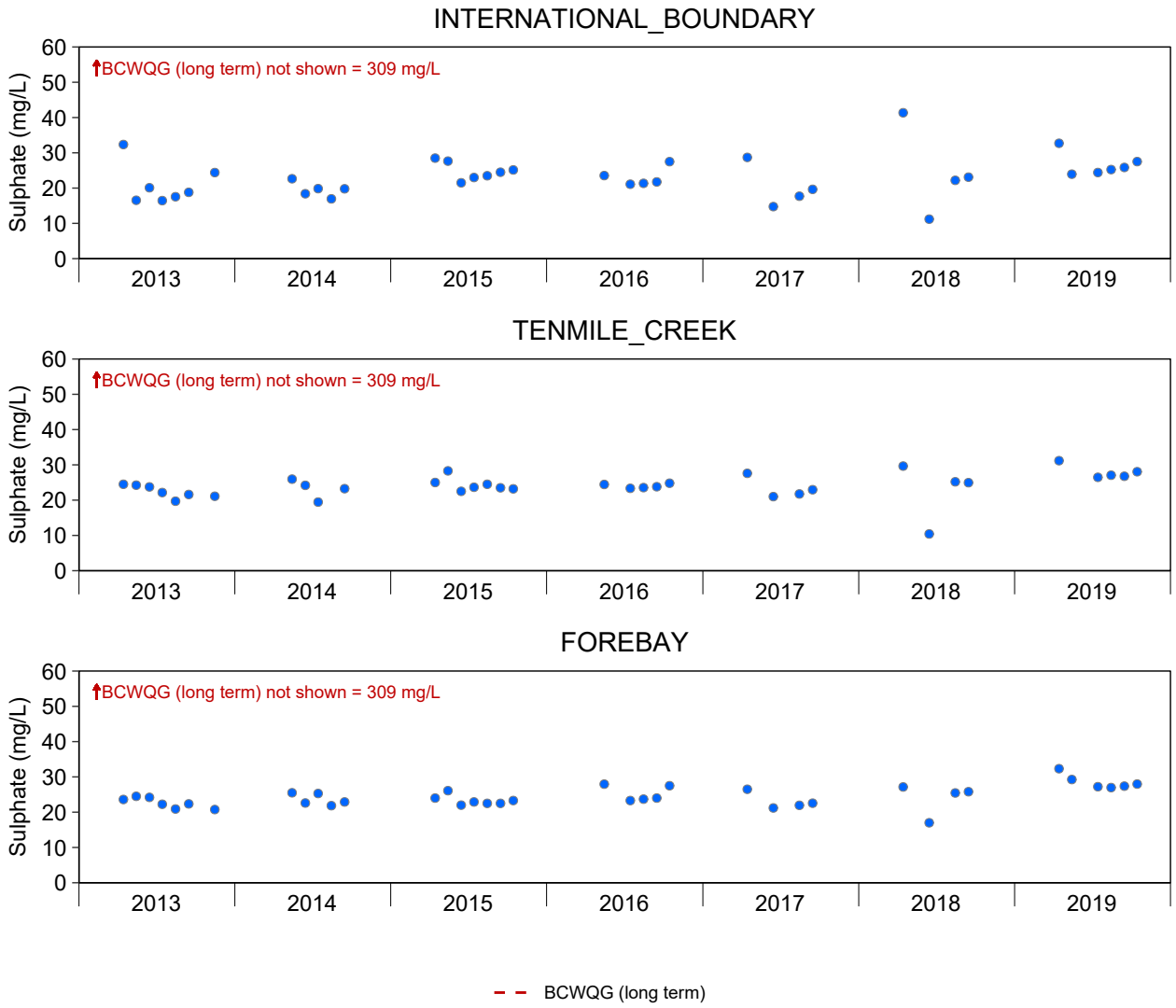


Figure B.13: Monthly Mean Sulphate Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

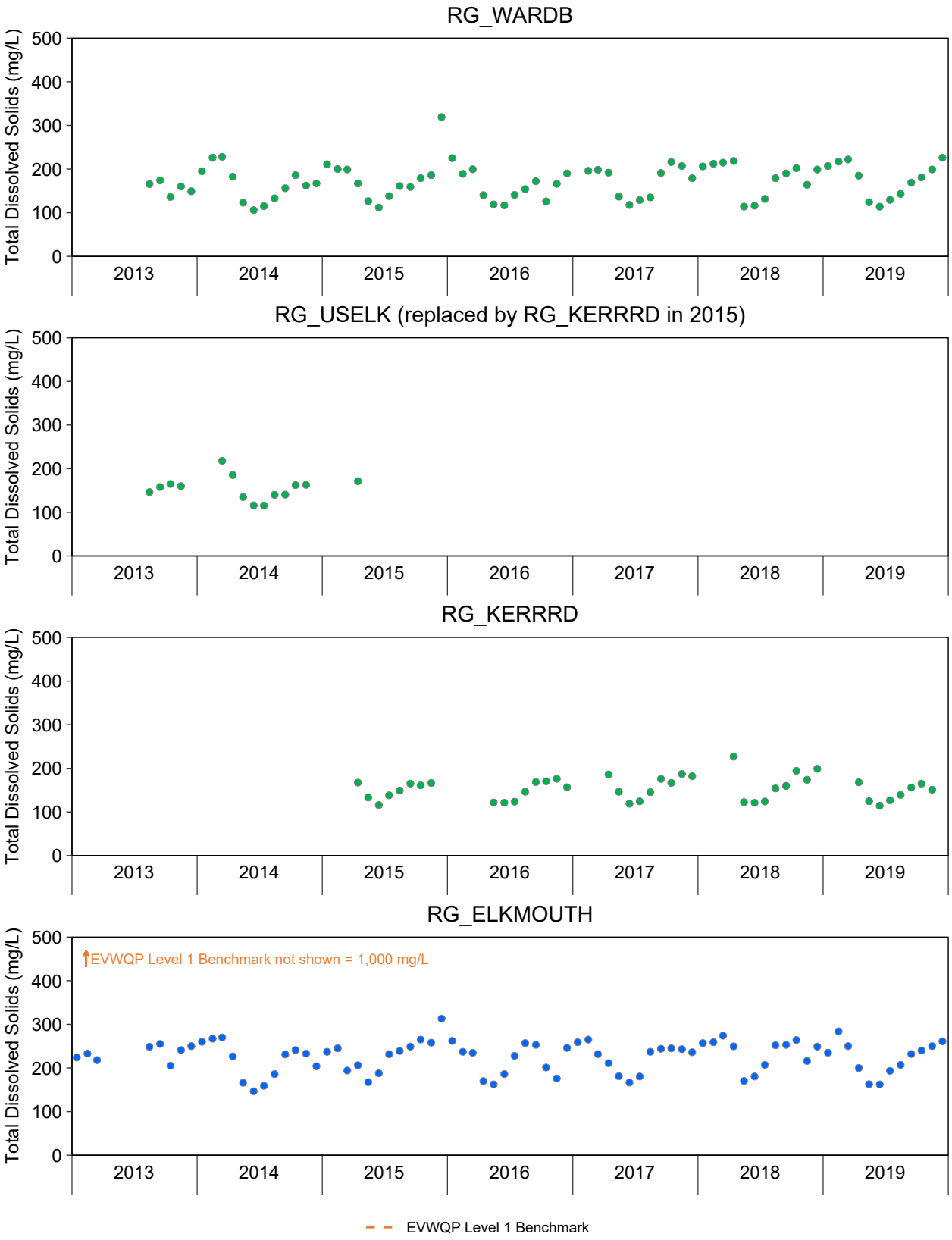


Figure B.14: Monthly Mean Total Dissolved Solids Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

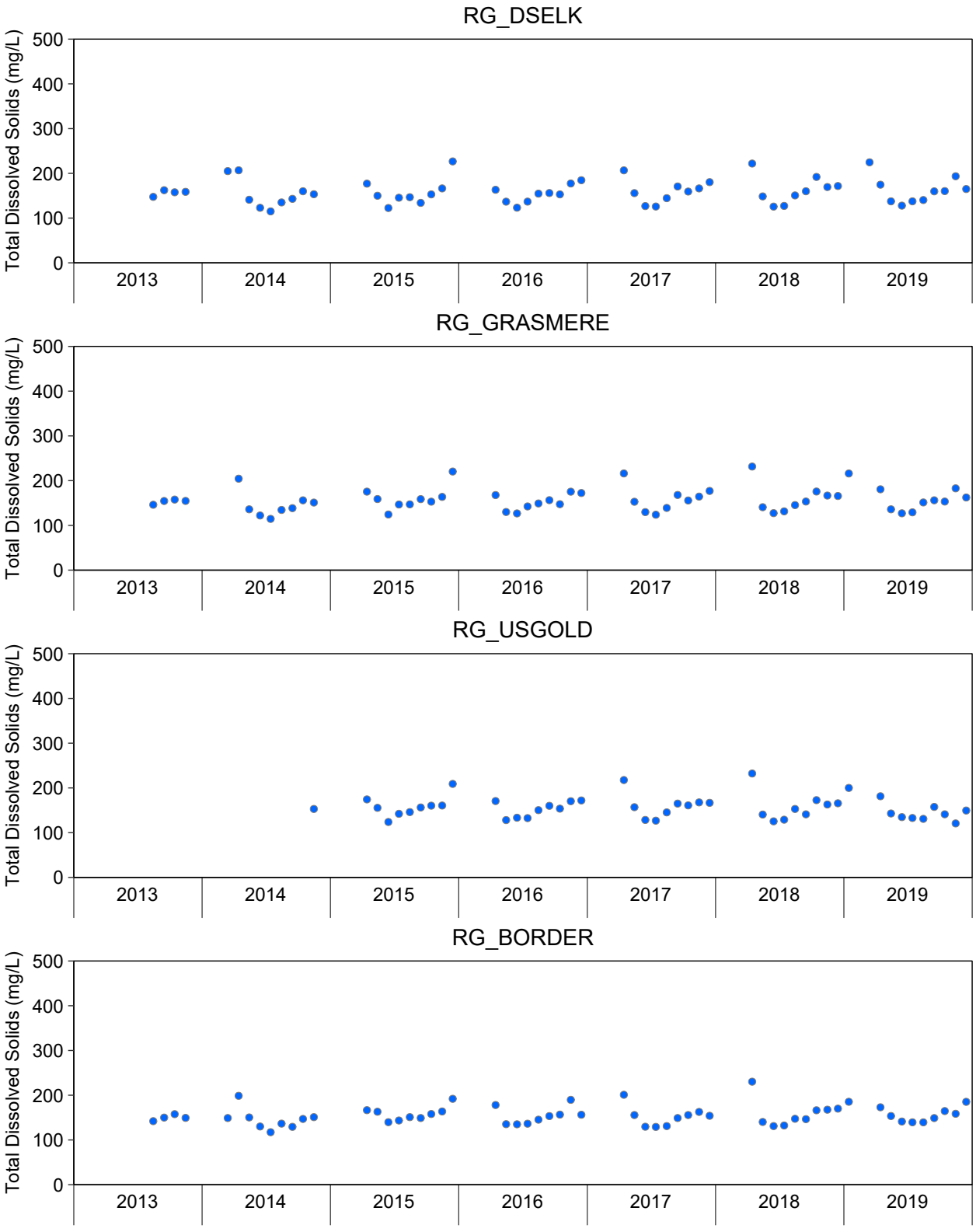


Figure B.14: Monthly Mean Total Dissolved Solids Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

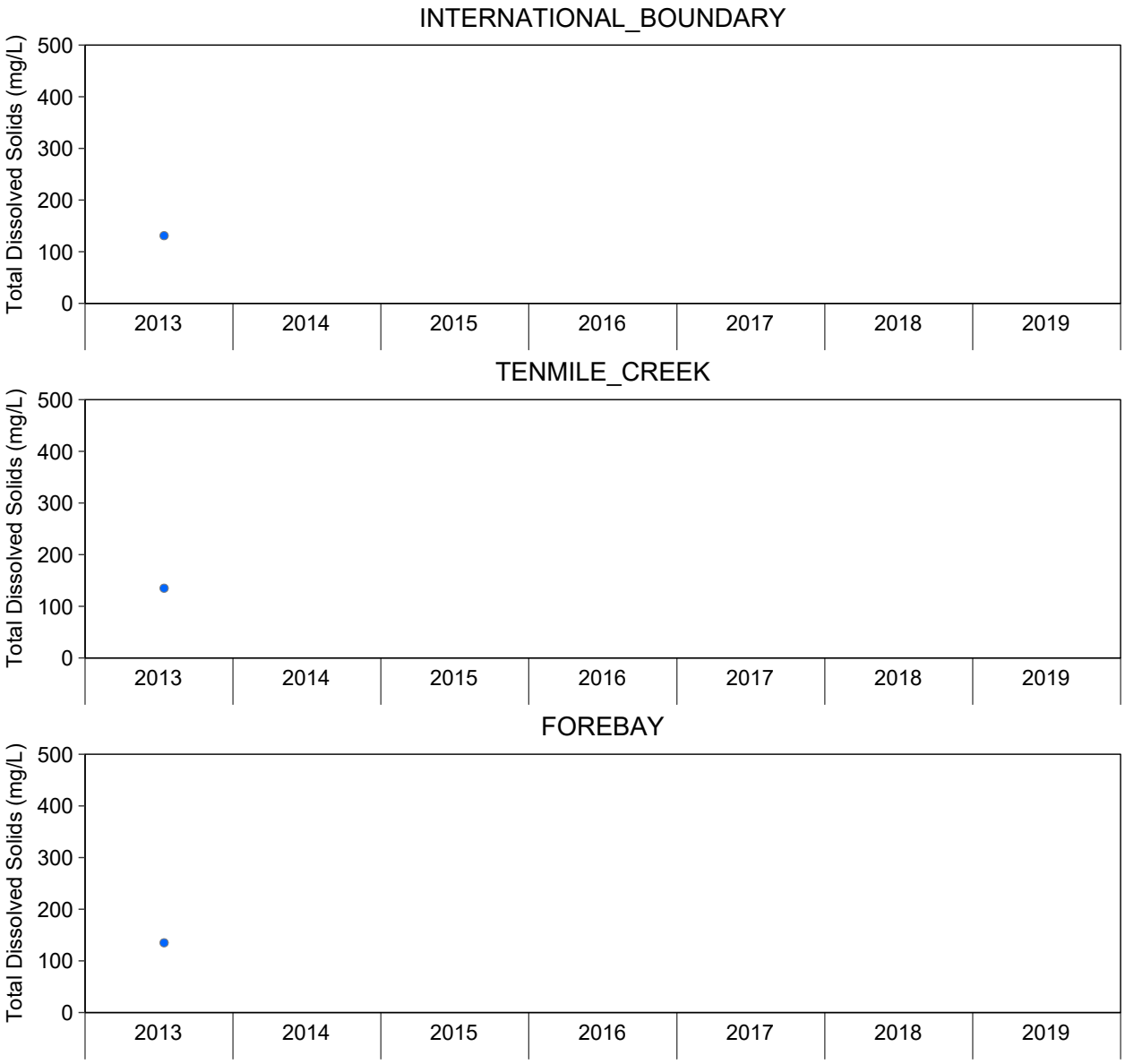


Figure B.14: Monthly Mean Total Dissolved Solids Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

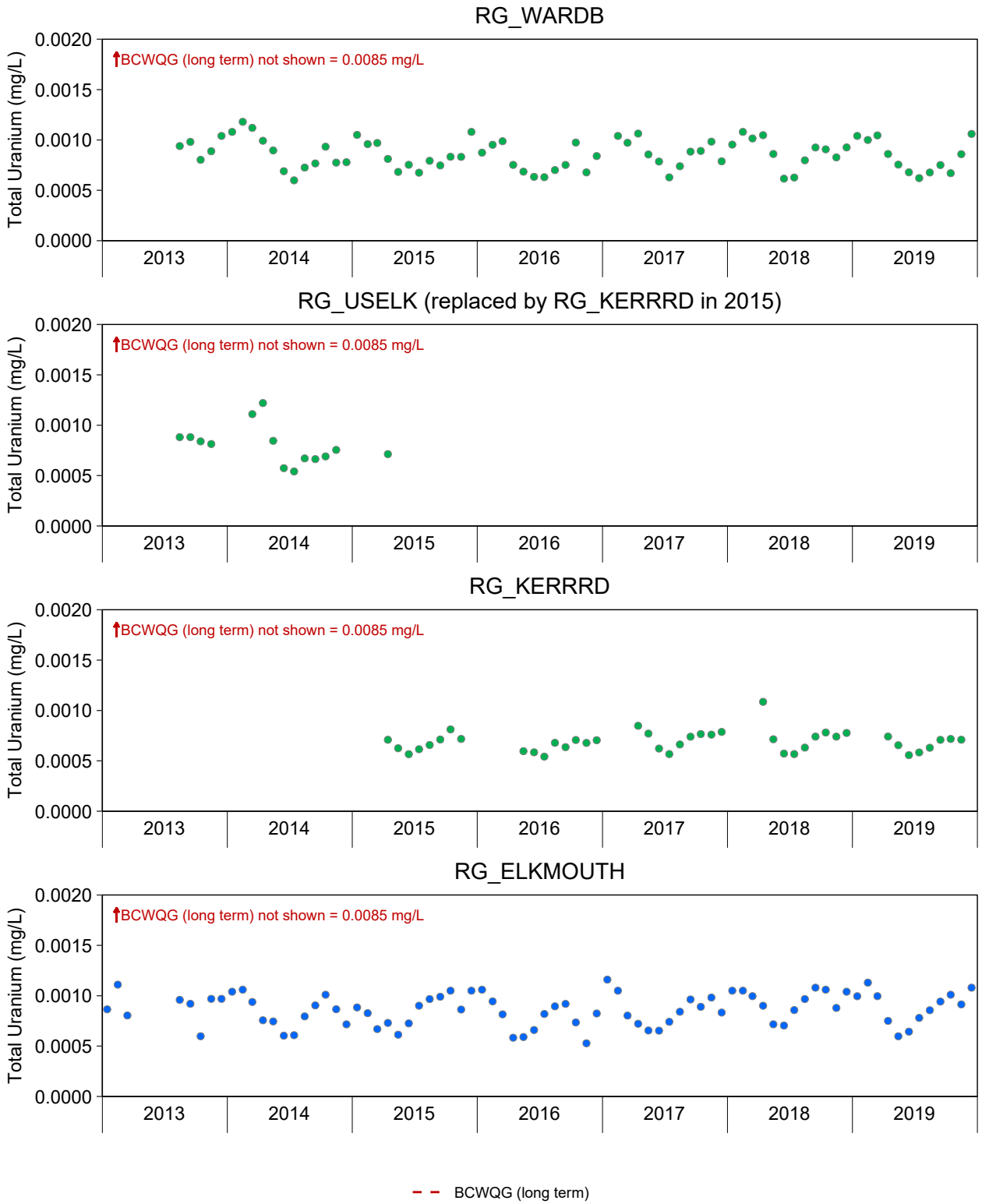


Figure B.15: Monthly Mean Total Uranium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

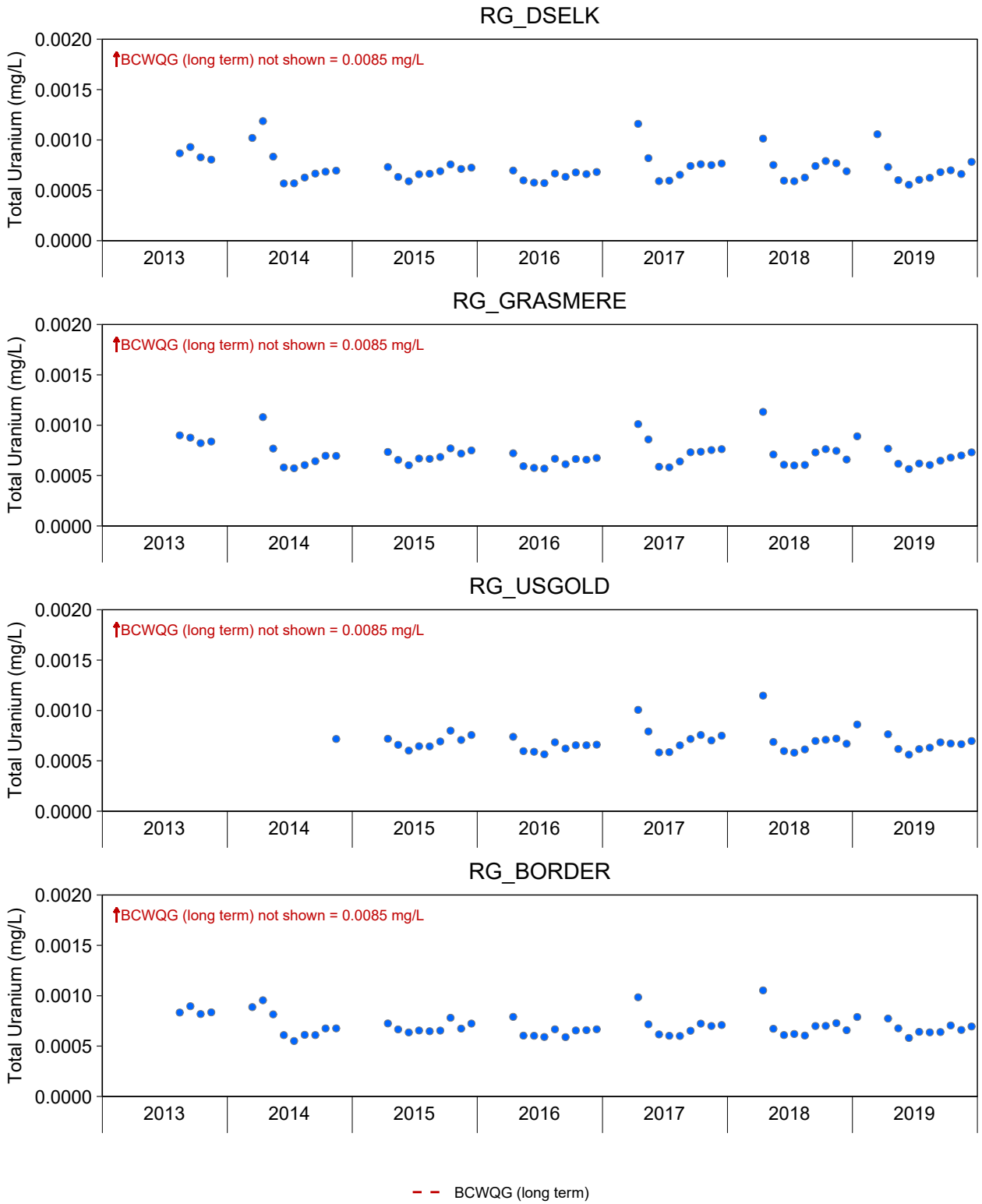


Figure B.15: Monthly Mean Total Uranium Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Note: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018).

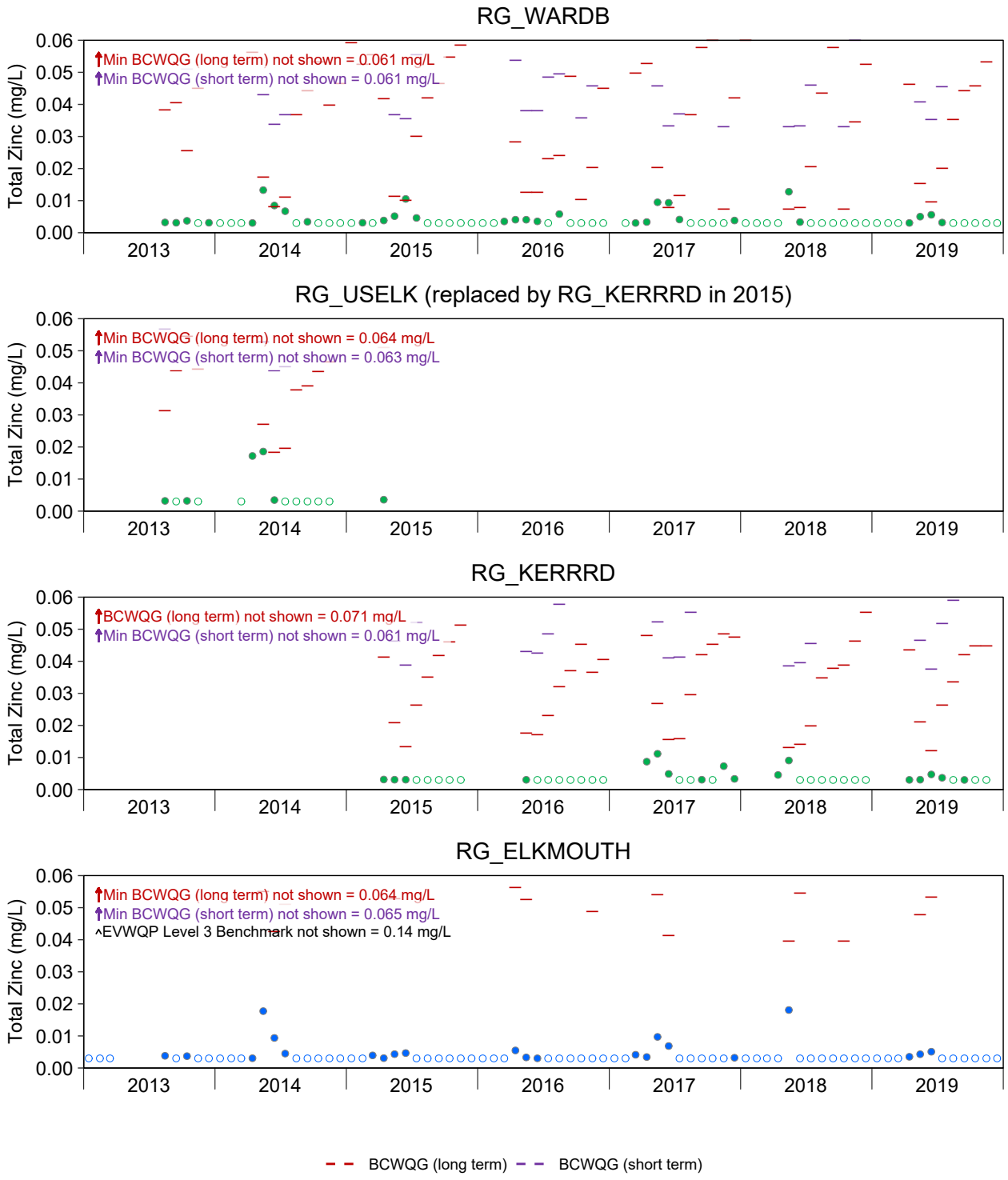


Figure B.16: Monthly Mean Total Zinc Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

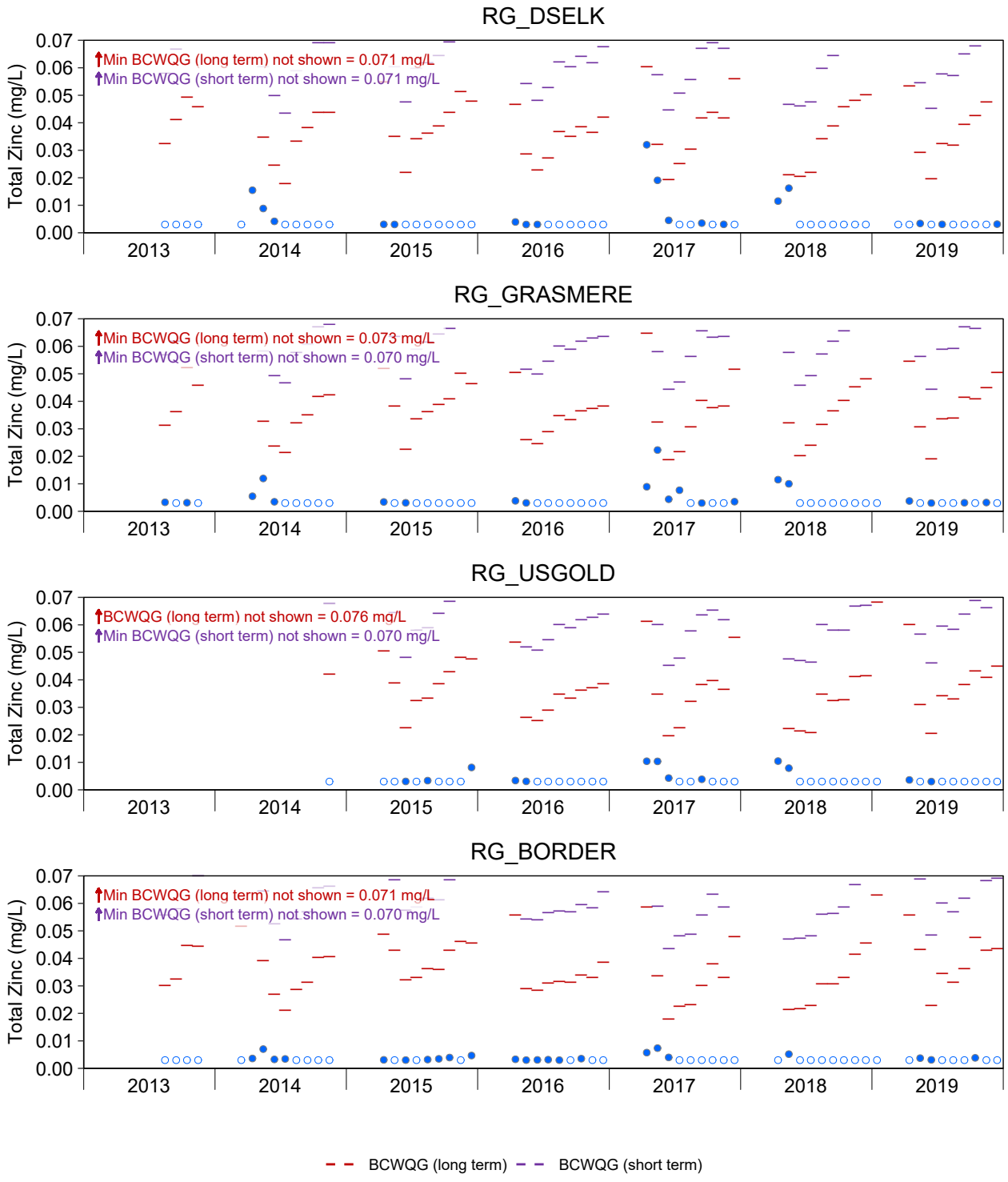


Figure B.16: Monthly Mean Total Zinc Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

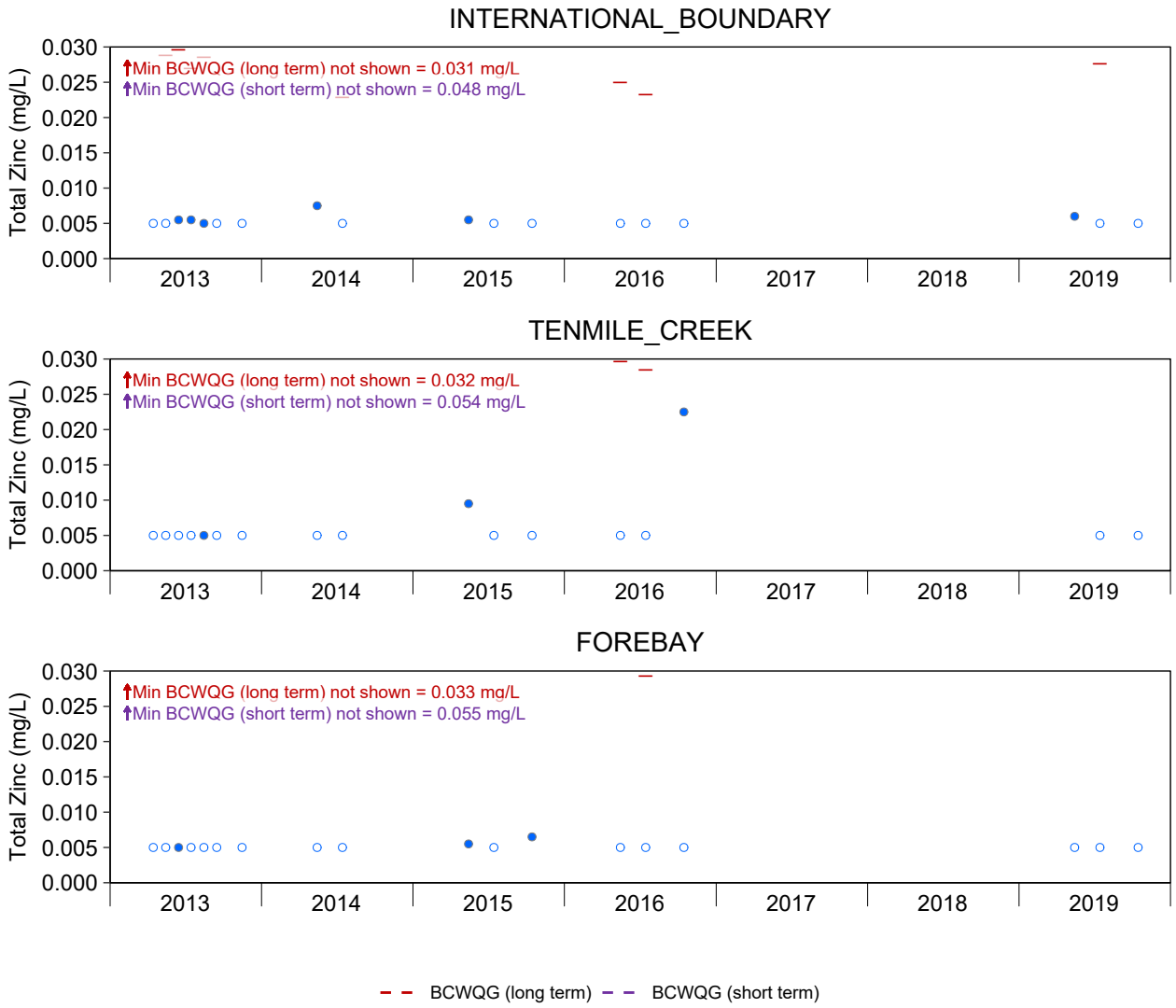


Figure B.16: Monthly Mean Total Zinc Concentrations at Koocanusa Reservoir Water Quality Monitoring Stations, 2013 to 2019

Notes: Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Green points indicate stations upstream of the Elk River; blue points indicate stations downstream of the Elk River. Water quality parameter identified as a constituent with an Early Warning Trigger (EWT; Teck 2018). Guidelines are dependent on water hardness.

Note: Too shallow to complete all profiles.

Sand Creek Area

RG_SC

RG_KERRRD

RG_TN

Elko

93

Elk River

RG_ELKMOUTH

RG_ER

Elk River Area

Koocanusa Reservoir

RG_DSELK

RG_T4

RG_GRASMERE

Gold Creek

RG_USGOLD

RG_GC

Gold Creek Area

RG_BORDER

CANADA

UNITED STATES OF AMERICA

LEGEND

Specific Conductance (µS/cm)

- 249-254
- 254-259
- 259-263
- 263-268
- 268-273
- 273-278
- 278-283
- 283-287
- 287-292
- 292-297

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for specific conductance.

Note: Reservoir channel outline is an approximate representation of the 2018 spring conditions.

Specific Conductance Profiles Conducted at Koocanusa Reservoir, April 2018

0 1.75 3.5 7

km

N W E S

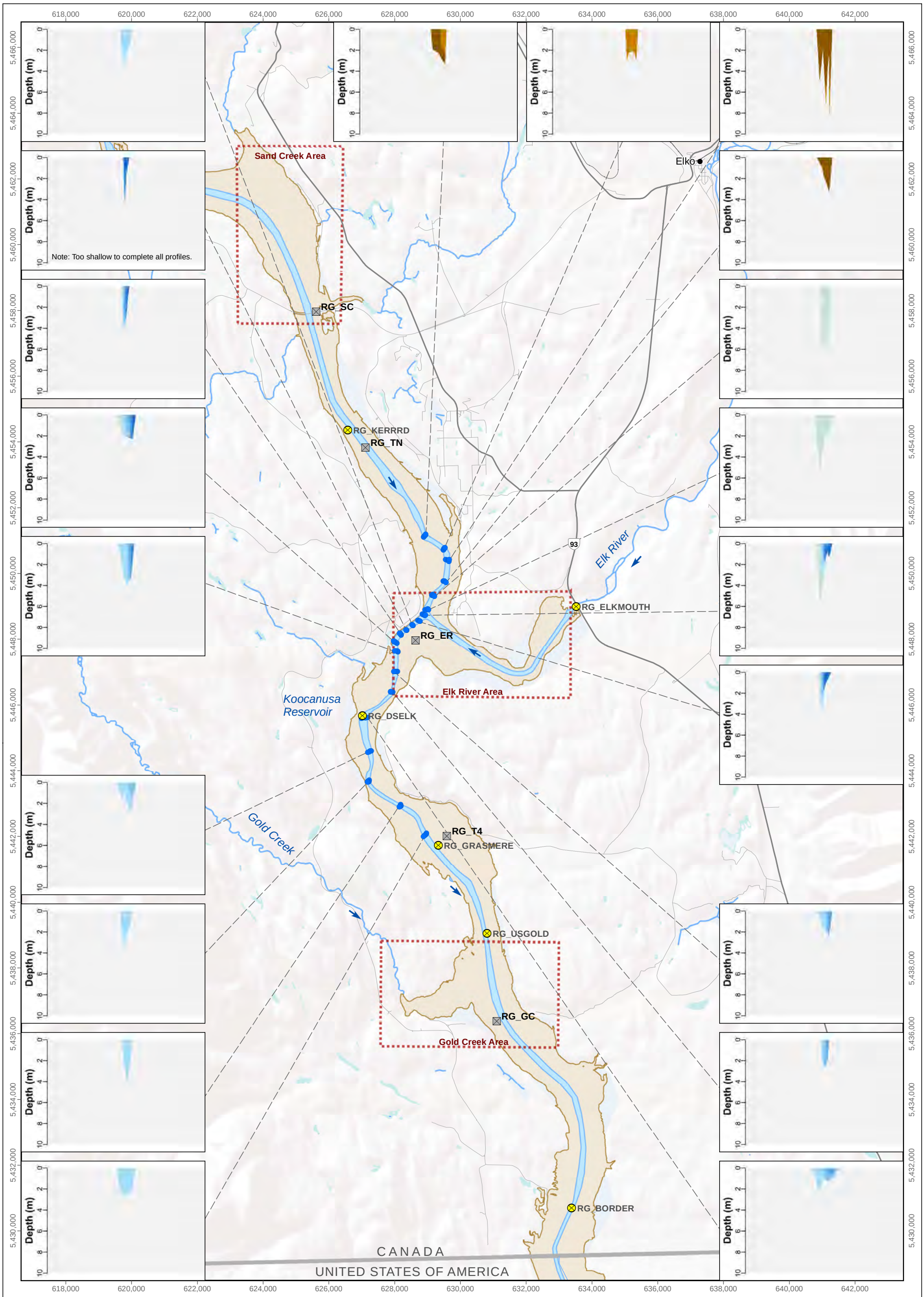
Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.17

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.17 Koocanusa April Plume 2018.mxd



LEGEND

Temperature (°C)

- 8.85 - 10.0
- 8.41 - 8.85
- 7.98 - 8.41
- 7.55 - 7.98
- 7.12 - 7.55
- 6.68 - 7.12
- 6.25 - 6.68
- 5.82 - 6.25
- 5.38 - 5.82
- 4.0 - 5.38

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for temperature.
Note: Reservoir levels are an approximate representation of the 2018 spring conditions.

Water Temperature Profiles Conducted at Koocanusa Reservoir, April 2018

0 1.75 3.5 7
km

N W E S

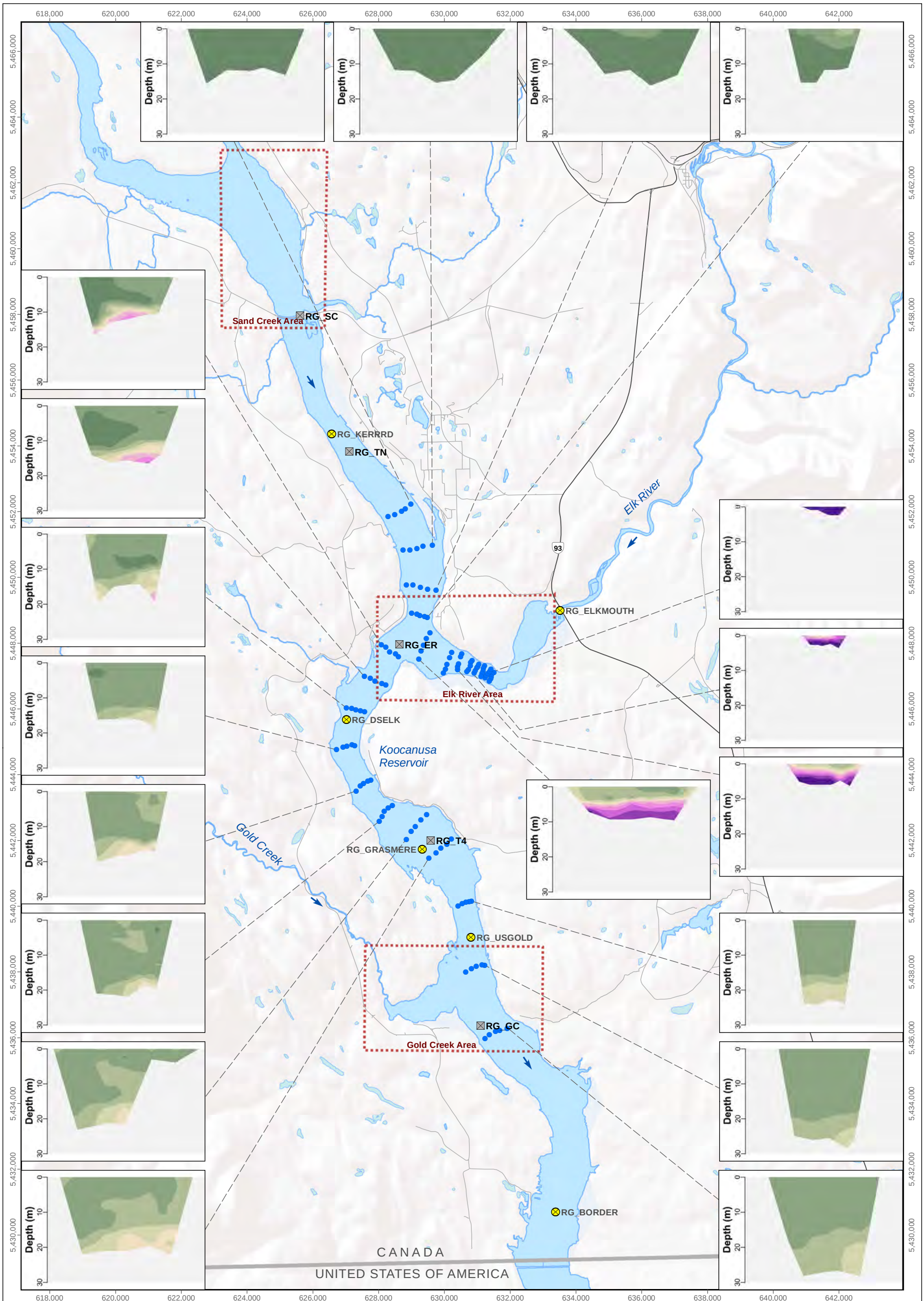
Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.18

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.18 Koocanusa April Temp 2018.mxd



LEGEND

Specific Conductance (µS/cm)

- 188-198
- 198-207
- 207-217
- 217-226
- 226-235
- 235-245
- 245-254
- 254-263
- 263-273
- 273-283

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for specific conductance.

Specific Conductance Profiles Conducted at Koocanusa Reservoir, June 2018

0 1.75 3.5 7
km

N
W E
S

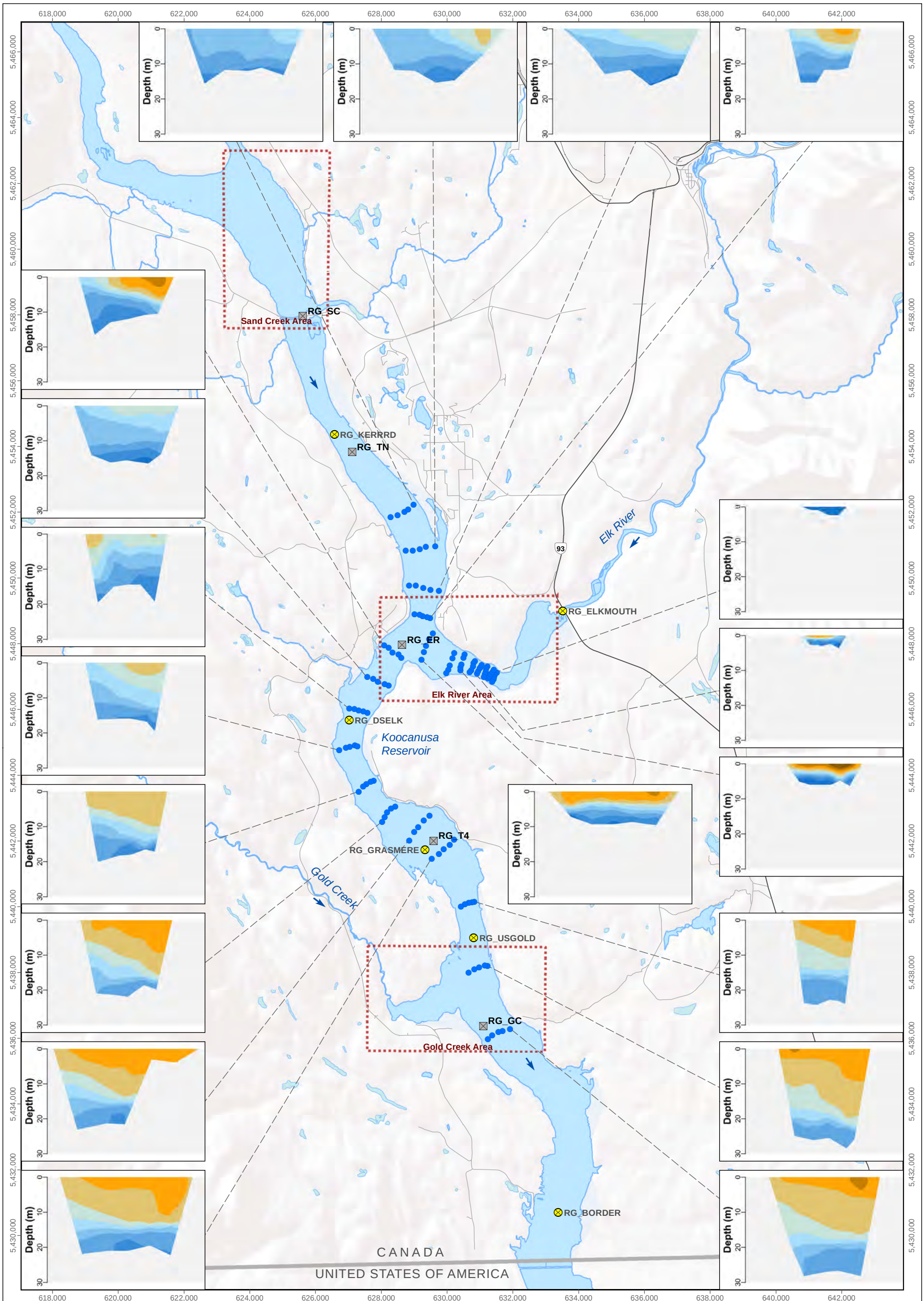
Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.19

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.19 Koocanusa June Plume 2018.mxd



LEGEND

Temperature (°C)

- 16.53 - 18.0
- 15.80 - 16.53
- 15.07 - 15.80
- 14.34 - 15.07
- 13.62 - 14.34
- 12.89 - 13.62
- 12.16 - 12.89
- 11.43 - 12.16
- 10.70 - 11.43
- 9.0 - 10.70

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for temperature.

Water Temperature Profiles Conducted at Koocanusa Reservoir, June 2018

0 1.75 3.5 7
km

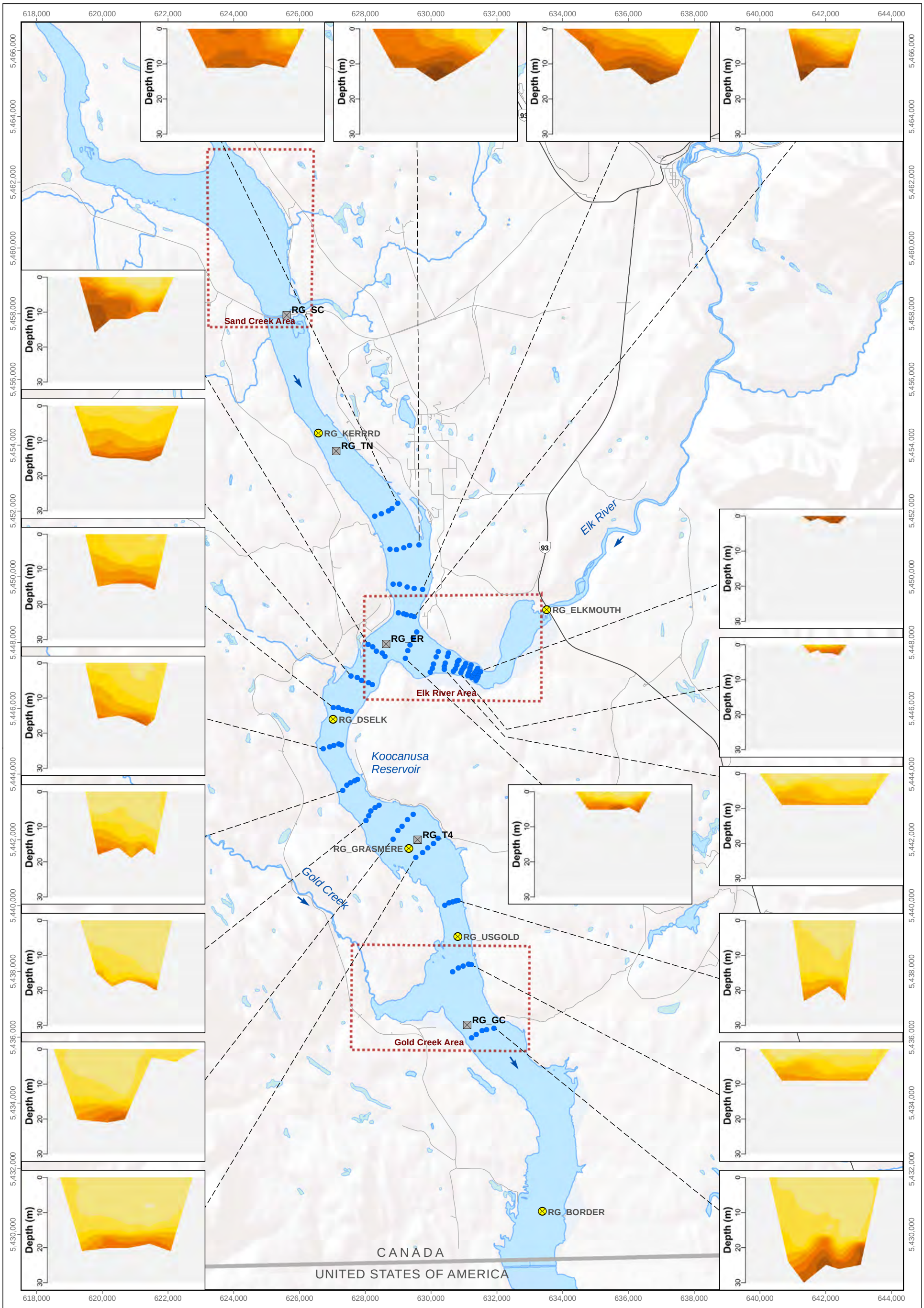
N
W E
S

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.20

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.20 Koocanusa June Temp 2018.mxd



LEGEND

Turbidity (NTU)

- 0.20 - 1.93
- 1.93 - 3.66
- 3.66 - 5.39
- 5.39 - 7.12
- 7.12 - 8.85
- 8.85 - 10.58
- 10.58 - 12.31
- 12.31 - 14.04
- 14.04 - 15.77
- 15.77 - 17.50

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for turbidity.

Turbidity Profiles Conducted at Koocanusa Reservoir, June 2018

0 1.75 3.5 7
km

N
W E
S

Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.21

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.21 Koocanusa June Turbidity 2018.mxd

618,000 620,000 622,000 624,000 626,000 628,000 630,000 632,000 634,000 636,000 638,000 640,000 642,000

5,466,000 5,464,000 5,462,000 5,460,000 5,458,000 5,456,000 5,454,000 5,452,000 5,450,000 5,448,000 5,446,000 5,444,000 5,442,000 5,440,000 5,438,000 5,436,000 5,434,000 5,432,000 5,430,000

Depth (m) 0 10 20 30

Elko

RG_SC

Sand Creek Area

RG_KERRRD

RG_TN

93

Elk River

RG_ELKMOUTH

RG_ER

Elk River Area

RG_DSELK

Koocanusa Reservoir

Gold Creek

RG_T4

RG_GRASMERE

RG_USGOLD

RG_GC

Gold Creek Area

RG_BORDER

CANADA

UNITED STATES OF AMERICA

618,000 620,000 622,000 624,000 626,000 628,000 630,000 632,000 634,000 636,000 638,000 640,000 642,000

LEGEND

Specific Conductance (µS/cm)

- 237-255
- 255-272
- 272-289
- 289-306
- 306-323
- 323-341
- 341-358
- 358-375
- 375-392
- 392-409

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for specific conductance.

Specific Conductance Profiles Conducted at Koocanusa Reservoir, August 2018

0 1.75 3.5 7
km

N W E S

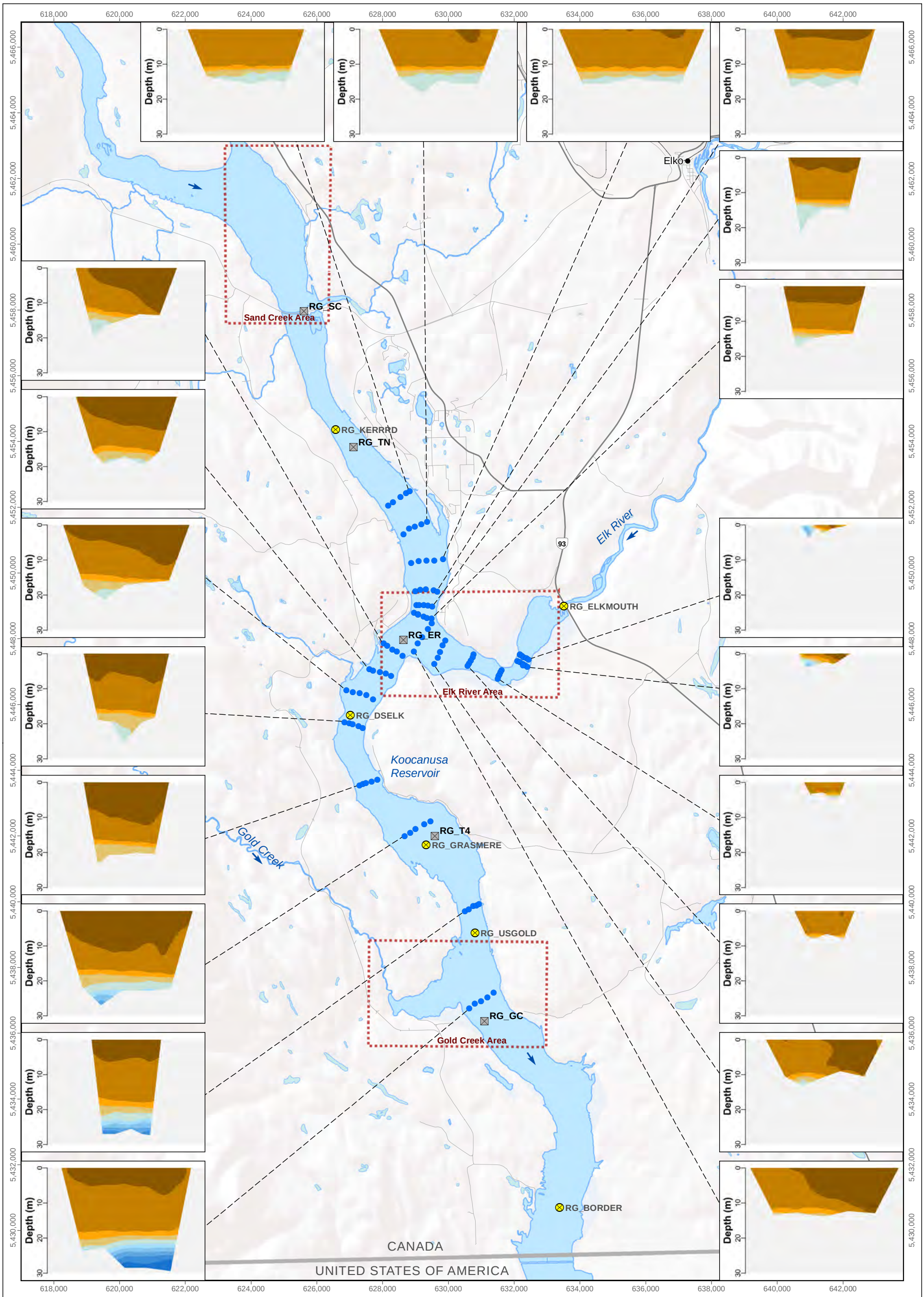
Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.008

minnow environmental inc.

Figure B.22

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.22 Koocanusa August Plume 2018.mxd



LEGEND

Temperature (°C)

- 19.25 - 21.0
- 18.34 - 19.25
- 17.44 - 18.34
- 16.53 - 17.44
- 15.63 - 16.53
- 14.73 - 15.63
- 13.82 - 14.73
- 12.92 - 13.82
- 12.01 - 12.92
- 11.0 - 12.01

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for temperature.

Water Temperature Profiles Conducted at Koocanusa Reservoir, August 2018

0 1.75 3.5 7
km

N W E S

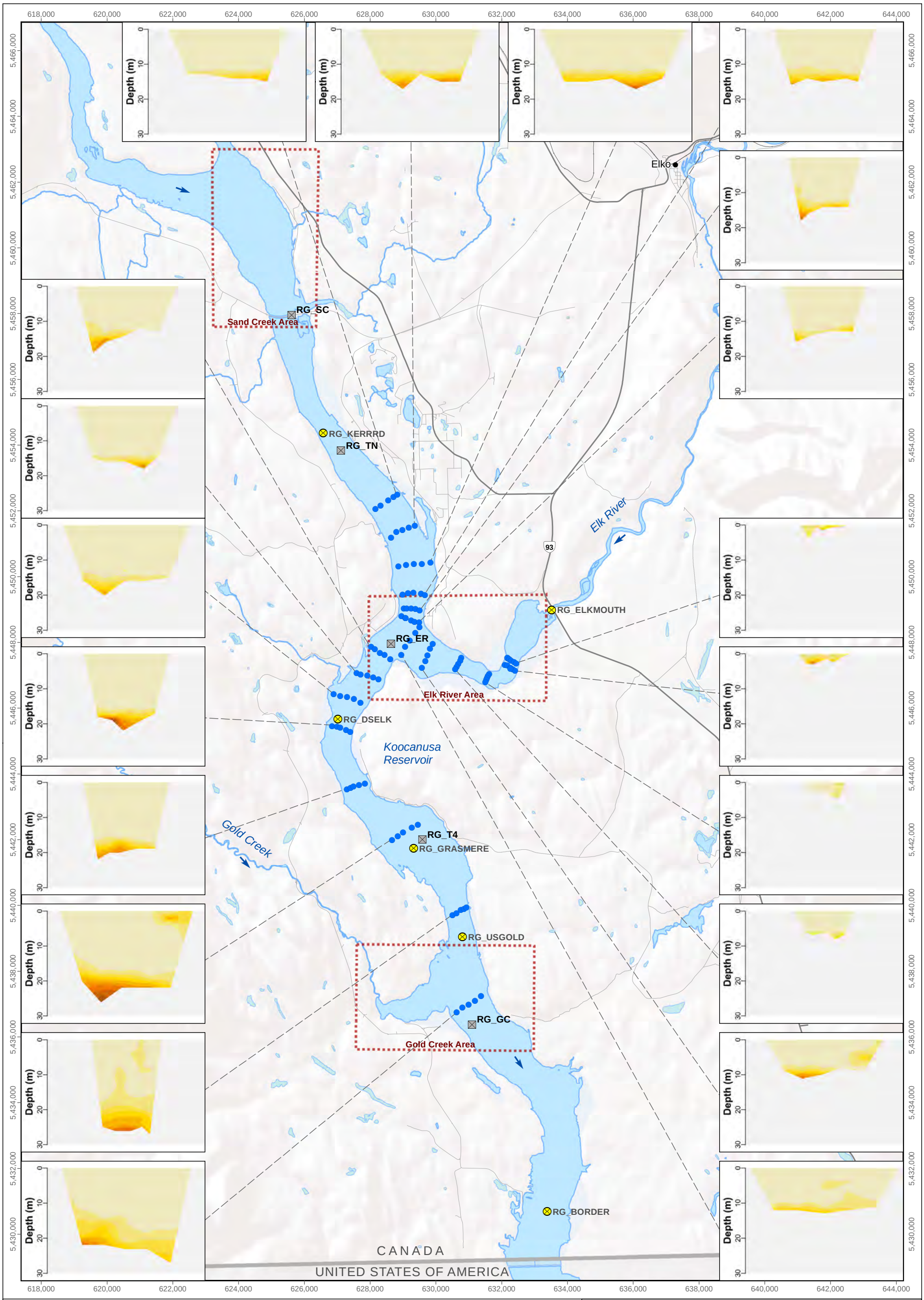
Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.008

minnow environmental inc.

Figure B.23

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.23 Koocanusa August Temp 2018.mxd



LEGEND

Turbidity (NTU)

- 1.90 - 2.59
- 2.59 - 3.28
- 3.28 - 3.98
- 3.98 - 4.67
- 4.67 - 5.37
- 5.37 - 6.07
- 6.07 - 6.76
- 6.76 - 7.46
- 7.46 - 8.15
- 8.15 - 8.84

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for turbidity.

Turbidity Profiles Conducted at Koocanusa Reservoir, August 2018

0 1.75 3.5 7
km

N
W E
S

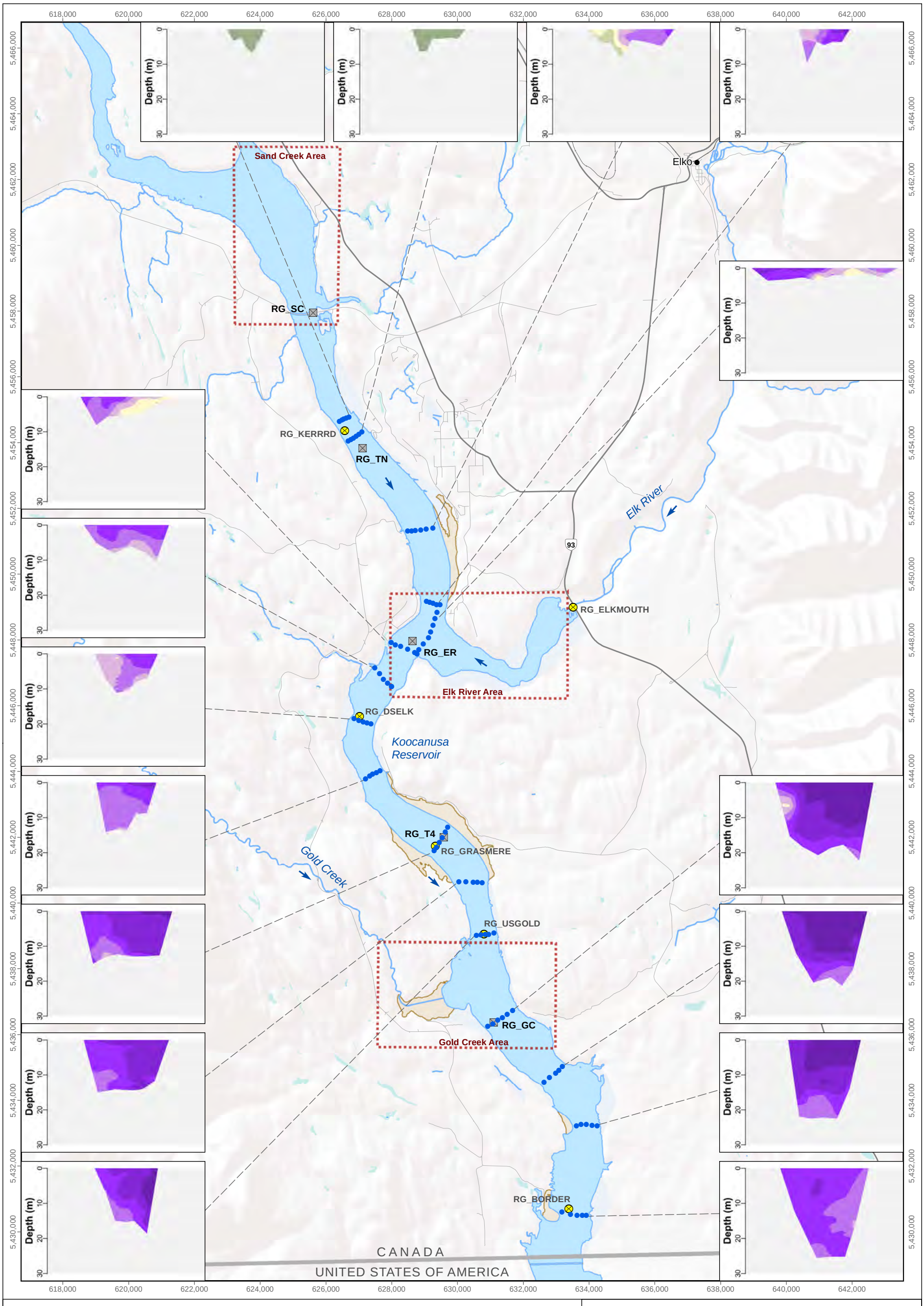
Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.008

minnow environmental inc.

Figure B.24

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.24 Koocanusa August Turbidity 2018.mxd



LEGEND

Specific Conductance (µS/cm)

- 260-273
- 273-286
- 286-299
- 299-311
- 311-324
- 324-337
- 337-349
- 349-362
- 362-374
- 374-570

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for specific conductance.

Specific Conductance Profiles Conducted at Koocanusa Reservoir, April 2019

0 1.75 3.5 7
km

N W E S

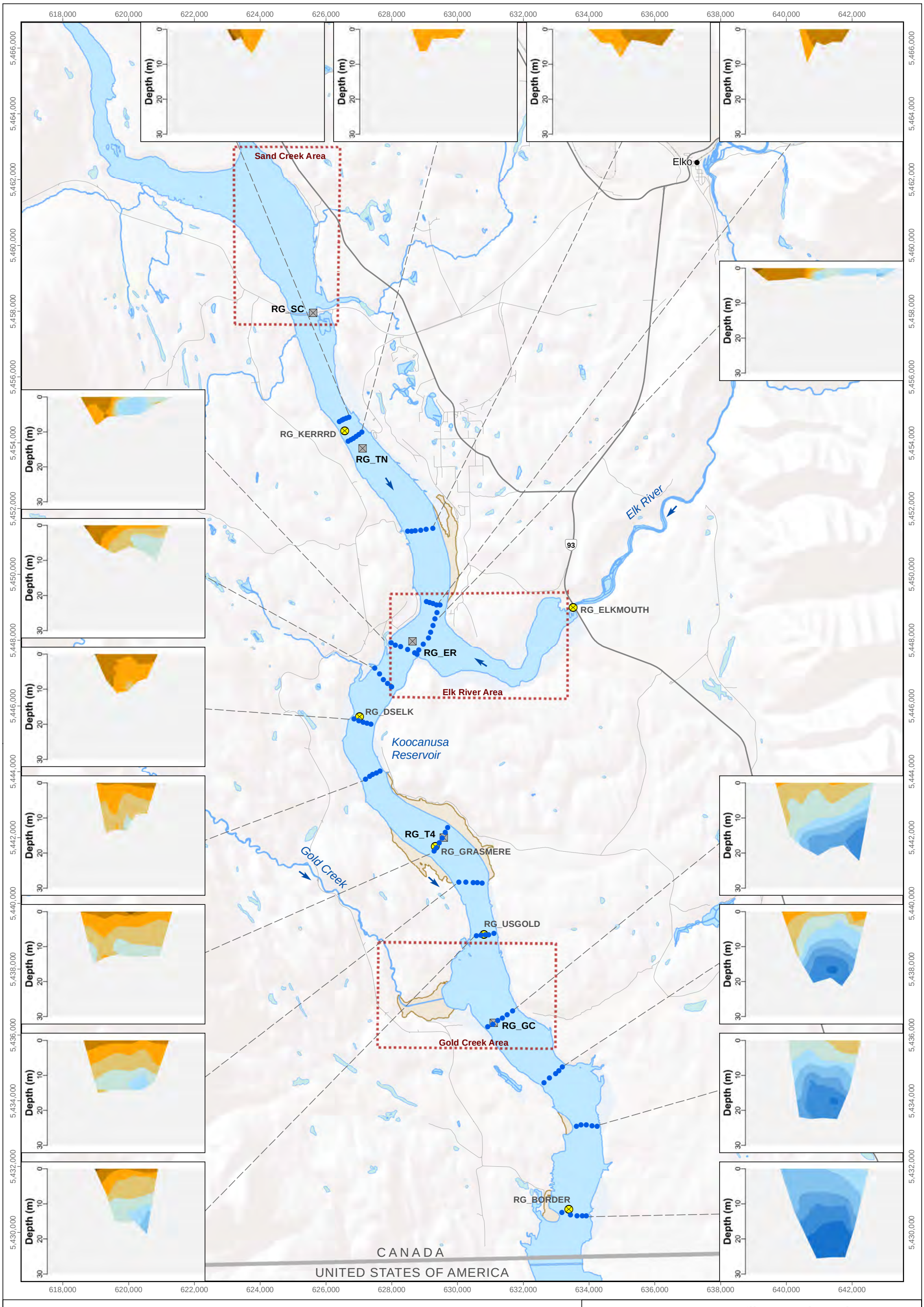
Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.25

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.25 Koocanusa April Plume 2019.mxd



LEGEND

Temperature (°C)

- 6.0 - 6.57
- 6.57 - 7.11
- 7.11 - 7.64
- 7.64 - 8.17
- 8.17 - 8.70
- 8.70 - 9.24
- 9.24 - 9.77
- 9.77 - 10.30
- 10.30 - 10.83
- 10.83 - 11.36

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for temperature.

Water Temperature Profiles Conducted at Koocanusa Reservoir, April 2019

0 1.75 3.5 7
km

N
W E
S

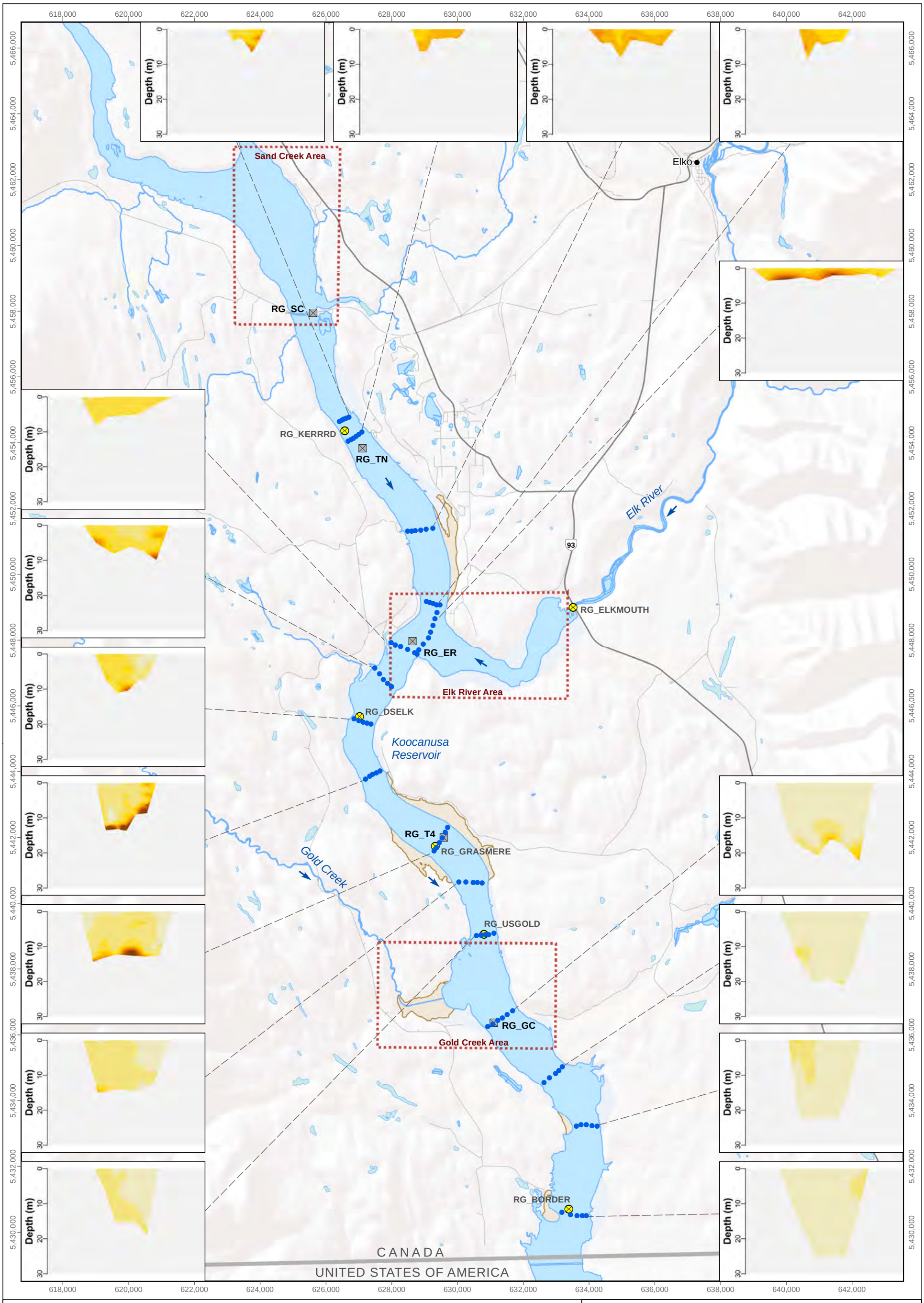
Projection: North American Datum 1983 UTM Zone 11U

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.26

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.26 Koocanusa April Temp 2019.mxd



LEGEND

Turbidity (NTU)

- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- > 90

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for turbidity.

Turbidity Profiles Conducted at Koocanusa Reservoir, April 2019

0 1.75 3.5 7
km

N
W E
S

Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.27

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.27 Koocanusa April Turbidity 2019.mxd

RG_SC
Sand Creek Area
RG_KERRRD
RG_TN
Elk River
93
RG_ELKMOUTH
RG_ER
Elk River Area
RG_DSELK
Koocanusa
Reservoir
RG_T4
RG_GRASMERE
Gold Creek
RG_USGOLD
RG_GC
Gold Creek Area
RG_BORDER
CANADA
UNITED STATES OF AMERICA

LEGEND

Specific Conductance (µS/cm)

- 206-223
- 223-240
- 240-257
- 257-273
- 273-290
- 290-307
- 307-323
- 323-340
- 340-356
- 356-373

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for specific conductance.

Specific Conductance Profiles Conducted at Koocanusa Reservoir, June 2019

0 1.75 3.5 7
km

N W E S

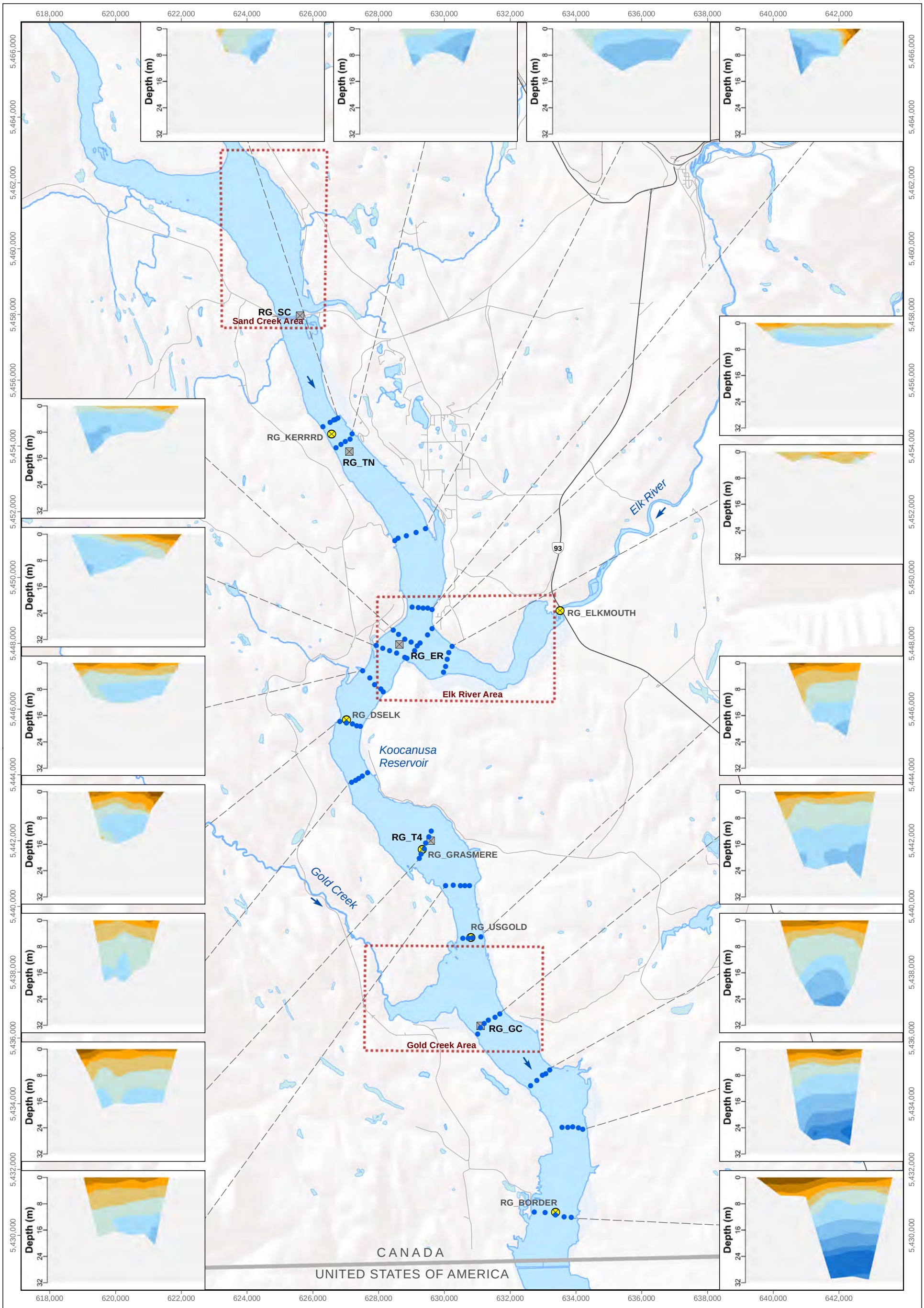
Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.28

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.28 Koocanusa June Plume 2019.mxd



LEGEND

Temperature (°C)

- 7.0 - 8.92
- 8.92 - 9.95
- 9.95 - 10.99
- 10.99 - 12.03
- 12.03 - 13.06
- 13.06 - 14.10
- 14.10 - 15.14
- 15.14 - 16.10
- 16.10 - 17.21
- 17.21 - 18.25

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for temperature.

Water Temperature Profiles Conducted at Koocanusa Reservoir, June 2019

0 1.75 3.5 7
km

N
W E
S

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.29

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.29 Koocanusa June Temp 2019.mxd

RG_SC
Sand Creek Area
RG_KERRRD
RG_TN
RG_ELKMOUTH
RG_ER
Elk River Area
RG_DSELK
Koocanusa Reservoir
RG_T4
RG_GRASMERE
Gold Creek
RG_USGOLD
RG_GC
Gold Creek Area
RG_BORDER
Elk River
93
CANADA
UNITED STATES OF AMERICA

LEGEND

Turbidity (NTU)
- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- > 90

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for turbidity.

Turbidity Profiles Conducted at Koocanusa Reservoir, June 2019

0 1.75 3.5 7
km

N W E S

Projection: North American Datum 1983 UTM Zone 11

Date: November 2020
Project 197202.0008

minnow environmental inc.

Figure B.30

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.30 Koocanusa June Turbidity 2019.mxd

618,000 620,000 622,000 624,000 626,000 628,000 630,000 632,000 634,000 636,000 638,000 640,000 642,000

5,466,000 5,464,000 5,462,000 5,460,000 5,458,000 5,456,000 5,454,000 5,452,000 5,450,000 5,448,000 5,446,000 5,444,000 5,442,000 5,440,000 5,438,000 5,436,000 5,434,000 5,432,000 5,430,000

Elko

RG_SC

Sand Creek Area

RG_KERRRD

RG_TN

Elk River

93

RG_ELKMOUTH

RG_ER

Elk River Area

RG_DSELK

Koocanusa Reservoir

Gold Creek

RG_T4

RG_GRASMERE

RG_USGOLD

RG_GC

Gold Creek Area

RG_BORDER

CANADA

UNITED STATES OF AMERICA

Depth (m) 0 6 12 18 24 30 36

Depth (m) 0 10 20 30

LEGEND

Specific Conductance (µS/cm)

- 261-276
- 276-291
- 291-306
- 306-320
- 320-335
- 335-349
- 349-364
- 364-378
- 378-393
- 393-407

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for specific conductance.

Specific Conductance Profiles Conducted at Koocanusa Reservoir, August 2019

0 1.75 3.5 7
km

N W E S

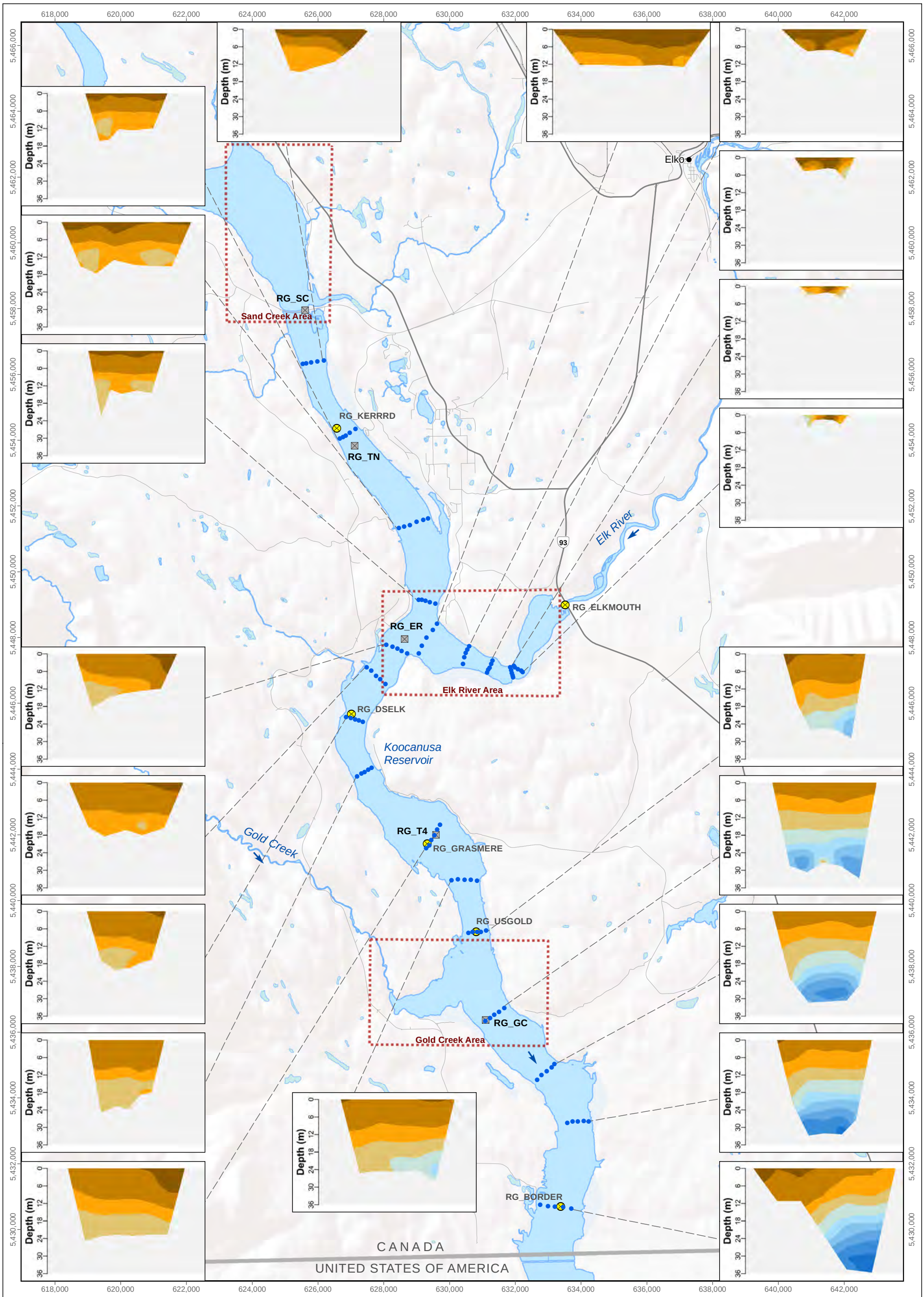
Projection: North American Datum 1983 UTM Zone 11U

Date: November 2020
Project 197202.008

minnow environmental inc.

Figure B.31

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.31 Koocanusa August Plume 2019.mxd



LEGEND

Temperature (°C)

- 9.0 - 11.06
- 11.06 - 12.20
- 12.20 - 13.33
- 13.33 - 14.46
- 14.46 - 15.59
- 15.59 - 16.72
- 16.72 - 17.86
- 17.86 - 18.99
- 18.99 - 20.12
- 20.12 - 21.25

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for temperature.

Water Temperature Profiles Conducted at Koocanusa Reservoir, August 2019

0 1.75 3.5 7
km

N W E S

Projection: North American Datum 1983 UTM Zone 11U

Date: November 2020
Project 197202.008

minnow environmental inc.

Figure B.32

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.32 Koocanusa August Temp 2019.mxd

Turbidity Profiles Conducted at Koocanusa Reservoir, August 2019

LEGEND

Turbidity (NTU)

- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- > 90

- Transect Location
- Water Chemistry and In Situ Monitoring Station
- Permitted Water Quality Station
- Fish (fish health, recruitment, and fish tissue) Sampling Area

Note: Color scheme set as 10% of the total range for turbidity.

0 1.75 3.5 7
km

N W E S

Projection: North American Datum 1983 UTM Zone 11U

Date: November 2020
Project 197202.008

minnow environmental inc.

Figure B.33

Document Path: S:\Projects\197202\197202.0008 - Teck Koocanusa 2019\4 - GIS\Report 2017 to 2019\19-08 Figure H.B.33 Koocanusa August Turbidity 2019.mxd

TABLES

Table B.1: *In situ* Water Quality Measurements in Koocanusa Reservoir, 2018

Station	Date	Location (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Specific Conductivity	ORP	Secchi Depth
		Easting	Northing	m	°C		mg/L	%	µS/cm	mV	m
RG_SC	30-Apr-18	625624	5457296	Surface	11.1	7.38	13.7	135	310	-74.4	-
				0.5	11.0	7.63	13.7	135	310	-31.6	
				1.0	11.1	7.37	13.5	122	310	-28.4	
				1.5	11.0	7.41	13.3	120	309	-25.5	
RG_ER	27-Apr-18	627959	5447572	Surface	9.29	8.26	9.95	86.9	303	157.7	0.1
				0.5	8.97	8.15	9.92	86.3	302	160.5	
				1.0	8.90	8.07	9.87	85.5	302	160.1	
RG_T4	29-Apr-18	629235	5441654	Surface	6.73	7.57	12.5	103	262	-89.5	0.1
				0.5	6.75	7.55	12.5	102	266	-92.2	
				1.0	6.73	7.44	12.4	102	261	-87.5	
				1.5	6.73	7.40	12.3	101	263	-90.0	
				2.0	6.73	7.35	12.3	101	265	-90.1	
				2.5	6.77	7.40	12.5	103	260	-91.5	
				3.0	6.74	7.41	12.4	102	265	-91.3	
RG_GC	27-Apr-18	630926	5436344	Surface	11.2	7.59	12.8	113	327	-9.60	-
				0.5	7.81	7.49	12.6	106	256	2.20	
				1.0	7.91	7.33	12.6	106	264	3.70	
				1.5	8.16	7.32	12.6	107	214	6.10	
				2.0	8.05	7.27	12.3	104	248	5.50	

Note: A profile was not collected at RG_TN due to insufficient depth.

Table B.2: Depth Profiles from the Koocanusa Reservoir, June 2018

Station	Date	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	Turbidity
		Easting	Northing	m	°C		mg/L	%	µS/cm	µS/cm	NTU
RG_SC	13-Jun-18	625691	5457986	Surface	11.6	7.98	10.6	104	131	175	13.2
				1.5	11.9	7.90	10.6	104	130	173	13.1
RG_TN-1	11-Jun-18	627369	5453492	1	12.2	8.19	10.7	108	143	190	10.1
				2	12.1	8.19	10.3	103	143	190	10.7
				3	12.1	8.19	10.0	100	143	190	10.2
				4	12.1	8.18	9.83	98.2	143	190	10.0
				5	12.1	8.16	9.82	98.0	143	190	10.4
				6	12.2	8.17	9.65	96.3	143	190	9.90
				7	12.1	8.16	9.71	96.6	144	190	9.60
				8	12.0	8.16	9.72	96.6	143	190	10.6
				9	11.9	8.16	9.66	95.4	142	189	12.7
				10	11.8	8.13	9.69	95.7	141	189	13.2
				11	11.8	8.11	9.64	95.4	141	189	13.2
RG_TN-2	11-Jun-18	627256	5453672	1	12.3	8.22	10.1	101	144	190	9.60
				2	12.3	8.21	9.74	97.3	144	190	9.40
				3	12.2	8.19	9.76	97.9	144	190	9.50
				4	12.0	8.18	9.59	95.5	143	190	10.2
				5	11.9	8.15	9.74	96.7	142	189	10.5
				6	11.8	8.14	9.71	96.2	141	188	10.9
				7	11.7	8.11	9.66	95.3	140	188	11.6
				8	11.7	8.08	9.68	95.3	140	188	11.8
				9	11.6	8.05	9.59	94.7	140	188	12.3
				10	11.6	8.04	9.61	94.6	140	188	12.8
RG_TN-3	11-Jun-18	627367	5453710	1	12.3	8.03	10.3	103	144	191	9.00
				2	12.4	8.10	10.1	101	145	190	9.00
				3	12.4	8.13	9.99	100	145	191	8.90
				4	12.3	8.15	9.96	99.7	144	191	9.70
				5	12.3	8.15	9.92	99.3	144	190	9.60
				6	12.2	8.16	9.86	98.5	144	190	10.3
				7	12.2	8.16	9.86	98.5	144	190	10.5
				8	12.0	8.18	9.82	97.5	143	190	12.3
				9	11.9	8.18	9.77	97.3	142	190	13.2
				10	11.9	8.15	9.81	97.5	142	190	13.5
				11	11.8	8.12	9.78	96.8	142	190	13.8
RG_TN-4	11-Jun-18	627333	5453882	1	12.4	8.16	10.2	103	145	191	9.30
				2	12.4	8.16	9.95	99.7	145	191	9.30
				3	12.5	8.16	9.75	97.9	145	191	9.30
				4	12.4	8.15	9.80	98.2	145	191	9.30
				5	12.4	8.14	9.74	97.6	145	191	9.40
				6	12.4	8.13	9.62	96.4	144	190	9.90
				7	12.1	8.12	9.67	96.2	143	189	9.80
				8	11.9	8.10	9.63	95.6	141	189	10.6
				9	11.7	8.08	9.62	95.1	140	188	12.0
				10	11.7	8.06	9.61	94.7	140	188	12.1
RG_TN-5	11-Jun-18	627200	5454005	1	12.5	8.21	9.98	99.7	145	190	9.60
				2	12.5	8.22	9.77	98.1	144	190	9.10
				3	12.4	8.21	9.60	96.1	144	190	9.00
				4	12.3	8.19	9.67	96.6	144	190	9.20
				5	12.1	8.18	9.68	96.2	142	189	10.0
				6	12.1	8.16	9.57	95.6	142	189	10.1
				7	12.0	8.13	9.54	94.2	141	188	10.2
				8	11.8	8.11	9.53	94.4	141	188	10.7
				9	11.7	8.09	9.58	94.2	140	188	11.9
				10	11.7	8.08	9.47	93.3	140	188	12.4
RG_ER	9-Jun-18	633598	5449060	Surface	10.3	-	-	-	196	273	14.7
	13-Jun-18	627959	5447572	Surface	13.1	8.02	9.50	102	145	189	10.2
				1.9	12.7	7.97	8.90	96.8	145	190	9.74
RG_DSELK	13-Jun-18	627017	5445677	1	15.4	8.34	9.59	103	165	203	3.00
				2	14.7	8.31	9.76	104	164	203	3.30
				3	14.7	8.25	9.88	105	163	202	3.90
				4	13.1	8.06	10.0	102	149	193	7.80
				5	12.9	8.00	9.92	101	148	193	7.60
				6	12.9	7.94	9.93	99.7	148	193	7.30
				7	13.0	7.85	10.0	100	147	192	7.60
				8	12.2	7.84	9.98	99.7	147	194	9.10
				9	12.2	7.86	9.81	97.7	146	193	8.80
				10	12.2	7.86	9.80	97.8	146	193	9.00
				11	12.1	7.85	9.76	97.5	145	192	9.00
				12	12.1	7.85	9.80	97.6	146	193	8.60
				13	12.1	-	-	-	144	192	8.70
				14	11.6	-	-	-	155	205	9.50
				15	11.1	-	-	-	155	211	12.5

Note: "-" indicates no data available.

Table B.2: Depth Profiles from the Koocanusa Reservoir, June 2018

Station	Date	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	Turbidity
		Easting	Northing	m	°C		mg/L	%	µS/cm	µS/cm	NTU
RG_T4-1	9-Jun-18	630115	5441812	Surface	16.1	8.20	9.67	105	166	202	2.90
				1	16.1	8.23	9.62	105	166	201	3.30
				2	16.1	8.22	9.54	104	166	200	3.10
				3	16.1	8.23	8.98	97.6	166	200	3.10
				4	16.1	8.22	8.88	97.2	166	200	3.10
				5	16.1	8.20	8.97	97.8	166	201	3.20
				6	16.0	8.18	9.29	107	166	200	3.40
				7	15.8	8.15	9.37	103	165	201	3.70
				8	15.6	8.12	9.12	98.5	165	201	3.90
				9	15.5	8.07	9.43	102	165	201	4.20
				10	15.4	8.03	9.47	102	165	202	4.20
				11	15.3	8.00	9.35	102	165	202	7.20
				12	14.8	7.98	9.25	99.5	165	205	4.90
				13	13.6	7.98	9.35	100	164	210	7.20
				14	12.2	-	-	-	162	215	10.1
				15	11.8	-	-	-	162	216	12.7
				16	11.5	-	-	-	162	219	14.1
				17	11.3	-	-	-	162	220	13.4
				18	11.2	-	-	-	165	223	12.6
				19	11.2	-	-	-	165	224	13.7
				20	10.8	-	-	-	163	224	14.6
				21	10.8	-	-	-	163	224	14.8
RG_T4-2	8-Jun-18	629831	5442006	1	16.6	7.97	8.44	92.2	170	202	2.70
				2	16.6	7.98	8.43	92.2	170	202	2.70
				3	16.5	8.00	8.46	92.4	170	203	2.70
				4	16.5	8.04	8.36	91.2	170	203	2.60
				5	16.3	8.05	8.43	92.2	169	203	2.70
				6	15.7	8.06	8.43	92.5	166	202	3.20
				7	15.2	8.07	8.32	91.3	164	201	3.20
				8	14.3	8.06	8.28	90.6	160	201	3.60
				9	14.1	8.05	8.30	89.9	159	201	4.30
				10	13.8	8.03	8.34	89.4	159	202	4.60
				11	13.3	7.97	8.19	85.5	158	204	6.00
				12	12.2	7.88	8.08	84.7	160	211	8.40
				13	11.5	7.86	8.03	83.6	171	230	10.5
				14	11.2	-	-	-	173	235	12.1
				15	11.2	-	-	-	173	236	14.0
				16	11.1	-	-	-	174	236	13.6
				17	11.1	-	-	-	175	238	13.6
				18	11.0	-	-	-	172	236	14.3
				19	11.0	-	-	-	171	235	14.8
RG_T4-3	9-Jun-18	629695	5441699	Surface	16.0	8.23	10.1	109	168	203	3.20
				1	16.0	8.29	9.89	108	168	203	3.20
				2	16.0	8.30	9.88	108	168	203	3.40
				3	16.1	8.29	9.55	105	168	203	3.40
				4	16.0	8.28	9.61	106	168	203	3.40
				5	16.0	8.28	9.48	103	168	203	3.30
				6	15.9	8.27	9.45	103	167	202	3.60
				7	15.7	8.27	9.37	102	166	202	3.80
				8	15.6	8.24	9.49	104	165	202	3.80
				9	15.4	8.20	9.37	102	165	202	4.10
				10	15.3	8.17	9.39	102	164	202	3.60
				11	14.5	8.13	9.22	99.4	163	203	4.00
				12	14.1	8.09	9.37	101	164	207	5.80
				13	13.0	8.04	9.34	101	166	216	8.90
				14	11.8	-	-	-	160	215	12.9
				15	11.6	-	-	-	161	217	12.9
				16	11.5	-	-	-	161	218	13.6
				17	11.5	-	-	-	162	218	14.1
				18	11.5	-	-	-	162	219	14.2
				19	11.5	-	-	-	162	219	14.8

Note: "-" indicates no data available.

Table B.2: Depth Profiles from the Koocanusa Reservoir, June 2018

Station	Date	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	Turbidity
		Easting	Northing	m	°C		mg/L	%	µS/cm	µS/cm	NTU
RG_T4-4	9-Jun-18	629494	5441783	Surface	16.0	8.36	10.1	112	170	206	2.90
				1	16.2	8.43	9.51	104	170	204	3.10
				2	16.1	8.45	9.48	106	169	203	3.00
				3	16.1	8.45	9.46	104	169	203	3.30
				4	16.1	8.47	9.62	105	169	203	3.20
				5	16.1	8.42	9.32	101	169	203	3.40
				6	16.1	8.40	9.43	103	169	203	3.20
				7	16.1	8.38	9.56	105	169	203	3.40
				8	15.7	8.37	9.18	100	166	202	3.80
				9	15.3	8.32	9.56	103	165	203	4.10
				10	15.0	8.27	9.03	98.2	166	205	4.90
				11	14.7	8.22	9.10	97.2	167	208	5.80
				12	14.3	8.17	9.04	98.1	165	208	6.90
				13	13.2	-	-	-	171	221	8.80
				14	11.9	-	-	-	156	209	13.6
				15	11.7	-	-	-	155	207	13.8
				16	11.6	-	-	-	155	208	13.4
				17	11.6	-	-	-	155	209	14.0
				18	11.6	-	-	-	156	210	15.9
				19	11.5	-	-	-	157	211	15.6
RG_T4-5	9-Jun-18	629430	5441547	Surface	16.5	8.45	9.81	109	171	204	2.60
				1	16.5	8.47	9.59	106	170	203	2.80
				2	16.5	8.47	9.47	104	170	203	2.70
				3	16.4	8.47	9.31	103	170	203	2.80
				4	16.4	8.46	9.45	104	170	203	2.80
				5	16.2	8.45	9.44	104	169	203	3.10
				6	16.1	8.43	9.60	105	168	203	3.40
				7	15.8	8.38	9.52	103	166	202	3.60
				8	15.4	8.33	9.00	97.0	169	208	5.00
				9	14.7	8.28	9.43	101	164	205	6.90
				10	14.3	8.24	9.53	101	160	201	6.90
				11	14.1	8.16	9.71	102	159	202	6.90
				12	13.8	-	-	-	162	206	8.20
				13	12.7	-	-	-	173	224	11.4
				14	12.0	-	-	-	145	195	14.0
				15	11.9	-	-	-	145	193	13.1
				16	11.8	-	-	-	145	193	14.0
				17	11.8	-	-	-	145	193	14.6
				18	11.7	-	-	-	149	199	15.1
				19	11.6	-	-	-	152	204	14.9
				20	11.6	-	-	-	153	205	14.5
RG_GC	8-Jun-18	630302	5436933	Surface	17.2	7.95	8.97	99.6	161	179	2.50
				1	16.7	7.97	9.03	99.4	165	187	2.80
				2	15.8	7.99	9.17	99.6	163	187	3.20
				3	14.8	7.95	9.13	96.4	154	188	3.70
				4	14.6	7.90	8.92	94.0	152	188	3.90
				5	14.3	7.88	8.84	92.4	151	188	3.90
				6	14.0	7.82	8.57	88.0	150	189	4.10

Note: "-" indicates no data available.

Table B.3: Depth Profile for RG_DSELK in July 2018

Station	Date	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	Turbidity
		Easting	Northing	m	°C		mg/L	%	µS/cm	µS/cm	NTU
RG_DSELK	31-Jul-18	627017	5445677	Surface	22.2	8.64	8.73	109	210	222	1.52
				1	22.1	8.64	8.76	109	210	223	1.45
				2	22.0	8.64	8.75	109	210	223	1.48
				3	21.3	8.64	8.97	110	210	226	1.67
				4	21.2	8.63	9.06	111	210	227	1.61
				5	20.7	8.64	9.28	113	212	231	1.59
				6	19.5	8.60	9.50	113	218	244	1.64
				7	18.9	8.58	9.39	110	228	259	1.60
				8	18.3	8.54	9.24	107	235	269	1.92
				9	17.7	8.46	9.01	103	208	242	2.13
				10	17.6	8.45	8.97	102	207	241	2.10
				11	17.4	8.41	8.86	101	200	234	2.37
				12	17.3	8.40	8.82	99.9	202	236	2.39
				13	16.6	8.28	8.36	93.3	190	227	2.96
				14	16.5	8.26	8.22	91.8	190	227	3.05
				15	16.1	8.20	7.83	86.4	190	229	2.09
				16	15.3	8.09	7.19	77.5	186	230	3.45
				17	14.0	8.04	7.02	74.0	178	224	3.80
				18	13.0	8.07	7.43	76.0	170	221	3.30
				19	13.0	8.07	7.43	75.9	170	221	3.30

Table B.4: Depth Profile for RG_DSELK in August 2018

Station	Date	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	TDS
		Easting	Northing	m	°C		mg/L	%	µS/cm	µS/cm	mg/L
RG_SC	29-Aug-18	625624	5457296	Surface	19.1	8.53	8.95	108	217	244	159
				1	19.1	8.54	8.97	106	217	244	159
				2	19.1	8.54	8.98	107	217	244	159
				3	19.1	8.54	8.99	107	216	244	158
				4	19.0	8.55	8.99	107	216	244	158
				5	19.0	8.54	8.99	106	216	244	158
				6	19.0	8.54	8.99	106	216	244	158
				7	18.9	8.53	8.98	106	216	244	159
				8	18.8	8.52	8.97	106	216	244	159
				9	18.6	8.51	8.97	105	216	245	160
				10	18.4	8.48	8.97	105	217	249	161
				11	18.1	8.46	8.99	104	218	252	163
				12	16.0	8.26	8.72	97.2	225	272	176
				13	15.8	8.24	8.65	95.9	226	274	178
				14	15.8	8.24	8.62	95.4	226	248	178
				15	15.7	8.24	8.60	95.2	226	248	179
				16	15.7	8.23	8.59	95.0	226	275	179
RG_TN-1	31-Aug-18	627369	5453492	Surface	19.1	8.85	9.04	97.6	214	242	157
				1	19.1	8.86	9.04	97.6	214	242	157
				2	19.1	8.86	9.04	97.7	214	242	157
				3	19.1	8.85	9.04	97.6	214	242	157
				4	19.1	8.85	9.04	97.6	214	242	157
				5	19.1	8.83	9.03	97.6	214	242	157
				6	19.1	8.82	9.03	97.5	214	242	157
				7	19.1	8.82	9.03	97.5	214	242	157
				8	19.1	8.82	9.04	97.5	214	242	157
				9	18.9	8.81	9.04	97.3	214	243	158
				10	18.7	8.79	9.02	96.7	215	245	159
				11	15.9	8.66	8.96	90.8	225	272	177
				12	15.9	8.56	8.72	88.2	225	272	177
				13	15.8	8.50	8.60	87.0	225	272	177
				14	15.8	8.50	8.58	86.8	225	272	177
				15	15.7	8.48	8.44	85.0	225	274	178
RG_TN-2	31-Aug-18	627256	5453672	Surface	19.1	8.85	9.06	97.8	214	242	157
				1	19.1	8.85	9.07	97.9	214	242	157
				2	19.1	8.85	9.07	97.9	214	242	157
				3	19.1	8.85	9.07	97.9	214	242	157
				4	19.1	8.85	9.06	97.8	214	242	157
				5	19.1	8.85	9.06	97.8	214	242	157
				6	19.0	8.84	9.06	97.7	214	242	157
				7	19.0	8.84	9.05	97.7	214	242	157
				8	18.9	8.84	9.05	97.6	214	242	157
				9	18.9	8.83	9.05	97.5	214	242	157
				10	18.7	8.81	9.03	96.9	215	244	159
				11	17.5	8.67	8.87	92.8	218	254	165
				12	15.7	8.50	8.68	87.4	225	273	178
				13	15.7	8.50	8.65	87.1	225	273	178
RG_TN-3	31-Aug-18	627367	5453710	Surface	19.1	8.86	8.88	96.0	215	242	157
				1	19.1	8.86	9.03	97.7	215	242	157
				2	19.1	8.85	9.05	97.8	215	242	157
				3	19.1	8.85	9.05	97.8	214	242	157
				4	19.1	8.85	9.05	97.8	214	242	157
				5	19.1	8.85	9.05	97.8	214	242	157
				6	19.1	8.85	9.05	97.7	214	242	157
				7	19.0	8.84	9.06	97.7	214	242	157
				8	18.9	8.84	9.06	97.6	214	242	157
				9	18.9	8.83	9.05	97.4	214	242	158
				10	18.4	8.80	9.00	96.1	216	247	160
				11	16.6	8.71	8.93	91.6	222	265	172
				12	15.7	8.53	8.66	87.2	225	274	178
				13	15.6	8.50	8.62	86.7	225	274	178
				14	15.6	8.48	8.58	86.3	225	274	178
RG_TN-4	31-Aug-18	627333	5453882	Surface	19.3	8.84	9.07	98.4	216	242	157
				1	19.2	8.84	9.07	98.3	215	242	157
				2	19.2	8.85	9.08	98.3	215	242	157
				3	19.1	8.85	9.08	98.2	215	242	157
				4	19.1	8.85	9.08	98.1	214	242	157
				5	19.1	8.84	9.08	98.0	214	242	157
				6	19.0	8.84	9.08	98.0	214	242	157
				7	19.0	8.84	9.08	97.9	214	242	157
				8	18.9	8.83	9.08	97.8	214	242	157
				9	18.9	8.83	9.07	97.8	214	242	157
				10	18.6	8.79	9.03	96.6	216	246	160
				11	17.6	8.69	8.92	93.4	217	253	164
				12	15.6	8.60	8.88	89.3	225	275	179
				13	15.5	8.49	8.69	87.2	225	275	179
RG_TN-5	31-Aug-18	627200	5454005	Surface	19.4	8.84	9.05	98.5	216	242	157
				1	19.3	8.84	9.08	98.5	216	242	157
				2	19.2	8.84	9.10	98.5	215	242	157
				3	19.1	8.84	9.11	98.5	215	242	157
				4	19.1	8.84	9.11	98.5	215	242	157
				5	19.1	8.84	9.11	98.4	214	242	157
				6	19.0	8.83	9.11	98.3	214	242	157
				7	19.0	8.83	9.11	98.3	214	242	157
				8	19.0	8.83	9.11	98.2	214	242	157
				9	18.9	8.83	9.10	98.1	214	242	157
				10	18.9	8.82	9.09	97.9	214	242	158
				11	16.6	8.71	9.06	92.9	223	266	173
				12	15.5	8.53	8.78	88.0	225	275	178
				13	15.5	8.48	8.71	87.3	225	275	178

Note: "-" indicates no data available.

Table B.4: Depth Profile for RG_DSELK in August 2018

Station	Date	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	TDS
		Easting	Northing	m	°C		mg/L	%	µS/cm	µS/cm	mg/L
RG_ER	30-Aug-18	627959	5447572	Surface	19.7	8.58	8.89	107	212	236	153
				1	19.7	8.56	8.90	107	212	236	153
				2	19.7	8.57	8.90	107	212	236	154
				3	19.6	8.56	8.92	107	212	237	154
				4	19.5	8.56	8.94	107	213	238	155
				5	19.4	8.55	8.95	107	213	238	155
				6	19.4	8.55	8.95	107	213	239	155
				7	19.3	8.53	8.96	107	213	239	155
				8	19.2	8.52	8.96	107	214	241	156
				9	19.1	8.51	8.96	106	215	242	158
				10	18.9	8.49	8.93	106	216	245	159
				11	18.6	8.46	8.92	105	217	246	161
				12	17.7	8.37	8.86	102	220	255	165
RG_ER	30-Aug-18	627959	5447572	13	16.6	8.22	8.54	96.6	222	265	172
				14	16.5	8.21	8.44	95.2	223	266	173
				15	16.5	8.21	8.39	94.5	224	267	174
				16	16.4	8.29	8.23	93.1	223	266	173
				17	16.1	8.19	8.19	91.7	227	274	178
RG_DSELK	4-Sep-18	627017	5445677	Surface	18.7	8.60	8.89	103	208	236	-
				1	18.7	8.60	8.89	103	208	236	-
				2	18.7	8.60	8.88	103	208	236	-
				3	18.7	8.60	8.88	103	208	236	-
				4	18.7	8.60	8.88	103	208	236	-
				5	18.7	8.59	8.87	103	208	236	-
				6	18.7	8.59	8.87	103	208	236	-
				7	18.7	8.58	8.86	103	208	236	-
				8	18.7	8.59	8.86	103	208	236	-
				9	18.7	8.58	8.86	103	208	236	-
				10	18.7	8.58	8.85	103	208	236	-
				11	18.7	8.58	8.85	103	208	236	-
				12	18.7	8.58	8.85	103	208	236	-
				13	18.7	8.58	8.84	103	208	236	-
				14	18.7	8.58	8.84	103	208	237	-
				15	18.7	8.58	8.84	103	208	237	-
				16	18.3	8.53	8.80	101	215	246	-
				17	16.6	8.36	8.57	95.1	234	279	-
				18	16.0	8.27	8.29	91.0	230	278	-
				19	15.8	8.23	8.16	89.1	230	279	-
				20	15.8	8.23	8.14	88.9	231	280	-
				21	15.7	8.23	8.12	88.5	234	285	-
				22	15.6	8.21	8.01	87.2	236	287	-
RG_T4-1	30-Aug-18	630115	5441812	Surface	19.4	8.27	8.49	92.4	-	-	-
				1	19.3	8.82	8.89	96.5	205	230	149
				2	19.3	8.82	8.90	96.5	205	230	149
				3	19.3	8.82	8.91	96.5	204	230	149
				4	19.3	8.81	8.90	96.5	204	230	149
				5	19.2	8.81	8.90	96.4	204	230	149
				6	19.2	8.81	8.89	96.4	204	229	149
				7	19.2	8.81	8.89	96.3	204	229	149
				8	19.2	8.81	8.89	96.2	204	229	149
				9	19.2	8.81	8.88	96.2	204	229	149
				10	19.2	8.81	8.88	96.1	204	229	-
				11	19.2	8.81	8.88	96.1	204	229	149
				12	19.2	8.80	8.88	96.0	204	230	149
				13	19.2	8.80	8.87	96.0	204	230	149
				14	19.1	8.79	8.87	95.9	205	230	150
				15	19.1	8.79	8.84	95.6	205	231	150
				16	19.1	8.77	8.79	94.9	207	233	152
				17	18.8	8.72	8.67	93.1	212	241	157
				18	18.1	8.54	8.22	86.9	224	258	168
				19	17.2	8.50	8.12	84.5	228	268	174
				20	16.5	8.38	7.60	77.9	227	271	176
				21	15.8	8.29	7.04	71.2	221	268	174
				22	15.3	8.21	6.71	67.1	208	255	166
				23	15.0	8.10	6.26	62.1	203	251	163
RG_T4-2	30-Aug-18	629831	5442006	Surface	19.7	8.81	8.88	97.1	206	230	149
				1	19.3	8.82	8.94	97.2	205	230	149
				2	19.3	8.82	8.94	97.1	205	230	149
				3	19.3	8.82	8.94	97.0	205	230	149
				4	19.3	8.81	8.94	97.0	205	230	149
				5	19.3	8.81	8.94	96.9	204	230	149
				6	19.2	8.80	8.93	96.8	204	230	149
				7	19.2	8.80	8.93	96.7	204	229	149
				8	19.2	8.79	8.93	96.7	204	230	149
				9	19.2	8.79	8.92	96.6	204	230	149
				10	19.2	8.78	8.91	96.4	204	230	149
				11	19.2	8.78	8.89	96.2	204	230	150
				12	19.2	8.78	8.87	96.0	204	230	150
				13	19.2	8.78	8.87	96.0	204	230	150
				14	19.1	8.78	8.85	95.7	205	230	150
				15	19.1	8.77	8.83	95.4	206	232	151
				16	19.0	8.75	8.78	94.7	208	235	153
				17	18.9	8.73	8.71	93.8	210	238	155
				18	18.2	8.57	8.29	88.0	220	253	164
				19	16.8	8.43	7.82	80.6	229	271	176
				20	16.2	8.32	7.32	74.5	223	268	174
				21	15.8	8.30	7.06	71.4	222	269	175
				22	15.5	8.21	6.49	65.1	210	257	167
				23	14.0	8.11	5.87	57.0	191	242	157

Note: "-" indicates no data available.

Table B.4: Depth Profile for RG_DSELK in August 2018

Station	Date	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	TDS
		Easting	Northing	m	°C		mg/L	%	µS/cm	µS/cm	mg/L
RG_T4-3	29-Aug-18	629695	5441699	Surface	19.2	8.77	8.90	96.5	205	231	-
				1	19.2	8.77	8.91	96.5	206	231	-
				2	19.2	8.77	8.90	96.5	205	231	-
				3	19.2	8.76	8.90	96.4	206	231	-
				4	19.2	8.78	8.89	96.4	205	231	-
				5	19.2	8.78	8.89	96.3	205	231	-
				6	19.2	8.77	8.88	96.2	206	231	-
				7	19.2	8.78	8.88	96.2	205	231	-
				8	19.2	8.77	8.87	96.1	205	231	-
				9	19.2	8.76	8.86	96.0	206	231	-
				10	19.2	8.77	8.85	95.9	206	231	-
				11	19.2	8.77	8.84	95.8	206	231	-
				12	19.2	8.77	8.82	95.5	206	231	-
				13	19.1	8.71	8.67	93.5	210	237	-
				14	18.6	8.61	8.47	90.5	218	248	-
				15	17.7	8.57	8.48	88.8	227	265	-
				16	17.1	8.50	8.24	85.6	227	267	-
				17	16.8	8.49	8.18	84.2	233	277	-
				18	16.4	8.46	8.03	82.2	236	281	-
				19	16.3	8.46	8.02	81.7	237	284	-
				20	16.2	8.43	7.78	78.5	236	284	-
				21	15.7	8.25	6.82	68.5	219	269	-
				22	15.4	8.21	6.62	66.2	215	264	-
				23	14.7	8.06	5.99	58.8	196	246	-
				24	14.2	8.10	5.95	57.5	187	244	-
RG_T4-4	31-Aug-18	629494	5441783	Surface	19.8	8.85	8.89	97.6	207	230	149
				1	19.4	8.85	8.95	97.4	205	229	149
				2	19.4	8.86	8.97	97.5	204	229	149
				3	19.3	8.85	8.97	97.4	204	229	149
				4	19.3	8.85	8.98	97.4	204	229	149
				5	19.2	8.84	9.00	97.4	204	230	149
				6	19.2	8.84	8.99	97.3	204	230	149
				7	19.1	8.82	8.94	96.7	204	230	149
				8	19.1	8.81	8.94	96.6	204	230	149
				9	19.1	8.81	8.91	96.3	205	231	150
				10	19.1	8.80	8.89	96.1	207	233	151
				11	19.1	8.79	8.87	95.8	208	234	152
				12	19.1	8.79	8.87	95.8	207	234	152
				13	19.1	8.79	8.86	95.7	207	233	152
				14	19.1	8.79	8.86	95.6	207	234	152
				15	19.0	8.78	8.84	95.3	210	237	154
				16	18.6	8.75	8.83	94.5	215	245	159
				17	18.3	8.69	8.68	92.2	218	250	163
				18	17.0	8.61	8.49	87.9	231	272	177
				19	16.5	8.52	8.25	84.6	230	274	178
				20	16.4	8.50	8.20	83.9	229	274	178
				21	16.2	8.46	8.03	81.8	224	270	175
				22	15.8	8.41	7.62	76.9	219	265	173
RG_T4-5	31-Aug-18	629430	5441547	Surface	19.9	8.84	8.63	94.7	208	230	150
				1	19.8	8.85	8.90	97.5	207	230	149
				2	19.7	8.85	8.96	98.0	206	230	149
				3	19.5	8.85	8.99	97.9	205	229	149
				4	19.4	8.86	9.02	98.1	205	229	149
				5	19.3	8.86	9.03	98.1	205	229	149
				6	19.3	8.85	9.03	97.9	205	230	150
				7	19.2	8.85	9.01	97.6	205	230	150
				8	19.2	8.83	8.98	97.1	206	232	151
				9	19.1	8.83	8.96	96.9	206	233	151
				10	19.1	8.82	8.94	96.7	206	232	150
				11	19.1	8.82	8.94	96.6	205	231	150
				12	19.1	8.81	8.91	96.2	205	232	151
				13	19.1	8.80	8.89	96.0	207	233	152
				14	18.8	8.75	8.88	95.4	214	242	157
				15	18.7	8.74	8.87	95.2	214	243	158
				16	18.5	8.72	8.86	94.6	217	248	161
				17	18.2	8.69	8.81	93.4	219	252	164
				18	17.2	8.60	8.63	89.7	228	268	174
				19	16.6	8.51	8.37	86.0	227	271	176
				20	16.5	8.48	8.13	83.3	228	272	177
				21	16.2	8.45	7.94	80.9	229	275	179
				22	15.7	8.35	7.30	73.5	217	264	172
				23	15.5	8.34	7.20	72.3	215	263	171

Note: "-" indicates no data available.

Table B.4: Depth Profile for RG_DSELK in August 2018

Station	Date	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	TDS
		Easting	Northing	m	°C		mg/L	%	µS/cm	µS/cm	mg/L
RG_GC	30-Aug-18	630926	5436344	0	19.0	8.79	8.94	96.4	202	228	-
				1	19.0	8.80	8.91	96.2	202	228	-
				2	19.0	8.80	8.88	95.8	202	228	-
				3	19.0	8.80	8.88	95.7	202	228	-
				4	19.0	8.80	8.87	95.7	202	228	-
				5	19.0	8.80	8.86	95.6	202	228	-
				6	19.0	8.79	8.85	95.5	202	228	-
				7	19.0	8.79	8.85	95.4	202	228	-
				8	19.0	8.79	8.84	95.4	202	228	-
				9	19.0	8.79	8.84	95.4	202	228	-
				10	19.0	8.79	8.84	95.3	202	228	-
				11	19.0	8.79	8.83	95.3	202	228	-
				12	19.0	8.79	8.83	95.2	202	228	-
				13	19.0	8.79	8.82	95.1	202	228	-
				14	19.0	8.78	8.79	94.8	203	229	-
				15	18.9	8.75	8.72	93.9	207	235	-
				16	18.8	8.74	8.68	93.3	208	236	-
				17	18.6	8.69	8.60	92.1	212	242	-
				18	18.5	8.66	8.51	90.7	212	243	-
				19	18.0	8.60	8.40	88.8	220	254	-
				20	17.4	8.50	7.98	83.2	219	257	-
				21	17.1	8.43	7.76	80.7	221	261	-
				22	16.6	8.35	7.40	76.1	222	264	-
				23	16.4	8.30	7.22	73.8	221	264	-
				24	16.2	8.26	6.99	71.3	220	264	-
				25	15.4	8.12	6.01	60.5	212	260	-
				26	13.4	8.01	5.52	53.0	182	234	-
				27	13.2	7.97	5.35	51.1	139	231	-

Note: "-" indicates no data available.

Table B.5: Depth Profile for RG_T4 in October 2018

Station	Date	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductance	TDS	Turbidity
		Easting	Northing	m	˚C		mg/L	%	µS/cm	µS/cm	mg/L	NTU
RG_T4-3	9-Oct-18	629695	5441699	0	12.9	8.06	9.25	87.6	207	269	175	0.37
				1	12.9	8.13	9.22	87.4	207	270	175	0.35
				2	12.9	8.15	9.21	87.3	207	270	175	0.36
				3	12.9	8.16	9.20	87.2	208	270	175	0.36
				4	12.9	8.17	9.20	87.1	208	270	175	0.34
				5	12.9	8.18	9.19	87.1	208	270	175	0.34
				6	12.9	8.18	9.19	87.1	208	270	175	0.33
				7	12.9	8.19	9.18	87.0	208	270	175	0.36
				8	12.9	8.20	9.18	87.0	208	270	176	0.36
				9	12.9	8.27	9.18	86.9	208	270	176	0.36
				10	12.9	8.21	9.18	86.9	208	270	175	0.37
				11	12.9	8.22	9.18	86.9	208	270	176	0.34
				12	12.9	8.23	9.18	86.8	208	270	176	0.35
				13	12.8	8.23	9.17	86.8	208	271	176	0.37
				14	12.8	8.23	9.17	86.8	208	271	176	0.38
				15	12.8	8.24	9.18	86.8	208	271	176	0.33
				16	12.8	8.24	9.19	86.6	208	273	176	0.35
				17	12.2	8.24	9.31	86.8	212	281	182	0.56
				18	12.2	8.22	9.33	86.9	213	282	182	0.48
				19	11.9	8.21	9.38	86.4	218	293	188	0.81
				20	11.5	8.16	9.41	86.5	219	294	191	0.23
				21	11.6	8.16	9.41	86.5	220	297	193	2.59
				22	11.4	8.14	9.33	85.5	221	298	194	2.69

Table B.6: Depth Profiles for Stations in Koocanusa Reservoir, April 2019

Station	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	Turbidity
	Easting	Northing	(m)	(˚C)		(mg/L)	(%)	(µS/cm)	(µS/cm)	(NTU)
RG_SC	625585	5459973	S	8.90	7.96	10.67	100.2	176.4	254.8	-
			1	8.90	7.91	10.74	101.0	174.9	252.8	-
			2	8.90	7.88	10.74	101.0	175.0	252.7	-
			3	8.90	7.88	10.74	101.1	174.5	252.0	-
			4	8.90	7.89	10.74	101.1	173.8	251.0	-
			5	8.90	7.90	10.72	100.9	173.6	250.3	-
			6	8.90	7.90	10.71	100.8	173.3	250.0	-
			7	8.90	7.91	10.71	100.8	173.3	250.0	-
			8	8.90	7.92	10.71	100.8	173.1	249.7	-
			9	8.80	-	-	-	-	-	-
RG-TN	627107	5453366	0	9.60	8.16	10.69	101.4	178.3	252.6	-
			1	9.50	8.17	10.70	101.3	177.8	252.7	-
			2	9.40	8.17	10.69	101.1	177.6	252.9	-
			3	9.40	8.16	10.66	100.6	177.4	253.0	-
			4	9.30	8.16	10.65	100.5	177.3	253.0	-
			5	9.30	8.15	10.64	100.4	177.1	252.9	-
			B	9.30	8.15	10.62	100.2	177.1	252.8	-
RG-ER	627976	5447551	0	10.10	8.17	10.60	101.8	188.4	263.2	-
			1	10.10	8.17	10.60	101.8	188.5	263.4	-
			2	10.00	8.17	10.61	101.4	187.7	263.3	-
			3	8.70	8.16	10.80	100.2	183.0	265.5	-
			4	8.30	8.16	10.84	99.6	180.5	264.7	-
			5	8.30	8.15	10.84	99.6	179.4	264.4	-
			6	8.10	8.15	10.86	99.4	178.6	264.0	-
			7	8.00	8.15	10.87	99.3	178.1	263.6	-
RG-T4	629235	5441654	0	10.40	8.20	10.89	97.4	203.0	282.0	7.74
			1	10.00	8.15	10.93	96.8	196.0	276.0	8.11
			2	9.70	8.18	10.94	96.4	195.0	276.0	8.69
			3	9.60	8.18	10.89	95.7	195.0	276.0	8.58
			4	9.60	8.18	10.87	95.5	195.0	276.0	8.02
			5	9.60	8.17	10.86	95.4	196.0	278.0	7.84
			6	9.60	8.18	10.86	95.3	197.0	280.0	8.50
			7	9.50	8.16	10.88	95.4	198.0	283.0	7.90
			8	9.40	8.16	10.94	95.6	201.0	286.0	7.88
			9	9.40	8.17	10.98	96.0	204.0	291.0	7.01
			10	9.40	8.17	11.02	96.4	207.0	295.0	6.48
			11	9.10	8.17	11.01	95.5	200.0	288.0	7.68
			12	8.30	8.14	10.89	92.3	200.0	295.0	8.45
			13	8.00	8.10	10.76	90.5	200.0	298.0	8.40
			14	7.60	8.06	10.46	87.1	201.0	302.0	10.32
RG-GC	630926	5436344	0	10.4	8.14	11.07	99.4	212.4	293.9	6.19
			1	10.2	8.12	11.14	99.2	209.0	291.3	6.45
			2	10.2	8.09	11.15	99.1	207.0	290.0	6.93
			3	10.1	8.08	11.14	98.9	207.0	290.0	6.58
			4	10.1	8.09	11.14	99.0	207.0	289.0	7.20
			5	10.1	8.08	11.14	98.9	207.0	290.0	7.20
			6	10.0	8.09	11.13	98.8	207.0	290.0	6.25
			7	10.0	8.09	11.13	98.8	207.0	290.0	6.61
			8	10.0	8.09	11.13	98.7	207.0	290.0	6.15
			9	10.0	8.09	11.13	98.7	206.0	289.0	6.52
			10	10.0	8.09	11.14	98.7	206.0	289.0	6.04
			11	9.60	8.09	11.19	98.2	200.0	285.0	5.60
			12	9.20	8.08	11.24	97.8	202.0	290.0	5.33
			13	8.90	8.07	11.11	94.8	201.0	294.0	5.40
			14	7.30	8.03	10.96	91.0	198.0	299.0	6.21
			15	6.70	8.00	10.93	89.5	195.0	301.0	5.10
			16	6.00	7.98	11.11	89.4	191.0	299.0	3.62

Notes: S = Shore B= Bottom, "-" = no data.

Table B.7: Depth Profiles for Stations in Koocanusa Reservoir, June 2019

Station	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	Turbidity	ORP
	Easting	Northing	(m)	(˚C)		(mg/L)	(%)	(µS/cm)	(µS/cm)	(NTU)	(Mv)
RG_SC	625547	5458929	0.5	12.6	8.22	10.11	103.6	185.1	242.6	29.59	185.2
			1	12.6	8.22	10.08	103.4	184.8	242.0	37.31	185.3
			2	12.4	8.22	10.08	102.8	183.4	241.8	33.20	185.9
			3	12.4	8.22	10.09	103.0	184.1	242.4	31.59	185.7
			4	12.3	8.22	10.05	102.4	183.2	241.7	33.67	186.0
			5	12.2	8.22	10.03	102.0	183.1	242.1	56.50	185.9
			6	12.2	8.22	10.01	101.8	182.4	241.2	36.35	186.2
			7	12.3	8.22	10.00	101.7	182.3	241.0	39.68	186.1
			8	12.3	8.22	10.00	101.7	182.3	241.0	44.52	186.2
			9	12.3	8.22	9.98	101.5	180.6	238.6	78.16	186.4
			10	12.3	8.22	9.95	101.4	180.7	238.3	81.98	186.0
RG_TN	627112	5453380	0.5	13.7	8.21	-	112.6	195.5	253.1	24.53	185.2
			1	12.8	8.22	-	104.9	187.1	244.0	32.86	186.5
			2	12.1	8.23	-	102.8	181.9	241.6	32.08	186.8
			3	11.8	8.23	-	102.0	181.0	241.8	42.97	187.0
			4	11.7	8.23	-	101.5	180.3	241.6	43.36	187.3
			5	11.7	8.23	-	101.3	179.8	240.8	51.51	187.1
			6	11.7	8.23	-	101.3	179.5	240.4	63.73	187.1
			7	11.8	8.22	-	101.3	179.2	239.7	45.80	187.1
			8	11.8	8.23	-	101.0	178.1	238.4	52.14	187.2
			9	11.7	8.23	-	100.9	177.7	238.0	51.21	187.2
			10	11.9	8.22	-	100.6	177.9	237.4	60.90	187.3
RG_ER	627959	5447572	0.5	14.9	8.16	10.00	107.6	185.5	230.0	26.57	185.2
			1	14.7	8.17	10.01	107.3	184.9	230.1	27.14	185.4
			2	14.7	8.18	10.01	107.3	184.7	230.2	29.26	185.3
			3	14.6	8.18	10.03	107.2	184.7	230.5	28.29	185.3
			4	14.5	8.19	10.03	107.2	185.0	231.2	27.94	185.2
			5	12.4	8.19	10.12	103.1	177.1	233.4	35.61	186.8
			6	12.2	8.19	10.13	102.8	176.4	233.4	37.71	187.2
			7	12.0	8.18	10.07	101.6	174.7	232.6	46.30	187.9
			8	11.9	8.17	10.01	100.7	172.8	230.6	53.64	188.5
			9	11.9	8.17	9.99	100.5	171.2	228.5	46.85	189.0
RG_T4	629235	5441654	0.5	16.2	8.17	10.09	111.6	17.9	21.5	49.63	158.3
			1	15.9	8.35	10.20	112.2	212.9	257.6	4.67	158.6
			2	15.6	8.37	10.23	111.8	211.3	257.2	5.86	158.4
			3	15.4	8.38	10.22	111.0	208.5	255.5	5.78	158.5
			4	14.9	8.38	10.24	110.2	207.8	257.4	6.01	158.7
			5	13.8	8.25	9.90	104.0	194.5	248.9	9.64	161.7
			6	13.4	8.25	9.93	103.4	190.8	244.8	16.84	162.0
			7	13.0	8.25	10.06	103.7	186.5	242.1	25.58	161.6
			8	12.7	8.24	10.05	103.0	183.6	240.1	30.08	161.8
			9	12.5	8.24	10.11	103.2	183.6	241.2	30.31	161.8
			10	12.0	8.23	10.09	101.6	175.8	234.3	38.46	162.2
			11	11.8	8.23	10.12	101.6	175.5	234.9	40.27	162.3
			12	11.5	8.22	10.08	100.5	173.5	234.0	50.11	162.6
			13	11.4	8.22	10.07	100.3	173.7	234.6	62.34	162.7
			14	11.4	8.22	10.08	100.2	173.7	234.8	61.04	162.6
			15	11.3	8.23	10.08	100.0	174.4	236.3	58.20	162.4
			16	11.2	8.24	10.06	99.7	183.6	246.6	59.75	162.8
			17	11.2	8.24	10.03	99.4	186.4	252.9	56.99	163.0
			18	11.3	8.24	10.01	99.2	188.7	255.9	62.67	163.1
			19	11.3	8.24	10.00	99.3	188.9	255.8	62.45	163.0

Note: "-" indicates no data.

Table B.7: Depth Profiles for Stations in Koocanusa Reservoir, June 2019

Station	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	Turbidity	ORP
	Easting	Northing	(m)	(˚C)		(mg/L)	(%)	(µS/cm)	(µS/cm)	(NTU)	(Mv)
RG_GC	630926	5436344	0.5	16.3	7.89	9.98	110.5	29.1	34.3	32.43	101.7
			1	16.1	8.33	10.25	112.9	204.3	246.4	5.07	95.1
			2	15.6	8.35	10.42	113.7	203.3	247.9	4.47	94.6
			3	14.9	8.36	10.35	111.3	198.8	246.1	35.14	94.1
			4	14.5	8.32	10.07	107.3	192.7	241.0	78.26	94.8
			5	14.0	8.23	9.79	103.2	188.2	238.0	9.51	96.4
			6	13.7	8.18	9.64	100.9	183.8	234.6	10.68	96.7
			7	13.6	8.18	9.66	100.9	184.1	235.5	9.99	96.4
			8	13.2	8.17	9.62	99.7	179.6	231.8	16.92	96.6
			9	13.1	8.17	9.67	99.9	178.4	230.9	18.50	96.4
			10	12.9	8.18	9.75	100.2	178.2	231.7	25.47	96.0
			11	12.8	8.18	9.78	100.4	179.0	233.3	26.72	95.5
			12	12.7	8.19	9.81	100.4	179.2	234.3	30.02	94.9
			13	12.4	8.19	9.85	100.2	177.7	233.9	31.95	95.1
			14	12.2	8.19	9.82	99.5	176.4	233.2	37.24	95.0
			15	12.1	8.18	9.85	99.5	175.3	232.9	38.79	94.4
			16	11.4	8.18	9.81	97.4	175.2	236.8	65.13	94.6
			17	11.3	8.17	9.80	97.3	175.2	237.0	74.30	94.6
			18	11.3	8.17	9.79	97.2	175.2	237.0	82.81	94.1
			19	11.4	8.17	9.78	97.1	175.2	236.9	75.90	94.2
			20	11.4	8.15	9.76	97.0	175.3	236.7	83.32	93.9
			21	11.5	8.14	9.67	96.4	175.6	236.5	113.98	89.9

Note: "-" indicates no data.

Table B.8: Depth Profiles for Stations in Koocanusa Reservoir, August 2019

Station	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	Turbidity	ORP
	Easting	Northing	(m)	(˚C)		(mg/L)	(%)	(µS/cm)	(µS/cm)	(NTU)	(Mv)
RG_SC	625547	5458929	0	20.4	8.50	9.02	99.9	225.8	247.8	0.59	151.8
			1	20.2	8.51	9.05	99.7	224.1	247.4	0.69	152.2
			2	20.0	8.51	9.05	99.6	224.0	247.5	0.71	153.2
			3	20.0	8.51	9.05	99.5	223.6	247.5	0.73	154.1
			4	19.4	8.48	9.26	100.8	224.2	250.7	0.98	156.8
			5	18.9	8.45	9.36	100.9	224.1	253.2	1.56	159.9
			6	18.3	8.41	9.41	99.8	222.9	256.3	2.46	162.6
			7	17.7	8.38	9.37	98.3	221.2	257.2	3.34	165.7
			8	17.3	8.35	9.31	96.9	219.8	257.9	3.47	167.8
			9	16.7	8.29	9.15	94.3	217.7	258.8	4.46	170.5
			10	16.4	8.28	9.04	92.5	216.9	259.6	5.35	172.4
			11	16.2	8.25	8.86	90.2	216.6	260.6	6.13	174.8
			12	16.1	8.23	8.74	88.9	216.4	260.5	6.20	176.4
			13	16.0	8.17	8.29	84.2	215.9	260.6	7.60	178.8
RG_TN	627112	5453380	0	20.2	8.22	8.95	98.9	220.4	242.5	0.55	169.6
			1	20.2	8.26	8.99	99.3	220.7	242.9	0.63	163.4
			2	20.2	8.28	8.98	99.3	220.8	243.0	0.59	162.0
			3	20.2	8.29	8.98	99.2	220.8	242.9	0.57	161.5
			4	20.2	8.32	8.98	99.2	220.7	242.9	0.56	160.7
			5	20.2	8.41	8.98	99.2	220.8	243.0	0.61	155.1
			6	20.2	8.44	8.98	99.2	221.0	243.3	0.66	154.6
			7	20.2	8.43	9.00	99.3	221.4	243.9	0.74	156.0
			8	19.6	8.39	9.10	99.1	222.6	248.1	1.09	158.4
			9	18.4	8.29	9.13	97.0	221.5	254.3	2.25	162.8
			10	17.8	8.24	9.09	95.4	220.2	256.8	3.15	165.2
			11	17.0	8.17	8.83	91.4	218.4	258.5	4.56	167.9
			12	16.7	8.15	8.72	89.8	218.2	259.1	5.31	169.4
			13	16.7	8.14	8.72	89.7	218.2	259.3	5.74	170.9
			14	16.5	8.13	8.65	88.8	217.9	259.8	5.85	171.8
			15	16.5	8.14	8.66	88.8	217.6	259.6	6.09	172.8
RG_ER	627959	5447572	0	21.7	8.40	8.93	100.6	226.9	244.6	0.53	163.5
			1	20.7	8.44	8.97	100.1	223.4	243.9	0.55	160.4
			2	20.3	8.45	9.04	100.1	221.9	243.7	0.65	159.4
			3	20.3	8.46	9.04	100.0	221.7	243.6	0.64	159.8
			4	20.3	8.45	9.04	100.0	221.3	243.4	0.64	161.8
			5	20.2	8.45	9.04	99.9	221.3	243.4	0.65	163.8
			6	20.2	8.45	9.01	99.5	221.4	243.7	0.60	165.7
			7	20.1	8.45	9.00	99.3	221.4	244.1	0.61	166.8
			8	20.1	8.48	9.01	99.4	221.8	244.8	0.65	167.0
			9	20.1	8.50	9.03	99.6	222.2	245.4	0.67	169.5
			10	19.8	8.47	9.10	99.8	224.8	252.9	0.96	172.3
			11	18.4	8.38	9.21	97.8	224.2	258.0	1.53	176.9
			12	17.9	8.34	9.20	96.9	223.9	259.0	1.63	180.0
			13	17.5	8.31	9.09	95.3	223.9	260.2	1.71	183.7
			14	17.6	8.29	9.03	93.6	225.3	263.5	1.97	187.2
			15	17.3	8.26	8.84	91.8	226.0	265.0	2.14	189.0
			16	16.7	8.17	8.20	84.0	229.1	273.2	3.33	192.6
			17	16.5	8.16	8.07	82.7	231.2	275.8	3.69	194.0

Notes: S = Shore B= Bottom, "-" = no data.

Table B.8: Depth Profiles for Stations in Koocanusa Reservoir, August 2019

Station	UTM (11U, NAD83)		Depth	Temperature	pH	Dissolved Oxygen		Conductivity	Specific Conductivity	Turbidity	ORP
	Easting	Northing	(m)	(˚C)		(mg/L)	(%)	(µS/cm)	(µS/cm)	(NTU)	(Mv)
RG-T4	629235	5441654	0	20.6	8.46	8.96	99.7	220.2	240.4	0.38	173.4
			1	20.4	8.46	8.97	99.6	219.4	240.4	0.40	173.3
			2	20.2	8.48	9.04	99.3	217.8	240.2	0.45	173.2
			3	20.1	8.48	9.02	99.4	217.7	240.3	0.46	174.1
			4	20.1	8.49	9.01	99.2	217.7	240.4	0.45	174.4
			5	20.0	8.49	9.01	99.2	217.7	240.5	0.48	175.7
			6	20.0	8.48	9.00	99.0	217.9	241.1	0.49	177.4
			7	19.9	8.46	8.99	98.6	218.7	242.6	0.50	179.2
			8	19.8	8.46	8.99	98.4	219.9	244.3	0.47	180.4
			9	19.7	8.44	8.98	98.3	220.6	245.5	0.52	181.9
			10	19.2	8.40	8.87	96.0	229.4	258.2	0.61	184.4
			11	19.1	8.40	8.86	95.7	229.1	258.6	0.62	185.2
			12	19.0	8.41	8.85	95.5	228.5	258.1	0.66	186.0
			13	18.9	8.40	8.84	95.2	229.1	259.1	0.67	187.4
			14	18.5	8.37	8.79	93.9	232.0	264.8	0.93	189.6
			15	18.4	8.36	8.76	93.4	235.8	269.8	0.95	190.9
			16	17.9	8.32	8.69	91.7	233.2	268.9	1.04	193.0
			17	17.4	8.25	8.50	88.6	232.1	271.5	1.91	196.5
			18	17.2	8.23	8.37	86.9	232.9	273.4	2.66	198.5
			19	17.1	8.21	8.29	86.0	232.7	274.1	3.20	200.4
			20	17.0	8.20	8.26	85.5	232.2	276.4	3.52	203.2
			21	16.9	8.17	8.14	85.1	232.0	276.0	3.61	204.0
			22	16.5	8.12	7.73	79.0	230.8	275.3	3.85	205.7
			23	16.1	8.07	7.40	75.3	230.4	281.5	4.71	268.2
			24	15.9	8.03	7.20	72.9	229.4	277.4	3.88	210.3
			25	14.8	7.84	6.21	71.4	208.1	260.8	5.31	215.1
RG-GC	630926	5436344	0	20.4	8.28	8.90	98.9	213.6	234.1	0.75	199.2
			1	20.3	8.34	8.93	98.9	214.2	235.3	0.73	196.9
			2	20.3	8.36	8.94	98.9	214.6	236.1	0.72	196.8
			3	20.2	8.40	8.95	98.9	214.7	236.2	0.64	195.3
			4	20.2	8.40	8.95	98.9	215.0	236.7.	0.65	197.2
			5	20.2	8.38	8.95	98.9	215.2	237.0	0.62	198.8
			6	20.2	8.38	8.95	98.8	215.2	237.1	0.58	200.1
			7	20.2	8.37	8.95	98.8	215.3	237.3	0.58	201.2
			8	20.1	8.37	8.94	98.7	215.5	237.6	0.53	202.1
			9	20.0	8.35	8.89	97.9	216.3	237.4	0.54	203.3
			10	19.4	8.37	8.89	96.6	219.4	245.0	0.51	203.2
			11	19.2	8.29	8.73	94.6	218.9	246.1	1.01	207.1
			12	18.8	8.25	8.65	92.8	224.3	254.6	0.80	209.3
			13	18.1	8.17	8.43	89.2	228.1	263.1	0.98	212.9
			14	17.8	8.15	8.34	87.7	229.9	266.9	0.98	214.6
			15	17.5	8.12	8.25	86.2	229.5	267.5	1.09	215.5
			16	17.5	8.12	8.23	86.1	229.5	268.0	1.11	216.4
			17	17.4	8.11	8.19	85.6	229.2	268.1	1.06	217.2
			18	17.3	8.10	8.15	85.0	229.4	268.8	1.18	218.1
			19	17.2	8.10	8.11	84.4	229.2	269.2	1.05	219.0
			20	17.1	8.10	8.05	83.4	228.4	269.2	1.19	219.3
			21	16.8	8.08	7.91	81.6	225.8	267.9	1.14	219.9
			22	16.7	8.07	7.84	80.7	225.5	268.0	1.42	221.2
			23	16.5	8.04	7.76	79.6	222.5	265.4	1.19	222.4
			24	16.4	8.03	7.63	78.1	221.2	264.8	1.61	223.2
			25	15.5	7.90	6.74	67.7	214.0	262.1	5.35	226.8
			26	15.0	7.84	6.47	64.4	207.0	259.3	4.22	229.2

Notes: S = Shore B= Bottom, "-" = no data.

Table B.9: Water Quality Analytes in Comparison to Guidelines, 2018

	Analyte	Units	Long term Guidelines [a]		Short Term Guidelines [a]		RG_SC	RG_SC	RG_SCU1	RG_SCU2
							Surface	Surface	Surface	Middle
			min	max	min	max	27-Apr-2018	13-Jun-2018	29-Aug-2018	29-Aug-2018
Physical Characteristics	Hardness (as CaCO3)	mg/L	-		-		172	93.2	124	119
	pH, Field	pH	< 6.5 or > 9		-		7.38	7.98	8.54	8.52
	Total Suspended Solids, Lab	mg/L	-		-		265	9.8	<1.0	1.5
	Total Dissolved Solids	mg/L	-		-		176	104	146	143
	Dissolved Oxygen-Field [b]	mg/L	< 8		< 5		13.74	10.60	8.99	8.97
	Dissolved Oxygen-Field	%	-		-		135.3	104.3	106.5	105.7
	Temperature-Field	C	-		-		11.09	11.62	19.1	18.8
Anions and Nutrients	Ammonia as N [c]	mg/L	0.15	1.95	1.06	13.30	0.0130	<0.0050	0.0107	0.0146
	Bromide (Br)	mg/L	-		-		<0.050	<0.050	<0.050	<0.050
	Chloride (Cl)	mg/L	150		600		4.33	1.08	2.54	2.65
	Fluoride (F) [e]	mg/L	-		1.31	1.58	0.088	0.057	0.093	0.092
	Nitrate (as N)	mg/L	3		32.8		0.104	0.0756	0.0703	0.0590
	Nitrite (as N) [d]	mg/L	-		0.02	0.06	0.0010	<0.0010	0.0014	<0.0010
	Phosphorus (P)-Total	mg/L	-		-		0.0651	0.0061	0.0023	<0.0020
	Sulphate (SO_4) [e]	mg/L	429		-		33.0	13.7	26.4	26.5
Total Metals	Aluminum (Al)	mg/L	-		-		1.70	0.132	0.0100	0.0100
	Antimony (Sb)	mg/L	0.009		-		<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)	mg/L	0.005		-		0.00126	0.00038	0.00038	0.00037
	Barium (Ba)	mg/L	1		-		0.0584	0.0242	0.0376	0.0373
	Beryllium (Be)	mg/L	0.0013		-		0.000084	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)	mg/L	-		-		<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)	mg/L	1.2		-		<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)	mg/L	-		-		0.0000335	0.0000057	<0.0000050	<0.0000050
	Calcium (Ca)	mg/L	-		-		59.6	25.3	33.1	33.5
	Chromium (Cr) [f]	mg/L	0.001		-		0.00248	0.00022	<0.00010	0.00016
	Cobalt (Co)	mg/L	0.004		0.011		0.00136	0.00011	<0.00010	<0.00010
	Copper (Cu) [e]	mg/L	0.01		0.04		0.00263	<0.00050	<0.00050	0.00067
	Iron (Fe)	mg/L	-		1		2.95	0.187	0.011	0.044
	Lead (Pb) [e]	mg/L	0.02		0.42		0.00257	0.000229	<0.000050	<0.000050
	Lithium (Li)	mg/L	-		-		0.0053	0.0011	0.0018	0.0017
	Magnesium (Mg) [e]	mg/L	-		-		14.5	6.96	9.70	9.86
	Manganese (Mn)	mg/L	1.02	1.41	3.39		0.0820	0.00813	0.00125	0.00176
	Mercury (Hg) [g]	µg/L	0.00125		-		0.00288	0.00080	<0.00050	<0.00050
	Molybdenum (Mo)	mg/L	1		2		0.000639	0.000522	0.000667	0.000777
	Nickel (Ni) [e]	mg/L	0.15		-		0.00276	<0.00050	<0.00050	0.00133
	Potassium (K)	mg/L	-		-		0.875	0.442	0.503	0.501
	Selenium (Se)	mg/L	0.07		-		0.000191	0.000081	0.000837	0.000712
	Silicon (Si)-Total	mg/L	-		-		4.77	2.31	1.12	1.14
	Silver (Ag) [e]	mg/L	0.0015		0.003		<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)	mg/L	-		-		5.16	1.96	3.11	3.21
	Strontium (Sr)	mg/L	-		-		0.200	0.0961	0.130	0.132
	Thallium (Tl)	mg/L	0.0008		-		0.000020	<0.000010	<0.000010	<0.000010
	Tin (Sn)	mg/L	-		-		<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)	mg/L	-		-		0.015	<0.010	<0.010	<0.010
	Uranium (U)	mg/L	0.0085		-		0.000872	0.000554	0.000679	0.000693
	Vanadium (V)	mg/L	-		-		0.00201	0.00052	<0.00050	<0.00050
	Zinc (Zn) [e]	mg/L	0.19		0.34		0.0102	<0.0030	<0.0030	<0.0030
Dissolved Metals	Aluminum (Al)	mg/L	-		0.05		0.0083	0.0165	0.0039	0.0040
	Antimony (Sb)	mg/L	-		-		<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)	mg/L	-		-		0.00045	0.00031	0.00037	0.00038
	Barium (Ba)	mg/L	-		-		0.0502	0.0253	0.0373	0.0372
	Beryllium (Be)	mg/L	-		-		<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)	mg/L	-		-		<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)	mg/L	-		-		<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd) [e]	mg/L	0.00046		0.0028		<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)	mg/L	-		-		46.3	25.4	32.9	31.2
	Chromium (Cr)	mg/L	-		-		<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)	mg/L	-		-		<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)	mg/L	-		-		<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)	mg/L	-		0.35		0.017	<0.010	<0.010	<0.010
	Lead (Pb)	mg/L	-		-		0.000051	<0.000050	<0.000050	<0.000050
	Lithium (Li)	mg/L	-		-		0.0019	<0.0010	0.0017	0.0017
	Magnesium (Mg)	mg/L	-		-		13.6	7.24	10.1	9.85
	Manganese (Mn)	mg/L	-		-		0.00098	0.00246	<0.00010	<0.00010
	Mercury (Hg)	µg/L	-		-		<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)	mg/L	-		-		0.000603	0.000508	0.000684	0.000652
	Nickel (Ni)	mg/L	-		-		<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)	mg/L	-		-		0.790	0.456	0.530	0.539
	Selenium (Se)	mg/L	-		-		0.000238	0.000102	0.000807	0.000690
	Silicon (Si)	mg/L	-		-		2.56	2.08	1.09	1.14
	Silver (Ag)	mg/L	-		-		<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)	mg/L	-		-		5.90	2.05	3.46	3.53
	Strontium (Sr)	mg/L	-		-		0.168	0.100	0.129	0.127
	Thallium (Tl)	mg/L	-		-		<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)	mg/L	-		-		<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)	mg/L	-		-		<0.010	<0.010	<0.010	<0.010
	Uranium (U)	mg/L	-		-		0.000838	0.000566	0.000670	0.000687
	Vanadium (V)	mg/L	-		-		<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)	mg/L	-		-		<0.0010	<0.0010	<0.0010	<0.0010

Exceeds BCMOE Long term Guideline
Exceeds BCMOE Short term Guideline

Notes: "-" = no data

[a] British Columbia Working (BCMOE 2017a) or Accepted (BCMOE 2017b) Water Quality Guidelines for the Protection of Aquatic Life were used. For guidelines dependent on other analytes (e.g., hardness), guidelines were screened using concurrent values.

[b] Dissolved oxygen guidelines represent a minimum value, and so exceedances were quantified below this guideline.

[c] Temperature and pH dependent; range of minimum and maximum values.

[d] Dependent on concurrent chloride, range of values reported (BCMOE 2017a)

[e] For hardness-based guidelines, concurrent hardness values were used for calculating guidelines. If hardness values exceeding the maximum applicable hardness, then guidelines were determined using the maximum applicable hardness. Minimum and maximum calculated guideline values presented if applicable.

[f] Chromium(VI) is the dominant oxidation state in oxygenated environments, and so its guideline was applied.

[g] The most conservative guideline (0.00000125 mg/L) was applied.

Table B.9: Water Quality Analytes in Comparison to Guidelines, 2018

	Analyte	Units	RG_SCU3	RG_TN	RG_TNU1	RG_TNU2	RG_TNU3	RG_TNS1
			Bottom	Surface	Surface	Middle	Bottom	Middle
			29-Aug-2018	30-Apr-2018	11-Jun-2018	11-Jun-2018	11-Jun-2018	29-Aug-2018
Physical Characteristics	Hardness (as CaCO3)	mg/L	132	120	97.0	95.7	94.8	121
	pH, Field	pH	8.24	7.74	8.13	8.15	8.18	8.75
	Total Suspended Solids, Lab	mg/L	2.9	544	6.5	6.9	3.3	1.5
	Total Dissolved Solids	mg/L	168	151	120	119	115	222
	Dissolved Oxygen-Field [b]	mg/L	8.65	15.21	9.99	9.92	9.82	9.05
	Dissolved Oxygen-Field	%	95.9	120.1	100.2	99.3	97.5	97.7
	Temperature-Field	C	15.8	5.5	12.39	12.3	11.95	19
Anions and Nutrients	Ammonia as N [c]	mg/L	0.0173	0.031	0.0067	0.0080	0.0073	0.0073
	Bromide (Br)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl)	mg/L	4.25	3.22	1.54	1.51	1.48	2.39
	Fluoride (F) [e]	mg/L	0.094	0.079	0.063	0.067	0.063	0.095
	Nitrate (as N)	mg/L	0.0345	0.192	0.0879	0.0880	0.0880	0.102
	Nitrite (as N) [d]	mg/L	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	0.0022
	Phosphorus (P)-Total	mg/L	0.0037	0.139	0.0066	0.0066	0.0069	<0.0020
	Sulphate (SO_4) [e]	mg/L	31.9	22.2	15.9	15.8	15.9	26.5
Total Metals	Aluminum (Al)	mg/L	0.0349	3.26	0.0944	0.0917	0.0854	0.0100
	Antimony (Sb)	mg/L	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)	mg/L	0.00048	0.00238	0.00036	0.00035	0.00040	0.00037
	Barium (Ba)	mg/L	0.0392	0.0594	0.0272	0.0264	0.0259	0.0383
	Beryllium (Be)	mg/L	<0.000020	0.000137	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)	mg/L	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)	mg/L	<0.010	<0.020	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)	mg/L	<0.0000050	0.000074	0.0000056	0.0000079	0.0000160	<0.0000050
	Calcium (Ca)	mg/L	37.0	82.9	27.9	27.0	28.2	32.6
	Chromium (Cr) [f]	mg/L	0.00012	0.00466	0.00016	0.00017	0.00021	0.00011
	Cobalt (Co)	mg/L	<0.00010	0.00285	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu) [e]	mg/L	<0.00050	0.0060	<0.00050	0.00052	0.00102	<0.00050
	Iron (Fe)	mg/L	0.057	6.17	0.123	0.121	0.117	<0.010
	Lead (Pb) [e]	mg/L	0.000096	0.00629	0.000176	0.000195	0.00134	<0.000050
	Lithium (Li)	mg/L	0.0016	0.0083	0.0010	0.0010	<0.0010	0.0020
	Magnesium (Mg) [e]	mg/L	11.3	17.5	7.80	7.69	7.74	10.1
	Manganese (Mn)	mg/L	0.00475	0.172	0.00728	0.00686	0.00792	0.00099
	Mercury (Hg) [g]	mg/L	<0.00050	0.00442	0.00070	0.00065	0.00063	<0.00050
	Molybdenum (Mo)	mg/L	0.000764	0.00072	0.000504	0.000494	0.000547	0.000652
	Nickel (Ni) [e]	mg/L	<0.00050	0.0059	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)	mg/L	0.597	0.97	0.474	0.464	0.470	0.506
	Selenium (Se)	mg/L	0.000180	0.00020	0.000135	0.000138	0.000124	0.00107
	Silicon (Si)-Total	mg/L	1.86	6.71	2.30	2.29	2.21	1.14
	Silver (Ag) [e]	mg/L	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)	mg/L	5.26	4.04	2.03	1.99	2.03	3.06
	Strontium (Sr)	mg/L	0.156	0.242	0.101	0.101	0.0982	0.131
	Thallium (Tl)	mg/L	<0.000010	0.000035	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)	mg/L	0.00019	<0.00020	0.00015	0.00012	0.00013	<0.00010
	Titanium (Ti)	mg/L	<0.010	0.033	<0.010	<0.010	<0.010	<0.010
	Uranium (U)	mg/L	0.000786	0.000939	0.000572	0.000555	0.000532	0.000689
	Vanadium (V)	mg/L	<0.00050	0.0040	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn) [e]	mg/L	<0.0030	0.0226	<0.0030	<0.0030	0.0803	<0.0030
Dissolved Metals	Aluminum (Al)	mg/L	0.0042	0.0119	0.0135	0.0142	0.0137	0.0037
	Antimony (Sb)	mg/L	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)	mg/L	0.00043	0.00048	0.00032	0.00027	0.00031	0.00034
	Barium (Ba)	mg/L	0.0385	0.0332	0.0266	0.0268	0.0265	0.0390
	Beryllium (Be)	mg/L	<0.000020	<0.000040	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)	mg/L	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)	mg/L	<0.010	<0.020	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd) [e]	mg/L	<0.0000050	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)	mg/L	34.7	32.6	26.3	25.8	25.6	32.0
	Chromium (Cr)	mg/L	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)	mg/L	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)	mg/L	<0.010	0.022	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)	mg/L	<0.000050	<0.00010	<0.000050	<0.000050	0.000144	<0.000050
	Lithium (Li)	mg/L	0.0015	0.0012	<0.0010	<0.0010	<0.0010	0.0018
	Magnesium (Mg)	mg/L	11.0	9.43	7.62	7.59	7.48	9.84
	Manganese (Mn)	mg/L	0.00010	0.00060	0.00259	0.00237	0.00244	<0.00010
	Mercury (Hg)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)	mg/L	0.000725	0.00048	0.000536	0.000526	0.000528	0.000655
	Nickel (Ni)	mg/L	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)	mg/L	0.591	0.53	0.476	0.469	0.476	0.535
	Selenium (Se)	mg/L	0.000140	0.00014	0.000130	0.000110	0.000110	0.00104
	Silicon (Si)	mg/L	1.81	2.86	2.16	2.21	2.15	1.06
	Silver (Ag)	mg/L	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)	mg/L	5.54	3.58	2.10	2.09	2.07	3.22
	Strontium (Sr)	mg/L	0.151	0.124	0.100	0.100	0.0997	0.126
	Thallium (Tl)	mg/L	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)	mg/L	0.00018	<0.00020	0.00014	0.00010	<0.00010	<0.00010
	Titanium (Ti)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)	mg/L	0.000788	0.000673	0.000560	0.000547	0.000545	0.000700
	Vanadium (V)	mg/L	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)	mg/L	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010

Exceeds BCMOE Long term Guideline
Exceeds BCMOE Short term Guideline

Notes: "-" = no data

[a] British Columbia Working (BCMOE 2017a) or Accepted (BCMOE 2017b) Water Quality Guidelines for the Protection of Aquatic Life were used. For guidelines dependent on other analytes (e.g., hardness), guidelines were screened using concurrent values.

[b] Dissolved oxygen guidelines represent a minimum value, and so exceedances were quantified below this guideline.

[c] Temperature and pH dependent; range of minimum and maximum values.

[d] Dependent on concurrent chloride, range of values reported (BCMOE 2017a)

[e] For hardness-based guidelines, concurrent hardness values were used for calculating guidelines. If hardness values exceeding the maximum applicable hardness, then guidelines were determined using the maximum applicable hardness. Minimum and maximum calculated guideline values presented if applicable.

[f] Chromium(VI) is the dominant oxidation state in oxygenated environments, and so its guideline was applied.

[g] The most conservative guideline (0.00000125 mg/L) was applied.

Table B.9: Water Quality Analytes in Comparison to Guidelines, 2018

	Analyte	Units	RG_TNS2	RG_ER	RG_ER	RG_ERU1	RG_ERU2	RG_ERU3
			Bottom	Surface	Surface	Surface	Middle	Bottom
			29-Aug-2018	27-Apr-2018	13-Jun-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018
Physical Characteristics	Hardness (as CaCO3)	mg/L	128	175	103	119	116	131
	pH, Field	pH	8.42	8.26	8.02	8.56	8.51	8.21
	Total Suspended Solids, Lab	mg/L	3.1	50.1	2.5	2.2	1.3	2.6
	Total Dissolved Solids	mg/L	231	193	111	151	152	178
	Dissolved Oxygen-Field [b]	mg/L	8.66	9.95	10.16	8.92	8.96	8.39
	Dissolved Oxygen-Field	%	87.7	86.9	102.3	107	106.4	94.5
	Temperature-Field	C	18	8.9	13.05	19.6	18.9	16.5
Anions and Nutrients	Ammonia as N [c]	mg/L	0.0198	0.0106	0.0073	0.0201	0.0179	0.0204
	Bromide (Br)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl)	mg/L	4.10	4.20	<0.50	2.13	2.13	3.87
	Fluoride (F) [e]	mg/L	0.096	0.100	<0.020	0.092	0.092	0.092
	Nitrate (as N)	mg/L	0.0368	0.284	<0.0050	0.118	0.117	0.0463
	Nitrite (as N) [d]	mg/L	0.0012	0.0016	<0.0010	0.0018	0.0018	0.0014
	Phosphorus (P)-Total	mg/L	0.0041	0.0261	0.0118	<0.0020	<0.0020	<0.0020
	Sulphate (SO_4) [e]	mg/L	31.5	36.5	<0.30	24.9	25.0	31.5
Total Metals	Aluminum (Al)	mg/L	0.0329	0.564	0.0772	0.0103	0.0113	0.0220
	Antimony (Sb)	mg/L	<0.00010	<0.00010	0.00021	<0.00010	<0.00010	<0.00010
	Arsenic (As)	mg/L	0.00049	0.00079	0.00039	0.00034	0.00036	0.00047
	Barium (Ba)	mg/L	0.0381	0.0608	0.0279	0.0396	0.0400	0.0385
	Beryllium (Be)	mg/L	<0.000020	0.000031	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)	mg/L	<0.010	0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)	mg/L	<0.0000050	0.0000267	0.0000269	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)	mg/L	35.2	46.0	27.1	33.2	33.5	35.9
	Chromium (Cr) [f]	mg/L	0.00011	0.00086	0.00023	<0.00010	<0.00010	0.00011
	Cobalt (Co)	mg/L	<0.00010	0.00043	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu) [e]	mg/L	<0.00050	0.00115	0.00100	<0.00050	<0.00050	<0.00050
	Iron (Fe)	mg/L	0.051	0.838	0.094	<0.010	<0.010	0.032
	Lead (Pb) [e]	mg/L	0.000090	0.000893	0.00382	<0.000050	<0.000050	0.000065
	Lithium (Li)	mg/L	0.0017	0.0038	0.0012	0.0019	0.0019	0.0016
	Magnesium (Mg) [e]	mg/L	11.0	13.7	7.71	9.42	9.65	10.7
	Manganese (Mn)	mg/L	0.00392	0.0313	0.00642	0.00125	0.00119	0.00372
	Mercury (Hg) [g]	mg/L	<0.00050	0.00199	0.00056	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)	mg/L	0.000679	0.000678	0.000521	0.000671	0.000687	0.000756
	Nickel (Ni) [e]	mg/L	<0.00050	0.00112	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)	mg/L	0.569	0.819	0.510	0.493	0.501	0.564
	Selenium (Se)	mg/L	0.000229	0.00116	0.000319	0.00116	0.00113	0.000309
	Silicon (Si)-Total	mg/L	1.85	3.29	2.31	1.16	1.10	1.74
	Silver (Ag) [e]	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)	mg/L	5.17	5.12	2.14	2.65	2.69	4.61
	Strontium (Sr)	mg/L	0.156	0.159	0.0998	0.123	0.123	0.151
	Thallium (Tl)	mg/L	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)	mg/L	<0.00010	<0.00010	<0.00010	0.00023	<0.00010	<0.00010
	Titanium (Ti)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)	mg/L	0.000777	0.000840	0.000561	0.000686	0.000675	0.000766
	Vanadium (V)	mg/L	<0.00050	0.00103	0.00053	<0.00050	<0.00050	<0.00050
	Zinc (Zn) [e]	mg/L	<0.0030	0.0041	0.0049	<0.0030	<0.0030	<0.0030
Dissolved Metals	Aluminum (Al)	mg/L	0.0041	0.0080	0.0172	0.0042	0.0040	0.0040
	Antimony (Sb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)	mg/L	0.00044	0.00050	0.00034	0.00036	0.00031	0.00045
	Barium (Ba)	mg/L	0.0371	0.0632	0.0306	0.0404	0.0404	0.0385
	Beryllium (Be)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd) [e]	mg/L	<0.0000050	<0.0000050	0.0000116	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)	mg/L	33.6	46.6	27.7	31.9	30.7	34.7
	Chromium (Cr)	mg/L	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)	mg/L	<0.010	0.015	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)	mg/L	<0.000050	<0.000050	0.000533	<0.000050	<0.000050	<0.000050
	Lithium (Li)	mg/L	0.0015	0.0027	0.0011	0.0018	0.0018	0.0015
	Magnesium (Mg)	mg/L	10.8	14.3	8.14	9.63	9.61	10.8
	Manganese (Mn)	mg/L	<0.00010	0.00083	0.00033	<0.00010	<0.00010	0.00013
	Mercury (Hg)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)	mg/L	0.000691	0.000679	0.000543	0.000655	0.000630	0.000897
	Nickel (Ni)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)	mg/L	0.575	0.792	0.507	0.511	0.507	0.593
	Selenium (Se)	mg/L	0.000204	0.00126	0.000326	0.00117	0.00116	0.000316
	Silicon (Si)	mg/L	1.86	2.48	2.19	1.16	1.08	1.68
	Silver (Ag)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)	mg/L	5.12	5.73	2.18	2.88	2.83	4.85
	Strontium (Sr)	mg/L	0.151	0.171	0.103	0.121	0.119	0.147
	Thallium (Tl)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)	mg/L	<0.00010	<0.00010	<0.00010	0.00012	0.00014	<0.00010
	Titanium (Ti)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)	mg/L	0.000760	0.000877	0.000587	0.000700	0.000669	0.000772
	Vanadium (V)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

Exceeds BCMOE Long term Guideline
Exceeds BCMOE Short term Guideline

Notes: "-" = no data

[a] British Columbia Working (BCMOE 2017a) or Accepted (BCMOE 2017b) Water Quality Guidelines for the Protection of Aquatic Life were used. For guidelines dependent on other analytes (e.g., hardness), guidelines were screened using concurrent values.

[b] Dissolved oxygen guidelines represent a minimum value, and so exceedances were quantified below this guideline.

[c] Temperature and pH dependent; range of minimum and maximum values.

[d] Dependent on concurrent chloride, range of values reported (BCMOE 2017a)

[e] For hardness-based guidelines, concurrent hardness values were used for calculating guidelines. If hardness values exceeding the maximum applicable hardness, then guidelines were determined using the maximum applicable hardness. Minimum and maximum calculated guideline values presented if applicable.

[f] Chromium(VI) is the dominant oxidation state in oxygenated environments, and so its guideline was applied.

[g] The most conservative guideline (0.00000125 mg/L) was applied.

Table B.9: Water Quality Analytes in Comparison to Guidelines, 2018

	Analyte	Units	RG_T4	RG_T4U1	RG_T4U2	RG_T4U3	RG_T4U1	RG_T4U2
			Surface	Surface	Middle	Bottom	Surface	Surface
			29-Apr-2018	08-Jun-2018	08-Jun-2018	08-Jun-2018	29-Aug-2018	29-Aug-2018
Physical Characteristics	Hardness (as CaCO3)	mg/L	137	103	107	122	116	118
	pH, Field	pH	7.57	8.00	8.03	-	8.76	8.77
	Total Suspended Solids, Lab	mg/L	879	2.3	2.1	10.1	1.3	1.1
	Total Dissolved Solids	mg/L	165	129	126	145	140	111
	Dissolved Oxygen-Field [b]	mg/L	12.53	8.46	8.34	-	8.9	8.82
	Dissolved Oxygen-Field	%	102.6	92.4	89.4	-	96.4	95.5
	Temperature-Field	C	6.73	16.53	13.76	11.09	19.2	19.2
Anions and Nutrients	Ammonia as N [c]	mg/L	0.045	0.0094	0.0134	0.0087	0.0127	0.0181
	Bromide (Br)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl)	mg/L	2.87	3.16	2.49	1.41	2.00	2.11
	Fluoride (F) [e]	mg/L	0.103	0.071	0.069	0.097	0.093	0.093
	Nitrate (as N)	mg/L	0.463	0.187	0.212	0.462	0.116	0.124
	Nitrite (as N) [d]	mg/L	0.0025	0.0016	0.0012	<0.0010	0.0022	0.0019
	Phosphorus (P)-Total	mg/L	0.370	0.0116	0.0074	0.0138	<0.0020	<0.0020
	Sulphate (SO_4) [e]	mg/L	28.8	15.1	15.4	22.2	23.9	24.7
Total Metals	Aluminum (Al)	mg/L	5.64	0.0472	0.0549	0.176	0.0138	0.0122
	Antimony (Sb)	mg/L	0.00026	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)	mg/L	0.00381	0.00040	0.00037	0.00039	0.00036	0.00039
	Barium (Ba)	mg/L	0.121	0.0363	0.0334	0.0464	0.0408	0.0400
	Beryllium (Be)	mg/L	0.000267	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)	mg/L	0.00012	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)	mg/L	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)	mg/L	0.000268	0.0000075	0.0000066	0.0000200	<0.0000050	<0.0000050
	Calcium (Ca)	mg/L	99.3	28.9	28.3	34.2	31.1	31.8
	Chromium (Cr) [f]	mg/L	0.00820	0.00013	0.00013	0.00038	<0.00010	<0.00010
	Cobalt (Co)	mg/L	0.00441	<0.00010	<0.00010	0.00014	<0.00010	<0.00010
	Copper (Cu) [e]	mg/L	0.0095	0.00065	<0.00050	0.00055	<0.00050	<0.00050
	Iron (Fe)	mg/L	9.99	0.043	0.053	0.212	<0.010	<0.010
	Lead (Pb) [e]	mg/L	0.0101	0.000170	0.000114	0.000235	<0.000050	<0.000050
	Lithium (Li)	mg/L	0.0136	0.0016	0.0015	0.0028	0.0019	0.0020
	Magnesium (Mg) [e]	mg/L	21.4	8.38	7.67	10.0	9.38	9.70
	Manganese (Mn)	mg/L	0.291	0.00263	0.00320	0.0107	0.00123	0.00138
	Mercury (Hg) [g]	mg/L	0.0196	0.00067	0.00068	0.00086	<0.00050	<0.00050
	Molybdenum (Mo)	mg/L	0.00103	0.000536	0.000506	0.000681	0.000677	0.000648
	Nickel (Ni) [e]	mg/L	0.0103	<0.00050	<0.00050	0.00055	<0.00050	<0.00050
	Potassium (K)	mg/L	1.50	0.595	0.492	0.517	0.484	0.489
	Selenium (Se)	mg/L	0.00246	0.000880	0.000752	0.00223	0.00115	0.00115
	Silicon (Si)-Total	mg/L	9.81	2.47	2.40	2.49	1.15	1.23
	Silver (Ag) [e]	mg/L	0.000065	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)	mg/L	3.72	4.47	2.40	1.64	2.66	2.74
	Strontium (Sr)	mg/L	0.270	0.0993	0.0980	0.114	0.122	0.124
	Thallium (Tl)	mg/L	0.000093	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)	mg/L	<0.00020	0.00057	0.00012	<0.00010	<0.00010	<0.00010
	Titanium (Ti)	mg/L	0.043	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)	mg/L	0.00112	0.000612	0.000612	0.000657	0.000726	0.000665
	Vanadium (V)	mg/L	0.0088	<0.00050	<0.00050	0.00061	<0.00050	<0.00050
	Zinc (Zn) [e]	mg/L	0.0424	0.0032	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals	Aluminum (Al)	mg/L	0.0147	0.0154	0.0183	0.0130	0.0044	0.0045
	Antimony (Sb)	mg/L	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)	mg/L	0.00060	0.00036	0.00036	0.00030	0.00032	0.00033
	Barium (Ba)	mg/L	0.0579	0.0375	0.0365	0.0455	0.0398	0.0388
	Beryllium (Be)	mg/L	<0.000040	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)	mg/L	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)	mg/L	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd) [e]	mg/L	<0.000010	<0.0000050	<0.0000050	0.0000153	<0.0000050	<0.0000050
	Calcium (Ca)	mg/L	36.9	27.6	29.0	32.5	31.1	31.7
	Chromium (Cr)	mg/L	<0.00020	<0.00010	<0.00010	0.00012	<0.00010	<0.00010
	Cobalt (Co)	mg/L	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)	mg/L	0.00060	<0.00050	<0.00050	0.00077	<0.00050	<0.00050
	Iron (Fe)	mg/L	0.022	<0.010	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)	mg/L	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)	mg/L	0.0026	0.0014	0.0015	0.0025	0.0019	0.0018
	Magnesium (Mg)	mg/L	10.9	8.27	8.29	9.85	9.33	9.42
	Manganese (Mn)	mg/L	0.00072	0.00026	0.00068	0.00058	<0.00010	<0.00010
	Mercury (Hg)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)	mg/L	0.00065	0.000483	0.000533	0.000652	0.000623	0.000609
	Nickel (Ni)	mg/L	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)	mg/L	0.56	0.603	0.556	0.510	0.520	0.514
	Selenium (Se)	mg/L	0.00206	0.000816	0.000777	0.00226	0.00101	0.00100
	Silicon (Si)	mg/L	2.67	2.33	2.28	2.14	1.16	1.20
	Silver (Ag)	mg/L	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)	mg/L	3.25	3.28	2.24	1.69	2.67	2.83
	Strontium (Sr)	mg/L	0.124	0.0921	0.0983	0.104	0.118	0.117
	Thallium (Tl)	mg/L	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)	mg/L	<0.00020	0.00046	0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)	mg/L	0.000749	0.000573	0.000583	0.000588	0.000663	0.000670
	Vanadium (V)	mg/L	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)	mg/L	<0.0020	0.0019	<0.0010	<0.0010	<0.0010	<0.0010

Exceeds BCMOE Long term Guideline
Exceeds BCMOE Short term Guideline

Notes: "-" = no data

[a] British Columbia Working (BCMOE 2017a) or Accepted (BCMOE 2017b) Water Quality Guidelines for the Protection of Aquatic Life were used. For guidelines dependent on other analytes (e.g., hardness), guidelines were screened using concurrent values.

[b] Dissolved oxygen guidelines represent a minimum value, and so exceedances were quantified below this guideline.

[c] Temperature and pH dependent; range of minimum and maximum values.

[d] Dependent on concurrent chloride, range of values reported (BCMOE 2017a)

[e] For hardness-based guidelines, concurrent hardness values were used for calculating guidelines. If hardness values exceeding the maximum applicable hardness, then guidelines were determined using the maximum applicable hardness. Minimum and maximum calculated guideline values presented if applicable.

[f] Chromium(VI) is the dominant oxidation state in oxygenated environments, and so its guideline was applied.

[g] The most conservative guideline (0.00000125 mg/L) was applied.

Table B.9: Water Quality Analytes in Comparison to Guidelines, 2018

	Analyte	Units	RG_T4U3	RG_GC	RG_GC	RG_GCU1	RG_GCU2	RG_GCU3
			Middle	Surface	Surface	Surface	Middle	Bottom
			29-Aug-2018	27-Apr-2018	08-Jun-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018
Physical Characteristics	Hardness (as CaCO3)	mg/L	143	184	100	114	117	132
	pH, Field	pH	8.25	7.59	7.95	8.8	8.79	8.26
	Total Suspended Solids, Lab	mg/L	3.1	43.1	1.9	1.5	1.3	1.3
	Total Dissolved Solids	mg/L	212	196	117	149	152	169
	Dissolved Oxygen-Field [b]	mg/L	6.82	12.83	8.97	8.88	8.82	6.99
	Dissolved Oxygen-Field	%	68.2	113.3	99.6	95.7	95.1	71.3
	Temperature-Field	C	15.7	11.87	17.2	19	19	16.2
Anions and Nutrients	Ammonia as N [c]	mg/L	0.0259	0.0258	0.0060	0.0229	0.0166	0.0216
	Bromide (Br)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl)	mg/L	2.56	3.71	1.18	1.92	1.96	2.93
	Fluoride (F) [e]	mg/L	0.114	0.108	0.066	0.090	0.090	0.103
	Nitrate (as N)	mg/L	0.386	0.457	0.168	0.114	0.117	0.222
	Nitrite (as N) [d]	mg/L	0.0052	0.0020	0.0018	0.0022	0.0022	0.0044
	Phosphorus (P)-Total	mg/L	0.0035	0.0333	0.0053	0.0028	<0.0020	0.0032
	Sulphate (SO_4) [e]	mg/L	33.4	37.7	13.7	23.0	23.4	30.4
Total Metals	Aluminum (Al)	mg/L	0.0262	0.853	0.0367	0.0104	0.0113	0.0225
	Antimony (Sb)	mg/L	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)	mg/L	0.00041	0.00109	0.00037	0.00036	0.00034	0.00043
	Barium (Ba)	mg/L	0.0514	0.0767	0.0374	0.0405	0.0391	0.0437
	Beryllium (Be)	mg/L	<0.000020	0.000050	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)	mg/L	0.0000056	0.0000378	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)	mg/L	37.3	45.6	28.1	31.6	31.7	37.1
	Chromium (Cr) [f]	mg/L	0.00016	0.00112	0.00023	0.00014	<0.00010	<0.00010
	Cobalt (Co)	mg/L	<0.00010	0.00061	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu) [e]	mg/L	<0.00050	0.00172	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)	mg/L	0.040	1.19	0.031	0.013	<0.010	0.026
	Lead (Pb) [e]	mg/L	0.000080	0.00124	<0.000050	<0.000050	<0.000050	0.000106
	Lithium (Li)	mg/L	0.0031	0.0044	0.0014	0.0018	0.0018	0.0022
	Magnesium (Mg) [e]	mg/L	11.6	13.0	8.04	9.26	9.09	10.9
	Manganese (Mn)	mg/L	0.00778	0.0548	0.00230	0.00115	0.00117	0.00400
	Mercury (Hg) [g]	mg/L	<0.00050	0.00146	0.00057	<0.00050	<0.00050	<0.00050
	Molybdenum (Mo)	mg/L	0.000798	0.000740	0.000477	0.000641	0.000647	0.000735
	Nickel (Ni) [e]	mg/L	<0.00050	0.00170	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)	mg/L	0.545	0.860	0.530	0.491	0.477	0.545
	Selenium (Se)	mg/L	0.00216	0.00183	0.000765	0.00106	0.00110	0.00111
	Silicon (Si)-Total	mg/L	1.96	4.00	2.62	1.22	1.21	1.85
	Silver (Ag) [e]	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)	mg/L	3.23	4.27	1.82	2.43	2.43	3.59
	Strontium (Sr)	mg/L	0.149	0.145	0.0917	0.116	0.115	0.142
	Thallium (Tl)	mg/L	<0.000010	0.000016	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)	mg/L	0.000789	0.000849	0.000593	0.000666	0.000673	0.000763
	Vanadium (V)	mg/L	<0.00050	0.00161	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn) [e]	mg/L	0.0035	0.0045	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals	Aluminum (Al)	mg/L	0.0034	0.0154	0.0144	0.0043	0.0042	0.0031
	Antimony (Sb)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)	mg/L	0.00040	0.00062	0.00033	0.00037	0.00035	0.00043
	Barium (Ba)	mg/L	0.0502	0.0831	0.0382	0.0406	0.0408	0.0441
	Beryllium (Be)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd) [e]	mg/L	<0.0000050	0.0000061	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)	mg/L	37.9	49.0	27.1	30.5	31.8	34.9
	Chromium (Cr)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)	mg/L	<0.00050	0.00057	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)	mg/L	<0.010	0.023	<0.010	<0.010	<0.010	<0.010
	Lead (Pb)	mg/L	<0.000050	0.000054	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)	mg/L	0.0029	0.0031	0.0013	0.0017	0.0017	0.0021
	Magnesium (Mg)	mg/L	11.8	15.1	7.90	9.19	9.24	11.0
	Manganese (Mn)	mg/L	<0.00010	0.0141	0.00027	<0.00010	<0.00010	<0.00010
	Mercury (Hg)	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)	mg/L	0.000819	0.000667	0.000465	0.000642	0.000632	0.000762
	Nickel (Ni)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Potassium (K)	mg/L	0.590	0.835	0.538	0.505	0.505	0.567
	Selenium (Se)	mg/L	0.00211	0.00182	0.000807	0.000920	0.00109	0.00106
	Silicon (Si)	mg/L	1.84	2.70	2.50	1.22	1.18	1.95
	Silver (Ag)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)	mg/L	3.45	4.86	1.79	2.63	2.62	3.81
	Strontium (Sr)	mg/L	0.151	0.165	0.0870	0.113	0.114	0.141
	Thallium (Tl)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)	mg/L	0.000809	0.000877	0.000571	0.000662	0.000671	0.000756
	Vanadium (V)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

Exceeds BCMOE Long term Guideline
Exceeds BCMOE Short term Guideline

Notes: "-" = no data

[a] British Columbia Working (BCMOE 2017a) or Accepted (BCMOE 2017b) Water Quality Guidelines for the Protection of Aquatic Life were used. For guidelines dependent on other analytes (e.g., hardness), guidelines were screened using concurrent values.

[b] Dissolved oxygen guidelines represent a minimum value, and so exceedances were quantified below this guideline.

[c] Temperature and pH dependent; range of minimum and maximum values.

[d] Dependent on concurrent chloride, range of values reported (BCMOE 2017a)

[e] For hardness-based guidelines, concurrent hardness values were used for calculating guidelines. If hardness values exceeding the maximum applicable hardness, then guidelines were determined using the maximum applicable hardness. Minimum and maximum calculated guideline values presented if applicable.

[f] Chromium(VI) is the dominant oxidation state in oxygenated environments, and so its guideline was applied.

[g] The most conservative guideline (0.00000125 mg/L) was applied.

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	pH[a]	Temp (°C)	TDS (mg/L)	TSS (mg/L)	Secchi Depth (m)	Chlorophyll a (mg/L)	Total Nitrogen (mg/L)	Dissolved Organic Carbon (mg/L)	Total Organic Carbon (mg/L)
International Boundary	2017-04-26	Bottom	7.9	8.4	-	-	-	-	-	-	-
	2017-04-26	Surface	7.9	8.9	-	-	-	-	-	-	-
	2017-05-16	Bottom	8.1	7.4	-	-	-	-	-	-	-
	2017-05-16	Surface	8.2	10	-	-	-	-	-	-	-
	2017-06-22	Bottom	-	-	-	-	-	-	-	-	-
	2017-06-22	Surface	-	-	-	-	-	-	-	-	-
	2017-07-25	Bottom	7.9	9.1	-	-	-	-	-	-	-
	2017-07-25	Surface	8.7	22	-	-	-	-	-	-	-
	2017-08-28	Bottom	-	-	-	-	-	-	-	-	-
	2017-08-28	Surface	-	-	-	-	-	-	-	-	-
	2017-09-26	Bottom	7.9	9.2	-	-	-	-	-	-	-
	2017-09-26	Surface	8.5	16	-	-	-	-	-	-	-
	2017-10-24	Bottom	8.3	12	-	-	-	-	-	-	-
	2017-10-24	Surface	8.5	12	-	-	-	-	-	-	-
	2018-04-24	Bottom	-	-	-	-	-	-	-	-	-
	2018-04-24	Surface	-	-	-	-	0.40	-	-	-	-
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	0.75	-	-	-	-
	2018-06-12	Bottom	-	-	-	-	-	-	-	-	-
	2018-06-12	Surface	-	-	-	-	1.5	-	-	-	-
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	4.0	-	-	-	-
	2018-08-28	Bottom	-	-	-	-	-	-	-	-	-
	2018-08-28	Surface	-	-	-	-	3.5	-	-	-	-
	2018-09-18	Bottom	-	-	-	-	-	-	-	-	-
	2018-09-18	Surface	-	-	-	-	5.0	-	-	-	-
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	5.5	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	-	0.29	-	-
	2019-04-16	Surface	-	-	-	-	-	0.0021	0.25	-	-
	2019-05-12	Bottom	-	-	-	-	-	-	0.47	-	-
	2019-05-12	Surface	-	-	-	-	-	0.0016	0.54	-	-
	2019-05-21	Bottom	-	-	-	-	-	-	-	-	-
	2019-05-21	Surface	-	-	-	-	-	-	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	0.33	-	-
	2019-06-11	Surface	-	-	-	-	-	0.0026	0.37	-	-
	2019-07-23	Bottom	-	-	-	-	-	-	0.49	-	-
	2019-07-23	Surface	-	-	-	-	-	0.0018	0.35	-	-
	2019-08-17	Bottom	-	-	-	-	-	-	-	-	-
	2019-08-20	Bottom	-	-	-	-	-	-	0.43	-	-
	2019-08-20	Surface	-	-	-	-	-	0.0015	0.45	-	-
	2019-09-03	Surface	-	-	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	-	0.38	-	-
	2019-09-25	Surface	-	-	-	-	-	0.0014	0.21	-	-
	2019-10-30	Bottom	-	-	-	-	-	-	0.34	-	-
	2019-10-30	Surface	-	-	-	-	-	0.0021	0.21	-	-
Tenmile Creek	2017-04-26	Bottom	8.0	4.0	-	-	-	-	-	-	-
	2017-04-26	Surface	8.2	4.6	-	-	-	-	-	-	-
	2017-05-16	Bottom	-	-	-	-	-	-	-	-	-
	2017-05-16	Surface	-	-	-	-	-	-	-	-	-
	2017-06-22	Bottom	-	-	-	-	-	-	-	-	-
	2017-06-22	Surface	-	-	-	-	-	-	-	-	-
	2017-07-25	Bottom	7.8	5.0	-	-	-	-	-	-	-
	2017-07-25	Surface	8.6	20	-	-	-	-	-	-	-
	2017-08-28	Bottom	-	-	-	-	-	-	-	-	-
	2017-08-28	Surface	-	-	-	-	-	-	-	-	-
	2017-09-26	Bottom	7.8	5.3	-	-	-	-	-	-	-
	2017-09-26	Surface	8.6	16	-	-	-	-	-	-	-
	2017-10-24	Bottom	7.7	5.2	-	-	-	-	-	-	-
	2017-10-24	Surface	8.3	12	-	-	-	-	-	-	-
	2018-04-24	Bottom	-	-	-	-	-	-	-	-	-
	2018-04-24	Surface	-	-	-	-	4.5	-	-	-	-
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	1.5	-	-	-	-
	2018-06-12	Bottom	-	-	-	-	-	-	-	-	-
	2018-06-12	Surface	-	-	-	-	1.0	-	-	-	-
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	4.5	-	-	-	-
	2018-08-28	Bottom	-	-	-	-	-	-	-	-	-
	2018-08-28	Surface	-	-	-	-	6.5	-	-	-	-
	2018-09-18	Bottom	-	-	-	-	-	-	-	-	-
	2018-09-18	Surface	-	-	-	-	8.5	-	-	-	-
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	8.5	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	-	0.42	-	-
	2019-04-16	Surface	-	-	-	-	-	0.00214	0.27	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	0.37	-	-
	2019-06-11	Surface	-	-	-	-	-	0.00370	0.27	-	-
	2019-07-23	Bottom	-	-	-	-	-	-	0.41	-	-
	2019-07-23	Surface	-	-	-	-	-	0.00170	0.34	-	-
	2019-08-20	Bottom	-	-	-	-	-	-	0.34	-	-
	2019-08-20	Surface	-	-	-	-	-	0.00200	0.23	-	-
	2019-09-25	Bottom	-	-	-	-	-	-	0.31	-	-
	2019-09-25	Surface	-	-	-	-	-	0.00160	0.21	-	-
	2019-10-30	Bottom	-	-	-	-	-	-	0.38	-	-
	2019-10-30	Surface	-	-	-	-	-	0.00150	0.32	-	-
Forebay	2017-04-26	Bottom	-	-	-	-	-	-	-	-	-
	2017-04-26	Surface	8.2	5.1	-	-	-	-	-	-	-
	2017-05-16	Bottom	-	-	-	-	-	-	-	-	-

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	pH[a]	Temp (°C)	TDS (mg/L)	TSS (mg/L)	Secchi Depth (m)	Chlorophyll a (mg/L)	Total Nitrogen (mg/L)	Dissolved Organic Carbon (mg/L)	Total Organic Carbon (mg/L)
Forebay	2017-05-16	Surface	8.2	9.5	-	-	-	-	-	-	-
	2017-06-22	Bottom	-	-	-	-	-	-	-	-	-
	2017-06-22	Surface	-	-	-	-	-	-	-	-	-
	2017-07-25	Bottom	7.8	4.4	-	-	-	-	-	-	-
	2017-07-25	Surface	8.7	21	-	-	-	-	-	-	-
	2017-08-28	Bottom	-	-	-	-	-	-	-	-	-
	2017-08-28	Surface	-	-	-	-	-	-	-	-	-
	2017-09-26	Bottom	7.8	4.6	-	-	-	-	-	-	-
	2017-09-26	Surface	8.6	16	-	-	-	-	-	-	-
	2017-10-24	Bottom	7.7	4.7	-	-	-	-	-	-	-
	2017-10-24	Surface	8.2	12	-	-	-	-	-	-	-
	2018-04-24	Bottom	-	-	-	-	-	-	-	-	-
	2018-04-24	Surface	-	-	-	-	5.0	-	-	-	-
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	1.5	-	-	-	-
	2018-06-12	Bottom	-	-	-	-	-	-	-	-	-
	2018-06-12	Surface	-	-	-	-	2.5	-	-	-	-
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	4.5	-	-	-	-
	2018-08-28	Bottom	-	-	-	-	-	-	-	-	-
	2018-08-28	Surface	-	-	-	-	6.0	-	-	-	-
	2018-09-18	Bottom	-	-	-	-	-	-	-	-	-
	2018-09-18	Surface	-	-	-	-	7.0	-	-	-	-
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	8.0	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	-	0.37508984	-	-
	2019-04-16	Surface	-	-	-	-	-	0.002	0.29785479	-	-
	2019-05-12	Bottom	-	-	-	-	-	-	0.46795728	-	-
	2019-05-12	Surface	-	-	-	-	-	0.003916	0.36187546	-	-
	2019-05-21	Bottom	-	-	-	-	-	-	-	-	-
	2019-05-21	Surface	-	-	-	-	-	-	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	0.44361021	-	-
	2019-06-11	Surface	-	-	-	-	-	0.0026	0.32259562	-	-
	2019-07-23	Bottom	-	-	-	-	-	-	0.52730293	-	-
	2019-07-23	Surface	-	-	-	-	-	0.0013	0.43948316	-	-
	2019-08-20	Bottom	-	-	-	-	-	-	0.3699158	-	-
	2019-08-20	Surface	-	-	-	-	-	0.0016	0.33205426	-	-
	2019-08-22	Surface	-	-	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	-	0.33111464	-	-
	2019-09-25	Surface	-	-	-	-	-	0.00178	0.25559286	-	-
	2019-10-30	Bottom	-	-	-	-	-	-	0.40719874	-	-
	2019-10-30	Surface	-	-	-	-	-	0.0015	0.24941591	-	-

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	Dissolved Oxygen (mg/L)	Orthophosphate (mg/L)	Phosphate-Phosphorus (mg/L)	Dissolved Ammonia (mg/L)	Total Ammonia (mg/L)	Dissolved Nitrate +Nitrite (mg/L)	Total Nitrate +Nitrite (mg/L)	Hardness (mg/L) [b]	Alkalinity (mg/L)
International Boundary	2017-04-26	Bottom	9.5	-	-	-	-	-	-	167	-
	2017-04-26	Surface	9.6	-	-	-	-	-	-	152	-
	2017-05-16	Bottom	11	-	-	-	-	-	-	-	-
	2017-05-16	Surface	10	-	-	-	-	-	-	-	-
	2017-06-22	Bottom	-	-	-	-	-	-	-	121	-
	2017-06-22	Surface	-	-	-	-	-	-	-	104	-
	2017-07-25	Bottom	8.5	-	-	-	-	-	-	-	-
	2017-07-25	Surface	9.1	-	-	-	-	-	-	-	-
	2017-08-28	Bottom	-	-	-	-	-	-	-	105	-
	2017-08-28	Surface	-	-	-	-	-	-	-	113	-
	2017-09-26	Bottom	7.0	-	-	-	-	-	-	117	-
	2017-09-26	Surface	8.7	-	-	-	-	-	-	119	-
	2017-10-24	Bottom	9.4	-	-	-	-	-	-	-	-
	2017-10-24	Surface	9.8	-	-	-	-	-	-	-	-
	2018-04-24	Bottom	-	-	-	-	-	-	-	166	-
	2018-04-24	Surface	-	-	-	-	-	-	-	166	-
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	-	-	-	-	-
	2018-06-12	Bottom	-	-	-	-	-	-	-	102	-
	2018-06-12	Surface	-	-	-	-	-	-	-	88	-
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	-	-	-	-	-
	2018-08-28	Bottom	-	-	-	-	-	-	-	119	-
	2018-08-28	Surface	-	-	-	-	-	-	-	111	-
	2018-09-18	Bottom	-	-	-	-	-	-	-	120	-
	2018-09-18	Surface	-	-	-	-	-	-	-	119	-
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-	-	-
	2019-04-16	Bottom	-	<0.001	-	-	0.021077	-	-	145	122
	2019-04-16	Surface	-	<0.001	-	-	0.019202	-	-	142	124
	2019-05-12	Bottom	-	0.001271126	-	-	0.038171	-	-	148	126
	2019-05-12	Surface	-	0.001468754	-	-	0.033153	-	-	104	94
	2019-05-21	Bottom	-	-	-	-	-	-	-	-	-
	2019-05-21	Surface	-	-	-	-	-	-	-	-	-
	2019-06-11	Bottom	-	<0.001	-	-	0.021809	-	-	108	97
	2019-06-11	Surface	-	<0.001	-	-	0.012183	-	-	106	96
	2019-07-23	Bottom	-	<0.001	-	-	<0.005	-	-	129	116
	2019-07-23	Surface	-	<0.001	-	-	0.008698	-	-	104	99
	2019-08-17	Bottom	-	-	-	-	-	-	-	-	-
	2019-08-20	Bottom	-	<0.001	-	-	<0.005	-	-	130	114
	2019-08-20	Surface	-	<0.001	-	-	<0.005	-	-	112	99
	2019-09-03	Surface	-	-	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	<0.001	-	-	<0.005	-	-	167	111
	2019-09-25	Surface	-	<0.001	-	-	0.018076	-	-	138	104
	2019-10-30	Bottom	-	<0.001	-	-	<0.005	-	-	123	108
	2019-10-30	Surface	-	<0.001	-	-	<0.005	-	-	121	109
Tenmile Creek	2017-04-26	Bottom	11	-	-	-	-	-	-	147	-
	2017-04-26	Surface	12	-	-	-	-	-	-	136	-
	2017-05-16	Bottom	-	-	-	-	-	-	-	-	-
	2017-05-16	Surface	-	-	-	-	-	-	-	-	-
	2017-06-22	Bottom	-	-	-	-	-	-	-	135	-
	2017-06-22	Surface	-	-	-	-	-	-	-	108	-
	2017-07-25	Bottom	9.5	-	-	-	-	-	-	-	-
	2017-07-25	Surface	9.0	-	-	-	-	-	-	-	-
	2017-08-28	Bottom	-	-	-	-	-	-	-	129	-
	2017-08-28	Surface	-	-	-	-	-	-	-	104	-
	2017-09-26	Bottom	8.3	-	-	-	-	-	-	139	-
	2017-09-26	Surface	9.1	-	-	-	-	-	-	111	-
	2017-10-24	Bottom	7.9	-	-	-	-	-	-	-	-
	2017-10-24	Surface	9.4	-	-	-	-	-	-	-	-
	2018-04-24	Bottom	-	-	-	-	-	-	-	140	-
	2018-04-24	Surface	-	-	-	-	-	-	-	136	-
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	-	-	-	-	-
	2018-06-12	Bottom	-	-	-	-	-	-	-	140	-
	2018-06-12	Surface	-	-	-	-	-	-	-	89	-
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	-	-	-	-	-
	2018-08-28	Bottom	-	-	-	-	-	-	-	137	-
	2018-08-28	Surface	-	-	-	-	-	-	-	101	-
	2018-09-18	Bottom	-	-	-	-	-	-	-	137	-
	2018-09-18	Surface	-	-	-	-	-	-	-	111	-
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-	-	-
	2019-04-16	Bottom	-	<0.001	-	-	<0.005	-	-	142	122
	2019-04-16	Surface	-	<0.001	-	-	<0.005	-	-	129	112
	2019-06-11	Bottom	-	<0.001	-	-	0.01449	-	-	139	119
	2019-06-11	Surface	-	<0.001	-	-	0.010248	-	-	125	107
	2019-07-23	Bottom	-	<0.001	-	-	<0.005	-	-	137	122
	2019-07-23	Surface	-	<0.001	-	-	0.008817	-	-	111	98
	2019-08-20	Bottom	-	<0.001	-	-	<0.005	-	-	140	117
	2019-08-20	Surface	-	0.001570492	-	-	0.005054	-	-	110	95
	2019-09-25	Bottom	-	0.001736412	-	-	<0.005	-	-	157	116
	2019-09-25	Surface	-	<0.001	-	-	<0.005	-	-	134	101
	2019-10-30	Bottom	-	<0.001	-	-	<0.005	-	-	132	116
	2019-10-30	Surface	-	<0.001	-	-	<0.005	-	-	114	100
Forebay	2017-04-26	Bottom	-	-	-	-	-	-	-	134	-
	2017-04-26	Surface	12	-	-	-	-	-	-	129	-
	2017-05-16	Bottom	-	-	-	-	-	-	-	-	-

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	Dissolved Oxygen (mg/L)	Orthophosphate (mg/L)	Phosphate-Phosphorus (mg/L)	Dissolved Ammonia (mg/L)	Total Ammonia (mg/L)	Dissolved Nitrate +Nitrite (mg/L)	Total Nitrate +Nitrite (mg/L)	Hardness (mg/L) [b]	Alkalinity (mg/L)
Forebay	2017-05-16	Surface	12	-	-	-	-	-	-	-	-
	2017-06-22	Bottom	-	-	-	-	-	-	-	133	-
	2017-06-22	Surface	-	-	-	-	-	-	-	106	-
	2017-07-25	Bottom	10	-	-	-	-	-	-	-	-
	2017-07-25	Surface	9.6	-	-	-	-	-	-	-	-
	2017-08-28	Bottom	-	-	-	-	-	-	-	133	-
	2017-08-28	Surface	-	-	-	-	-	-	-	103	-
	2017-09-26	Bottom	8.6	-	-	-	-	-	-	141	-
	2017-09-26	Surface	9.2	-	-	-	-	-	-	112	-
	2017-10-24	Bottom	8.3	-	-	-	-	-	-	-	-
	2017-10-24	Surface	9.4	-	-	-	-	-	-	-	-
	2018-04-24	Bottom	-	-	-	-	-	-	-	151	-
	2018-04-24	Surface	-	-	-	-	-	-	-	126	-
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	-	-	-	-	-
	2018-06-12	Bottom	-	-	-	-	-	-	-	140	-
	2018-06-12	Surface	-	-	-	-	-	-	-	93	-
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	-	-	-	-	-
	2018-08-28	Bottom	-	-	-	-	-	-	-	146	-
	2018-08-28	Surface	-	-	-	-	-	-	-	108	-
	2018-09-18	Bottom	-	-	-	-	-	-	-	141	-
	2018-09-18	Surface	-	-	-	-	-	-	-	109	-
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-	-	-
	2019-04-16	Bottom	-	0.001510025	-	-	0.023532	-	-	152.83658	127.8
	2019-04-16	Surface	-	<0.001	-	-	0.018774	-	-	126.4758	107.2
	2019-05-12	Bottom	-	0.001042516	-	-	0.016116	-	-	153.12263	129.2
	2019-05-12	Surface	-	<0.001	-	-	0.011981	-	-	128.3569	110.2
	2019-05-21	Bottom	-	-	-	-	-	-	-	-	-
	2019-05-21	Surface	-	-	-	-	-	-	-	-	-
	2019-06-11	Bottom	-	<0.001	-	-	0.01454	-	-	143.11475	122.8
	2019-06-11	Surface	-	0.001552241	-	-	0.015532	-	-	125.77869	108.4
	2019-07-23	Bottom	-	<0.001	-	-	<0.005	-	-	142.86832	123
	2019-07-23	Surface	-	<0.001	-	-	<0.005	-	-	106.59031	95
	2019-08-20	Bottom	-	<0.001	-	-	<0.005	-	-	142.19399	116.6
	2019-08-20	Surface	-	<0.001	-	-	<0.005	-	-	109.63302	93.2
	2019-08-22	Surface	-	-	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	0.001345957	-	-	<0.005	-	-	158.02116	118.4
	2019-09-25	Surface	-	0.001152228	-	-	0.019623	-	-	125.36754	99
	2019-10-30	Bottom	-	<0.001	-	-	<0.005	-	-	139.63695	117.6
	2019-10-30	Surface	-	<0.001	-	-	<0.005	-	-	112.19273	99

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	Bicarbonate (mg/L)	Carbonate (mg/L)	Dissolved Aluminum (mg/L)	Total Aluminum (mg/L)	Dissolved Antimony (mg/L)	Total Antimony (mg/L)	Dissolved Arsenic (mg/L)	Total Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Total Cadmium (mg/L)	Total Calcium (mg/L)
International Boundary	2017-04-26	Bottom	-	-	-	-	-	-	-	-	<0.000035	0.000039	45
	2017-04-26	Surface	-	-	-	-	-	-	-	-	<0.000035	0.000045	41
	2017-05-16	Bottom	-	-	-	-	-	-	-	-	0.0000060	-	-
	2017-05-16	Surface	-	-	-	-	-	-	-	-	0.0000040	-	-
	2017-06-22	Bottom	-	-	-	-	-	-	-	-	<0.000012	0.000027	33
	2017-06-22	Surface	-	-	-	-	-	-	-	-	0.0000070	<0.000012	28
	2017-07-25	Bottom	-	-	-	-	-	-	-	-	0.000011	-	-
	2017-07-25	Surface	-	-	-	-	-	-	-	-	<0.000016	-	-
	2017-08-28	Bottom	-	-	-	-	-	-	-	-	0.0000090	0.0000090	28
	2017-08-28	Surface	-	-	-	-	-	-	-	-	0.000066	<0.000051	29
	2017-09-26	Bottom	-	-	-	-	-	-	-	-	0.0000030	0.0000070	33
	2017-09-26	Surface	-	-	-	-	-	-	-	-	<0.000008	0.0000030	32
	2017-10-24	Bottom	-	-	-	-	-	-	-	-	<0.000008	-	-
	2017-10-24	Surface	-	-	-	-	-	-	-	-	<0.000008	-	-
	2018-04-24	Bottom	-	-	-	-	-	-	-	-	-	<0.00003	44
	2018-04-24	Surface	-	-	-	-	-	-	-	-	-	0.000022	44
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	-	-	-	-	-	-	-
	2018-06-12	Bottom	-	-	-	-	-	-	-	-	-	0.000012	28
	2018-06-12	Surface	-	-	-	-	-	-	-	-	-	<0.00003	24
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	-	-	-	-	-	-	-
	2018-08-28	Bottom	-	-	-	-	-	-	-	-	-	<0.00003	32
	2018-08-28	Surface	-	-	-	-	-	-	-	-	-	<0.00003	29
	2018-09-18	Bottom	-	-	-	-	-	-	-	-	-	<0.00003	33
	2018-09-18	Surface	-	-	-	-	-	-	-	-	-	<0.00003	32
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-05-12	Bottom	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-05-12	Surface	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-05-21	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-05-21	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-06-11	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-07-23	Bottom	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-07-23	Surface	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-08-17	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-08-20	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-08-20	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-09-03	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-09-25	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-10-30	Bottom	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-10-30	Surface	-	-	-	-	-	-	-	<0.0020	-	-	-
Tenmile Creek	2017-04-26	Bottom	-	-	-	-	-	-	-	-	<0.000035	<0.000035	38
	2017-04-26	Surface	-	-	-	-	-	-	-	-	<0.000035	<0.000035	36
	2017-05-16	Bottom	-	-	-	-	-	-	-	-	0.0000050	-	-
	2017-05-16	Surface	-	-	-	-	-	-	-	-	<0.000008	-	-
	2017-06-22	Bottom	-	-	-	-	-	-	-	-	0.0000080	0.000011	35
	2017-06-22	Surface	-	-	-	-	-	-	-	-	<0.000012	<0.000012	29
	2017-07-25	Bottom	-	-	-	-	-	-	-	-	<0.000016	-	-
	2017-07-25	Surface	-	-	-	-	-	-	-	-	<0.000016	-	-
	2017-08-28	Bottom	-	-	-	-	-	-	-	-	0.000010	<0.000051	33
	2017-08-28	Surface	-	-	-	-	-	-	-	-	<0.00001	<0.00001	27
	2017-09-26	Bottom	-	-	-	-	-	-	-	-	0.0000060	0.0000080	37
	2017-09-26	Surface	-	-	-	-	-	-	-	-	<0.000008	<0.000008	30
	2017-10-24	Bottom	-	-	-	-	-	-	-	-	0.0000060	-	-
	2017-10-24	Surface	-	-	-	-	-	-	-	-	<0.00001	-	-
	2018-04-24	Bottom	-	-	-	-	-	-	-	-	-	<0.00003	37
	2018-04-24	Surface	-	-	-	-	-	-	-	-	-	<0.00003	36
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	-	-	-	-	-	-	-
	2018-06-12	Bottom	-	-	-	-	-	-	-	-	-	0.000014	37
	2018-06-12	Surface	-	-	-	-	-	-	-	-	-	<0.00003	24
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	-	-	-	-	-	-	-
	2018-08-28	Bottom	-	-	-	-	-	-	-	-	-	<0.00003	36
	2018-08-28	Surface	-	-	-	-	-	-	-	-	-	<0.00003	26
	2018-09-18	Bottom	-	-	-	-	-	-	-	-	-	<0.00003	36
	2018-09-18	Surface	-	-	-	-	-	-	-	-	-	<0.00003	30
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-06-11	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-07-23	Bottom	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-07-23	Surface	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-08-20	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-08-20	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-09-25	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-10-30	Bottom	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-10-30	Surface	-	-	-	-	-	-	-	<0.0020	-	-	-
Forebay	2017-04-26	Bottom	-	-	-	-	-	-	-	-	<0.000035	<0.000035	35
	2017-04-26	Surface	-	-	-	-	-	-	-	-	<0.000035	<0.000035	34
	2017-05-16	Bottom	-	-	-	-	-	-	-	-	0.0000040	-	-

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	Bicarbonate (mg/L)	Carbonate (mg/L)	Dissolved Aluminum (mg/L)	Total Aluminum (mg/L)	Dissolved Antimony (mg/L)	Total Antimony (mg/L)	Dissolved Arsenic (mg/L)	Total Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Total Cadmium (mg/L)	Total Calcium (mg/L)
Forebay	2017-05-16	Surface	-	-	-	-	-	-	-	-	<0.000008	-	-
	2017-06-22	Bottom	-	-	-	-	-	-	-	-	<0.000012	<0.000012	34
	2017-06-22	Surface	-	-	-	-	-	-	-	-	<0.000012	<0.000012	29
	2017-07-25	Bottom	-	-	-	-	-	-	-	-	<0.000016	-	-
	2017-07-25	Surface	-	-	-	-	-	-	-	-	<0.000016	-	-
	2017-08-28	Bottom	-	-	-	-	-	-	-	-	<0.00001	0.0000060	34
	2017-08-28	Surface	-	-	-	-	-	-	-	-	<0.00001	<0.00001	27
	2017-09-26	Bottom	-	-	-	-	-	-	-	-	<0.000008	0.0000040	37
	2017-09-26	Surface	-	-	-	-	-	-	-	-	<0.000008	<0.000008	30
	2017-10-24	Bottom	-	-	-	-	-	-	-	-	<0.000008	-	-
	2017-10-24	Surface	-	-	-	-	-	-	-	-	<0.000008	-	-
	2018-04-24	Bottom	-	-	-	-	-	-	-	-	-	<0.00003	44
	2018-04-24	Surface	-	-	-	-	-	-	-	-	-	<0.00003	34
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	-	-	-	-	-	-	-
	2018-06-12	Bottom	-	-	-	-	-	-	-	-	-	<0.00003	37
	2018-06-12	Surface	-	-	-	-	-	-	-	-	-	<0.00003	25
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	-	-	-	-	-	-	-
	2018-08-28	Bottom	-	-	-	-	-	-	-	-	-	<0.00003	38
	2018-08-28	Surface	-	-	-	-	-	-	-	-	-	<0.00003	29
	2018-09-18	Bottom	-	-	-	-	-	-	-	-	-	<0.00003	37
	2018-09-18	Surface	-	-	-	-	-	-	-	-	-	<0.00003	29
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-05-12	Bottom	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-05-12	Surface	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-05-21	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-05-21	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-06-11	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-07-23	Bottom	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-07-23	Surface	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-08-20	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-08-20	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-08-22	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2019-09-25	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-10-30	Bottom	-	-	-	-	-	-	-	<0.0020	-	-	-
	2019-10-30	Surface	-	-	-	-	-	-	-	<0.0020	-	-	-

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	Total Chloride (mg/L)	Dissolved Chromium (mg/L)	Total Chromium (mg/L)	Dissolved Copper (mg/L)	Total Copper (mg/L)	Dissolved Iron (mg/L)	Total Iron (mg/L)	Dissolved Lead (mg/L)	Total Lead (mg/L)	Total Magnesium (mg/L)	Total Mercury (mg/L)
International Boundary	2017-04-26	Bottom	3.0	-	-	-	-	-	-	0.00016	0.0018	13	0.0000031
	2017-04-26	Surface	3.0	-	-	-	-	-	-	0.00011	0.0013	12	0.0000026
	2017-05-16	Bottom	-	-	-	-	-	-	-	0.000065	-	-	0.0000035
	2017-05-16	Surface	-	-	-	-	-	-	-	0.000035	-	-	0.0000022
	2017-06-22	Bottom	1.1	-	-	-	-	-	-	0.000028	0.00084	9.1	0.0000016
	2017-06-22	Surface	1.1	-	-	-	-	-	-	0.000033	0.000077	8.3	0.00000074
	2017-07-25	Bottom	-	-	-	-	-	-	-	0.000075	-	-	0.0000011
	2017-07-25	Surface	-	-	-	-	-	-	-	0.000012	-	-	0.00000047
	2017-08-28	Bottom	1.3	-	-	-	-	-	-	0.000036	0.00013	8.4	0.00000088
	2017-08-28	Surface	1.7	-	-	-	-	-	-	0.000012	<0.000091	9.6	0.00000038
	2017-09-26	Bottom	1.2	-	-	-	-	-	-	0.000023	0.000072	8.7	0.00000053
	2017-09-26	Surface	2.3	-	-	-	-	-	-	0.000012	0.000018	9.6	0.00000020
	2017-10-24	Bottom	-	-	-	-	-	-	-	<0.000022	-	-	0.00000034
	2017-10-24	Surface	-	-	-	-	-	-	-	<0.000022	-	-	0.00000032
	2018-04-24	Bottom	4.9	-	-	-	-	-	-	-	0.00039	14	-
	2018-04-24	Surface	4.9	-	-	-	-	-	-	-	0.00070	13	-
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-	-	0.0000029
	2018-05-22	Surface	-	-	-	-	-	-	-	-	-	-	0.0000016
	2018-06-12	Bottom	1.0	-	-	-	-	-	-	-	0.00036	8.0	-
	2018-06-12	Surface	1.2	-	-	-	-	-	-	-	0.00011	6.8	-
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-	-	0.00000075
	2018-07-10	Surface	-	-	-	-	-	-	-	-	-	-	0.00000058
	2018-08-28	Bottom	2.0	-	-	-	-	-	-	-	0.000098	9.5	-
	2018-08-28	Surface	1.8	-	-	-	-	-	-	-	0.000026	9.1	-
	2018-09-18	Bottom	1.9	-	-	-	-	-	-	-	0.000059	9.2	-
	2018-09-18	Surface	2.1	-	-	-	-	-	-	-	<0.000073	9.3	-
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Bottom	3.5	-	-	-	-	-	-	-	0.0000820	-	-
	2019-04-16	Surface	3.3	-	-	-	-	-	-	-	0.0000510	-	-
	2019-05-12	Bottom	4.9	-	<0.0020	-	0.002	-	-	-	0.0001250	-	-
	2019-05-12	Surface	3.0	-	<0.0020	-	<0.0010	-	-	-	0.0003100	-	-
	2019-05-21	Bottom	-	-	-	-	-	-	-	-	0.0001250	-	-
	2019-05-21	Surface	-	-	-	-	-	-	-	-	0.0003310	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	-	-	0.0003840	-	-
	2019-06-11	Surface	-	-	-	-	-	-	-	-	0.0000710	-	-
	2019-07-23	Bottom	3.8	-	<0.0020	-	<0.0010	-	-	-	0.0000760	-	-
	2019-07-23	Surface	2.5	-	<0.0020	-	<0.0010	-	-	-	0.0000420	-	-
	2019-08-17	Bottom	-	-	-	-	-	-	-	-	0.0008413	-	-
	2019-08-20	Bottom	3.9	-	-	-	-	-	-	-	0.0000540	-	-
	2019-08-20	Surface	2.8	-	-	-	-	-	-	-	0.0000180	-	-
	2019-09-03	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-09-25	Bottom	2.8	-	-	-	-	-	-	-	0.0000690	-	-
	2019-09-25	Surface	2.9	-	-	-	-	-	-	-	0.0000180	-	-
	2019-10-30	Bottom	3.2	-	<0.0020	-	<0.0010	-	-	-	0.0000420	-	-
	2019-10-30	Surface	2.6	-	<0.0020	-	<0.0010	-	-	-	0.0000250	-	-
Tenmile Creek	2017-04-26	Bottom	3.5	-	-	-	-	-	-	<0.000061	0.00011	12	0.00000089
	2017-04-26	Surface	3.2	-	-	-	-	-	-	<0.000061	0.000031	12	0.00000073
	2017-05-16	Bottom	-	-	-	-	-	-	-	0.000011	-	-	0.0000013
	2017-05-16	Surface	-	-	-	-	-	-	-	0.000012	-	-	0.0000018
	2017-06-22	Bottom	3.1	-	-	-	-	-	-	0.00014	0.00030	12	0.0000012
	2017-06-22	Surface	1.5	-	-	-	-	-	-	0.000033	0.000063	8.8	0.00000083
	2017-07-25	Bottom	-	-	-	-	-	-	-	0.000028	-	-	0.0000011
	2017-07-25	Surface	-	-	-	-	-	-	-	<0.000016	-	-	0.00000044
	2017-08-28	Bottom	2.9	-	-	-	-	-	-	0.000021	0.000083	11	0.00000072
	2017-08-28	Surface	1.5	-	-	-	-	-	-	<0.000018	0.000010	8.8	0.00000037
	2017-09-26	Bottom	3.3	-	-	-	-	-	-	0.000012	0.000051	11	0.00000057
	2017-09-26	Surface	1.6	-	-	-	-	-	-	0.000049	<0.00002	8.9	0.00000018
	2017-10-24	Bottom	-	-	-	-	-	-	-	<0.000033	-	-	0.00000057
	2017-10-24	Surface	-	-	-	-	-	-	-	<0.000027	-	-	0.00000022
	2018-04-24	Bottom	3.8	-	-	-	-	-	-	-	0.000073	12	-
	2018-04-24	Surface	3.3	-	-	-	-	-	-	-	0.000031	11	-
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-	-	0.00000075
	2018-05-22	Surface	-	-	-	-	-	-	-	-	-	-	0.0000014
	2018-06-12	Bottom	3.3	-	-	-	-	-	-	-	0.00044	12	-
	2018-06-12	Surface	1.1	-	-	-	-	-	-	-	0.00013	6.9	-
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-	-	0.00000084
	2018-07-10	Surface	-	-	-	-	-	-	-	-	-	-	0.00000046
	2018-08-28	Bottom	3.3	-	-	-	-	-	-	-	0.000038	11	-
	2018-08-28	Surface	1.6	-	-	-	-	-	-	-	<0.000073	8.4	-
	2018-09-18	Bottom	3.0	-	-	-	-	-	-	-	0.000039	12	-
	2018-09-18	Surface	1.7	-	-	-	-	-	-	-	<0.000073	8.9	-
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Bottom	2.8	-	-	-	-	-	-	-	0.0000520	-	-
	2019-04-16	Surface	2.9	-	-	-	-	-	-	-	0.0000190	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	-	-	0.0000930	-	-
	2019-06-11	Surface	-	-	-	-	-	-	-	-	0.0001650	-	-
	2019-07-23	Bottom	3.9	-	<0.0020	-	<0.0010	-	-	-	0.0000610	-	-
	2019-07-23	Surface	2.6	-	<0.0020	-	<0.0010	-	-	-	0.0000240	-	-
	2019-08-20	Bottom	4.2	-	-	-	-	-	-	-	0.0000470	-	-
	2019-08-20	Surface	2.3	-	-	-	-	-	-	-	0.0000130	-	-
	2019-09-25	Bottom	3.5	-	-	-	-	-	-	-	0.0000130	-	-
	2019-09-25	Surface	2.4	-	-	-	-	-	-	-	0.0000050	-	-
	2019-10-30	Bottom	3.9	-	<0.0020	-	<0.0010	-	-	-	0.0000250	-	-
	2019-10-30	Surface	2.3	-	<0.0020	-	<0.0010	-	-	-	0.0000120	-	-
Forebay	2017-04-26	Bottom	3.2	-	-	-	-	-	-	<0.000061	0.000035	11	0.00000077
	2017-04-26	Surface	2.7	-	-	-	-	-	-	<0.000061	0.000032	11	0.00000097
	2017-05-16	Bottom	-	-	-	-	-	-	-	0.0000080	-	-	0.0000012

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	Total Chloride (mg/L)	Dissolved Chromium (mg/L)	Total Chromium (mg/L)	Dissolved Copper (mg/L)	Total Copper (mg/L)	Dissolved Iron (mg/L)	Total Iron (mg/L)	Dissolved Lead (mg/L)	Total Lead (mg/L)	Total Magnesium (mg/L)	Total Mercury (mg/L)
Forebay	2017-05-16	Surface	-	-	-	-	-	-	-	0.0000090	-	-	0.0000017
	2017-06-22	Bottom	3.3	-	-	-	-	-	-	0.000024	0.000051	12	0.00000063
	2017-06-22	Surface	1.3	-	-	-	-	-	-	0.000047	0.000095	8.5	0.00000088
	2017-07-25	Bottom	-	-	-	-	-	-	-	0.000021	-	-	0.00000097
	2017-07-25	Surface	-	-	-	-	-	-	-	<0.000016	-	-	0.00000050
	2017-08-28	Bottom	3.0	-	-	-	-	-	-	0.000027	0.000033	12	0.00000062
	2017-08-28	Surface	1.4	-	-	-	-	-	-	<0.000018	0.000011	8.4	0.00000081
	2017-09-26	Bottom	3.4	-	-	-	-	-	-	<0.00002	0.000034	12	0.00000059
	2017-09-26	Surface	1.6	-	-	-	-	-	-	<0.00002	0.000012	8.9	0.00000025
	2017-10-24	Bottom	-	-	-	-	-	-	-	<0.000022	-	-	0.00000067
	2017-10-24	Surface	-	-	-	-	-	-	-	<0.000022	-	-	0.00000028
	2018-04-24	Bottom	3.1	-	-	-	-	-	-	-	0.000043	10	-
	2018-04-24	Surface	2.9	-	-	-	-	-	-	-	0.000032	10	-
	2018-05-22	Bottom	-	-	-	-	-	-	-	-	-	-	0.00000047
	2018-05-22	Surface	-	-	-	-	-	-	-	-	-	-	0.0000013
	2018-06-12	Bottom	3.1	-	-	-	-	-	-	-	0.00010	12	-
	2018-06-12	Surface	1.3	-	-	-	-	-	-	-	0.000080	7.2	-
	2018-07-10	Bottom	-	-	-	-	-	-	-	-	-	-	0.00000045
	2018-07-10	Surface	-	-	-	-	-	-	-	-	-	-	0.00000049
	2018-08-28	Bottom	3.3	-	-	-	-	-	-	-	<0.000073	12	-
	2018-08-28	Surface	1.6	-	-	-	-	-	-	-	<0.000073	8.7	-
	2018-09-18	Bottom	3.4	-	-	-	-	-	-	-	<0.000073	12	-
	2018-09-18	Surface	1.6	-	-	-	-	-	-	-	<0.000073	8.6	-
	2018-10-23	Bottom	-	-	-	-	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-	-	-	-	-
	2019-04-16	Bottom	3.7780926	-	-	-	-	-	-	-	0.000151	-	-
	2019-04-16	Surface	2.5744525	-	-	-	-	-	-	-	0.000013	-	-
	2019-05-12	Bottom	4.6808227	-	<0.0020	-	<0.0010	-	-	-	0.00003	-	-
	2019-05-12	Surface	3.2765759	-	<0.0020	-	<0.0010	-	-	-	0.000023	-	-
	2019-05-21	Bottom	-	-	-	-	-	-	-	-	0.00003	-	-
	2019-05-21	Surface	-	-	-	-	-	-	-	-	0.000023	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	-	-	0.000038	-	-
	2019-06-11	Surface	-	-	-	-	-	-	-	-	0.000031	-	-
	2019-07-23	Bottom	4.0790027	-	<0.0020	-	<0.0010	-	-	-	0.000017	-	-
	2019-07-23	Surface	2.4741492	-	<0.0020	-	<0.0010	-	-	-	0.000014	-	-
	2019-08-20	Bottom	4.5805194	-	-	-	-	-	-	-	0.000017	-	-
	2019-08-20	Surface	2.3738458	-	-	-	-	-	-	-	0.000009	-	-
	2019-08-22	Surface	-	-	-	-	-	-	-	-	0.0007083	-	-
	2019-09-25	Bottom	3.3768793	-	-	-	-	-	-	-	0.000008	-	-
	2019-09-25	Surface	2.0729358	-	-	-	-	-	-	-	0.000005	-	-
	2019-10-30	Bottom	3.878396	-	<0.0020	-	<0.0010	-	-	-	0.000028	-	-
	2019-10-30	Surface	2.3738458	-	<0.0020	-	<0.0010	-	-	-	0.000007	-	-

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	Total Potassium (mg/L)	Dissolved Methylseleninic Acid (mg/L)	Dissolved Selenate (mg/L)	Dissolved Selenite (mg/L)	Dissolved Selenium (mg/L)	Total Selenium (mg/L)	Dissolved Selenocyanate (mg/L)	Dissolved Selenomethionine (mg/L)	Dissolved Silver (mg/L)
International Boundary	2017-04-26	Bottom	0.87	-	-	-	0.0013	-	-	-	-
	2017-04-26	Surface	0.75	-	-	-	0.0014	-	-	-	-
	2017-05-16	Bottom	-	-	-	-	0.00096	-	-	-	-
	2017-05-16	Surface	-	-	-	-	0.0010	-	-	-	-
	2017-06-22	Bottom	0.48	-	-	-	0.00095	0.00095	-	-	-
	2017-06-22	Surface	0.42	-	-	-	0.00084	0.00080	-	-	-
	2017-07-25	Bottom	-	-	-	-	0.00093	-	-	-	-
	2017-07-25	Surface	-	-	-	-	0.00087	-	-	-	-
	2017-08-28	Bottom	0.47	-	-	-	0.00088	-	-	-	-
	2017-08-28	Surface	0.46	-	-	-	0.00093	-	-	-	-
	2017-09-26	Bottom	1.1	-	-	-	0.00078	-	-	-	-
	2017-09-26	Surface	0.85	-	-	-	0.00090	-	-	-	-
	2017-10-24	Bottom	-	-	-	-	0.0011	-	-	-	-
	2017-10-24	Surface	-	-	-	-	0.0011	-	-	-	-
	2018-04-24	Bottom	0.72	-	-	-	0.0018	-	-	-	-
	2018-04-24	Surface	0.76	-	-	-	0.0023	-	-	-	-
	2018-05-22	Bottom	-	-	-	-	0.0010	-	-	-	-
	2018-05-22	Surface	-	-	-	-	0.00098	-	-	-	-
	2018-06-12	Bottom	0.41	-	-	-	0.0012	-	-	-	-
	2018-06-12	Surface	0.37	-	-	-	0.00085	-	-	-	-
	2018-07-10	Bottom	-	-	-	-	0.0013	-	-	-	-
	2018-07-10	Surface	-	-	-	-	0.00075	-	-	-	-
	2018-08-28	Bottom	0.52	-	-	-	0.0010	-	-	-	-
	2018-08-28	Surface	0.45	-	-	-	0.00094	-	-	-	-
	2018-09-18	Bottom	0.54	-	-	-	0.00099	-	-	-	-
	2018-09-18	Surface	0.49	-	-	-	0.0010	-	-	-	-
	2018-10-23	Bottom	-	-	-	-	0.0011	-	-	-	-
	2018-10-23	Surface	-	-	-	-	0.0011	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	0.00128	-	-	-
	2019-04-16	Surface	-	-	-	-	-	0.00121	-	-	-
	2019-05-12	Bottom	-	-	-	-	-	0.00127	-	-	-
	2019-05-12	Surface	-	-	-	-	-	0.00091	-	-	-
	2019-05-21	Bottom	-	-	-	-	-	0.00127	-	-	-
	2019-05-21	Surface	-	-	-	-	-	0.00091	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	0.00096	-	-	-
	2019-06-11	Surface	-	-	-	-	-	0.00080	-	-	-
	2019-07-23	Bottom	-	-	-	-	-	0.00116	-	-	-
	2019-07-23	Surface	-	-	-	-	-	0.00073	-	-	-
	2019-08-17	Bottom	-	-	-	-	-	0.00117	-	-	-
	2019-08-20	Bottom	-	-	-	-	-	0.00120	-	-	-
	2019-08-20	Surface	-	-	-	-	-	0.00094	-	-	-
	2019-09-03	Surface	-	-	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	0.00094	-	-	-
	2019-09-25	Surface	-	-	-	-	-	0.00079	-	-	-
	2019-10-30	Bottom	-	-	-	-	-	0.00106	-	-	-
	2019-10-30	Surface	-	-	-	-	-	0.00106	-	-	-
Tenmile Creek	2017-04-26	Bottom	0.67	-	-	-	0.0010	-	-	-	-
	2017-04-26	Surface	0.60	-	-	-	0.00087	-	-	-	-
	2017-05-16	Bottom	-	-	-	-	0.0010	-	-	-	-
	2017-05-16	Surface	-	-	-	-	0.0010	-	-	-	-
	2017-06-22	Bottom	0.62	-	-	-	0.00097	0.00095	-	-	-
	2017-06-22	Surface	0.46	-	-	-	0.00090	0.00098	-	-	-
	2017-07-25	Bottom	-	-	-	-	0.0011	-	-	-	-
	2017-07-25	Surface	-	-	-	-	0.00091	-	-	-	-
	2017-08-28	Bottom	0.61	-	-	-	0.0010	-	-	-	-
	2017-08-28	Surface	0.46	-	-	-	0.00086	-	-	-	-
	2017-09-26	Bottom	0.91	-	-	-	0.00088	-	-	-	-
	2017-09-26	Surface	0.82	-	-	-	0.00078	-	-	-	-
	2017-10-24	Bottom	-	-	-	-	0.00035	-	-	-	-
	2017-10-24	Surface	-	-	-	-	0.0011	-	-	-	-
	2018-04-24	Bottom	0.61	-	-	-	0.0012	-	-	-	-
	2018-04-24	Surface	0.58	-	-	-	0.0012	-	-	-	-
	2018-05-22	Bottom	-	-	-	-	0.0013	-	-	-	-
	2018-05-22	Surface	-	-	-	-	0.0013	-	-	-	-
	2018-06-12	Bottom	0.58	-	-	-	0.0012	-	-	-	-
	2018-06-12	Surface	0.40	-	-	-	0.00091	-	-	-	-
	2018-07-10	Bottom	-	-	-	-	0.0011	-	-	-	-
	2018-07-10	Surface	-	-	-	-	0.00094	-	-	-	-
	2018-08-28	Bottom	0.60	-	-	-	0.0011	-	-	-	-
	2018-08-28	Surface	0.44	-	-	-	0.00094	-	-	-	-
	2018-09-18	Bottom	0.62	-	-	-	0.0011	-	-	-	-
	2018-09-18	Surface	0.49	-	-	-	0.00095	-	-	-	-
	2018-10-23	Bottom	-	-	-	-	0.0011	-	-	-	-
	2018-10-23	Surface	-	-	-	-	0.0010	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	0.00126	-	-	-
	2019-04-16	Surface	-	-	-	-	-	0.00116	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	0.00118	-	-	-
	2019-06-11	Surface	-	-	-	-	-	0.00109	-	-	-
	2019-07-23	Bottom	-	-	-	-	-	0.00116	-	-	-
	2019-07-23	Surface	-	-	-	-	-	0.00089	-	-	-
	2019-08-20	Bottom	-	-	-	-	-	0.00122	-	-	-
	2019-08-20	Surface	-	-	-	-	-	0.00093	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	0.00101	-	-	-
	2019-09-25	Surface	-	-	-	-	-	0.00080	-	-	-
	2019-10-30	Bottom	-	-	-	-	-	0.00115	-	-	-
	2019-10-30	Surface	-	-	-	-	-	0.00099	-	-	-
Forebay	2017-04-26	Bottom	0.59	-	-	-	0.00088	-	-	-	-
	2017-04-26	Surface	0.60	-	-	-	0.00084	-	-	-	-
	2017-05-16	Bottom	-	-	-	-	0.00099	-	-	-	-

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	Total Potassium (mg/L)	Dissolved Methylseleninic Acid (mg/L)	Dissolved Selenate (mg/L)	Dissolved Selenite (mg/L)	Dissolved Selenium (mg/L)	Total Selenium (mg/L)	Dissolved Selenocyanate (mg/L)	Dissolved Selenomethionine (mg/L)	Dissolved Silver (mg/L)
Forebay	2017-05-16	Surface	-	-	-	-	0.00090	-	-	-	-
	2017-06-22	Bottom	0.57	-	-	-	0.00097	0.00099	-	-	-
	2017-06-22	Surface	0.45	-	-	-	0.00089	0.00093	-	-	-
	2017-07-25	Bottom	-	-	-	-	0.0010	-	-	-	-
	2017-07-25	Surface	-	-	-	-	0.00087	-	-	-	-
	2017-08-28	Bottom	0.65	-	-	-	0.0010	-	-	-	-
	2017-08-28	Surface	0.45	-	-	-	0.00084	-	-	-	-
	2017-09-26	Bottom	0.93	-	-	-	0.00090	-	-	-	-
	2017-09-26	Surface	0.76	-	-	-	0.00080	-	-	-	-
	2017-10-24	Bottom	-	-	-	-	0.00091	-	-	-	-
	2017-10-24	Surface	-	-	-	-	0.00099	-	-	-	-
	2018-04-24	Bottom	0.56	-	-	-	0.0012	-	-	-	-
	2018-04-24	Surface	0.55	-	-	-	0.0011	-	-	-	-
	2018-05-22	Bottom	-	-	-	-	0.0012	-	-	-	-
	2018-05-22	Surface	-	-	-	-	0.0013	-	-	-	-
	2018-06-12	Bottom	0.55	-	-	-	0.0011	-	-	-	-
	2018-06-12	Surface	0.41	-	-	-	0.00097	-	-	-	-
	2018-07-10	Bottom	-	-	-	-	0.0011	-	-	-	-
	2018-07-10	Surface	-	-	-	-	0.00091	-	-	-	-
	2018-08-28	Bottom	0.62	-	-	-	0.0011	-	-	-	-
	2018-08-28	Surface	0.45	-	-	-	0.00091	-	-	-	-
	2018-09-18	Bottom	0.63	-	-	-	0.0010	-	-	-	-
	2018-09-18	Surface	0.48	-	-	-	0.00091	-	-	-	-
	2018-10-23	Bottom	-	-	-	-	0.0011	-	-	-	-
	2018-10-23	Surface	-	-	-	-	0.00098	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	0.00132	-	-	-
	2019-04-16	Surface	-	-	-	-	-	0.0011	-	-	-
	2019-05-12	Bottom	-	-	-	-	-	0.00135	-	-	-
	2019-05-12	Surface	-	-	-	-	-	0.00112	-	-	-
	2019-05-21	Bottom	-	-	-	-	-	0.00135	-	-	-
	2019-05-21	Surface	-	-	-	-	-	0.00112	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	0.00135	-	-	-
	2019-06-11	Surface	-	-	-	-	-	0.0012	-	-	-
	2019-07-23	Bottom	-	-	-	-	-	0.00123	-	-	-
	2019-07-23	Surface	-	-	-	-	-	0.000954	-	-	-
	2019-08-20	Bottom	-	-	-	-	-	0.00126	-	-	-
	2019-08-20	Surface	-	-	-	-	-	0.000944	-	-	-
	2019-08-22	Surface	-	-	-	-	-	0.000962	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	0.00103	-	-	-
	2019-09-25	Surface	-	-	-	-	-	0.000839	-	-	-
	2019-10-30	Bottom	-	-	-	-	-	0.00114	-	-	-
	2019-10-30	Surface	-	-	-	-	-	0.00098	-	-	-

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	Total Silver (mg/L)	Sodium Adsorption Ratio	Total Sodium (mg/L)	Total Sulfate (mg/L)	Total Sulfide (mg/L)	Dissolved Zinc (mg/L)	Total Zinc (mg/L)
International Boundary	2017-04-26	Bottom	-	-	3.6	28	-	-	-
	2017-04-26	Surface	-	-	3.5	29	-	-	-
	2017-05-16	Bottom	-	-	-	-	-	-	-
	2017-05-16	Surface	-	-	-	-	-	-	-
	2017-06-22	Bottom	-	-	1.5	16	-	-	-
	2017-06-22	Surface	-	-	1.5	13	-	-	-
	2017-07-25	Bottom	-	-	-	-	-	-	-
	2017-07-25	Surface	-	-	-	-	-	-	-
	2017-08-28	Bottom	-	-	1.5	16	-	-	-
	2017-08-28	Surface	-	-	1.9	20	-	-	-
	2017-09-26	Bottom	-	-	1.9	16	-	-	-
	2017-09-26	Surface	-	-	2.7	23	-	-	-
	2017-10-24	Bottom	-	-	-	-	-	-	-
	2017-10-24	Surface	-	-	-	-	-	-	-
	2018-04-24	Bottom	-	-	5.5	41	-	-	-
	2018-04-24	Surface	-	-	5.3	41	-	-	-
	2018-05-22	Bottom	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	-	-	-
	2018-06-12	Bottom	-	-	1.6	11	-	-	-
	2018-06-12	Surface	-	-	1.5	12	-	-	-
	2018-07-10	Bottom	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	-	-	-
	2018-08-28	Bottom	-	-	2.5	22	-	-	-
	2018-08-28	Surface	-	-	2.2	22	-	-	-
	2018-09-18	Bottom	-	-	2.4	22	-	-	-
	2018-09-18	Surface	-	-	2.5	25	-	-	-
	2018-10-23	Bottom	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	-	-
	2019-04-16	Surface	-	-	-	-	-	-	-
	2019-05-12	Bottom	-	-	-	-	-	-	0.007
	2019-05-12	Surface	-	-	-	-	-	-	<0.005
	2019-05-21	Bottom	-	-	-	-	-	-	-
	2019-05-21	Surface	-	-	-	-	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	-
	2019-06-11	Surface	-	-	-	-	-	-	-
	2019-07-23	Bottom	-	-	-	-	-	-	<0.005
	2019-07-23	Surface	-	-	-	-	-	-	<0.005
	2019-08-17	Bottom	-	-	-	-	-	-	-
	2019-08-20	Bottom	-	-	-	-	-	-	-
	2019-08-20	Surface	-	-	-	-	-	-	-
	2019-09-03	Surface	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	-	-
	2019-09-25	Surface	-	-	-	-	-	-	-
	2019-10-30	Bottom	-	-	-	-	-	-	<0.005
	2019-10-30	Surface	-	-	-	-	-	-	<0.005
Tenmile Creek	2017-04-26	Bottom	-	-	4.4	29	-	-	-
	2017-04-26	Surface	-	-	4.0	27	-	-	-
	2017-05-16	Bottom	-	-	-	-	-	-	-
	2017-05-16	Surface	-	-	-	-	-	-	-
	2017-06-22	Bottom	-	-	3.9	26	-	-	-
	2017-06-22	Surface	-	-	1.9	16	-	-	-
	2017-07-25	Bottom	-	-	-	-	-	-	-
	2017-07-25	Surface	-	-	-	-	-	-	-
	2017-08-28	Bottom	-	-	3.4	26	-	-	-
	2017-08-28	Surface	-	-	1.8	18	-	-	-
	2017-09-26	Bottom	-	-	3.9	26	-	-	-
	2017-09-26	Surface	-	-	2.1	20	-	-	-
	2017-10-24	Bottom	-	-	-	-	-	-	-
	2017-10-24	Surface	-	-	-	-	-	-	-
	2018-04-24	Bottom	-	-	4.3	32	-	-	-
	2018-04-24	Surface	-	-	3.7	28	-	-	-
	2018-05-22	Bottom	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	-	-	-
	2018-06-12	Bottom	-	-	4.1	11	-	-	-
	2018-06-12	Surface	-	-	1.5	9.7	-	-	-
	2018-07-10	Bottom	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	-	-	-
	2018-08-28	Bottom	-	-	4.1	30	-	-	-
	2018-08-28	Surface	-	-	2.0	21	-	-	-
	2018-09-18	Bottom	-	-	4.0	29	-	-	-
	2018-09-18	Surface	-	-	2.1	21	-	-	-
	2018-10-23	Bottom	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	-	-
	2019-04-16	Surface	-	-	-	-	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	-
	2019-06-11	Surface	-	-	-	-	-	-	-
	2019-07-23	Bottom	-	-	-	-	-	-	<0.005
	2019-07-23	Surface	-	-	-	-	-	-	<0.005
	2019-08-20	Bottom	-	-	-	-	-	-	-
	2019-08-20	Surface	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	-	-
	2019-09-25	Surface	-	-	-	-	-	-	-
	2019-10-30	Bottom	-	-	-	-	-	-	<0.005
	2019-10-30	Surface	-	-	-	-	-	-	<0.005
Forebay	2017-04-26	Bottom	-	-	4.0	28	-	-	-
	2017-04-26	Surface	-	-	4.8	25	-	-	-
	2017-05-16	Bottom	-	-	-	-	-	-	-

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.10: Water Quality Data for Montana in the Koocanusa Reservoir, 2017 to 2019

Station	Date	Depth	Total Silver (mg/L)	Sodium Adsorption Ratio	Total Sodium (mg/L)	Total Sulfate (mg/L)	Total Sulfide (mg/L)	Dissolved Zinc (mg/L)	Total Zinc (mg/L)
Forebay	2017-05-16	Surface	-	-	-	-	-	-	-
	2017-06-22	Bottom	-	-	4.1	28	-	-	-
	2017-06-22	Surface	-	-	1.7	15	-	-	-
	2017-07-25	Bottom	-	-	-	-	-	-	-
	2017-07-25	Surface	-	-	-	-	-	-	-
	2017-08-28	Bottom	-	-	3.9	27	-	-	-
	2017-08-28	Surface	-	-	1.7	17	-	-	-
	2017-09-26	Bottom	-	-	4.1	26	-	-	-
	2017-09-26	Surface	-	-	2.1	19	-	-	-
	2017-10-24	Bottom	-	-	-	-	-	-	-
	2017-10-24	Surface	-	-	-	-	-	-	-
	2018-04-24	Bottom	-	-	3.4	28	-	-	-
	2018-04-24	Surface	-	-	3.2	27	-	-	-
	2018-05-22	Bottom	-	-	-	-	-	-	-
	2018-05-22	Surface	-	-	-	-	-	-	-
	2018-06-12	Bottom	-	-	4.2	22	-	-	-
	2018-06-12	Surface	-	-	1.7	12	-	-	-
	2018-07-10	Bottom	-	-	-	-	-	-	-
	2018-07-10	Surface	-	-	-	-	-	-	-
	2018-08-28	Bottom	-	-	4.3	31	-	-	-
	2018-08-28	Surface	-	-	2.0	20	-	-	-
	2018-09-18	Bottom	-	-	4.3	31	-	-	-
	2018-09-18	Surface	-	-	2.0	21	-	-	-
	2018-10-23	Bottom	-	-	-	-	-	-	-
	2018-10-23	Surface	-	-	-	-	-	-	-
	2019-04-16	Bottom	-	-	-	-	-	-	-
	2019-04-16	Surface	-	-	-	-	-	-	-
	2019-05-12	Bottom	-	-	-	-	-	-	<0.005
	2019-05-12	Surface	-	-	-	-	-	-	<0.005
	2019-05-21	Bottom	-	-	-	-	-	-	-
	2019-05-21	Surface	-	-	-	-	-	-	-
	2019-06-11	Bottom	-	-	-	-	-	-	-
	2019-06-11	Surface	-	-	-	-	-	-	-
	2019-07-23	Bottom	-	-	-	-	-	-	<0.005
	2019-07-23	Surface	-	-	-	-	-	-	<0.005
	2019-08-20	Bottom	-	-	-	-	-	-	-
	2019-08-20	Surface	-	-	-	-	-	-	-
	2019-08-22	Surface	-	-	-	-	-	-	-
	2019-09-25	Bottom	-	-	-	-	-	-	-
	2019-09-25	Surface	-	-	-	-	-	-	-
	2019-10-30	Bottom	-	-	-	-	-	-	<0.005
	2019-10-30	Surface	-	-	-	-	-	-	<0.005

Notes: "-" indicates no data available.

[a] When depth gradient of pH was present in the dataset, the values closest to the top and bottom depths of the other parameters was selected.

[b] Hardness was calculated as (2.5 × Total Calcium) + (4.1 × Total Magnesium).

Table B.11: Water Quality for Biological Monitoring Stations in the Koocanusa Reservoir, 2019

	Analyte	Units	Long Term Guidelines	Short Term Guidelines	RG_SC_U1	RG_SC_U2	RG_SC_U1	RG_SC_U2	RG_SC_U1	RG_SC_U2
					Surface	Bottom	Surface	Bottom	Surface	Middle
					24-Apr-19	24-Apr-19	12-Jun-19	12-Jun-19	20-Aug-19	20-Aug-19
Physical Characteristics	Hardness (as CaCO3)	mg/L	-	-	126	128	106	108	129	132
	pH, Field	pH	> 6.5 or < 9.0		7.88	7.9	8.22	8.22	8.51	8.41
	pH, Lab	pH	> 6.5 or < 9.0		8.22	8.26	8.21	8.16	8.28	8.23
	Total Suspended Solids, Lab	mg/L	-	-	27	26.4	10.4	11	<1.00	<1.00
	Total Dissolved Solids	mg/L	-	-	151	152	125	116	146	153
	Dissolved Oxygen-Field	mg/L	< 8	< 5	10.74	10.71	10.07	10.01	9.05	9.41
	Dissolved Oxygen-Field	%	-	-	101.1	100.8	102.7	101.8	99.5	99.8
	Temperature-Field	C	-	-	8.9	8.9	12.41	12.2	20	18.3
Anions and Nutrients	Ammonia as N	mg/L	1.4	7	0.0051	0.0064	0.01	0.0054	0.0134	0.0086
	Bromide (Br)	mg/L	-	-	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
	Chloride (Cl)	mg/L	150	600	3.62	3.47	1.94	1.96	2.36	2.79
	Fluoride (F)	mg/L	-	1.5	0.076	0.075	0.069	0.071	0.06	0.058
	Nitrate (as N)	mg/L	3	33	0.152	0.144	0.128	0.126	0.0567	0.0474
	Nitrite (as N)	mg/L	0.06	0.6	<0.00100	<0.00100	<0.00100	<0.00100	0.0014	0.0011
	Phosphorus (P)-Total	mg/L	-	-	0.0171	0.017	0.0053	0.005	<0.00200	<0.00200
	Sulphate (SO_4)	mg/L	309	-	26.5	24.7	19.8	19.9	23.5	25
Total Metals	Aluminum (Al)	mg/L	-	-	0.263	0.266	0.0803	0.0663	0.0083	0.0258
	Antimony (Sb)	mg/L	0.009	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Arsenic (As)	mg/L	0.005	0.005	0.00059	0.00058	0.00036	0.00035	0.00032	0.00037
	Barium (Ba)	mg/L	1	-	0.0346	0.035	0.0265	0.0266	0.0355	0.0357
	Beryllium (Be)	mg/L	0.00013	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	1.2	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	-	0.0000083	0.0000101	<0.00000500	0.0000067	<0.00000500	<0.00000500
	Calcium (Ca)	mg/L	-	-	36	35.1	30	30.2	37.5	39.1
	Chromium (Cr)	mg/L	0.001	-	0.00047	0.00049	0.00017	0.00036	0.0001	<0.000100
	Cobalt (Co)	mg/L	0.004	0.11	0.00021	0.00023	<0.000100	<0.000100	<0.000100	<0.000100
	Copper (Cu)	mg/L	-	-	0.00093	0.00108	<0.000500	<0.000500	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	1	0.393	0.426	0.109	0.109	<0.0100	0.017
	Lead (Pb)	mg/L	0.0091	0.15	0.000745	0.00114	0.000185	0.000192	<0.0000500	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0019	0.0018	0.001	<0.00100	0.0015	0.0014
	Magnesium (Mg)	mg/L	-	-	10.8	10.9	8.49	8.06	10.6	11
	Manganese (Mn)	mg/L	1.3	2.3	0.0223	0.0238	0.00788	0.00785	0.00133	0.00284
	Mercury (Hg)	µg/L	0.0012	-	0.011	0.021	0.00055	0.00055	<0.000500	<0.000500
	Molybdenum (Mo)	mg/L	1	2	0.000562	0.000542	0.000548	0.000532	0.00069	0.000727
	Nickel (Ni)	mg/L	0.025	-	0.00057	0.00092	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.653	0.654	0.424	0.411	0.462	0.478
	Selenium (Se)	mg/L	0.002	-	0.000118	0.000127	0.00013	0.00012	0.000423	0.000156
	Silicon (Si)-Total	mg/L	-	-	2.83	2.82	2.27	2.34	1.62	2.02
	Silver (Ag)	mg/L	0.0015	0.003	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	4.25	4.46	2.57	2.36	3.34	3.97
	Strontium (Sr)	mg/L	-	-	0.127	0.124	0.126	0.128	0.16	0.17
	Thallium (Tl)	mg/L	0.0008	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	0.0085	-	0.000671	0.000658	0.000627	0.000629	0.000654	0.000701
	Vanadium (V)	mg/L	-	-	<0.000500	0.00051	<0.000500	<0.000500	<0.000500	<0.000500
	Zinc (Zn)	mg/L	0.059	0.085	0.0053	0.0159	<0.00300	<0.00300	<0.00300	<0.00300
Dissolved Metals	Aluminum (Al)	mg/L	0.05	0.1	0.0077	0.0111	0.0092	0.0091	0.0031	0.0041
	Antimony (Sb)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Arsenic (As)	mg/L	-	-	0.00043	0.00044	0.00027	0.0003	0.00035	0.00036
	Barium (Ba)	mg/L	-	-	0.0329	0.033	0.0249	0.0253	0.0368	0.0362
	Beryllium (Be)	mg/L	-	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	0.00095	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
	Calcium (Ca)	mg/L	-	-	33.2	34.1	29.3	29.5	33.4	34.8
	Chromium (Cr)	mg/L	0.0003	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Cobalt (Co)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Copper (Cu)	mg/L	0.0015	0.0089	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	0.35	0.014	0.015	<0.0100	<0.0100	<0.0100	<0.0100
	Lead (Pb)	mg/L	-	-	0.000055	0.000089	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0014	0.0014	<0.00100	<0.00100	0.0015	0.0014
	Magnesium (Mg)	mg/L	-	-	10.5	10.4	8.08	8.27	11.1	11
	Manganese (Mn)	mg/L	-	-	0.00723	0.00842	0.00128	0.00143	<0.000100	<0.000100
	Mercury (Hg)	mg/L	-	-	<0.00000500	0.0000064	<0.00000500	<0.00000500	<0.00000500	<0.00000500
	Molybdenum (Mo)	mg/L	-	-	0.000536	0.000512	0.000529	0.000517	0.000671	0.000663
	Nickel (Ni)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.583	0.573	0.389	0.399	0.486	0.511
	Selenium (Se)	mg/L	-	-	0.000142	0.000128	0.000089	0.000129	0.000508	0.000172
	Silicon (Si)	mg/L	-	-	2.49	2.49	2.18	2.28	1.59	1.91
	Silver (Ag)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	4.28	4.34	2.36	2.36	3.28	3.69
	Strontium (Sr)	mg/L	-	-	0.132	0.127	0.118	0.117	0.142	0.15
	Thallium (Tl)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	0.00012
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	-	-	0.000682	0.000646	0.00061	0.000611	0.000653	0.000667
	Vanadium (V)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Zinc (Zn)	mg/L	-	-	<0.00100	0.0054	<0.00100	<0.00100	<0.00100	<0.00100

Exceeds CCME Long Term Guideline.

Exceeds CCME Short Term Guideline.

Notes: "-" indicates no data.

Table B.11: Water Quality for Biological Monitoring Stations in the Koocanusa Reservoir, 2019

	Analyte	Units	Long Term Guidelines	Short Term Guidelines	RG_SC_U3	RG_TN_U1	RG_TN_U1	RG_TN_U2	RG_TN_U1	RG_TN_U2
					Bottom	Surface	Surface	Bottom	Surface	Middle
					20-Aug-19	25-Apr-19	12-Jun-19	12-Jun-19	20-Aug-19	20-Aug-19
Physical Characteristics	Hardness (as CaCO3)	mg/L	-	-	135	123	108	111	128	128
	pH, Field	pH	> 6.5 or < 9.0		8.28	8.16	8.22	8.23	8.29	8.39
	pH, Lab	pH	> 6.5 or < 9.0		8.18	8.24	8.15	8.17	8.29	8.26
	Total Suspended Solids, Lab	mg/L	-	-	2.5	13.7	10.4	10.9	<1.00	1.2
	Total Dissolved Solids	mg/L	-	-	157	161	123	119	145	143
	Dissolved Oxygen-Field	mg/L	< 8	< 5	9.04	10.66	-	-	8.98	9.1
	Dissolved Oxygen-Field	%	-	-	92.5	100.6	101.7	101.3	99.2	99.1
	Temperature-Field	C	-	-	16.4	9.4	11.8	11.7	20.2	19.6
Anions and Nutrients	Ammonia as N	mg/L	1.4	7	0.0126	<0.00500	0.007	0.0111	0.0137	0.009
	Bromide (Br)	mg/L	-	-	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
	Chloride (Cl)	mg/L	150	600	2.91	3.71	1.96	1.94	1.97	2.24
	Fluoride (F)	mg/L	-	1.5	0.063	0.078	0.07	0.069	0.063	0.059
	Nitrate (as N)	mg/L	3	33	0.0705	0.143	0.13	0.127	0.126	0.0896
	Nitrite (as N)	mg/L	0.06	0.6	0.0012	<0.00100	<0.00100	<0.00100	0.0038	0.0031
	Phosphorus (P)-Total	mg/L	-	-	<0.00200	0.0106	0.0055	0.005	<0.00200	<0.00200
	Sulphate (SO_4)	mg/L	309	-	25.7	27.5	19.8	19.8	23.5	23.4
Total Metals	Aluminum (Al)	mg/L	-	-	0.0381	0.148	0.0752	0.083	0.0081	0.0148
	Antimony (Sb)	mg/L	0.009	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Arsenic (As)	mg/L	0.005	0.005	0.00035	0.00054	0.00032	0.00034	0.00034	0.00034
	Barium (Ba)	mg/L	1	-	0.0358	0.0334	0.0271	0.0278	0.0386	0.0365
	Beryllium (Be)	mg/L	0.00013	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	1.2	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	-	0.0000055	0.0000087	<0.00000500	0.0000053	<0.00000500	<0.00000500
	Calcium (Ca)	mg/L	-	-	38.2	35.3	30.2	30.7	35.2	37.2
	Chromium (Cr)	mg/L	0.001	-	0.00015	0.00029	0.00018	0.00026	0.00012	<0.000100
	Cobalt (Co)	mg/L	0.004	0.11	<0.000100	0.00014	<0.000100	<0.000100	<0.000100	<0.000100
	Copper (Cu)	mg/L	-	-	<0.000500	0.00075	<0.000500	<0.000500	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	1	0.03	0.194	0.104	0.115	<0.0100	<0.0100
	Lead (Pb)	mg/L	0.0091	0.15	0.00008	0.000366	0.000209	0.000209	<0.0000500	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0014	0.0017	<0.00100	0.001	0.0017	0.0016
	Magnesium (Mg)	mg/L	-	-	11.1	10.5	8.13	8.47	10	10.3
	Manganese (Mn)	mg/L	1.3	2.3	0.00452	0.0171	0.00818	0.00867	0.00093	0.00133
	Mercury (Hg)	µg/L	0.0012	-	<0.000500	0.00896	<0.000500	0.00055	<0.000500	<0.000500
	Molybdenum (Mo)	mg/L	1	2	0.00062	0.000522	0.000533	0.000558	0.000676	0.000634
	Nickel (Ni)	mg/L	0.025	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.485	0.648	0.41	0.428	0.442	0.455
	Selenium (Se)	mg/L	0.002	-	0.000124	0.000145	0.000105	0.000083	0.000938	0.000565
	Silicon (Si)-Total	mg/L	-	-	2.14	2.74	2.24	2.34	1.29	1.47
	Silver (Ag)	mg/L	0.0015	0.003	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	4.03	4.41	2.48	2.53	2.84	3.19
	Strontium (Sr)	mg/L	-	-	0.171	0.122	0.124	0.123	0.148	0.152
	Thallium (Tl)	mg/L	0.0008	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	0.0085	-	0.000679	0.000679	0.00066	0.00063	0.000658	0.000682
	Vanadium (V)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Zinc (Zn)	mg/L	0.059	0.085	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
Dissolved Metals	Aluminum (Al)	mg/L	0.05	0.1	0.0051	0.0068	0.0092	0.0091	0.0034	0.0034
	Antimony (Sb)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Arsenic (As)	mg/L	-	-	0.00034	0.00045	0.00028	0.0003	0.00036	0.00034
	Barium (Ba)	mg/L	-	-	0.0362	0.0345	0.0247	0.0245	0.0391	0.037
	Beryllium (Be)	mg/L	-	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	0.00095	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
	Calcium (Ca)	mg/L	-	-	35.8	32.7	29.7	30.7	33.7	33.6
	Chromium (Cr)	mg/L	0.0003	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Cobalt (Co)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Copper (Cu)	mg/L	0.0015	0.0089	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	0.35	<0.0100	0.015	<0.0100	<0.0100	<0.0100	<0.0100
	Lead (Pb)	mg/L	-	-	<0.0000500	0.000054	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0014	0.0014	<0.00100	<0.00100	0.0018	0.0016
	Magnesium (Mg)	mg/L	-	-	11.1	9.97	8.13	8.35	10.7	10.7
	Manganese (Mn)	mg/L	-	-	<0.000100	0.00796	0.00151	0.00157	<0.000100	<0.000100
	Mercury (Hg)	mg/L	-	-	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
	Molybdenum (Mo)	mg/L	-	-	0.000685	0.000584	0.000524	0.000544	0.000641	0.000645
	Nickel (Ni)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.504	0.578	0.388	0.399	0.48	0.481
	Selenium (Se)	mg/L	-	-	0.00012	0.000131	0.000099	0.000114	0.00103	0.00072
	Silicon (Si)	mg/L	-	-	2.02	2.51	2.17	2.18	1.25	1.47
	Silver (Ag)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	3.77	4.23	2.37	2.37	2.75	3.17
	Strontium (Sr)	mg/L	-	-	0.157	0.135	0.116	0.119	0.134	0.134
	Thallium (Tl)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	-	-	0.000677	0.000722	0.000614	0.000604	0.000612	0.000619
	Vanadium (V)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Zinc (Zn)	mg/L	-	-	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100

Exceeds CCME Long Term Guideline.

Exceeds CCME Short Term Guideline.

Notes: "-" indicates no data.

Table B.11: Water Quality for Biological Monitoring Stations in the Koocanusa Reservoir, 2019

	Analyte	Units	Long Term Guidelines	Short Term Guidelines	RG_TN_U3	RG_ER_U1	RG_ER_U1	RG_ER_U2	RG_ER_U1	RG_ER_U2
					Bottom	Surface	Surface	Bottom	Surface	Middle
					20-Aug-19	25-Apr-19	12-Jun-19	12-Jun-19	19-Aug-19	19-Aug-19
Physical Characteristics	Hardness (as CaCO3)	mg/L	-	-	132	133	103	106	117	119
	pH, Field	pH	> 6.5 or < 9.0		8.14	8.16	8.18	8.19	8.46	8.48
	pH, Lab	pH	> 6.5 or < 9.0		8.17	8.28	8.15	8.2	8.33	8.32
	Total Suspended Solids, Lab	mg/L	-	-	3.9	14.1	6.8	9.3	<1.00	<1.00
	Total Dissolved Solids	mg/L	-	-	152	162	122	104	206	206
	Dissolved Oxygen-Field	mg/L	< 8	< 5	8.72	10.8	10.03	10.13	9.04	9.01
	Dissolved Oxygen-Field	%	-	-	89.7	100.2	107.2	102.8	100	99.4
	Temperature-Field	C	-	-	16.7	8.7	14.6	12.23	20.3	20.1
Anions and Nutrients	Ammonia as N	mg/L	1.4	7	0.015	0.0072	0.0056	0.0071	0.0055	0.0077
	Bromide (Br)	mg/L	-	-	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
	Chloride (Cl)	mg/L	150	600	2.9	3.15	1.68	1.79	2.39	2.03
	Fluoride (F)	mg/L	-	1.5	0.057	0.093	0.067	0.068	0.087	0.093
	Nitrate (as N)	mg/L	3	33	0.0831	0.268	0.148	0.137	0.161	0.147
	Nitrite (as N)	mg/L	0.06	0.6	0.0025	<0.00100	<0.00100	<0.00100	0.002	0.0023
	Phosphorus (P)-Total	mg/L	-	-	0.0023	0.0156	0.0026	0.0062	<0.00200	<0.00200
	Sulphate (SO_4)	mg/L	309	-	25.6	28.7	17.9	18.7	23.7	23.8
Total Metals	Aluminum (Al)	mg/L	-	-	0.0514	0.341	0.0529	0.0857	0.0115	0.0101
	Antimony (Sb)	mg/L	0.009	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	0.00012
	Arsenic (As)	mg/L	0.005	0.005	0.00037	0.00053	0.00035	0.00032	0.00032	0.00033
	Barium (Ba)	mg/L	1	-	0.0356	0.052	0.0244	0.0253	0.0406	0.0413
	Beryllium (Be)	mg/L	0.00013	-	<0.0000200	0.000022	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	1.2	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	-	<0.00000500	0.0000166	<0.00000500	0.0000066	<0.00000500	<0.00000500
	Calcium (Ca)	mg/L	-	-	38.7	36.3	28.6	29.5	32.4	32.2
	Chromium (Cr)	mg/L	0.001	-	0.00015	0.00055	0.00014	0.00017	0.00011	0.0001
	Cobalt (Co)	mg/L	0.004	0.11	<0.000100	0.0002	<0.000100	<0.000100	<0.000100	<0.000100
	Copper (Cu)	mg/L	-	-	<0.000500	0.00086	<0.000500	<0.000500	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	1	0.038	0.338	0.058	0.098	<0.0100	<0.0100
	Lead (Pb)	mg/L	0.0091	0.15	0.000105	0.000506	0.000147	0.000175	<0.0000500	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0014	0.0028	<0.00100	<0.00100	0.0019	0.0019
	Magnesium (Mg)	mg/L	-	-	10.7	11.4	7.75	7.69	10.3	10.1
	Manganese (Mn)	mg/L	1.3	2.3	0.00517	0.0191	0.00669	0.00793	0.0011	0.00109
	Mercury (Hg)	µg/L	0.0012	-	<0.000500	0.0136	0.00055	0.00056	<0.000500	<0.000500
	Molybdenum (Mo)	mg/L	1	2	0.000647	0.00062	0.000539	0.000509	0.000636	0.000656
	Nickel (Ni)	mg/L	0.025	-	<0.000500	0.00064	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.487	0.704	0.39	0.4	0.464	0.455
	Selenium (Se)	mg/L	0.002	-	0.000172	0.00125	0.0002	0.000154	0.000989	0.00102
	Silicon (Si)-Total	mg/L	-	-	2.12	3.01	2.13	2.18	1.28	1.29
	Silver (Ag)	mg/L	0.0015	0.003	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	4.05	3.98	2.14	2.25	2.66	2.71
	Strontium (Sr)	mg/L	-	-	0.164	0.126	0.116	0.117	0.128	0.13
	Thallium (Tl)	mg/L	0.0008	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	0.0085	-	0.000696	0.000657	0.000593	0.000596	0.000582	0.000565
	Vanadium (V)	mg/L	-	-	<0.000500	0.00081	<0.000500	<0.000500	<0.000500	<0.000500
	Zinc (Zn)	mg/L	0.059	0.085	<0.00300	0.0046	<0.00300	<0.00300	<0.00300	<0.00300
Dissolved Metals	Aluminum (Al)	mg/L	0.05	0.1	0.0056	0.014	0.0104	0.0104	0.0039	0.004
	Antimony (Sb)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Arsenic (As)	mg/L	-	-	0.00034	0.00041	0.00028	0.00027	0.0003	0.00032
	Barium (Ba)	mg/L	-	-	0.0357	0.0504	0.0238	0.0243	0.0395	0.0388
	Beryllium (Be)	mg/L	-	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	0.00095	<0.00000500	0.000008	<0.00000500	<0.00000500	<0.00000500	<0.00000500
	Calcium (Ca)	mg/L	-	-	34.3	35.2	28.7	29.7	31.6	32.6
	Chromium (Cr)	mg/L	0.0003	-	<0.000100	0.00011	<0.000100	<0.000100	<0.000100	<0.000100
	Cobalt (Co)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Copper (Cu)	mg/L	0.0015	0.0089	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	0.35	<0.0100	0.018	<0.0100	<0.0100	<0.0100	<0.0100
	Lead (Pb)	mg/L	-	-	<0.0000500	0.000052	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0014	0.0022	<0.00100	<0.00100	0.0018	0.0018
	Magnesium (Mg)	mg/L	-	-	11.2	11.1	7.7	7.79	9.39	9.27
	Manganese (Mn)	mg/L	-	-	0.00011	0.00721	0.00224	0.00261	<0.000100	<0.000100
	Mercury (Hg)	mg/L	-	-	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
	Molybdenum (Mo)	mg/L	-	-	0.000675	0.000608	0.000518	0.000519	0.000599	0.000604
	Nickel (Ni)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.492	0.578	0.368	0.382	0.431	0.444
	Selenium (Se)	mg/L	-	-	0.000173	0.0013	0.00019	0.000149	0.000979	0.00101
	Silicon (Si)	mg/L	-	-	2	2.37	2.01	2.08	1.13	1.13
	Silver (Ag)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	3.8	3.88	2.02	2.24	2.45	2.56
	Strontium (Sr)	mg/L	-	-	0.151	0.133	0.111	0.117	0.129	0.123
	Thallium (Tl)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	-	-	0.00065	0.000642	0.000578	0.000579	0.000662	0.000626
	Vanadium (V)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Zinc (Zn)	mg/L	-	-	<0.00100	0.001	<0.00100	<0.00100	<0.00100	<0.00100

Exceeds CCME Long Term Guideline.

Exceeds CCME Short Term Guideline.

Notes: "-" indicates no data.

Table B.11: Water Quality for Biological Monitoring Stations in the Koocanusa Reservoir, 2019

	Analyte	Units	Long Term Guidelines	Short Term Guidelines	RG_ER_U3	RG_T4_U1	RG_T4_U2	RG_T4_U3	RG_T4_U1	RG_T4_U2
					Bottom	Surface	Middle	Bottom	Surface	Middle
					19-Aug-19	25-Apr-19	25-Apr-19	25-Apr-19	12-Jun-19	12-Jun-19
Physical Characteristics	Hardness (as CaCO3)	mg/L	-	-	119	149	154	158	109	104
	pH, Field	pH	> 6.5 or < 9.0		8.29	8.18	8.16	8.14	8.38	8.23
	pH, Lab	pH	> 6.5 or < 9.0		8.3	8.3	8.3	8.32	8.2	8.17
	Total Suspended Solids, Lab	mg/L	-	-	<1.00	8.6	7.6	6.2	2.6	8
	Total Dissolved Solids	mg/L	-	-	202	180	177	180	123	119
	Dissolved Oxygen-Field	mg/L	< 8	< 5	9.03	10.89	10.94	10.89	10.21	10.09
	Dissolved Oxygen-Field	%	-	-	93.6	95.7	95.6	92.3	111	101.6
	Temperature-Field	C	-	-	17.6	9.6	9.4	8.3	15.37	11.95
Anions and Nutrients	Ammonia as N	mg/L	1.4	7	0.0062	0.0077	0.0099	0.0088	<0.00500	0.0094
	Bromide (Br)	mg/L	-	-	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
	Chloride (Cl)	mg/L	150	600	2.27	3.84	3.92	3.86	1.69	1.4
	Fluoride (F)	mg/L	-	1.5	0.092	0.099	0.095	0.101	0.076	0.066
	Nitrate (as N)	mg/L	3	33	0.139	0.243	0.255	0.322	0.301	0.177
	Nitrite (as N)	mg/L	0.06	0.6	0.0015	<0.00100	<0.00100	<0.00100	0.0012	<0.00100
	Phosphorus (P)-Total	mg/L	-	-	0.0031	0.0116	0.0124	0.0124	0.0065	0.006
	Sulphate (SO_4)	mg/L	309	-	24.8	34.8	35.5	36.8	18.2	15.8
Total Metals	Aluminum (Al)	mg/L	-	-	0.0122	0.237	0.228	0.205	0.0385	0.097
	Antimony (Sb)	mg/L	0.009	-	<0.000100	<0.000100	<0.000100	0.0001	<0.000100	<0.000100
	Arsenic (As)	mg/L	0.005	0.005	0.00033	0.00054	0.00052	0.00048	0.00039	0.00035
	Barium (Ba)	mg/L	1	-	0.0399	0.0537	0.0547	0.0582	0.0352	0.0294
	Beryllium (Be)	mg/L	0.00013	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	1.2	-	<0.0100	<0.0100	<0.0100	0.011	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	-	<0.00000500	0.0000114	0.000013	0.0000142	0.0000051	0.0000056
	Calcium (Ca)	mg/L	-	-	32.2	42.6	41.6	42.7	30	30.4
	Chromium (Cr)	mg/L	0.001	-	0.00013	0.00042	0.0004	0.00046	0.00011	0.00022
	Cobalt (Co)	mg/L	0.004	0.11	<0.000100	0.00015	0.00016	0.00012	<0.000100	<0.000100
	Copper (Cu)	mg/L	-	-	<0.000500	0.00236	0.00097	0.00073	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	1	<0.0100	0.232	0.225	0.173	0.031	0.101
	Lead (Pb)	mg/L	0.0091	0.15	<0.0000500	0.000325	0.000296	0.000241	0.000066	0.00018
	Lithium (Li)	mg/L	-	-	0.0018	0.0029	0.0029	0.0035	0.0014	0.0012
	Magnesium (Mg)	mg/L	-	-	11	13	13.1	13.1	8.33	7.72
	Manganese (Mn)	mg/L	1.3	2.3	0.0014	0.0165	0.0164	0.0132	0.00376	0.00785
	Mercury (Hg)	µg/L	0.0012	-	<0.000500	0.00135	0.00133	0.00145	<0.000500	0.00064
	Molybdenum (Mo)	mg/L	1	2	0.00066	0.00069	0.000665	0.000725	0.000556	0.000549
	Nickel (Ni)	mg/L	0.025	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.47	0.703	0.707	0.689	0.445	0.412
	Selenium (Se)	mg/L	0.002	-	0.000853	0.00113	0.00127	0.00164	0.000782	0.000507
	Silicon (Si)-Total	mg/L	-	-	1.41	2.75	2.66	2.6	2.19	2.29
	Silver (Ag)	mg/L	0.0015	0.003	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	3.01	4.86	4.89	4.68	2.33	2.03
	Strontium (Sr)	mg/L	-	-	0.137	0.145	0.142	0.15	0.113	0.114
	Thallium (Tl)	mg/L	0.0008	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	0.00016	<0.000100	<0.000100	<0.000100	<0.000100
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	0.0085	-	0.000598	0.000746	0.000731	0.000725	0.000602	0.000592
	Vanadium (V)	mg/L	-	-	<0.000500	0.00059	0.00062	0.00064	<0.000500	<0.000500
	Zinc (Zn)	mg/L	0.059	0.085	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
Dissolved Metals	Aluminum (Al)	mg/L	0.05	0.1	0.0033	0.0098	0.0109	0.0131	0.0098	0.0098
	Antimony (Sb)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Arsenic (As)	mg/L	-	-	0.0003	0.00041	0.00042	0.00038	0.00032	0.0003
	Barium (Ba)	mg/L	-	-	0.0372	0.0527	0.0543	0.0617	0.0332	0.0275
	Beryllium (Be)	mg/L	-	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	0.00095	<0.00000500	0.0000061	<0.00000500	0.0000054	<0.00000500	<0.00000500
	Calcium (Ca)	mg/L	-	-	32.5	39.1	41	41.8	30.3	29
	Chromium (Cr)	mg/L	0.0003	-	<0.000100	0.00011	0.00012	0.00012	<0.000100	<0.000100
	Cobalt (Co)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Copper (Cu)	mg/L	0.0015	0.0089	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	0.35	<0.0100	0.014	0.014	0.013	<0.0100	<0.0100
	Lead (Pb)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0018	0.0023	0.0024	0.0029	0.0014	0.0012
	Magnesium (Mg)	mg/L	-	-	9.25	12.6	12.5	13.1	8.01	7.69
	Manganese (Mn)	mg/L	-	-	<0.000100	0.00511	0.00484	0.00353	0.00018	0.00027
	Mercury (Hg)	mg/L	-	-	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
	Molybdenum (Mo)	mg/L	-	-	0.00059	0.000639	0.00065	0.000703	0.000532	0.000528
	Nickel (Ni)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.431	0.618	0.619	0.625	0.412	0.372
	Selenium (Se)	mg/L	-	-	0.000871	0.00136	0.00146	0.00197	0.000769	0.000506
	Silicon (Si)	mg/L	-	-	1.28	2.33	2.28	2.21	2.1	2.05
	Silver (Ag)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	2.81	4.79	4.71	4.63	2.18	1.94
	Strontium (Sr)	mg/L	-	-	0.133	0.152	0.155	0.161	0.106	0.105
	Thallium (Tl)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	-	-	0.000653	0.000737	0.000782	0.000768	0.000582	0.00058
	Vanadium (V)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Zinc (Zn)	mg/L	-	-	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100

Exceeds CCME Long Term Guideline.

Exceeds CCME Short Term Guideline.

Notes: "-" indicates no data.

Table B.11: Water Quality for Biological Monitoring Stations in the Koocanusa Reservoir, 2019

	Analyte	Units	Long Term Guidelines	Short Term Guidelines	RG_T4_U3	RG_T4_U1	RG_T4_U2	RG_T4_U3	RG_GC_U1	RG_GC_U2
					Bottom	Surface	Middle	Bottom	Surface	Middle
					12-Jun-19	19-Aug-19	19-Aug-19	19-Aug-19	25-Apr-19	25-Apr-19
Physical Characteristics	Hardness (as CaCO3)	mg/L	-	-	103	123	126	133	158	158
	pH, Field	pH	> 6.5 or < 9.0		8.24	8.48	8.4	8.07	8.08	8.09
	pH, Lab	pH	> 6.5 or < 9.0		8.18	8.31	8.26	8.21	8.27	8.34
	Total Suspended Solids, Lab	mg/L	-	-	15	<1.00	<1.00	3.9	5.5	5.7
	Total Dissolved Solids	mg/L	-	-	125	199	220	159	190	182
	Dissolved Oxygen-Field	mg/L	< 8	< 5	10.03	9.02	8.84	7.4	11.14	11.13
	Dissolved Oxygen-Field	%	-	-	99.4	99.4	95.2	75.3	98.9	98.7
	Temperature-Field	C	-	-	11.22	20.1	18.9	16.1	10.1	10
Anions and Nutrients	Ammonia as N	mg/L	1.4	7	0.0153	0.0054	0.0082	0.0154	<0.00500	<0.00500
	Bromide (Br)	mg/L	-	-	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
	Chloride (Cl)	mg/L	150	600	1.46	1.97	2.25	2.7	4.26	4.21
	Fluoride (F)	mg/L	-	1.5	0.075	0.091	0.099	0.105	0.1	0.096
	Nitrate (as N)	mg/L	3	33	0.251	0.143	0.209	0.251	0.256	0.256
	Nitrite (as N)	mg/L	0.06	0.6	<0.00100	0.0021	0.0021	0.0027	0.001	<0.00100
	Phosphorus (P)-Total	mg/L	-	-	0.0081	<0.00200	<0.00200	0.0033	0.0107	0.0112
	Sulphate (SO_4)	mg/L	309	-	18.3	23.1	26.6	29.8	37.8	37.3
Total Metals	Aluminum (Al)	mg/L	-	-	0.116	0.0116	0.0165	0.0443	0.163	0.21
	Antimony (Sb)	mg/L	0.009	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Arsenic (As)	mg/L	0.005	0.005	0.00037	0.00033	0.00037	0.00039	0.00048	0.00046
	Barium (Ba)	mg/L	1	-	0.0318	0.0415	0.0435	0.0437	0.0536	0.0548
	Beryllium (Be)	mg/L	0.00013	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	1.2	-	<0.0100	<0.0100	<0.0100	<0.0100	0.011	0.01
	Cadmium (Cd)	mg/L	-	-	0.0000069	<0.00000500	<0.00000500	0.0000057	0.0000121	0.0000143
	Calcium (Ca)	mg/L	-	-	30.5	33	34.3	34.8	41.2	43.8
	Chromium (Cr)	mg/L	0.001	-	0.00024	0.0001	0.00014	0.00026	0.00033	0.00039
	Cobalt (Co)	mg/L	0.004	0.11	0.00012	<0.000100	<0.000100	<0.000100	0.00011	0.00012
	Copper (Cu)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	0.00062	0.00066
	Iron (Fe)	mg/L	-	1	0.158	<0.0100	0.012	0.064	0.141	0.17
	Lead (Pb)	mg/L	0.0091	0.15	0.000259	<0.0000500	<0.0000500	0.000092	0.000229	0.000242
	Lithium (Li)	mg/L	-	-	0.0015	0.0018	0.0022	0.0023	0.0031	0.0032
	Magnesium (Mg)	mg/L	-	-	8.32	10.1	11	11.8	13.2	13.4
	Manganese (Mn)	mg/L	1.3	2.3	0.0119	0.0012	0.00196	0.00588	0.0126	0.0131
	Mercury (Hg)	µg/L	0.0012	-	0.00075	<0.000500	<0.000500	<0.000500	0.00126	0.00122
	Molybdenum (Mo)	mg/L	1	2	0.000547	0.000636	0.000698	0.000749	0.000667	0.000621
	Nickel (Ni)	mg/L	0.025	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.416	0.468	0.472	0.505	0.725	0.753
	Selenium (Se)	mg/L	0.002	-	0.000789	0.000937	0.00121	0.00131	0.00134	0.00119
	Silicon (Si)-Total	mg/L	-	-	2.34	1.36	1.55	1.97	2.5	2.69
	Silver (Ag)	mg/L	0.0015	0.003	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	1.94	2.71	3	3.48	5.26	5.49
	Strontium (Sr)	mg/L	-	-	0.12	0.128	0.142	0.155	0.15	0.15
	Thallium (Tl)	mg/L	0.0008	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	0.00014	<0.000100	<0.000100	<0.000100
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	0.0085	-	0.00061	0.000577	0.000609	0.000674	0.000771	0.000774
	Vanadium (V)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	0.00054	0.00061
	Zinc (Zn)	mg/L	0.059	0.085	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
Dissolved Metals	Aluminum (Al)	mg/L	0.05	0.1	0.0102	0.0037	0.0033	0.0035	0.0091	0.0101
	Antimony (Sb)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Arsenic (As)	mg/L	-	-	0.00024	0.00029	0.00031	0.00033	0.00039	0.00041
	Barium (Ba)	mg/L	-	-	0.032	0.0396	0.0429	0.0423	0.0553	0.0579
	Beryllium (Be)	mg/L	-	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	0.00095	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500	0.0000054
	Calcium (Ca)	mg/L	-	-	28.4	33.9	34	36.2	41.5	41.5
	Chromium (Cr)	mg/L	0.0003	-	<0.000100	<0.000100	<0.000100	<0.000100	0.00011	0.00011
	Cobalt (Co)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Copper (Cu)	mg/L	0.0015	0.0089	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	0.35	<0.0100	<0.0100	<0.0100	<0.0100	0.01	0.011
	Lead (Pb)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0014	0.0019	0.0022	0.0023	0.0026	0.0026
	Magnesium (Mg)	mg/L	-	-	7.71	9.39	9.97	10.5	13.2	13.3
	Manganese (Mn)	mg/L	-	-	0.00121	<0.000100	<0.000100	<0.000100	0.00133	0.00123
	Mercury (Hg)	mg/L	-	-	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
	Molybdenum (Mo)	mg/L	-	-	0.000575	0.000593	0.00065	0.000702	0.000665	0.000668
	Nickel (Ni)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.364	0.438	0.455	0.479	0.647	0.664
	Selenium (Se)	mg/L	-	-	0.000736	0.00101	0.00129	0.00135	0.00153	0.00147
	Silicon (Si)	mg/L	-	-	2.04	1.22	1.42	1.81	2.27	2.27
	Silver (Ag)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	1.69	2.58	2.83	3.23	5.19	5.18
	Strontium (Sr)	mg/L	-	-	0.111	0.129	0.135	0.145	0.164	0.164
	Thallium (Tl)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	-	-	0.000524	0.000626	0.000682	0.000719	0.000782	0.0008
	Vanadium (V)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Zinc (Zn)	mg/L	-	-	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100

Exceeds CCME Long Term Guideline.

Exceeds CCME Short Term Guideline.

Notes: "-" indicates no data.

Table B.11: Water Quality for Biological Monitoring Stations in the Koocanusa Reservoir, 2019

	Analyte	Units	Long Term Guidelines	Short Term Guidelines	RG_GC_U3	RG_GC_U1	RG_GC_U2	RG_GC_U3	RG_GC_U1	RG_GC_U2
					Bottom	Surface	Middle	Bottom	Surface	Middle
					25-Apr-19	12-Jun-19	12-Jun-19	12-Jun-19	19-Aug-19	19-Aug-19
Physical Characteristics	Hardness (as CaCO3)	mg/L	-	-	159	108	104	107	118	128
	pH, Field	pH	> 6.5 or < 9.0		8.07	8.36	8.17	8.17	8.4	8.17
	pH, Lab	pH	> 6.5 or < 9.0		8.33	8.19	8.12	8.16	8.33	8.26
	Total Suspended Solids, Lab	mg/L	-	-	5	2.9	3.8	17.1	<1.00	1.5
	Total Dissolved Solids	mg/L	-	-	189	117	114	118	125	141
	Dissolved Oxygen-Field	mg/L	< 8	< 5	11.11	10.34	9.66	9.78	8.95	8.43
	Dissolved Oxygen-Field	%	-	-	94.8	111.3	99.7	97.1	98.9	89.2
	Temperature-Field	C	-	-	8.9	14.9	13	11.35	20.2	18.1
Anions and Nutrients	Ammonia as N	mg/L	1.4	7	0.0087	0.0193	0.0234	0.0101	0.0103	0.0119
	Bromide (Br)	mg/L	-	-	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
	Chloride (Cl)	mg/L	150	600	4.05	1.56	1.45	1.39	1.87	2.25
	Fluoride (F)	mg/L	-	1.5	0.1	0.072	0.071	0.077	0.088	0.094
	Nitrate (as N)	mg/L	3	33	0.308	0.208	0.207	0.269	0.139	0.192
	Nitrite (as N)	mg/L	0.06	0.6	0.0011	<0.00100	<0.00100	<0.00100	0.002	0.0024
	Phosphorus (P)-Total	mg/L	-	-	0.0081	0.004	0.0039	0.0089	<0.00200	<0.00200
	Sulphate (SO_4)	mg/L	309	-	37.2	17.3	16.1	18.6	21.9	25.4
Total Metals	Aluminum (Al)	mg/L	-	-	0.117	0.0456	0.056	0.175	0.0198	0.0171
	Antimony (Sb)	mg/L	0.009	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Arsenic (As)	mg/L	0.005	0.005	0.00041	0.00035	0.00033	0.0004	0.00035	0.00032
	Barium (Ba)	mg/L	1	-	0.0602	0.0346	0.0356	0.0333	0.0398	0.0433
	Beryllium (Be)	mg/L	0.00013	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	1.2	-	0.01	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	-	0.0000117	0.0000056	<0.00000500	0.0000085	<0.00000500	<0.00000500
	Calcium (Ca)	mg/L	-	-	41	28.1	28.3	30.1	31	35.5
	Chromium (Cr)	mg/L	0.001	-	0.00026	0.00013	0.00015	0.0003	0.00013	0.00012
	Cobalt (Co)	mg/L	0.004	0.11	<0.000100	<0.000100	<0.000100	0.00015	<0.000100	<0.000100
	Copper (Cu)	mg/L	-	-	0.00058	<0.000500	<0.000500	0.00051	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	1	0.107	0.036	0.051	0.201	0.013	0.017
	Lead (Pb)	mg/L	0.0091	0.15	0.000138	0.000068	0.0001	0.000297	<0.0000500	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0034	0.0013	0.0012	0.0015	0.0017	0.002
	Magnesium (Mg)	mg/L	-	-	14.1	7.83	7.6	8.15	9.73	10.5
	Manganese (Mn)	mg/L	1.3	2.3	0.0114	0.00443	0.00524	0.0133	0.00119	0.00281
	Mercury (Hg)	µg/L	0.0012	-	0.00092	0.00052	0.00061	0.00065	<0.000500	<0.000500
	Molybdenum (Mo)	mg/L	1	2	0.000676	0.000522	0.000481	0.000497	0.00061	0.000654
	Nickel (Ni)	mg/L	0.025	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.736	0.435	0.447	0.424	0.449	0.468
	Selenium (Se)	mg/L	0.002	-	0.00169	0.000624	0.000498	0.000751	0.000926	0.000978
	Silicon (Si)-Total	mg/L	-	-	2.58	2.22	2.6	2.45	1.34	1.83
	Silver (Ag)	mg/L	0.0015	0.003	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	5.06	2.11	2	1.77	2.48	3.06
	Strontium (Sr)	mg/L	-	-	0.15	0.103	0.0988	0.112	0.126	0.14
	Thallium (Tl)	mg/L	0.0008	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	0.00017	0.00014
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	0.0085	-	0.000782	0.000581	0.000574	0.000604	0.000571	0.000607
	Vanadium (V)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Zinc (Zn)	mg/L	0.059	0.085	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
Dissolved Metals	Aluminum (Al)	mg/L	0.05	0.1	0.0066	0.009	0.008	0.0107	0.0036	0.0032
	Antimony (Sb)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Arsenic (As)	mg/L	-	-	0.00037	0.00033	0.00032	0.00027	0.00033	0.00028
	Barium (Ba)	mg/L	-	-	0.0634	0.0336	0.0355	0.03	0.0394	0.0414
	Beryllium (Be)	mg/L	-	-	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Boron (B)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Cadmium (Cd)	mg/L	-	0.00095	0.0000058	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
	Calcium (Ca)	mg/L	-	-	41.7	29.7	28.8	29.7	32.2	34.7
	Chromium (Cr)	mg/L	0.0003	-	0.0001	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Cobalt (Co)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
	Copper (Cu)	mg/L	0.0015	0.0089	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Iron (Fe)	mg/L	-	0.35	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Lead (Pb)	mg/L	-	-	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0029	0.0013	0.0012	0.0014	0.0018	0.002
	Magnesium (Mg)	mg/L	-	-	13.3	8.19	7.67	7.91	9.19	10
	Manganese (Mn)	mg/L	-	-	0.00065	0.00011	0.00015	0.00051	<0.000100	<0.000100
	Mercury (Hg)	mg/L	-	-	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
	Molybdenum (Mo)	mg/L	-	-	0.000676	0.000491	0.000463	0.00054	0.000585	0.000615
	Nickel (Ni)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Potassium (K)	mg/L	-	-	0.66	0.414	0.415	0.363	0.443	0.471
	Selenium (Se)	mg/L	-	-	0.00202	0.000657	0.000599	0.000829	0.000949	0.000935
	Silicon (Si)	mg/L	-	-	2.25	2.2	2.41	2.03	1.19	1.64
	Silver (Ag)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Sodium (Na)	mg/L	-	-	4.8	2.08	1.98	1.68	2.41	2.79
	Strontium (Sr)	mg/L	-	-	0.166	0.106	0.095	0.108	0.123	0.133
	Thallium (Tl)	mg/L	-	-	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
	Tin (Sn)	mg/L	-	-	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	0.00011
	Titanium (Ti)	mg/L	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Uranium (U)	mg/L	-	-	0.000854	0.00059	0.000564	0.000568	0.000653	0.00067
	Vanadium (V)	mg/L	-	-	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Zinc (Zn)	mg/L	-	-	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100

Exceeds CCME Long Term Guideline.

Exceeds CCME Short Term Guideline.

Notes: "-" indicates no data.

Table B.11: Water Quality for Biological Monitoring Stations in the Koocanusa Reservoir, 2019

	Analyte	Units	Long Term Guidelines	Short Term Guidelines	RG_GC_U3
					Bottom
					19-Aug-19
Physical Characteristics	Hardness (as CaCO3)	mg/L	-	-	130
	pH, Field	pH	> 6.5 or < 9.0		8.04
	pH, Lab	pH	> 6.5 or < 9.0		8.1
	Total Suspended Solids, Lab	mg/L	-	-	9.7
	Total Dissolved Solids	mg/L	-	-	148
	Dissolved Oxygen-Field	mg/L	< 8	< 5	7.76
	Dissolved Oxygen-Field	%	-	-	79.6
	Temperature-Field	C	-	-	16.5
Anions and Nutrients	Ammonia as N	mg/L	1.4	7	0.0102
	Bromide (Br)	mg/L	-	-	<0.0500
	Chloride (Cl)	mg/L	150	600	2.08
	Fluoride (F)	mg/L	-	1.5	0.101
	Nitrate (as N)	mg/L	3	33	0.318
	Nitrite (as N)	mg/L	0.06	0.6	0.0036
	Phosphorus (P)-Total	mg/L	-	-	0.0035
	Sulphate (SO_4)	mg/L	309	-	25.7
Total Metals	Aluminum (Al)	mg/L	-	-	0.131
	Antimony (Sb)	mg/L	0.009	-	<0.000100
	Arsenic (As)	mg/L	0.005	0.005	0.00042
	Barium (Ba)	mg/L	1	-	0.0447
	Beryllium (Be)	mg/L	0.00013	-	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500
	Boron (B)	mg/L	1.2	-	<0.0100
	Cadmium (Cd)	mg/L	-	-	0.0000071
	Calcium (Ca)	mg/L	-	-	33.9
	Chromium (Cr)	mg/L	0.001	-	0.00028
	Cobalt (Co)	mg/L	0.004	0.11	0.00011
	Copper (Cu)	mg/L	-	-	0.0005
	Iron (Fe)	mg/L	-	1	0.184
	Lead (Pb)	mg/L	0.0091	0.15	0.000187
	Lithium (Li)	mg/L	-	-	0.0022
	Magnesium (Mg)	mg/L	-	-	10.7
	Manganese (Mn)	mg/L	1.3	2.3	0.0169
	Mercury (Hg)	µg/L	0.0012	-	0.00066
	Molybdenum (Mo)	mg/L	1	2	0.000698
	Nickel (Ni)	mg/L	0.025	-	<0.000500
	Potassium (K)	mg/L	-	-	0.482
	Selenium (Se)	mg/L	0.002	-	0.00113
	Silicon (Si)-Total	mg/L	-	-	2.62
	Silver (Ag)	mg/L	0.0015	0.003	<0.0000100
	Sodium (Na)	mg/L	-	-	2.61
	Strontium (Sr)	mg/L	-	-	0.147
	Thallium (Tl)	mg/L	0.0008	-	<0.0000100
	Tin (Sn)	mg/L	-	-	0.00052
	Titanium (Ti)	mg/L	-	-	<0.0100
	Uranium (U)	mg/L	0.0085	-	0.000626
	Vanadium (V)	mg/L	-	-	<0.000500
	Zinc (Zn)	mg/L	0.059	0.085	<0.00300
Dissolved Metals	Aluminum (Al)	mg/L	0.05	0.1	0.003
	Antimony (Sb)	mg/L	-	-	<0.000100
	Arsenic (As)	mg/L	-	-	0.0003
	Barium (Ba)	mg/L	-	-	0.0412
	Beryllium (Be)	mg/L	-	-	<0.0000200
	Bismuth (Bi)	mg/L	-	-	<0.0000500
	Boron (B)	mg/L	-	-	<0.0100
	Cadmium (Cd)	mg/L	-	0.00095	<0.00000500
	Calcium (Ca)	mg/L	-	-	35.4
	Chromium (Cr)	mg/L	0.0003	-	<0.000100
	Cobalt (Co)	mg/L	-	-	<0.000100
	Copper (Cu)	mg/L	0.0015	0.0089	<0.000500
	Iron (Fe)	mg/L	-	0.35	<0.0100
	Lead (Pb)	mg/L	-	-	<0.0000500
	Lithium (Li)	mg/L	-	-	0.0022
	Magnesium (Mg)	mg/L	-	-	10.1
	Manganese (Mn)	mg/L	-	-	0.00102
	Mercury (Hg)	mg/L	-	-	<0.00000500
	Molybdenum (Mo)	mg/L	-	-	0.000656
	Nickel (Ni)	mg/L	-	-	<0.000500
	Potassium (K)	mg/L	-	-	0.452
	Selenium (Se)	mg/L	-	-	0.00131
	Silicon (Si)	mg/L	-	-	2.24
	Silver (Ag)	mg/L	-	-	<0.0000100
	Sodium (Na)	mg/L	-	-	2.61
	Strontium (Sr)	mg/L	-	-	0.141
	Thallium (Tl)	mg/L	-	-	<0.0000100
	Tin (Sn)	mg/L	-	-	0.00034
	Titanium (Ti)	mg/L	-	-	<0.0100
	Uranium (U)	mg/L	-	-	0.00067
	Vanadium (V)	mg/L	-	-	<0.000500
	Zinc (Zn)	mg/L	-	-	0.0016

Exceeds CCME Long Term Guideline.

Exceeds CCME Short Term Guideline.

Notes: "-" indicates no data.

Table B.12: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2014

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
RG_WARDB	n	12	3	12	12	3	3	12	12	12	12	12	12	12	12	12
	Annual Minimum	91.0	-0.100	106	8.09	7.79	9.52	0.610	79.2	0.0383	<0.00100	<0.00500	0.0570	<0.00100	0.00440	14.4
	Annual Maximum	191	10.4	228	8.30	8.47	13.6	2.04	134	0.181	0.00140	0.0811	0.243	0.00390	0.0814	53.0
	Annual Mean	140	5.57	165	8.22	8.19	11.0	1.23	107	0.103	0.00114	0.0157	0.140	0.00197	0.0249	33.6
	Annual Median	140	6.40	164	8.24	8.30	9.89	1.20	106	0.0970	0.00105	0.00701	0.134	0.00140	0.0142	33.1
	% < LRL	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	25%	0%	42%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USELK	n	9	0	9	9	0	0	9	9	9	9	9	9	9	9	9
	Annual Minimum	105	-	116	8.17	-	-	1.00	87.4	0.0910	<0.00100	<0.00500	0.0553	<0.00100	0.00383	13.7
	Annual Maximum	191	-	218	8.35	-	-	1.77	137	0.203	0.00305	0.0395	0.378	0.00160	0.190	47.2
	Annual Mean	136	-	153	8.25	-	-	1.37	108	0.144	0.00155	0.0118	0.154	0.00115	0.0427	26.0
	Annual Median	132	-	140	8.26	-	-	1.44	106	0.150	0.00155	0.00867	0.113	<0.00100	0.00680	23.4
	% < LRL	0%	-	0%	0%	-	-	0%	0%	0%	22%	33%	0%	67%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	-	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	-	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	3	12	12	3	3	12	12	12	12	12	12	12	12	12
	Annual Minimum	137	-0.100	146	8.16	7.98	8.86	<0.500	110	0.763	<0.00100	<0.00500	<0.0500	<0.00100	<0.00200	20.8
	Annual Maximum	266	10.2	270	8.40	8.44	13.4	1.82	177	1.74	0.00480	0.0221	0.359	0.00470	0.140	66.4
	Annual Mean	203	5.37	216	8.33	8.26	11.0	0.981	148	1.23	0.00225	0.00818	0.101	0.00241	0.0313	44.6
	Annual Median	209	6.00	229	8.35	8.36	10.6	0.865	152	1.30	0.00225	0.00542	0.0650	0.00178	0.00520	47.5
	% < LRL	0%	0%	0%	0%	0%	0%	8%	0%	0%	8%	42%	50%	42%	8%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_DSELK	n	9	0	9	9	0	0	9	9	9	9	9	9	9	9	9
	Annual Minimum	104	-	115	8.14	-	-	1.09	91.4	0.0954	<0.00100	<0.00500	0.103	<0.00100	0.00303	15.3
	Annual Maximum	182	-	207	8.34	-	-	1.98	144	0.415	0.00233	0.0415	0.290	0.00222	0.166	44.6
	Annual Mean	138	-	154	8.25	-	-	1.35	109	0.204	0.00165	0.0125	0.149	0.00126	0.0319	25.6
	Annual Median	131	-	143	8.25	-	-	1.28	106	0.149	0.00177	0.00787	0.124	<0.00100	0.00805	23.3
	% < LRL	0%	-	0%	0%	-	-	0%	0%	0%	22%	11%	0%	67%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	-	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	-	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.12: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2014

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
RG_GRASMERE	n	8	0	8	8	0	0	8	8	8	8	8	8	8	8	8
	Annual Minimum	108	-	114	8.18	-	-	1.05	92.0	0.146	0.00102	<0.00500	0.0610	<0.00100	0.00317	15.3
	Annual Maximum	179	-	204	8.34	-	-	1.91	137	0.444	0.00255	0.0294	0.251	0.00189	0.0824	41.0
	Annual Mean	131	-	145	8.27	-	-	1.35	105	0.217	0.00177	0.00963	0.141	0.00120	0.0211	22.8
	Annual Median	125	-	137	8.28	-	-	1.35	101	0.158	0.00173	0.00667	0.119	<0.00100	0.00689	21.1
	% < LRL	0%	-	0%	0%	-	-	0%	0%	0%	0%	25%	0%	63%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	-	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	-	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USGOLD	n	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1
	Annual Minimum	136	-	153	8.31	-	-	1.40	111	0.195	0.00253	0.00580	0.0503	<0.00100	0.00347	25.9
	Annual Maximum	136	-	153	8.31	-	-	1.40	111	0.195	0.00253	0.00580	0.0503	<0.00100	0.00347	25.9
	Annual Mean	136	-	153	8.31	-	-	1.40	111	0.195	0.00253	0.00580	0.0503	<0.00100	0.00347	25.9
	Annual Median	136	-	153	8.31	-	-	1.40	111	0.195	0.00253	0.00580	0.0503	<0.00100	0.00347	25.9
	% < LRL	0%	-	0%	0%	-	-	0%	0%	0%	0%	0%	0%	100%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	-	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	-	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_BORDER	n	9	0	9	9	0	0	9	9	9	9	9	9	9	9	9
	Annual Minimum	108	-	117	8.16	-	-	0.690	91.4	0.106	<0.00100	0.00500	0.0670	<0.00100	0.00270	6.46
	Annual Maximum	175	-	199	8.34	-	-	2.07	133	0.380	0.00270	0.0220	0.237	0.00195	0.0489	37.6
	Annual Mean	132	-	145	8.27	-	-	1.31	108	0.225	0.00177	0.00902	0.129	0.00116	0.0128	20.5
	Annual Median	132	-	147	8.27	-	-	1.30	105	0.191	0.00187	0.00640	0.126	<0.00100	0.00810	18.9
	% < LRL	0%	-	0%	0%	-	-	0%	0%	0%	11%	0%	0%	67%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	-	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	-	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.12: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2014

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
INTERNATIONAL BOUNDARY	n	7	7	0	7	0	7	0	7	0	0	7	0	7	7	5
	Annual Minimum	106	8.12	-	8.17	-	8.64	-	107	-	-	<0.00500	-	<0.00100	0.00400	17.0
	Annual Maximum	162	19.0	-	8.46	-	10.3	-	150	-	-	0.0305	-	0.00250	0.0310	22.6
	Annual Mean	125	14.2	-	8.31	-	9.42	-	120	-	-	0.0163	-	0.00157	0.0151	19.5
	Annual Median	117	14.5	-	8.29	-	9.10	-	114	-	-	0.0115	-	0.00100	0.00900	19.8
	% < LRL	0%	0%	-	0%	-	0.0%	-	0%	-	-	14%	-	29%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	0%	-	0%	-	-	0%	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TENMILE CREEK	n	6	6	0	6	0	6	0	6	0	0	6	0	6	6	4
	Annual Minimum	123	4.87	-	7.72	-	8.84	-	116	-	-	0.00500	-	<0.00100	0.00250	19.4
	Annual Maximum	137	18.6	-	8.65	-	11.3	-	126	-	-	0.0220	-	0.00200	0.00750	26.0
	Annual Mean	129	11.9	-	8.26	-	10.1	-	119	-	-	0.00958	-	0.00125	0.00525	23.2
	Annual Median	128	12.2	-	8.21	-	10.3	-	118	-	-	0.00650	-	<0.00100	0.00525	23.7
	% < LRL	0%	0%	-	0%	-	0.0%	-	0%	-	-	0%	-	67%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	0%	-	0%	-	-	0%	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FOREBAY	n	7	7	0	7	0	7	0	7	0	0	7	0	7	7	5
	Annual Minimum	118	4.16	-	7.76	-	8.78	-	110	-	-	<0.00500	-	<0.00100	<0.00200	21.8
	Annual Maximum	134	21.8	-	8.81	-	11.5	-	128	-	-	0.0135	-	0.00100	0.00750	25.5
	Annual Mean	126	14.4	-	8.29	-	10.1	-	120	-	-	0.00664	-	0.00100	0.00436	23.6
	Annual Median	126	16.5	-	8.34	-	10.2	-	119	-	-	0.00550	-	<0.00100	0.00350	22.9
	% < LRL	0%	0%	-	0%	-	0%	-	0%	-	-	14%	-	71%	14%	0%
	% > BCWQG[a]	-	-	-	0%	-	0%	-	0%	-	-	0%	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.12: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2014

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	1.70	0.0580	<0.000100	0.000450	0.0330	<0.000100	<0.0100	0.000180	<0.000100	0.0850	0.000102	0.00137	0.00762	<0.0000100	0.000545
	Annual Maximum	8.50	0.119	0.000120	0.00139	0.0514	0.000132	0.0180	0.00279	0.00160	3.33	0.00335	0.00479	0.0891	<0.0000100	0.00100
	Annual Mean	5.03	0.0955	0.000103	0.000648	0.0410	0.000103	0.0123	0.000701	0.000369	0.730	0.000732	0.00241	0.0265	<0.0000100	0.000774
	Annual Median	4.80	0.102	<0.000100	0.000535	0.0400	<0.000100	0.0115	0.000320	0.000120	0.198	0.000298	0.00233	0.0153	<0.0000100	0.000779
	% < LRL	0%	0%	83%	0%	0%	92%	33%	0%	42%	0%	0%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	8%	0%	25%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	25%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USELK	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.59	0.0641	<0.000100	0.000345	0.0296	<0.000100	<0.0100	0.000130	<0.000100	0.0210	<0.0000500	0.000810	0.00284	<0.0000100	0.000495
	Annual Maximum	8.30	0.114	0.000160	0.00230	0.0764	0.000152	0.0140	0.00414	0.00230	4.92	0.00448	0.00719	0.145	0.0000118	0.000950
	Annual Mean	3.37	0.0889	0.000111	0.000802	0.0466	0.000111	0.0106	0.00106	0.000593	1.18	0.00107	0.00277	0.0354	0.0000102	0.000705
	Annual Median	2.88	0.0963	<0.000100	0.000413	0.0436	<0.000100	<0.0100	0.000187	<0.000100	0.0490	0.0000870	0.00194	0.00435	<0.0000100	0.000716
	% < LRL	0%	0%	78%	0%	0%	78%	56%	0%	56%	0%	11%	0%	0%	89%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	22%	0%	22%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	22%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	1.58	0.119	<0.000100	0.000210	0.0651	<0.000100	<0.0100	0.000290	<0.000100	0.0280	<0.0000500	0.00381	0.00160	<0.0000100	0.000793
	Annual Maximum	3.60	0.201	0.000203	0.00144	0.108	0.000173	0.0110	0.00364	0.00120	2.92	0.00196	0.00659	0.107	<0.0000100	0.00112
	Annual Mean	2.46	0.169	0.000113	0.000427	0.0893	0.000107	0.0102	0.000827	0.000252	0.475	0.000346	0.00557	0.0185	<0.0000100	0.000968
	Annual Median	2.20	0.184	<0.000100	0.000255	0.0895	<0.000100	<0.0100	0.000375	<0.000100	0.0590	0.0000565	0.00574	0.00269	<0.0000100	0.000992
	% < LRL	0%	0%	67%	0%	0%	83%	58%	0%	67%	0%	42%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	8%	0%	17%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	17%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.54	0.0700	<0.000100	0.000350	0.0332	<0.000100	<0.0100	0.000125	<0.000100	0.0190	<0.0000500	0.00136	0.00195	<0.0000100	0.000512
	Annual Maximum	8.40	0.114	0.000157	0.00204	0.0965	0.000145	0.0140	0.00350	0.00161	3.47	0.00282	0.00670	0.152	<0.0000100	0.000934
	Annual Mean	3.36	0.0907	0.000108	0.000680	0.0490	0.000105	0.0108	0.000846	0.000390	0.727	0.000625	0.00256	0.0295	<0.0000100	0.000695
	Annual Median	2.70	0.0895	<0.000100	0.000405	0.0428	<0.000100	0.0100	0.000230	<0.000100	0.0740	0.0000985	0.00190	0.00365	<0.0000100	0.000702
	% < LRL	0%	0%	67%	0%	0%	78%	44%	0%	67%	0%	11%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	11%	0%	22%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	22%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.12: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2014

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)
RG_GRASMERE	n	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	Annual Minimum	1.64	0.0710	<0.000100	0.000315	0.0347	<0.000100	<0.0100	0.000120	<0.000100	0.0160	<0.0000500	0.00115	0.00172	<0.0000100	0.000539
	Annual Maximum	4.73	0.113	0.000148	0.00135	0.0737	0.000111	0.0110	0.00280	0.00128	2.85	0.00237	0.00462	0.0742	<0.0000100	0.000843
	Annual Mean	2.56	0.0883	0.000107	0.000594	0.0462	0.000101	0.0102	0.000690	0.000329	0.597	0.000533	0.00233	0.0209	<0.0000100	0.000661
	Annual Median	2.40	0.0920	<0.000100	0.000380	0.0426	<0.000100	<0.0100	0.000187	0.000102	0.0775	0.0000907	0.00181	0.00369	<0.0000100	0.000670
	% < LRL	0%	0%	75%	0%	0%	88%	63%	0%	50%	0%	13%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	25%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	25%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USGOLD	n	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Annual Minimum	2.50	0.0980	<0.000100	0.000373	0.0498	<0.000100	<0.0100	0.000140	<0.000100	0.0340	0.0000620	0.00203	0.00247	<0.0000100	0.000737
	Annual Maximum	2.50	0.0980	<0.000100	0.000373	0.0498	<0.000100	<0.0100	0.000140	<0.000100	0.0340	0.0000620	0.00203	0.00247	<0.0000100	0.000737
	Annual Mean	2.50	0.0980	<0.000100	0.000373	0.0498	<0.000100	<0.0100	0.000140	<0.000100	0.0340	0.0000620	0.00203	0.00247	<0.0000100	0.000737
	Annual Median	2.50	0.0980	<0.000100	0.000373	0.0498	<0.000100	<0.0100	0.000140	<0.000100	0.0340	0.0000620	0.00203	0.00247	<0.0000100	0.000737
	% < LRL	0%	0%	100%	0%	0%	100%	100%	0%	100%	0%	0%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.57	0.0580	<0.000100	0.000280	0.0360	<0.000100	<0.0100	<0.000100	<0.000100	0.0145	<0.0000500	0.000760	0.00154	<0.0000100	0.000280
	Annual Maximum	6.90	0.110	0.000136	0.000982	0.102	0.000103	0.0110	0.00146	0.000622	1.22	0.00132	0.00325	0.0491	<0.0000100	0.000784
	Annual Mean	2.59	0.0859	0.000105	0.000460	0.0520	0.000100	0.0101	0.000401	0.000184	0.262	0.000273	0.00192	0.0132	<0.0000100	0.000594
	Annual Median	2.00	0.0846	<0.000100	0.000373	0.0448	<0.000100	<0.0100	0.000280	0.000110	0.181	0.0000960	0.00183	0.00721	<0.0000100	0.000604
	% < LRL	0%	0%	67%	0%	0%	89%	89%	11%	44%	0%	33%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	11%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	11%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.12: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2014

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)
INTERNATIONAL BOUNDARY	n	5	0	0	2	0	0	0	2	0	0	5	0	0	4	0
	Annual Minimum	1.27	-	-	<0.00300	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Maximum	2.19	-	-	<0.00300	-	-	-	<0.00200	-	-	0.00160	-	-	<0.0000500	-
	Annual Mean	1.58	-	-	<0.00300	-	-	-	<0.00200	-	-	0.000587	-	-	<0.0000500	-
	Annual Median	1.52	-	-	<0.00300	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	% < LRL	0%	-	-	100%	-	-	-	100%	-	-	60%	-	-	100%	-
	% > BCWQG[a]	0%	-	-	-	-	-	-	100%	-	-	0%	-	-	100%	-
	% > BCWQG[b]	0%	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TENMILE CREEK	n	4	0	0	2	0	0	0	2	0	0	4	0	0	3	0
	Annual Minimum	2.20	-	-	<0.00300	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Maximum	2.93	-	-	<0.00300	-	-	-	<0.00200	-	-	<0.00100	-	-	<0.0000500	-
	Annual Mean	2.54	-	-	<0.00300	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Median	2.52	-	-	<0.00300	-	-	-	<0.00200	-	-	<0.00100	-	-	<0.0000500	-
	% < LRL	0%	-	-	100%	-	-	-	100%	-	-	100%	-	-	100%	-
	% > BCWQG[a]	0%	-	-	-	-	-	-	100%	-	-	0%	-	-	100%	-
	% > BCWQG[b]	0%	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FOREBAY	n	5	0	0	2	0	0	0	2	0	0	5	0	0	4	0
	Annual Minimum	2.00	-	-	<0.00300	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Maximum	2.78	-	-	<0.00300	-	-	-	<0.00200	-	-	<0.00100	-	-	<0.0000500	-
	Annual Mean	2.35	-	-	<0.00300	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Median	2.15	-	-	<0.00300	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	% < LRL	0%	-	-	100%	-	-	-	100%	-	-	100%	-	-	100%	-
	% > BCWQG[a]	0%	-	-	-	-	-	-	100%	-	-	0%	-	-	100%	-
	% > BCWQG[b]	0%	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.12: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2014

Station	Summary Statistic	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	<0.000500	<0.000100	<0.0000100	<0.0000100	0.000599	<0.00300	<0.00300	<0.0000100	<0.000500	<0.0100
	Annual Maximum	0.00316	0.000140	0.0000132	0.0000280	0.00118	0.0133	0.0269	0.0000165	<0.000500	0.0332
	Annual Mean	0.000953	0.000109	0.0000103	0.0000120	0.000878	0.00466	0.00980	0.0000106	<0.000500	0.0144
	Annual Median	<0.000500	0.000104	<0.0000100	<0.0000100	0.000837	<0.00300	0.00575	<0.0000100	<0.000500	<0.0100
	% < LRL	75%	42%	83%	75%	0%	58%	17%	83%	100%	58%
	% > BCWQG[a]	-	0%	0%	0%	0%	8%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	0%	-	-	-	-	-	-	-	-
RG_USELK	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000170	<0.0000100	<0.0000100	0.000541	<0.00300	<0.00300	<0.0000100	<0.000500	<0.0100
	Annual Maximum	0.00470	0.00126	0.0000260	0.0000405	0.00122	0.0186	0.0217	0.0000104	<0.000500	0.0182
	Annual Mean	0.00143	0.000579	0.0000146	0.0000168	0.000785	0.00636	0.00900	0.0000100	<0.000500	0.0114
	Annual Median	<0.000500	0.000535	<0.0000100	<0.0000100	0.000690	<0.00300	0.00510	<0.0000100	<0.000500	<0.0100
	% < LRL	67%	0%	67%	56%	0%	67%	11%	89%	100%	67%
	% > BCWQG[a]	-	0%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	<0.000500	0.00334	<0.0000100	<0.0000100	0.000604	<0.00300	<0.00300	<0.0000100	<0.000500	<0.0100
	Annual Maximum	0.00427	0.00795	0.0000638	0.0000743	0.00106	0.0177	0.0357	0.0000145	<0.000500	0.0348
	Annual Mean	0.00105	0.00573	0.0000173	0.0000191	0.000837	0.00489	0.00999	0.0000111	<0.000500	0.0130
	Annual Median	<0.000500	0.00622	<0.0000100	<0.0000100	0.000831	<0.00300	0.00315	<0.0000100	<0.000500	<0.0100
	% < LRL	58%	0%	83%	58%	0%	67%	50%	58%	100%	75%
	% > BCWQG[a]	-	100%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	0%	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	0%	0%	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	100%	-	-	-	-	-	-	-	-
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000515	<0.0000100	<0.0000100	0.000568	<0.00300	<0.00300	<0.0000100	<0.000500	<0.0100
	Annual Maximum	0.00398	0.00184	0.0000295	0.0000538	0.00119	0.0155	0.0244	0.0000535	0.000692	0.0200
	Annual Mean	0.00113	0.000928	0.0000139	0.0000172	0.000761	0.00516	0.00978	0.0000156	0.000546	0.0113
	Annual Median	<0.000500	0.000910	<0.0000100	<0.0000100	0.000685	<0.00300	0.00585	<0.0000100	<0.000500	<0.0100
	% < LRL	67%	0%	67%	67%	0%	67%	33%	67%	67%	67%
	% > BCWQG[a]	-	0%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	11%	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.12: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2014

Station	Summary Statistic	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_GRASMERE	n	8	8	8	8	8	8	8	8	8	8
	Annual Minimum	<0.000500	0.000720	<0.0000100	<0.0000100	0.000573	<0.00300	<0.00300	<0.0000100	0.000250	<0.0100
	Annual Maximum	0.00306	0.00204	0.0000194	0.0000342	0.00108	0.0119	0.0223	<0.0000100	0.000526	0.0167
	Annual Mean	0.000976	0.00106	0.0000112	0.0000145	0.000705	0.00448	0.00966	<0.0000100	0.000284	0.0110
	Annual Median	<0.000500	0.000948	<0.0000100	<0.0000100	0.000669	<0.00300	0.00582	<0.0000100	0.000250	<0.0100
	% < LRL	63%	0%	88%	63%	0%	63%	25%	100%	75%	75%
	% > BCWQG[a]	-	13%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	13%	-	-	-	-	-	-	-	-
RG_USGOLD	n	1	1	1	1	1	1	1	1	1	1
	Annual Minimum	<0.000500	0.00131	<0.0000100	<0.0000100	0.000717	<0.00300	<0.00300	<0.0000100	0.000250	<0.0100
	Annual Maximum	<0.000500	0.00131	<0.0000100	<0.0000100	0.000717	<0.00300	<0.00300	<0.0000100	0.000250	<0.0100
	Annual Mean	<0.000500	0.00131	<0.0000100	<0.0000100	0.000717	<0.00300	<0.00300	<0.0000100	0.000250	<0.0100
	Annual Median	<0.000500	0.00131	<0.0000100	<0.0000100	0.000717	<0.00300	<0.00300	<0.0000100	0.000250	<0.0100
	% < LRL	100%	0%	100%	100%	0%	100%	100%	100%	0%	100%
	% > BCWQG[a]	-	0%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000170	<0.0000100	<0.0000100	0.000551	<0.00300	<0.00300	<0.0000100	0.000250	<0.0100
	Annual Maximum	0.00159	0.00166	0.0000488	0.0000232	0.000955	0.00701	0.0231	0.0000103	0.000520	0.0208
	Annual Mean	0.000698	0.00104	0.0000162	0.0000122	0.000710	0.00359	0.00964	0.0000101	0.000308	0.0113
	Annual Median	<0.000500	0.00105	<0.0000100	0.0000100	0.000675	<0.00300	0.00650	<0.0000100	0.000250	<0.0100
	% < LRL	56%	0%	56%	44%	0%	56%	22%	78%	67%	78%
	% > BCWQG[a]	-	0%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	11%	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.12: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2014

Station	Summary Statistic	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
INTERNATIONAL BOUNDARY	n	0	7	0	0	0	2	0	6	0	0
	Annual Minimum	-	0.000900	-	-	-	<0.00500	-	<0.0000300	-	-
	Annual Maximum	-	0.00139	-	-	-	0.00750	-	0.00262	-	-
	Annual Mean	-	0.00110	-	-	-	0.00625	-	0.000463	-	-
	Annual Median	-	0.00114	-	-	-	0.00625	-	<0.0000300	-	-
	% < LRL	-	0%	-	-	-	50%	-	67%	-	-
	% > BCWQG[a]	-	0%	-	-	-	0%	-	17%	-	-
	% > BCWQG[b]	-	-	-	-	-	0%	-	17%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-
TENMILE CREEK	n	0	6	0	0	0	2	0	5	0	0
	Annual Minimum	-	0.000750	-	-	-	<0.00500	-	<0.0000300	-	-
	Annual Maximum	-	0.00122	-	-	-	<0.00500	-	0.00155	-	-
	Annual Mean	-	0.000996	-	-	-	<0.00500	-	0.000335	-	-
	Annual Median	-	0.000980	-	-	-	<0.00500	-	<0.0000300	-	-
	% < LRL	-	17%	-	-	-	100%	-	60%	-	-
	% > BCWQG[a]	-	0%	-	-	-	0%	-	20%	-	-
	% > BCWQG[b]	-	-	-	-	-	0%	-	20%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-
FOREBAY	n	0	7	0	0	0	2	0	6	0	0
	Annual Minimum	-	0.000680	-	-	-	<0.00500	-	<0.0000300	-	-
	Annual Maximum	-	0.00150	-	-	-	<0.00500	-	0.000635	-	-
	Annual Mean	-	0.000976	-	-	-	<0.00500	-	0.000131	-	-
	Annual Median	-	0.000970	-	-	-	<0.00500	-	<0.0000300	-	-
	% < LRL	-	14%	-	-	-	100%	-	83%	-	-
	% > BCWQG[a]	-	0%	-	-	-	0%	-	17%	-	-
	% > BCWQG[b]	-	-	-	-	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.13: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2015

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
RG_WARDB	n	12	3	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	93.4	0.100	112	8.19	7.90	9.21	0.880	77.8	0.0292	<0.00100	<0.00500	<0.0500	<0.00100	0.00570	18.5
	Annual Maximum	178	1.20	319	8.45	8.60	13.6	2.07	137	0.157	0.00390	0.0488	0.160	0.00940	0.0351	47.5
	Annual Mean	140	0.833	180	8.28	8.34	11.3	1.55	109	0.102	0.00130	0.0118	0.117	0.00246	0.0159	35.0
	Annual Median	146	1.20	173	8.26	8.36	11.2	1.53	112	0.0998	0.00100	0.00657	0.124	0.00155	0.0150	37.3
	% < LRL	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	25%	8%	25%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USELK	n	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
	Annual Minimum	148	-	171	8.29	8.04	10.1	1.80	119	0.310	0.00114	0.00623	0.141	0.00126	0.00884	31.6
	Annual Maximum	148	-	171	8.29	8.04	10.1	1.80	119	0.310	0.00114	0.00623	0.141	0.00126	0.00884	31.6
	Annual Mean	148	-	171	8.29	8.04	10.1	1.80	119	0.310	0.00114	0.00623	0.141	0.00126	0.00884	31.6
	Annual Median	148	-	171	8.29	8.04	10.1	1.80	119	0.310	0.00114	0.00623	0.141	0.00126	0.00884	31.6
	% < LRL	0%	-	0%	0%	0%	0.0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_KERRRD	n	8	2	8	8	8	8	8	8	8	8	8	8	8	8	8
	Annual Minimum	97.7	13.2	116	8.18	8.02	8.17	0.957	82.3	0.0626	<0.00100	0.00533	0.0813	<0.00100	0.00243	16.1
	Annual Maximum	148	15.6	167	8.39	8.55	51.9	1.75	115	0.163	0.00177	0.00823	0.132	0.00127	0.0111	31.6
	Annual Mean	126	14.4	149	8.28	8.35	14.9	1.21	102	0.109	0.00129	0.00627	0.101	0.00105	0.00606	25.4
	Annual Median	131	14.4	155	8.28	8.42	10.4	1.08	107	0.0992	0.00128	0.00608	0.0977	<0.00100	0.00418	27.4
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	13%	0%	0%	63%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.13: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2015

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
RG_ELKMOUTH	n	12	3	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	150	0	168	8.31	8.20	9.51	0.820	114	0.770	0.00130	<0.00500	<0.0500	<0.00100	<0.00200	29.0
	Annual Maximum	244	1.10	313	8.46	8.61	220	1.97	169	1.72	0.00350	0.0157	0.189	0.00233	0.0394	62.6
	Annual Mean	202	0.367	233	8.39	8.46	29.4	1.30	146	1.22	0.00191	0.00707	0.127	0.00126	0.0109	47.3
	Annual Median	209	0	238	8.39	8.51	12.0	1.14	151	1.20	0.00162	0.00603	0.121	0.00101	0.00520	49.0
	% < LRL	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	8%	50%	17%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_DSELK	n	9	2	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	110	14.1	123	8.13	8.24	8.13	1.02	88.5	0.127	0.00117	0.00513	0.0855	<0.00100	0.00267	17.6
	Annual Maximum	153	16.9	227	8.41	8.59	63.5	1.73	118	0.417	0.00230	0.0106	0.150	0.0370	0.00881	33.5
	Annual Mean	134	15.5	158	8.29	8.40	15.6	1.24	105	0.269	0.00178	0.00675	0.119	0.00501	0.00550	26.7
	Annual Median	132	15.5	150	8.31	8.42	10.3	1.15	106	0.265	0.00197	0.00607	0.114	<0.00100	0.00512	24.9
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	0%	0%	67%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_GRASMERE	n	9	2	9	9	8	8	9	9	9	9	9	9	9	9	9
	Annual Minimum	110	14.3	124	8.16	8.21	7.76	0.973	92.6	0.173	0.00128	0.00533	0.0757	<0.00100	0.00220	17.4
	Annual Maximum	149	16.8	220	8.41	8.47	58.4	1.70	122	0.411	0.00260	0.00852	0.165	0.00110	0.0108	33.0
	Annual Mean	133	15.5	161	8.31	8.35	15.4	1.21	109	0.260	0.00190	0.00675	0.116	0.00102	0.00564	26.6
	Annual Median	132	15.5	159	8.31	8.40	9.88	1.08	111	0.246	0.00202	0.00652	0.104	<0.00100	0.00427	27.0
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	0%	0%	78%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	13%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	13%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USGOLD	n	9	2	9	9	8	8	9	9	9	9	9	9	9	9	9
	Annual Minimum	110	14.3	124	8.07	8.19	7.82	0.977	92.2	0.179	0.00131	0.00527	0.0792	<0.00100	<0.00200	17.4
	Annual Maximum	147	17.2	209	8.41	8.49	59.4	1.65	123	0.385	0.00353	0.0112	0.288	0.00108	0.0148	31.8
	Annual Mean	133	15.8	159	8.30	8.34	15.5	1.29	108	0.258	0.00213	0.00761	0.132	0.00101	0.00601	26.2
	Annual Median	132	15.8	156	8.31	8.34	9.52	1.13	111	0.251	0.00207	0.00722	0.114	<0.00100	0.00435	27.2
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	0%	0%	78%	11%	0%
	% > BCWQG[a]	-	-	-	0%	0%	13%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	13%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.13: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2015

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
RG_BORDER	n	9	2	9	9	8	8	9	9	9	9	9	9	9	9	9
	Annual Minimum	123	13.8	140	8.06	7.97	7.04	0.967	99.4	0.189	0.00122	0.00590	0.101	<0.00100	0.00277	20.6
	Annual Maximum	145	15.8	192	8.38	8.40	64.2	2.02	118	0.344	0.00290	0.0120	0.192	0.00102	0.00715	30.0
	Annual Mean	134	14.8	159	8.27	8.14	16.0	1.41	109	0.257	0.00217	0.00727	0.129	0.00100	0.00487	25.5
	Annual Median	137	14.8	158	8.30	8.13	9.52	1.47	110	0.241	0.00250	0.00630	0.121	<0.00100	0.00541	26.4
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	0%	0%	89%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	25%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	25%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INTERNATIONAL BOUNDARY	n	7	3	0	3	0	3	0	7	0	0	7	0	7	7	7
	Annual Minimum	122	6.23	-	7.96	-	7.10	-	101	-	-	<0.00500	-	<0.00100	0.00350	21.5
	Annual Maximum	140	21.4	-	8.67	-	11.3	-	114	-	-	0.0120	-	0.00150	0.0102	28.5
	Annual Mean	129	13.4	-	8.20	-	9.12	-	110	-	-	0.00721	-	0.00107	0.00525	24.8
	Annual Median	126	12.5	-	7.98	-	8.96	-	112	-	-	0.00650	-	<0.00100	0.00450	24.5
	% < LRL	0%	0%	-	0%	-	0.0%	-	0%	-	-	29%	-	86%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	33%	-	0%	-	-	0%	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	33%	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TENMILE CREEK	n	7	3	0	3	0	3	0	7	0	0	7	0	7	7	7
	Annual Minimum	118	4.67	-	7.62	-	8.86	-	101	-	-	<0.00500	-	<0.00100	0.00300	22.5
	Annual Maximum	137	21.2	-	8.71	-	11.6	-	112	-	-	0.0155	-	<0.00100	0.00650	28.3
	Annual Mean	126	14.3	-	8.22	-	9.82	-	107	-	-	0.00700	-	<0.00100	0.00393	24.4
	Annual Median	126	16.8	-	8.34	-	8.98	-	109	-	-	<0.00500	-	<0.00100	0.00350	23.6
	% < LRL	0%	0%	-	0%	-	0.0%	-	0%	-	-	71%	-	100%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	0%	-	0%	-	-	0%	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FOREBAY	n	7	3	0	3	0	3	0	7	0	0	7	0	7	7	7
	Annual Minimum	121	4.57	-	7.77	-	8.48	-	102	-	-	<0.00500	-	<0.00100	0.00250	22.0
	Annual Maximum	134	21.0	-	8.73	-	11.2	-	120	-	-	0.00700	-	0.00250	0.0115	26.1
	Annual Mean	127	12.0	-	8.13	-	9.74	-	109	-	-	0.00543	-	0.00136	0.00536	23.3
	Annual Median	124	10.5	-	7.90	-	9.49	-	108	-	-	<0.00500	-	<0.00100	0.00400	22.9
	% < LRL	0%	0%	-	0%	-	0.0%	-	0%	-	-	71%	-	57%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	0%	-	0%	-	-	0%	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.13: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2015

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	2.08	0.0646	<0.000100	0.000440	0.0315	<0.000100	<0.0100	0.000160	<0.000100	0.0830	0.000101	0.00160	0.00682	<0.00000500	0.000555
	Annual Maximum	7.00	0.110	0.000104	0.00120	0.0471	0.000114	0.0230	0.00204	0.00119	2.61	0.00244	0.00376	0.0708	<0.0000100	0.000975
	Annual Mean	4.83	0.0891	0.000100	0.000588	0.0392	0.000101	0.0135	0.000497	0.000263	0.474	0.000480	0.00215	0.0188	<0.00000500	0.000781
	Annual Median	4.75	0.0905	<0.000100	0.000530	0.0378	<0.000100	<0.0100	0.000220	<0.000100	0.135	0.000167	0.00200	0.0129	<0.00000500	0.000794
	% < LRL	0%	0%	92%	0%	0%	92%	58%	0%	58%	0%	8%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	8%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	17%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USELK	n	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Annual Minimum	3.66	0.0930	0.000102	0.000429	0.0467	<0.000100	<0.0100	0.000319	0.000122	0.182	0.000244	0.00247	0.0100	<0.00000500	0.000653
	Annual Maximum	3.66	0.0930	0.000102	0.000429	0.0467	<0.000100	<0.0100	0.000319	0.000122	0.182	0.000244	0.00247	0.0100	<0.00000500	0.000653
	Annual Mean	3.66	0.0930	0.000102	0.000429	0.0467	<0.000100	<0.0100	0.000319	0.000122	0.182	0.000244	0.00247	0.0100	<0.00000500	0.000653
	Annual Median	3.66	0.0930	0.000102	0.000429	0.0467	<0.000100	<0.0100	0.000319	0.000122	0.182	0.000244	0.00247	0.0100	<0.00000500	0.000653
	% < LRL	0%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_KERRRD	n	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	Annual Minimum	1.85	0.0617	<0.000100	0.000372	0.0262	<0.000100	<0.0100	0.000137	<0.000100	0.0397	<0.0000500	0.00127	0.00281	<0.00000500	0.000524
	Annual Maximum	3.88	0.0937	0.000101	0.000480	0.0460	<0.000100	0.0107	0.000447	0.000200	0.348	0.000398	0.00213	0.0136	<0.00000500	0.000759
	Annual Mean	2.89	0.0813	0.000100	0.000431	0.0356	<0.000100	0.0101	0.000244	0.000126	0.139	0.000176	0.00165	0.00648	<0.00000500	0.000657
	Annual Median	3.02	0.0843	<0.000100	0.000430	0.0358	<0.000100	<0.0100	0.000191	0.000101	0.0649	0.0000943	0.00163	0.00342	<0.00000500	0.000660
	% < LRL	0%	0%	88%	0%	0%	100%	75%	0%	50%	0%	13%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.13: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2015

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	1.50	0.124	<0.000100	0.000230	0.0693	<0.000100	<0.0100	0.000220	<0.000100	0.0120	<0.0000500	0.00422	0.00100	<0.00000500	0.000744
	Annual Maximum	3.30	0.184	0.000125	0.000436	0.101	<0.000100	0.0102	0.000848	0.000240	0.521	0.000405	0.00810	0.0213	<0.0000100	0.00122
	Annual Mean	2.31	0.159	0.000106	0.000301	0.0860	<0.000100	0.0100	0.000418	0.000132	0.155	0.000133	0.00604	0.00656	0.00000501	0.00102
	Annual Median	2.21	0.166	0.000103	0.000275	0.0888	<0.000100	<0.0100	0.000323	<0.000100	0.0610	0.0000594	0.00577	0.00362	<0.00000500	0.00102
	% < LRL	0%	0%	25%	0%	0%	100%	92%	0%	67%	0%	33%	0%	0%	92%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.80	0.0735	<0.000100	0.000358	0.0329	<0.000100	<0.0100	0.000127	<0.000100	0.0213	<0.0000500	0.00165	0.00240	<0.00000500	0.000563
	Annual Maximum	3.46	0.101	<0.000100	0.000447	0.0532	<0.000100	0.0123	0.000340	0.000151	0.222	0.000243	0.00283	0.0103	<0.00000500	0.000823
	Annual Mean	2.59	0.0924	<0.000100	0.000394	0.0444	<0.000100	0.0103	0.000230	0.000111	0.0917	0.000119	0.00223	0.00540	<0.00000500	0.000711
	Annual Median	2.53	0.0950	<0.000100	0.000397	0.0443	<0.000100	<0.0100	0.000218	<0.000100	0.0597	0.0000757	0.00222	0.00378	<0.00000500	0.000703
	% < LRL	0%	0%	100%	0%	0%	100%	89%	0%	56%	0%	22%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_GRASMERE	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.76	0.0744	<0.000100	0.000335	0.0348	<0.000100	<0.0100	0.000133	<0.000100	0.0240	<0.0000500	0.00177	0.00225	<0.00000500	0.000574
	Annual Maximum	3.39	0.100	0.000107	0.000473	0.0555	<0.000100	0.0110	0.000418	0.000165	0.254	0.000257	0.00298	0.0109	<0.00000500	0.000814
	Annual Mean	2.52	0.0916	0.000101	0.000403	0.0452	<0.000100	0.0101	0.000227	0.000114	0.0958	0.000119	0.00225	0.00525	<0.00000500	0.000712
	Annual Median	2.50	0.0913	<0.000100	0.000402	0.0456	<0.000100	<0.0100	0.000187	<0.000100	0.0467	0.0000693	0.00227	0.00335	<0.00000500	0.000719
	% < LRL	0%	0%	78%	0%	0%	100%	78%	0%	67%	0%	11%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USGOLD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.77	0.0739	<0.000100	0.000350	0.0346	<0.000100	<0.0100	0.000133	<0.000100	0.0263	<0.0000500	0.00169	0.00217	<0.00000500	0.000569
	Annual Maximum	3.38	0.0987	0.000110	0.000440	0.0547	<0.000100	0.0107	0.000423	0.000153	0.216	0.000235	0.00279	0.00838	<0.00000500	0.000791
	Annual Mean	2.52	0.0904	0.000101	0.000392	0.0441	<0.000100	0.0101	0.000234	0.000108	0.0834	0.000113	0.00218	0.00477	<0.00000500	0.000699
	Annual Median	2.53	0.0940	<0.000100	0.000389	0.0458	<0.000100	<0.0100	0.000207	<0.000100	0.0480	0.0000763	0.00217	0.00313	<0.00000500	0.000701
	% < LRL	0%	0%	89%	0%	0%	100%	78%	0%	67%	0%	11%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.13: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2015

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.98	0.0802	<0.000100	0.000355	0.0401	<0.000100	<0.0100	0.000140	<0.000100	0.0327	<0.0000500	0.00177	0.00232	<0.00000500	0.000620
	Annual Maximum	3.32	0.0967	0.000115	0.000430	0.0553	<0.000100	0.0100	0.000291	0.000129	0.164	0.000185	0.00257	0.00727	<0.00000500	0.000751
	Annual Mean	2.50	0.0892	0.000102	0.000384	0.0456	<0.000100	0.0100	0.000190	0.000103	0.0627	0.000101	0.00210	0.00405	<0.00000500	0.000688
	Annual Median	2.37	0.0907	<0.000100	0.000389	0.0454	<0.000100	<0.0100	0.000170	<0.000100	0.0410	0.000102	0.00200	0.00345	<0.00000500	0.000692
	% < LRL	0%	0%	56%	0%	0%	100%	89%	0%	78%	0%	11%	0%	0%	100%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	100%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INTERNATIONAL BOUNDARY	n	7	0	0	3	0	0	0	3	0	0	7	0	0	7	0
	Annual Minimum	1.30	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Maximum	2.60	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.00100	-	-	<0.0000500	-
	Annual Mean	1.78	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Median	1.79	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	% < LRL	0%	-	-	100%	-	-	-	100%	-	-	100%	-	-	100%	-
	% > BCWQG[a]	0%	-	-	-	-	-	-	100%	-	-	0%	-	-	100%	-
	% > BCWQG[b]	0%	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TENMILE CREEK	n	7	0	0	3	0	0	0	3	0	0	7	0	0	7	0
	Annual Minimum	1.50	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Maximum	2.15	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.00100	-	-	<0.0000500	-
	Annual Mean	1.80	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Median	1.74	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	% < LRL	0%	-	-	100%	-	-	-	100%	-	-	100%	-	-	100%	-
	% > BCWQG[a]	0%	-	-	-	-	-	-	100%	-	-	0%	-	-	100%	-
	% > BCWQG[b]	0%	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FOREBAY	n	7	0	0	3	0	0	0	3	0	0	7	0	0	7	0
	Annual Minimum	1.32	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Maximum	2.05	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.00100	-	-	<0.0000500	-
	Annual Mean	1.71	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	Annual Median	1.79	-	-	<0.00200	-	-	-	<0.00200	-	-	<0.000300	-	-	<0.0000500	-
	% < LRL	0%	-	-	100%	-	-	-	100%	-	-	100%	-	-	100%	-
	% > BCWQG[a]	0%	-	-	-	-	-	-	100%	-	-	0%	-	-	100%	-
	% > BCWQG[b]	0%	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.13: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2015

Station	Summary Statistic	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	<0.000500	0.0000812	<0.0000100	<0.0000100	0.000675	<0.00300	0.00380	<0.0000050(	<0.000500	<0.0100
	Annual Maximum	0.00241	0.000138	0.0000160	0.0000224	0.00108	0.0105	0.0560	<0.0000100	0.000505	0.0600
	Annual Mean	0.000744	0.000102	0.0000107	0.0000113	0.000849	0.00401	0.0132	0.00000579	0.000500	0.0204
	Annual Median	<0.000500	0.000102	<0.0000100	<0.0000100	0.000822	<0.00300	0.00608	0.00000500	<0.000500	0.0124
	% < LRL	75%	8%	83%	75%	0%	58%	0%	58%	92%	25%
	% > BCWQG[a]	-	0%	0%	0%	0%	8%	8%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	0%	-	-	-	-	-	-	-	-
RG_USELK	n	1	1	1	1	1	1	1	1	1	1
	Annual Minimum	0.000502	0.00127	<0.0000100	<0.0000100	0.000713	0.00356	0.00552	0.0000320	0.000528	0.0104
	Annual Maximum	0.000502	0.00127	<0.0000100	<0.0000100	0.000713	0.00356	0.00552	0.0000320	0.000528	0.0104
	Annual Mean	0.000502	0.00127	<0.0000100	<0.0000100	0.000713	0.00356	0.00552	0.0000320	0.000528	0.0104
	Annual Median	0.000502	0.00127	<0.0000100	<0.0000100	0.000713	0.00356	0.00552	0.0000320	0.000528	0.0104
	% < LRL	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%
	% > BCWQG[a]	-	0%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-
RG_KERRRD	n	8	8	8	8	8	8	8	8	8	8
	Annual Minimum	<0.000500	0.000109	<0.0000100	<0.0000100	0.000566	<0.00300	0.00310	<0.0000050(	0.000250	<0.0100
	Annual Maximum	0.000567	0.000801	0.0000110	0.0000107	0.000812	0.00313	0.0138	<0.0000050(	0.000280	0.0147
	Annual Mean	0.000516	0.000413	0.0000102	0.0000101	0.000677	0.00304	0.00760	<0.0000050(	0.000254	0.0109
	Annual Median	<0.000500	0.000402	<0.0000100	<0.0000100	0.000683	<0.00300	0.00732	<0.0000050(	0.000250	0.0100
	% < LRL	75%	0%	75%	75%	0%	63%	13%	100%	0%	50%
	% > BCWQG[a]	-	0%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.13: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2015

Station	Summary Statistic	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	<0.000500	0.00408	<0.0000100	<0.0000100	0.000613	<0.00300	<0.00300	0.00000735	<0.000500	<0.0100
	Annual Maximum	0.00116	0.00763	0.0000370	0.0000194	0.00105	0.00466	0.0364	0.0000113	0.000632	0.0233
	Annual Mean	0.000682	0.00578	0.0000128	0.0000118	0.000856	0.00333	0.00793	0.00000891	0.000513	0.0113
	Annual Median	0.000609	0.00586	<0.0000100	<0.0000100	0.000874	<0.00300	0.00547	0.00000810	<0.000500	<0.0100
	% < LRL	42%	0%	67%	67%	0%	67%	42%	17%	83%	67%
	% > BCWQG[a]	-	100%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	0%	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	0%	0%	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	100%	-	-	-	-	-	-	-	-
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000754	<0.0000100	<0.0000100	0.000590	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.00197	0.00202	0.0000105	0.0000101	0.000757	0.00307	0.0365	0.00000648	0.000349	0.0307
	Annual Mean	0.000668	0.00125	0.0000101	0.0000100	0.000685	0.00301	0.00986	0.00000526	0.000272	0.0124
	Annual Median	0.000500	0.00129	<0.0000100	<0.0000100	0.000690	<0.00300	0.00473	<0.00000500	0.000250	<0.0100
	% < LRL	44%	0%	89%	78%	0%	78%	22%	78%	0%	78%
	% > BCWQG[a]	-	11%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	11%	-	-	-	-	-	-	-	-
RG_GRASMERE	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000866	<0.0000100	<0.0000100	0.000603	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.000590	0.00194	0.0000103	0.0000127	0.000770	0.00340	0.0119	0.00000663	0.000250	0.0132
	Annual Mean	0.000520	0.00129	0.0000100	0.0000105	0.000694	0.00305	0.00602	0.00000522	0.000250	0.0104
	Annual Median	<0.000500	0.00125	<0.0000100	<0.0000100	0.000684	<0.00300	0.00487	<0.00000500	0.000250	<0.0100
	% < LRL	67%	0%	67%	67%	0%	78%	33%	78%	0%	89%
	% > BCWQG[a]	-	0%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	22%	-	-	-	-	-	-	-	-
RG_USGOLD	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000839	<0.0000100	<0.0000100	0.000602	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.000596	0.00178	0.0000124	0.0000106	0.000800	0.00813	0.0117	0.00000585	0.000473	0.0105
	Annual Mean	0.000511	0.00123	0.0000103	0.0000101	0.000692	0.00362	0.00493	0.00000524	0.000279	0.0101
	Annual Median	<0.000500	0.00121	<0.0000100	<0.0000100	0.000692	<0.00300	0.00435	<0.00000500	0.000250	<0.0100
	% < LRL	89%	0%	78%	89%	0%	67%	22%	67%	0%	78%
	% > BCWQG[a]	-	0%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	11%	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.13: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2015

Station	Summary Statistic	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000954	<0.0000100	<0.0000100	0.000636	<0.00300	<0.00300	<0.0000050(	0.000250	<0.0100
	Annual Maximum	0.000571	0.00151	0.0000505	0.0000102	0.000781	0.00467	0.00950	0.00000775	0.000950	<0.0100
	Annual Mean	0.000516	0.00119	0.0000145	0.0000100	0.000685	0.00338	0.00495	0.00000556	0.000347	<0.0100
	Annual Median	<0.000500	0.00113	<0.0000100	<0.0000100	0.000666	0.00310	0.00356	0.00000526	0.000250	<0.0100
	% < LRL	67%	0%	89%	89%	0%	33%	22%	44%	0%	100%
	% > BCWQG[a]	-	0%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	11%	-	-	-	-	-	-	-	-
INTERNATIONAL BOUNDARY	n	0	7	0	0	0	3	0	7	0	0
	Annual Minimum	-	0.00103	-	-	-	<0.00500	-	<0.0000300	-	-
	Annual Maximum	-	0.00124	-	-	-	0.00550	-	<0.0000300	-	-
	Annual Mean	-	0.00113	-	-	-	0.00517	-	<0.0000300	-	-
	Annual Median	-	0.00111	-	-	-	<0.00500	-	<0.0000300	-	-
	% < LRL	-	0%	-	-	-	67%	-	100%	-	-
	% > BCWQG[a]	-	0%	-	-	-	0%	-	0%	-	-
	% > BCWQG[b]	-	-	-	-	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-
TENMILE CREEK	n	0	7	0	0	0	3	0	7	0	0
	Annual Minimum	-	0.000860	-	-	-	<0.00500	-	<0.0000300	-	-
	Annual Maximum	-	0.00120	-	-	-	0.00950	-	<0.0000300	-	-
	Annual Mean	-	0.00108	-	-	-	0.00650	-	<0.0000300	-	-
	Annual Median	-	0.00112	-	-	-	<0.00500	-	<0.0000300	-	-
	% < LRL	-	0%	-	-	-	67%	-	100%	-	-
	% > BCWQG[a]	-	0%	-	-	-	0%	-	0%	-	-
	% > BCWQG[b]	-	-	-	-	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-
FOREBAY	n	0	7	0	0	0	3	0	7	0	0
	Annual Minimum	-	0.000940	-	-	-	<0.00500	-	<0.0000300	-	-
	Annual Maximum	-	0.00128	-	-	-	0.00650	-	0.0000400	-	-
	Annual Mean	-	0.00108	-	-	-	0.00567	-	0.0000314	-	-
	Annual Median	-	0.00108	-	-	-	0.00550	-	<0.0000300	-	-
	% < LRL	-	0%	-	-	-	33%	-	86%	-	-
	% > BCWQG[a]	-	0%	-	-	-	0%	-	0%	-	-
	% > BCWQG[b]	-	-	-	-	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.14: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2016

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)	Dissolved Chloride (mg/L)
RG_WARDB	n	12	10	12	12	11	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	93.8	0.900	117	8.11	6.28	8.79	0.740	76.6	0.0515	<0.00100	<0.00500	0.0660	<0.00100	0.00700	18.0	1.79
	Annual Maximum	182	16.9	225	8.32	8.54	15.4	2.39	130	0.158	0.00152	0.0477	0.146	0.00710	0.0231	49.8	7.10
	Annual Mean	128	9.69	162	8.22	8.08	11.1	1.65	102	0.106	0.00112	0.0113	0.100	0.00218	0.0153	31.3	3.99
	Annual Median	115	9.31	160	8.21	8.28	10.9	1.68	94.1	0.102	0.00100	0.00515	0.0984	0.00110	0.0172	27.9	3.35
	% < LRL	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%	0%	33%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	9%	0%	-	0%	0%	0%	17%	17%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	17%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_KERRRD	n	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	Annual Minimum	103	1.80	121	8.11	8.07	8.57	0.877	86.3	0.0725	<0.00100	<0.00500	0.0625	<0.00100	0.00323	16.8	1.46
	Annual Maximum	140	19.0	176	8.35	8.40	13.6	1.49	116	0.136	0.00170	0.00870	0.100	0.00150	0.0110	35.3	3.52
	Annual Mean	122	11.9	148	8.26	8.28	10.2	1.09	102	0.0982	0.00117	0.00626	0.0832	0.00108	0.00550	24.4	2.42
	Annual Median	126	12.4	152	8.27	8.35	9.64	0.999	105	0.0868	0.00104	0.00590	0.0829	<0.00100	0.00460	25.0	2.39
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	38%	38%	0%	75%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	145	0.100	162	8.21	6.22	10.1	0.750	115	0.595	<0.00100	<0.00500	0.0690	<0.00100	0.00300	26.9	0.886
	Annual Maximum	236	14.6	262	8.41	8.58	15.8	2.64	159	1.54	0.00352	0.0237	0.254	0.00328	0.0479	62.8	3.60
	Annual Mean	190	8.12	218	8.34	8.22	11.8	1.46	139	1.06	0.00168	0.00687	0.121	0.00136	0.0117	43.5	1.91
	Annual Median	194	7.08	231	8.34	8.40	11.4	1.14	141	1.06	0.00135	<0.00500	0.116	<0.00100	0.00740	44.6	1.55
	% < LRL	0%	0%	0%	0%	0%	0%	0%	0%	0%	17%	67%	0%	58%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	8%	0%	-	0%	0%	0%	17%	17%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	17%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	110	3.13	123	7.88	8.08	8.56	0.967	91.2	0.167	<0.00100	<0.00500	0.0725	<0.00100	0.00293	17.7	1.34
	Annual Maximum	142	19.3	185	8.37	8.51	12.9	2.58	114	0.352	0.00233	0.0125	0.168	0.00198	0.0312	28.2	2.48
	Annual Mean	127	12.4	154	8.23	8.33	10.1	1.35	105	0.221	0.00151	0.00687	0.104	0.00117	0.00853	24.3	2.00
	Annual Median	129	13.7	155	8.24	8.35	9.99	1.13	111	0.189	0.00137	0.00570	0.100	<0.00100	0.00502	26.6	2.24
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	11%	22%	0%	56%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.14: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2016

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)	Dissolved Chloride (mg/L)
RG_GRASMERE	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	113	5.50	127	7.89	8.10	8.52	0.927	93.0	0.160	0.00103	<0.00500	0.0799	<0.00100	0.00327	18.1	1.35
	Annual Maximum	147	18.4	175	8.40	8.43	10.7	2.51	116	0.369	0.00300	0.0116	0.162	0.00198	0.0226	28.4	2.71
	Annual Mean	126	13.2	152	8.25	8.31	9.52	1.32	105	0.221	0.00192	0.00683	0.105	0.00115	0.00769	24.0	1.96
	Annual Median	126	14.1	149	8.27	8.36	9.32	1.20	110	0.198	0.00183	0.00630	0.0973	<0.00100	0.00540	25.6	2.17
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	11%	0%	56%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USGOLD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	114	5.73	128	7.97	8.06	8.54	0.847	93.8	0.161	0.00103	<0.00500	0.0758	<0.00100	0.00230	18.6	1.36
	Annual Maximum	152	18.1	172	8.37	8.45	10.6	2.25	118	0.385	0.00290	0.00938	0.156	0.00169	0.0186	29.7	2.81
	Annual Mean	127	12.9	152	8.26	8.26	9.40	1.29	105	0.223	0.00182	0.00633	0.103	0.00111	0.00623	24.0	1.97
	Annual Median	126	13.8	154	8.28	8.27	9.25	1.21	109	0.200	0.00180	0.00580	0.101	<0.00100	0.00422	25.5	2.17
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	22%	0%	56%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	118	6.90	135	8.09	7.22	8.40	1.03	94.9	0.184	0.00121	<0.00500	0.0683	<0.00100	0.00250	19.6	1.59
	Annual Maximum	155	17.8	190	8.32	8.33	10.4	1.88	121	0.322	0.00347	0.00959	0.146	0.00117	0.0133	30.1	3.16
	Annual Mean	126	12.5	154	8.24	7.87	9.34	1.33	106	0.227	0.00209	0.00654	0.0917	0.00103	0.00597	23.9	2.06
	Annual Median	122	13.4	153	8.26	7.90	9.21	1.28	108	0.213	0.00170	0.00633	0.0863	<0.00100	0.00515	24.7	2.07
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	22%	0%	67%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INTERNATIONAL BOUNDARY	n	7	7	0	7	0	7	0	7	0	0	7	0	7	7	5	6
	Annual Minimum	111	7.90	-	7.76	-	6.60	-	101	-	-	0.00500	-	<0.00100	0.00200	21.1	1.94
	Annual Maximum	149	15.0	-	8.11	-	12.0	-	134	-	-	0.0110	-	0.00200	0.0150	27.5	2.73
	Annual Mean	123	12.1	-	7.89	-	9.11	-	113	-	-	0.00679	-	0.00121	0.00736	23.0	2.14
	Annual Median	117	12.4	-	7.84	-	9.31	-	111	-	-	0.00600	-	<0.00100	0.00700	21.8	2.03
	% < LRL	0%	0%	-	0%	-	0.0%	-	0%	-	-	0%	-	57%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	29%	-	0%	-	-	0%	-	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	29%	-	-	-	-	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.14: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2016

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)	Dissolved Chloride (mg/L)
TENMILE CREEK	n	7	7	0	7	0	7	0	7	0	0	7	0	7	7	5	6
	Annual Minimum	118	5.36	-	7.83	-	8.54	-	112	-	-	<0.00500	-	<0.00100	<0.00200	23.4	2.47
	Annual Maximum	134	13.2	-	8.09	-	12.8	-	120	-	-	0.00950	-	0.00150	0.0135	24.8	3.05
	Annual Mean	127	10.2	-	7.95	-	10.1	-	115	-	-	0.00607	-	0.00114	0.00407	24.0	2.64
	Annual Median	128	10.6	-	7.92	-	9.59	-	115	-	-	<0.00500	-	<0.00100	0.00200	23.8	2.55
	% < LRL	0%	0%	-	0%	-	0.0%	-	0%	-	-	71%	-	71%	14%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	0%	-	0%	-	-	0%	-	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FOREBAY	n	7	7	0	7	0	7	0	7	0	0	7	0	7	7	5	6
	Annual Minimum	119	5.34	-	7.79	-	8.56	-	111	-	-	<0.00500	-	<0.00100	<0.00200	23.3	2.42
	Annual Maximum	131	20.6	-	8.50	-	12.4	-	119	-	-	0.00950	-	0.00250	0.0125	28.0	3.20
	Annual Mean	126	11.5	-	8.02	-	10.0	-	115	-	-	0.00621	-	0.00143	0.00414	25.3	2.71
	Annual Median	126	11.0	-	7.92	-	9.82	-	115	-	-	<0.00500	-	<0.00100	0.00300	24.0	2.62
	% < LRL	0%	0%	-	0%	-	0.0%	-	0%	-	-	57%	-	57%	29%	0%	0%
	% > BCWQG[a]	-	-	-	0%	-	0%	-	0%	-	-	0%	-	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.
[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.14: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2016

Station	Summary Statistic	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	0.0620	<0.000100	0.000408	0.0282	<0.0000200	<0.0100	0.000120	<0.000100	0.0560	0.0000620	<0.00100	0.00647	0.000000520	0.000573	<0.000500	0.0000660	<0.0000100
	Annual Maximum	0.106	0.000120	0.000690	0.0460	<0.000100	0.0200	0.00106	0.000790	1.28	0.00160	0.00270	0.0299	0.00000620	0.000976	0.00158	0.000164	<0.0000100
	Annual Mean	0.0836	0.000102	0.000512	0.0362	0.0000256	0.0118	0.000398	0.000218	0.349	0.000393	0.00189	0.0141	0.00000160	0.000752	0.000659	0.000102	<0.0000100
	Annual Median	0.0805	<0.000100	0.000500	0.0360	<0.0000200	<0.0100	0.000246	0.000117	0.160	0.000213	0.00189	0.0118	0.00000111	0.000742	<0.000500	0.0000933	<0.0000100
	% < LRL	0%	83%	0%	0%	75%	58%	0%	42%	0%	0%	8%	0%	25%	0%	67%	0%	100%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	8%	0%	-	0%	-	0%	50%	0%	-	0%	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	8%	0%	-	0%	-	0%	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
RG_KERRRD	n	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	Annual Minimum	0.0613	<0.000100	0.000327	0.0266	<0.0000200	<0.0100	0.000117	<0.000100	0.0297	0.0000503	0.00103	0.00205	<0.000000500	0.000509	<0.000500	0.0000879	<0.0000100
	Annual Maximum	0.0927	<0.000100	0.000450	0.0410	0.0000221	<0.0100	0.000441	0.000181	0.358	0.000338	0.00193	0.0109	0.00000468	0.000728	0.000567	0.000628	0.0000107
	Annual Mean	0.0780	<0.000100	0.000386	0.0348	0.0000203	<0.0100	0.000178	0.000112	0.102	0.000121	0.00145	0.00511	0.00000110	0.000642	0.000508	0.000319	0.0000101
	Annual Median	0.0795	<0.000100	0.000391	0.0365	<0.0000200	<0.0100	0.000125	<0.000100	0.0555	0.0000808	0.00144	0.00382	0.000000560	0.000662	<0.000500	0.000345	<0.0000100
	% < LRL	0%	100%	0%	0%	88%	100%	0%	75%	0%	0%	0%	0%	25%	0%	88%	0%	88%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	13%	0%	-	0%	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	0.114	<0.000100	0.000210	0.0653	<0.0000200	<0.0100	0.000240	<0.000100	0.0110	<0.0000500	0.00380	0.000920	<0.000000500	0.000735	<0.000500	0.00265	<0.0000100
	Annual Maximum	0.180	0.000190	0.000498	0.104	<0.000100	0.0130	0.00114	0.000312	0.742	0.000480	0.00790	0.0234	<0.00000500	0.00116	0.00153	0.00682	0.0000168
	Annual Mean	0.150	0.000110	0.000281	0.0842	0.0000214	0.0102	0.000419	0.000125	0.159	0.000123	0.00571	0.00618	0.00000110	0.000931	0.000667	0.00466	0.0000106
	Annual Median	0.152	0.000100	0.000256	0.0817	<0.0000200	<0.0100	0.000310	<0.000100	0.0714	0.0000671	0.00562	0.00398	0.000000913	0.000944	0.000528	0.00475	<0.0000100
	% < LRL	0%	42%	0%	0%	83%	92%	8%	67%	0%	42%	0%	0%	58%	0%	42%	0%	92%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	8%	0%	-	0%	-	0%	67%	0%	-	100%	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	92%	-
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	0.0730	<0.000100	0.000338	0.0336	<0.0000200	<0.0100	0.000107	<0.000100	0.0163	<0.0000500	0.00145	0.00152	<0.000000500	0.000577	<0.000500	0.000646	<0.0000100
	Annual Maximum	0.0933	0.000118	0.000682	0.0524	<0.000100	0.0107	0.000930	0.000412	0.857	0.000789	0.00295	0.0333	<0.00000500	0.000731	0.00113	0.00119	<0.0000100
	Annual Mean	0.0855	0.000103	0.000404	0.0430	0.0000204	0.0101	0.000258	0.000144	0.168	0.000177	0.00205	0.00769	0.00000102	0.000660	0.000584	0.000959	<0.0000100
	Annual Median	0.0873	<0.000100	0.000363	0.0449	<0.0000200	<0.0100	0.000133	<0.000100	0.0380	0.0000660	0.00207	0.00429	<0.000000500	0.000682	<0.000500	0.00101	<0.0000100
	% < LRL	0%	78%	0%	0%	89%	89%	0%	67%	0%	33%	0%	0%	67%	0%	67%	0%	100%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	22%	0%	-	0%	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.14: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2016

Station	Summary Statistic	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)
RG_GRASMERE	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	0.0736	<0.000100	0.000337	0.0344	<0.0000200	<0.0100	0.000100	<0.000100	0.0147	<0.0000500	0.00148	0.00165	<0.000000500	0.000563	<0.000500	0.000696	<0.0000100
	Annual Maximum	0.0923	0.000153	0.000616	0.0539	<0.000100	0.0105	0.000722	0.000327	0.650	0.000625	0.00306	0.0284	0.00000539	0.000935	0.00103	0.00131	<0.0000100
	Annual Mean	0.0853	0.000107	0.000395	0.0431	0.0000205	0.0101	0.000236	0.000134	0.141	0.000157	0.00204	0.00718	0.00000110	0.000680	0.000572	0.000972	<0.0000100
	Annual Median	0.0870	<0.000100	0.000367	0.0449	<0.0000200	<0.0100	0.000140	<0.000100	0.0373	0.0000643	0.00196	0.00427	<0.000000500	0.000675	<0.000500	0.000970	<0.0000100
	% < LRL	0%	56%	0%	0%	78%	89%	0%	67%	0%	11%	0%	0%	67%	0%	67%	0%	100%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	22%	0%	-	0%	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
RG_USGOLD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	0.0735	<0.000100	0.000332	0.0355	<0.0000200	<0.0100	<0.000100	<0.000100	<0.0100	<0.0000500	0.00152	0.00136	<0.000000500	0.000558	<0.000500	0.000777	<0.0000100
	Annual Maximum	0.0931	0.000103	0.000593	0.0558	<0.000100	0.0106	0.000613	0.000277	0.523	0.000527	0.00305	0.0251	0.00000751	0.000737	0.000857	0.00139	0.0000102
	Annual Mean	0.0852	0.000101	0.000391	0.0432	0.0000202	0.0101	0.000212	0.000128	0.119	0.000141	0.00202	0.00615	0.00000133	0.000658	0.000574	0.000977	0.0000100
	Annual Median	0.0877	<0.000100	0.000367	0.0447	<0.0000200	<0.0100	0.000140	<0.000100	0.0293	0.0000617	0.00185	0.00318	<0.000000500	0.000683	<0.000500	0.000947	<0.0000100
	% < LRL	0%	78%	0%	0%	89%	89%	11%	67%	11%	33%	0%	0%	67%	0%	67%	0%	89%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	22%	0%	-	0%	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	0.0753	<0.000100	0.000350	0.0377	<0.0000200	<0.0100	0.000110	<0.000100	0.0197	<0.0000500	0.00152	0.00164	<0.000000500	0.000566	<0.000500	0.000786	<0.0000100
	Annual Maximum	0.0932	0.000104	0.000531	0.0570	<0.000100	0.0101	0.000495	0.000199	0.321	0.000361	0.00287	0.0179	<0.00000500	0.000772	0.000668	0.00121	0.0000102
	Annual Mean	0.0843	0.000101	0.000407	0.0439	0.0000201	0.0100	0.000203	0.000118	0.100	0.000119	0.00191	0.00602	0.000000774	0.000656	0.000542	0.000915	0.0000100
	Annual Median	0.0833	<0.000100	0.000405	0.0424	<0.0000200	<0.0100	0.000133	<0.000100	0.0458	0.0000643	0.00177	0.00383	0.000000510	0.000667	0.000512	0.000870	<0.0000100
	% < LRL	0%	78%	0%	0%	78%	89%	0%	67%	0%	22%	0%	0%	56%	0%	44%	0%	89%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	22%	0%	-	0%	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
INTERNATIONAL BOUNDARY	n	0	0	2	0	0	0	3	0	0	6	0	0	6	0	0	7	0
	Annual Minimum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000447	-	-	0.00000370	-	-	0.000812	-
	Annual Maximum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.000184	-	-	0.0000200	-	-	0.00138	-
	Annual Mean	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000843	-	-	0.00000913	-	-	0.00101	-
	Annual Median	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000702	-	-	0.00000370	-	-	0.000931	-
	% < LRL	-	-	100%	-	-	-	100%	-	-	0%	-	-	50%	-	-	0%	-
	% > BCWQG[a]	-	-	-	-	-	-	100%	-	-	0%	-	-	100%	-	-	0%	-
	% > BCWQG[b]	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.14: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2016

Station	Summary Statistic	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)
TENMILE CREEK	n	0	0	2	0	0	0	3	0	0	6	0	0	6	0	0	7	0
	Annual Minimum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000110	-	-	<0.0000200	-	-	0.000871	-
	Annual Maximum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000345	-	-	0.0000200	-	-	0.00124	-
	Annual Mean	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000235	-	-	0.0000200	-	-	0.00105	-
	Annual Median	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000250	-	-	<0.0000200	-	-	0.00106	-
	% < LRL	-	-	100%	-	-	-	100%	-	-	0%	-	-	83%	-	-	0%	-
	% > BCWQG[a]	-	-	-	-	-	-	100%	-	-	0%	-	-	100%	-	-	0%	-
	% > BCWQG[b]	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
FOREBAY	n	0	0	2	0	0	0	3	0	0	6	0	0	6	0	0	7	0
	Annual Minimum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000105	-	-	<0.0000200	-	-	0.000882	-
	Annual Maximum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000350	-	-	0.0000200	-	-	0.00124	-
	Annual Mean	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000190	-	-	0.0000200	-	-	0.00106	-
	Annual Median	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000168	-	-	<0.0000200	-	-	0.00106	-
	% < LRL	-	-	100%	-	-	-	100%	-	-	0%	-	-	83%	-	-	0%	-
	% > BCWQG[a]	-	-	-	-	-	-	100%	-	-	0%	-	-	100%	-	-	0%	-
	% > BCWQG[b]	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.
[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.14: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2016

Station	Summary Statistic	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12
	Annual Minimum	<0.0000100	0.000630	<0.00300	<0.00300	<0.00000500	<0.000500	<0.0100
	Annual Maximum	0.0000160	0.000988	0.00580	0.0126	0.00000640	0.000790	0.0188
	Annual Mean	0.0000107	0.000788	0.00349	0.00776	0.00000521	0.000538	0.0124
	Annual Median	<0.0000100	0.000752	<0.00300	0.00775	<0.00000500	<0.000500	0.0100
	% < LRL	67%	0%	58%	8%	83%	75%	42%
	% > BCWQG[a]	0%	0%	0%	0%	0%	8%	-
	% > BCWQG[b]	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-
RG_KERRRD	n	8	8	8	8	8	8	8
	Annual Minimum	<0.0000100	0.000542	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	<0.0000100	0.000707	0.00304	0.0120	0.00000598	0.000250	0.0100
	Annual Mean	<0.0000100	0.000641	0.00300	0.00562	0.00000512	0.000250	0.0100
	Annual Median	<0.0000100	0.000657	<0.00300	0.00442	<0.00000500	0.000250	<0.0100
	% < LRL	100%	0%	88%	25%	88%	0%	88%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	12	12	12	12	12	12
	Annual Minimum	<0.0000100	0.000528	<0.00300	<0.00300	<0.00000500	<0.000500	<0.0100
	Annual Maximum	0.0000222	0.00106	0.00548	0.0167	0.0000128	0.000980	0.0122
	Annual Mean	0.0000123	0.000781	0.00323	0.00558	0.00000874	0.000568	0.0102
	Annual Median	<0.0000100	0.000817	<0.00300	0.00351	0.00000828	<0.000500	<0.0100
	% < LRL	67%	0%	75%	42%	8%	75%	83%
	% > BCWQG[a]	0%	0%	0%	0%	0%	8%	-
	% > BCWQG[b]	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-
RG_DSELK	n	9	9	9	9	9	9	9
	Annual Minimum	<0.0000100	0.000572	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.0000130	0.000696	0.00392	0.0152	0.00000636	<0.000500	0.0183
	Annual Mean	0.0000104	0.000641	0.00311	0.00621	0.00000532	0.000250	0.0115
	Annual Median	<0.0000100	0.000661	<0.00300	0.00385	<0.00000500	0.000250	<0.0100
	% < LRL	78%	0%	67%	22%	67%	11%	67%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.14: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2016

Station	Summary Statistic	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_GRASMERE	n	9	9	9	9	9	9	9
	Annual Minimum	<0.0000100	0.000570	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.0000128	0.000722	0.00380	0.0106	0.00000518	0.000331	0.0122
	Annual Mean	0.0000104	0.000638	0.00310	0.00531	0.00000503	0.000259	0.0102
	Annual Median	<0.0000100	0.000657	<0.00300	0.00388	<0.00000500	0.000250	<0.0100
	% < LRL	67%	0%	78%	22%	78%	0%	89%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-
RG_USGOLD	n	9	9	9	9	9	9	9
	Annual Minimum	<0.0000100	0.000565	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.0000123	0.000739	0.00338	0.0156	0.00000527	0.000250	0.0155
	Annual Mean	0.0000103	0.000641	0.00305	0.00561	0.00000504	0.000250	0.0108
	Annual Median	<0.0000100	0.000655	<0.00300	0.00367	<0.00000500	0.000250	<0.0100
	% < LRL	78%	0%	78%	44%	78%	0%	67%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-
RG_BORDER	n	9	9	9	9	9	9	9
	Annual Minimum	<0.0000100	0.000589	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.0000120	0.000790	0.00353	0.00963	0.00000558	0.000460	0.0110
	Annual Mean	0.0000103	0.000647	0.00312	0.00510	0.00000507	0.000288	0.0102
	Annual Median	<0.0000100	0.000655	0.00301	0.00473	<0.00000500	0.000250	<0.0100
	% < LRL	78%	0%	33%	11%	78%	0%	78%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-
INTERNATIONAL BOUNDARY	n	0	0	3	0	6	0	0
	Annual Minimum	-	-	<0.00500	-	0.00000700	-	-
	Annual Maximum	-	-	<0.00500	-	<0.000100	-	-
	Annual Mean	-	-	<0.00500	-	0.00000900	-	-
	Annual Median	-	-	<0.00500	-	0.0000100	-	-
	% < LRL	-	-	100%	-	50%	-	-
	% > BCWQG[a]	-	-	0%	-	0%	-	-
	% > BCWQG[b]	-	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.14: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2016

Station	Summary Statistic	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
TENMILE CREEK	n	0	0	3	0	6	0	0
	Annual Minimum	-	-	<0.00500	-	0.0000100	-	-
	Annual Maximum	-	-	0.0225	-	<0.000100	-	-
	Annual Mean	-	-	0.0108	-	0.0000100	-	-
	Annual Median	-	-	<0.00500	-	0.0000100	-	-
	% < LRL	-	-	67%	-	50%	-	-
	% > BCWQG[a]	-	-	0%	-	0%	-	-
	% > BCWQG[b]	-	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-
FOREBAY	n	0	0	3	0	6	0	0
	Annual Minimum	-	-	<0.00500	-	0.00000700	-	-
	Annual Maximum	-	-	<0.00500	-	<0.000100	-	-
	Annual Mean	-	-	<0.00500	-	0.00000850	-	-
	Annual Median	-	-	<0.00500	-	0.00000850	-	-
	% < LRL	-	-	100%	-	67%	-	-
	% > BCWQG[a]	-	-	0%	-	0%	-	-
	% > BCWQG[b]	-	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.15: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2017

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
RG_WARDB	n	10	11	11	11	11	11	11	11	11	11	11	11	11	11	11
	Annual Minimum	90.4	0	118	8.15	8.11	8.57	0.830	83.4	0.0407	<0.00100	<0.00500	<0.0500	<0.00100	0.00580	15.3
	Annual Maximum	173	17.8	216	8.34	8.64	13.6	2.32	145	0.181	0.00120	0.0238	0.198	0.00470	0.0701	47.6
	Annual Mean	134	7.59	173	8.25	8.25	11.3	1.55	117	0.0942	0.00103	0.00862	0.0984	0.00228	0.0218	34.4
	Annual Median	141	8.30	191	8.25	8.21	11.2	1.54	121	0.0829	<0.00100	0.00530	0.0820	0.00230	0.0123	38.2
	% < LRL	0%	0%	0%	0%	0%	0%	0%	0%	0%	64%	27%	27%	18%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_KERRRD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	101	2.73	119	8.17	7.64	7.68	1.12	85.2	0.0573	<0.00100	<0.00500	0.0537	<0.00100	0.00240	13.9
	Annual Maximum	145	19.3	187	8.34	8.53	23.4	2.10	129	0.156	0.00183	0.0107	0.217	0.00285	0.0796	38.1
	Annual Mean	127	11.7	159	8.26	8.24	11.3	1.43	113	0.0897	0.00124	0.00683	0.106	0.00127	0.0208	25.6
	Annual Median	136	12.4	167	8.24	8.29	10.2	1.20	117	0.0825	0.00103	0.00598	0.0710	<0.00100	0.00532	28.2
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	44%	11%	0%	67%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	11%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	11%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	135	-0.100	166	8.25	7.87	9.29	<0.500	117	0.752	0.00100	<0.00500	0.0770	<0.00100	<0.00200	24.5
	Annual Maximum	249	15.5	265	8.39	8.60	14.2	2.21	172	1.59	0.00630	0.0222	0.266	0.00512	0.0925	60.6
	Annual Mean	192	5.70	225	8.34	8.31	12.1	1.12	147	1.09	0.00243	0.00768	0.137	0.00191	0.0195	46.1
	Annual Median	191	5.80	236	8.35	8.32	12.5	1.05	148	1.11	0.00150	<0.00500	0.124	0.00102	0.00560	48.7
	% < LRL	0%	0%	0%	0%	0%	0%	8%	0%	0%	0%	58%	0%	50%	8%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	106	3.90	126	8.20	7.62	8.02	0.980	91.7	0.168	0.00102	<0.00500	0.0820	<0.00100	0.00213	15.2
	Annual Maximum	161	18.4	207	8.33	8.55	11.6	2.10	147	0.367	0.00243	0.0774	0.804	0.00266	0.392	36.3
	Annual Mean	132	11.6	160	8.26	8.25	9.75	1.36	117	0.251	0.00143	0.0153	0.214	0.00145	0.0673	25.9
	Annual Median	136	12.5	159	8.26	8.23	9.83	1.23	120	0.233	0.00125	0.00600	0.112	<0.00100	0.00527	28.4
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	11%	0%	56%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.15: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2017

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
RG_GRASMERE	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	105	4.83	124	8.20	7.89	8.21	1.05	90.2	0.145	<0.00100	<0.00500	0.0610	<0.00100	0.00215	14.8
	Annual Maximum	166	19.0	216	8.34	8.55	11.2	2.15	148	0.331	0.00243	0.0872	0.276	0.00250	0.169	34.3
	Annual Mean	130	12.3	158	8.27	8.31	9.61	1.42	116	0.209	0.00151	0.0170	0.128	0.00135	0.0313	24.7
	Annual Median	130	13.4	156	8.27	8.35	9.75	1.28	118	0.200	0.00125	0.00597	0.0963	<0.00100	0.00570	26.0
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	11%	11%	0%	67%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USGOLD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	106	5.43	127	8.20	7.92	7.47	1.07	90.1	0.139	<0.00100	<0.00500	0.0550	<0.00100	0.00250	14.9
	Annual Maximum	162	17.4	218	8.34	8.49	11.0	1.99	144	0.342	0.00253	0.0739	0.274	0.00307	0.0848	33.7
	Annual Mean	130	12.1	159	8.27	8.30	9.39	1.40	114	0.238	0.00154	0.0162	0.118	0.00147	0.0230	24.1
	Annual Median	129	13.6	161	8.27	8.31	9.36	1.32	115	0.232	0.00143	0.00653	0.0787	<0.00100	0.00383	25.3
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	11%	11%	0%	67%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	11%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	11%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	104	6.27	129	8.19	7.65	8.22	1.07	91.3	0.137	0.00109	<0.00500	0.0653	<0.00100	0.00200	14.2
	Annual Maximum	158	16.1	201	8.30	8.49	10.7	2.30	139	0.322	0.00190	0.0779	0.198	0.00289	0.0481	31.7
	Annual Mean	125	11.7	152	8.25	8.08	9.38	1.47	110	0.222	0.00147	0.0157	0.109	0.00129	0.0151	22.1
	Annual Median	124	13.2	154	8.26	8.12	9.19	1.46	113	0.214	0.00132	0.00565	0.0970	<0.00100	0.00407	21.5
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	44%	0%	67%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INTERNATIONAL BOUNDARY	n	4	5	0	5	0	5	0	0	0	0	0	0	0	0	4
	Annual Minimum	109	8.64	-	7.90	-	7.86	-	-	-	-	-	-	-	-	14.8
	Annual Maximum	160	15.3	-	8.38	-	10.7	-	-	-	-	-	-	-	-	28.7
	Annual Mean	125	11.5	-	8.17	-	9.29	-	-	-	-	-	-	-	-	20.2
	Annual Median	115	12.1	-	8.18	-	9.56	-	-	-	-	-	-	-	-	18.7
	% < LRL	0%	0%	-	0%	-	0.0%	-	-	-	-	-	-	-	-	0%
	% > BCWQG[a]	-	-	-	0%	-	20%	-	-	-	-	-	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	20%	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.15: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2017

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
TENMILE CREEK	n	4	4	0	4	0	4	0	0	0	0	0	0	0	0	4
	Annual Minimum	117	4.31	-	7.97	-	8.64	-	-	-	-	-	-	-	-	21.0
	Annual Maximum	141	12.7	-	8.20	-	11.6	-	-	-	-	-	-	-	-	27.6
	Annual Mean	126	9.08	-	8.10	-	9.55	-	-	-	-	-	-	-	-	23.3
	Annual Median	123	9.66	-	8.12	-	8.97	-	-	-	-	-	-	-	-	22.4
	% < LRL	0%	0%	-	0%	-	0.0%	-	-	-	-	-	-	-	-	0%
	% > BCWQG[a]	-	-	-	0%	-	0%	-	-	-	-	-	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FOREBAY	n	4	5	0	5	0	5	0	0	0	0	0	0	0	0	4
	Annual Minimum	118	5.13	-	7.92	-	8.84	-	-	-	-	-	-	-	-	21.2
	Annual Maximum	132	12.8	-	8.23	-	12.0	-	-	-	-	-	-	-	-	26.5
	Annual Mean	124	9.21	-	8.16	-	10.2	-	-	-	-	-	-	-	-	23.0
	Annual Median	123	9.49	-	8.22	-	9.81	-	-	-	-	-	-	-	-	22.2
	% < LRL	0%	0%	-	0%	-	0.0%	-	-	-	-	-	-	-	-	0%
	% > BCWQG[a]	-	-	-	0%	-	0%	-	-	-	-	-	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.15: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2017

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Selenium (mg/L)
RG_WARDB	n	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
	Annual Minimum	1.44	0.0580	<0.000100	0.000460	0.0324	<0.0000200	<0.0100	0.000160	<0.000100	0.0480	0.0000510	0.00110	0.00602	0.000000520	0.000552	<0.000500	0.0000730
	Annual Maximum	7.00	0.105	0.000102	0.00111	0.0521	0.0000675	0.0170	0.00330	0.00124	2.71	0.00234	0.00405	0.0716	0.00000315	0.00106	0.00261	0.000224
	Annual Mean	4.83	0.0856	0.000100	0.000647	0.0435	0.0000287	0.0120	0.000769	0.000333	0.597	0.000602	0.00227	0.0242	0.00000126	0.000776	0.000868	0.000114
	Annual Median	5.92	0.0920	<0.000100	0.000580	0.0455	<0.0000200	0.0120	0.000320	<0.000100	0.0950	0.000158	0.00210	0.0152	0.000000770	0.000786	<0.000500	0.000107
	% < LRL	0%	0%	73%	0%	0%	73%	36%	0%	55%	0%	0%	0%	0%	0%	0%	73%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	18%	0%	-	0%	-	0%	36%	0%	-	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	18%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
RG_KERRRD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.18	0.0562	<0.000100	0.000332	0.0290	<0.0000200	<0.0100	<0.000100	<0.000100	0.0203	0.0000597	0.00103	0.00213	<0.000000500	0.000528	<0.000500	0.000103
	Annual Maximum	4.54	0.0943	0.000107	0.00121	0.0516	0.0000718	0.0113	0.00216	0.00122	2.63	0.00240	0.00440	0.0688	0.00000436	0.000829	0.00262	0.000728
	Annual Mean	2.89	0.0782	0.000101	0.000600	0.0410	0.0000315	0.0101	0.000680	0.000368	0.674	0.000629	0.00219	0.0201	0.00000138	0.000665	0.00120	0.000325
	Annual Median	3.32	0.0820	<0.000100	0.000440	0.0418	<0.0000200	<0.0100	0.000163	<0.000100	0.0880	0.000118	0.00190	0.00501	<0.000000500	0.000680	<0.000500	0.000263
	% < LRL	0%	0%	67%	0%	0%	67%	78%	22%	67%	0%	0%	0%	0%	56%	0%	56%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	33%	0%	-	0%	-	0%	33%	0%	-	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	33%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	0.712	0.113	<0.000100	0.000230	0.0670	<0.0000200	<0.0100	0.000210	<0.000100	0.0130	<0.0000500	0.00485	0.00110	<0.000000500	0.000762	<0.000500	0.00340
	Annual Maximum	3.32	0.177	0.000146	0.000802	0.108	0.0000720	0.0105	0.00163	0.000618	1.37	0.00102	0.00740	0.0565	0.00000553	0.00120	0.00246	0.00713
	Annual Mean	2.05	0.151	0.000108	0.000358	0.0901	0.0000280	0.0100	0.000539	0.000181	0.275	0.000219	0.00611	0.0117	0.00000129	0.000971	0.000834	0.00530
	Annual Median	2.34	0.154	0.000102	0.000295	0.0912	<0.0000200	<0.0100	0.000330	<0.000100	0.0470	0.0000555	0.00611	0.00301	<0.000000500	0.000968	0.000500	0.00563
	% < LRL	0%	0%	50%	0%	0%	67%	92%	0%	67%	0%	42%	0%	0%	58%	0%	50%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	17%	0%	-	0%	-	0%	33%	0%	-	100%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	17%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	0%
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	0%
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	0.978	0.0688	<0.000100	0.000325	0.0377	<0.0000200	<0.0100	<0.000100	<0.000100	0.0183	<0.0000500	0.00163	0.00239	<0.000000500	0.000533	<0.000500	0.000776
	Annual Maximum	3.61	0.104	0.000263	0.00284	0.120	0.000209	0.0112	0.00496	0.00287	5.99	0.00591	0.00945	0.246	0.0000121	0.000891	0.00661	0.00195
	Annual Mean	2.28	0.0880	0.000134	0.000852	0.0571	0.0000568	0.0101	0.00114	0.000651	1.25	0.00123	0.00343	0.0466	0.00000252	0.000719	0.00170	0.00125
	Annual Median	2.56	0.0937	<0.000100	0.000427	0.0473	<0.0000200	<0.0100	0.000170	0.000102	0.0512	0.000118	0.00240	0.00410	0.000000555	0.000729	<0.000500	0.00113
	% < LRL	0%	0%	67%	0%	0%	56%	89%	22%	44%	0%	11%	0%	0%	44%	0%	67%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	22%	0%	22%	0%	-	0%	-	0%	33%	0%	-	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	22%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22%

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.15: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2017

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Selenium (mg/L)
RG_GRASMERE	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	0.958	0.0682	<0.000100	0.000330	0.0340	<0.0000200	<0.0100	<0.000100	<0.000100	0.0133	<0.0000500	0.00135	0.00168	<0.000000500	0.000521	<0.000500	0.000698
	Annual Maximum	3.66	0.103	0.000178	0.00201	0.0866	0.000138	0.0100	0.00390	0.00216	4.80	0.00453	0.00666	0.144	0.00000595	0.000946	0.00503	0.00158
	Annual Mean	2.23	0.0853	0.000112	0.000711	0.0518	0.0000388	0.0100	0.000773	0.000443	0.845	0.000784	0.00282	0.0321	0.00000148	0.000703	0.00124	0.00101
	Annual Median	2.36	0.0903	<0.000100	0.000420	0.0458	<0.0000200	<0.0100	0.000137	<0.000100	0.0430	0.0000527	0.00210	0.00340	0.000000560	0.000678	<0.000500	0.00102
	% < LRL	0%	0%	78%	0%	0%	67%	56%	22%	56%	0%	33%	0%	0%	44%	0%	67%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	11%	0%	22%	0%	-	0%	-	0%	33%	0%	-	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	22%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11%
RG_USGOLD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	0.959	0.0694	<0.000100	0.000347	0.0354	<0.0000200	<0.0100	<0.000100	<0.000100	0.0203	0.0000517	0.00140	0.00218	<0.000000500	0.000528	<0.000500	0.000782
	Annual Maximum	3.61	0.100	0.000134	0.00160	0.0851	0.0000732	<0.0100	0.00195	0.00102	2.21	0.00192	0.00539	0.106	0.00000362	0.000840	0.00254	0.00159
	Annual Mean	2.10	0.0861	0.000108	0.000626	0.0512	0.0000332	<0.0100	0.000594	0.000333	0.583	0.000536	0.00259	0.0241	0.00000132	0.000691	0.000998	0.00114
	Annual Median	2.10	0.0883	<0.000100	0.000407	0.0458	<0.0000200	<0.0100	0.000150	<0.000100	0.0310	0.0000683	0.00213	0.00428	0.000000580	0.000697	<0.000500	0.00116
	% < LRL	0%	0%	67%	0%	0%	67%	100%	22%	56%	0%	0%	0%	0%	44%	0%	67%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	22%	0%	-	0%	-	0%	33%	0%	-	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	22%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11%
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	0.953	0.0676	<0.000100	0.000313	0.0344	<0.0000200	<0.0100	0.000103	<0.000100	0.0167	<0.0000500	0.00145	0.00178	<0.000000500	0.000514	<0.000500	0.000752
	Annual Maximum	3.36	0.0984	0.000138	0.00138	0.0844	0.0000523	<0.0100	0.00152	0.000698	1.48	0.00129	0.00441	0.0740	0.00000286	0.000842	0.00173	0.00152
	Annual Mean	1.92	0.0818	0.000107	0.000586	0.0491	0.0000283	<0.0100	0.000502	0.000249	0.403	0.000383	0.00224	0.0177	0.00000107	0.000657	0.000793	0.00104
	Annual Median	1.77	0.0847	<0.000100	0.000410	0.0468	<0.0000200	<0.0100	0.000183	<0.000100	0.0327	0.0000623	0.00193	0.00245	0.000000553	0.000614	<0.000500	0.000970
	% < LRL	0%	0%	67%	0%	0%	67%	100%	11%	56%	0%	11%	0%	0%	44%	0%	56%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	22%	0%	-	0%	-	0%	33%	0%	-	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	22%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11%
INTERNATIONAL BOUNDARY	n	4	0	0	0	0	0	0	0	0	0	4	0	0	7	0	0	1
	Annual Minimum	1.12	-	-	-	-	-	-	-	-	-	0.0000450	-	-	0.000000330	-	-	0.000874
	Annual Maximum	3.02	-	-	-	-	-	-	-	-	-	0.00155	-	-	0.00000284	-	-	0.000874
	Annual Mean	1.85	-	-	-	-	-	-	-	-	-	0.000541	-	-	0.00000128	-	-	0.000874
	Annual Median	1.62	-	-	-	-	-	-	-	-	-	0.000285	-	-	0.000000760	-	-	0.000874
	% < LRL	0%	-	-	-	-	-	-	-	-	-	0%	-	-	0%	-	-	0%
	% > BCWQG[a]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	29%	-	-	0%
	% > BCWQG[b]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.15: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2017

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Selenium (mg/L)
TENMILE CREEK	n	4	0	0	0	0	0	0	0	0	0	4	0	0	7	0	0	1
	Annual Minimum	2.17	-	-	-	-	-	-	-	-	-	0.0000355	-	-	0.000000375	-	-	0.000966
	Annual Maximum	3.33	-	-	-	-	-	-	-	-	-	0.000181	-	-	0.00000151	-	-	0.000966
	Annual Mean	2.56	-	-	-	-	-	-	-	-	-	0.0000834	-	-	0.000000776	-	-	0.000966
	Annual Median	2.38	-	-	-	-	-	-	-	-	-	0.0000585	-	-	0.000000775	-	-	0.000966
	% < LRL	0%	-	-	-	-	-	-	-	-	-	0%	-	-	0%	-	-	0%
	% > BCWQG[a]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	14%	-	-	0%
	% > BCWQG[b]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
FOREBAY	n	4	0	0	0	0	0	0	0	0	0	4	0	0	7	0	0	1
	Annual Minimum	2.22	-	-	-	-	-	-	-	-	-	0.0000220	-	-	0.000000420	-	-	0.000961
	Annual Maximum	2.92	-	-	-	-	-	-	-	-	-	0.0000730	-	-	0.00000142	-	-	0.000961
	Annual Mean	2.49	-	-	-	-	-	-	-	-	-	0.0000379	-	-	0.000000771	-	-	0.000961
	Annual Median	2.40	-	-	-	-	-	-	-	-	-	0.0000283	-	-	0.000000735	-	-	0.000961
	% < LRL	0%	-	-	-	-	-	-	-	-	-	0%	-	-	0%	-	-	0%
	% > BCWQG[a]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	14%	-	-	0%
	% > BCWQG[b]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.15: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2017

Station	Summary Statistic	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_WARDB	n	11	11	11	11	11	11	11	11
	Annual Minimum	<0.0000100	<0.0000100	0.000628	<0.00300	0.00340	<0.00000500	<0.000500	<0.0100
	Annual Maximum	0.0000116	0.0000174	0.00106	0.00948	0.0229	0.00000602	<0.000500	0.0268
	Annual Mean	0.0000101	0.0000113	0.000875	0.00437	0.00886	0.00000518	<0.000500	0.0126
	Annual Median	<0.0000100	<0.0000100	0.000884	0.00302	0.00610	<0.00000500	<0.000500	<0.0100
	% < LRL	91%	82%	0%	45%	0%	82%	100%	64%
	% > BCWQG[a]	0%	0%	0%	9%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-
RG_KERRRD	n	9	9	9	9	9	9	9	9
	Annual Minimum	<0.0000100	<0.0000100	0.000567	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.0000136	0.0000208	0.000848	0.0112	0.0250	0.00000583	0.000544	0.0274
	Annual Mean	0.0000107	0.0000119	0.000725	0.00527	0.00931	0.00000509	0.000283	0.0133
	Annual Median	<0.0000100	<0.0000100	0.000760	0.00333	0.00640	<0.00000500	0.000250	<0.0100
	% < LRL	78%	67%	0%	33%	11%	89%	11%	67%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12
	Annual Minimum	<0.0000100	<0.0000100	0.000653	<0.00300	<0.00300	<0.00000500	<0.000500	<0.0100
	Annual Maximum	0.0000202	0.0000356	0.00116	0.00970	0.0201	0.0000110	0.000508	0.0177
	Annual Mean	0.0000113	0.0000143	0.000858	0.00403	0.00567	0.00000718	0.000501	0.0111
	Annual Median	<0.0000100	<0.0000100	0.000837	<0.00300	<0.00300	0.00000685	<0.000500	<0.0100
	% < LRL	75%	67%	0%	58%	58%	25%	92%	83%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	8%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-
RG_DSELK	n	9	9	9	9	9	9	9	9
	Annual Minimum	<0.0000100	<0.0000100	0.000591	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.0000390	0.000176	0.00116	0.0320	0.0179	0.00000598	0.000655	0.0338
	Annual Mean	0.0000163	0.0000397	0.000760	0.00824	0.00851	0.00000513	0.000295	0.0138
	Annual Median	<0.0000100	<0.0000100	0.000751	0.00307	0.00635	<0.00000500	0.000250	<0.0100
	% < LRL	56%	56%	0%	44%	11%	67%	22%	67%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.15: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2017

Station	Summary Statistic	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_GRASMERE	n	9	9	9	9	9	9	9	9
	Annual Minimum	<0.0000100	<0.0000100	0.000582	<0.00300	0.00307	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.0000316	0.0000518	0.00101	0.0223	0.0182	0.00000582	<0.000500	0.0269
	Annual Mean	0.0000126	0.0000164	0.000740	0.00653	0.00847	0.00000509	0.000250	0.0132
	Annual Median	<0.0000100	<0.0000100	0.000737	0.00350	0.00665	<0.00000500	0.000250	<0.0100
	% < LRL	67%	67%	0%	33%	0%	78%	11%	67%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
RG_USGOLD	n	9	9	9	9	9	9	9	9
	Annual Minimum	<0.0000100	<0.0000100	0.000583	<0.00300	0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.0000159	0.0000267	0.00101	0.0104	0.0181	0.00000537	0.000250	0.0258
	Annual Mean	0.0000117	0.0000145	0.000727	0.00487	0.00833	0.00000508	0.000250	0.0126
	Annual Median	<0.0000100	<0.0000100	0.000717	<0.00300	0.00633	<0.00000500	0.000250	<0.0100
	% < LRL	67%	56%	0%	56%	0%	78%	0%	67%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
RG_BORDER	n	9	9	9	9	9	9	9	9
	Annual Minimum	<0.0000100	<0.0000100	0.000600	<0.00300	0.00313	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.0000282	0.0000203	0.000985	0.00736	0.0417	0.0000101	0.000365	0.0968
	Annual Mean	0.0000122	0.0000125	0.000700	0.00390	0.0148	0.00000558	0.000274	0.0224
	Annual Median	<0.0000100	<0.0000100	0.000700	<0.00300	0.00837	<0.00000500	0.000250	<0.0100
	% < LRL	78%	67%	0%	67%	0%	78%	0%	67%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
INTERNATIONAL BOUNDARY	n	0	0	0	0	0	7	0	0
	Annual Minimum	-	-	-	-	-	0.00000300	-	-
	Annual Maximum	-	-	-	-	-	0.0000375	-	-
	Annual Mean	-	-	-	-	-	0.0000107	-	-
	Annual Median	-	-	-	-	-	0.00000700	-	-
	% < LRL	-	-	-	-	-	29%	-	-
	% > BCWQG[a]	-	-	-	-	-	0%	-	-
	% > BCWQG[b]	-	-	-	-	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.15: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2017

Station	Summary Statistic	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
TENMILE CREEK	n	0	0	0	0	0	7	0	0
	Annual Minimum	-	-	-	-	-	0.00000500	-	-
	Annual Maximum	-	-	-	-	-	<0.0000350	-	-
	Annual Mean	-	-	-	-	-	0.00000700	-	-
	Annual Median	-	-	-	-	-	0.00000600	-	-
	% < LRL	-	-	-	-	-	29%	-	-
	% > BCWQG[a]	-	-	-	-	-	0%	-	-
	% > BCWQG[b]	-	-	-	-	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
FOREBAY	n	0	0	0	0	0	7	0	0
	Annual Minimum	-	-	-	-	-	0.00000400	-	-
	Annual Maximum	-	-	-	-	-	<0.0000350	-	-
	Annual Mean	-	-	-	-	-	0.00000400	-	-
	Annual Median	-	-	-	-	-	0.00000400	-	-
	% < LRL	-	-	-	-	-	86%	-	-
	% > BCWQG[a]	-	-	-	-	-	0%	-	-
	% > BCWQG[b]	-	-	-	-	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.16: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2018

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
RG_WARDB	n	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	89.4	0.200	114	8.15	7.75	8.50	0.620	78.1	0.0254	<0.00100	<0.00500	0.0510	<0.00100	0.00770	15.4
	Annual Maximum	166	17.2	218	8.41	8.39	15.8	2.13	128	0.170	0.00180	0.0274	0.163	0.00890	0.0896	54.6
	Annual Mean	137	7.45	179	8.28	8.07	11.3	1.37	112	0.0931	0.00120	0.00949	0.0858	0.00346	0.0206	36.5
	Annual Median	150	7.20	194	8.28	8.08	10.9	1.44	122	0.0794	0.00115	<0.00500	0.0795	0.00190	0.0151	39.4
	% < LRL	0%	0%	0%	0%	0%	0%	0%	0%	0%	42%	58%	0%	17%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_KERRRD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	97.5	1.73	121	8.17	8.12	7.33	0.937	79.5	0.0340	<0.00100	<0.00500	0.0568	<0.00100	0.00397	15.2
	Annual Maximum	175	18.7	227	8.43	8.63	12.9	2.06	138	0.215	0.00413	0.0119	0.190	0.00195	0.0504	49.3
	Annual Mean	129	11.6	164	8.30	8.35	9.52	1.26	107	0.0956	0.00146	0.00737	0.0959	0.00125	0.0142	28.3
	Annual Median	131	12.7	160	8.28	8.25	9.26	1.09	107	0.0827	0.00113	0.00540	0.0813	0.00102	0.00828	29.1
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	33%	11%	0%	44%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	33%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	33%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	133	-0.100	170	8.28	8.01	8.70	<0.500	115	0.745	0.00100	<0.00500	0.142	<0.00100	<0.00200	23.7
	Annual Maximum	228	14.9	274	8.53	8.40	17.5	2.17	162	1.50	0.00567	0.0255	0.322	0.00678	0.192	66.0
	Annual Mean	196	6.08	236	8.39	8.24	12.4	0.975	146	1.18	0.00260	0.00920	0.201	0.00167	0.0223	51.6
	Annual Median	209	5.61	251	8.39	8.23	11.9	0.763	156	1.23	0.00230	0.00505	0.191	0.00115	0.00540	56.1
	% < LRL	0%	0%	0%	0%	0%	0%	8%	0%	0%	0%	50%	0%	42%	17%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.16: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2018

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	108	3.10	126	8.19	8.15	7.23	1.04	87.0	0.149	0.00113	<0.00500	0.0793	<0.00100	0.00389	17.7
	Annual Maximum	175	18.0	222	8.41	8.64	12.3	2.13	140	0.483	0.00205	0.0146	0.318	0.00377	0.130	45.8
	Annual Mean	132	11.8	163	8.31	8.36	9.41	1.34	109	0.253	0.00152	0.00883	0.149	0.00189	0.0318	27.5
	Annual Median	132	13.3	160	8.31	8.27	9.19	1.18	111	0.206	0.00137	0.00760	0.112	0.00132	0.00830	28.6
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	11%	0%	33%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	22%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	22%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_GRASMERE	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	107	5.77	127	8.18	8.15	6.42	1.07	87.0	0.161	0.00107	0.00510	0.0867	<0.00100	0.00283	17.1
	Annual Maximum	188	17.5	232	8.38	8.58	11.7	2.14	137	0.442	0.00250	0.0284	0.288	0.00335	0.0888	49.7
	Annual Mean	133	12.2	160	8.31	8.35	9.10	1.34	107	0.238	0.00155	0.00922	0.138	0.00143	0.0237	26.8
	Annual Median	129	13.7	153	8.31	8.31	9.21	1.20	108	0.202	0.00143	0.00660	0.103	<0.00100	0.00463	27.6
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	0%	0%	56%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	22%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	22%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USGOLD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	108	6.00	125	8.18	8.11	6.26	0.948	87.9	0.164	0.00112	<0.00500	0.0640	<0.00100	0.00347	17.6
	Annual Maximum	182	16.9	232	8.38	8.58	11.0	2.08	149	0.427	0.00230	0.0247	0.255	0.00314	0.0743	47.8
	Annual Mean	128	12.1	158	8.29	8.33	8.91	1.29	106	0.239	0.00150	0.00880	0.124	0.00138	0.0187	25.8
	Annual Median	124	13.5	153	8.27	8.30	9.15	1.17	106	0.217	0.00137	0.00708	0.110	<0.00100	0.00463	24.3
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	22%	0%	67%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	22%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	22%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.16: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2018

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	109	6.32	131	8.18	7.73	6.04	1.08	88.6	0.187	0.00127	<0.00500	0.0777	<0.00100	0.00313	17.3
	Annual Maximum	184	14.9	230	8.37	8.56	10.4	2.30	146	0.420	0.00323	0.0378	0.208	0.00315	0.0374	46.2
	Annual Mean	128	11.5	159	8.29	8.22	8.73	1.43	107	0.250	0.00181	0.0101	0.117	0.00143	0.0107	24.9
	Annual Median	121	13.4	147	8.29	8.16	8.88	1.36	106	0.223	0.00167	0.00693	0.0988	<0.00100	0.00450	22.4
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	33%	0%	56%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	33%	-	0%	0%	0%	0%	0%	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	33%	-	-	0%	0%	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INTERNATIONAL BOUNDARY	n	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4
	Annual Minimum	94.9	-	-	-	-	-	-	-	-	-	-	-	-	-	11.2
	Annual Maximum	166	-	-	-	-	-	-	-	-	-	-	-	-	-	41.4
	Annual Mean	124	-	-	-	-	-	-	-	-	-	-	-	-	-	24.5
	Annual Median	117	-	-	-	-	-	-	-	-	-	-	-	-	-	22.6
	% < LRL	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
	% > BCWQG[a]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TENMILE CREEK	n	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4
	Annual Minimum	114	-	-	-	-	-	-	-	-	-	-	-	-	-	10.4
	Annual Maximum	138	-	-	-	-	-	-	-	-	-	-	-	-	-	29.6
	Annual Mean	124	-	-	-	-	-	-	-	-	-	-	-	-	-	22.6
	Annual Median	121	-	-	-	-	-	-	-	-	-	-	-	-	-	25.1
	% < LRL	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
	% > BCWQG[a]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FOREBAY	n	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4
	Annual Minimum	116	-	-	-	-	-	-	-	-	-	-	-	-	-	17.0
	Annual Maximum	138	-	-	-	-	-	-	-	-	-	-	-	-	-	27.2
	Annual Mean	127	-	-	-	-	-	-	-	-	-	-	-	-	-	23.8
	Annual Median	126	-	-	-	-	-	-	-	-	-	-	-	-	-	25.6
	% < LRL	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
	% > BCWQG[a]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
	% > BCWQG[b]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.16: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2018

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	1.74	0.0602	<0.000100	0.000415	0.0285	<0.0000200	<0.0100	<0.000100	<0.000100	0.0450	0.0000610	0.00132	0.00701	<0.000000500	0.000479
	Annual Maximum	8.13	0.107	0.000112	0.00145	0.0518	0.0000774	0.0220	0.00294	0.00144	3.11	0.00385	0.00418	0.0806	0.00000394	0.000861
	Annual Mean	5.22	0.0899	0.000101	0.000581	0.0405	0.0000249	0.0145	0.000405	0.000229	0.377	0.000490	0.00216	0.0184	0.00000103	0.000748
	Annual Median	5.32	0.0960	<0.000100	0.000510	0.0411	<0.0000200	0.0145	0.000165	<0.000100	0.0940	0.000135	0.00195	0.0122	0.000000767	0.000796
	% < LRL	0%	0%	92%	0%	0%	83%	33%	17%	58%	0%	0%	0%	0%	17%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	8%	0%	-	0%	-	0%	17%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	8%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_KERRRD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.46	0.0641	<0.000100	0.000307	0.0270	<0.0000200	<0.0100	<0.000100	<0.000100	0.0120	<0.0000500	0.00112	0.00166	<0.000000500	0.000519
	Annual Maximum	6.50	0.105	0.000108	0.00108	0.0570	0.0000661	0.0170	0.00205	0.00102	2.23	0.00227	0.00328	0.0580	0.00000283	0.000883
	Annual Mean	3.21	0.0843	0.000101	0.000521	0.0394	0.0000258	0.0115	0.000414	0.000243	0.380	0.000421	0.00200	0.0147	0.000000935	0.000681
	Annual Median	3.07	0.0913	<0.000100	0.000403	0.0406	<0.0000200	<0.0100	0.000117	<0.000100	0.0260	0.0000743	0.00180	0.00369	0.000000530	0.000712
	% < LRL	0%	0%	89%	0%	0%	78%	67%	33%	67%	0%	22%	0%	0%	33%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	11%	0%	-	0%	-	0%	22%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	11%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	0.822	0.113	<0.000100	0.000200	0.0646	<0.0000200	<0.0100	0.000160	<0.000100	<0.0100	<0.0000500	0.00458	0.000800	<0.000000500	0.000794
	Annual Maximum	3.97	0.188	0.000182	0.00155	0.113	0.000155	0.0102	0.00388	0.00145	3.34	0.00221	0.00780	0.128	0.00000742	0.00115
	Annual Mean	2.30	0.160	0.000111	0.000376	0.0887	0.0000314	0.0100	0.000583	0.000216	0.338	0.000257	0.00683	0.0142	0.00000123	0.00101
	Annual Median	2.11	0.160	0.000102	0.000265	0.0874	<0.0000200	<0.0100	0.000280	<0.000100	0.0507	0.0000555	0.00695	0.00284	0.000000510	0.00101
	% < LRL	0%	0%	50%	0%	0%	83%	92%	0%	75%	8%	50%	0%	0%	50%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	8%	0%	8%	0%	-	0%	-	0%	8%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	8%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.16: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2018

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.29	0.0717	<0.000100	0.000322	0.0333	<0.0000200	<0.0100	0.000103	<0.000100	0.0133	<0.0000500	0.00147	0.00183	<0.000000500	0.000561
	Annual Maximum	4.84	0.114	0.000152	0.00169	0.0856	0.000116	0.0124	0.00334	0.00162	3.81	0.00319	0.00614	0.105	0.00000576	0.000870
	Annual Mean	2.45	0.0916	0.000110	0.000621	0.0502	0.0000377	0.0103	0.000719	0.000380	0.720	0.000658	0.00294	0.0240	0.00000171	0.000702
	Annual Median	2.43	0.0943	<0.000100	0.000387	0.0476	<0.0000200	<0.0100	0.000126	<0.000100	0.0267	0.0000633	0.00230	0.00324	0.000000543	0.000719
	% < LRL	0%	0%	78%	0%	0%	78%	78%	0%	67%	0%	11%	0%	0%	33%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	22%	0%	-	0%	-	0%	22%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	22%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_GRASMERE	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.30	0.0745	<0.000100	0.000300	0.0342	<0.0000200	<0.0100	<0.000100	<0.000100	0.0120	<0.0000500	0.00161	0.00182	<0.000000500	0.000560
	Annual Maximum	5.50	0.120	0.000132	0.00143	0.0910	0.0000890	0.0138	0.00231	0.00114	2.50	0.00251	0.00610	0.0994	0.00000448	0.000941
	Annual Mean	2.47	0.0900	0.000107	0.000575	0.0485	0.0000334	0.0105	0.000588	0.000323	0.569	0.000551	0.00266	0.0207	0.00000134	0.000684
	Annual Median	2.53	0.0913	<0.000100	0.000387	0.0455	<0.0000200	<0.0100	0.000127	<0.000100	0.0317	0.0000605	0.00223	0.00314	0.000000547	0.000697
	% < LRL	0%	0%	78%	0%	0%	78%	78%	11%	67%	0%	22%	0%	0%	33%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	22%	0%	-	0%	-	0%	22%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	22%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USGOLD	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.27	0.0722	<0.000100	0.000320	0.0338	<0.0000200	<0.0100	<0.000100	<0.000100	0.0140	<0.0000500	0.00153	0.00196	<0.000000500	0.000550
	Annual Maximum	5.24	0.121	0.000125	0.00136	0.0908	0.0000720	0.0138	0.00197	0.00108	2.34	0.00219	0.00612	0.0919	0.00000338	0.00103
	Annual Mean	2.34	0.0888	0.000105	0.000552	0.0480	0.0000306	0.0104	0.000521	0.000288	0.487	0.000474	0.00261	0.0184	0.00000116	0.000685
	Annual Median	2.02	0.0910	<0.000100	0.000377	0.0433	<0.0000200	<0.0100	0.000132	<0.000100	0.0187	0.0000797	0.00207	0.00344	0.000000507	0.000658
	% < LRL	0%	0%	78%	0%	0%	78%	78%	22%	67%	0%	11%	0%	0%	44%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	22%	0%	-	0%	-	0%	22%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	22%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.16: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2018

Station	Summary Statistic	Dissolved Chloride (mg/L)	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	1.34	0.0740	<0.000100	0.000330	0.0369	<0.0000200	<0.0100	<0.000100	<0.000100	0.0133	<0.0000500	0.00162	0.00161	<0.000000500	0.000549
	Annual Maximum	5.22	0.118	0.000110	0.000895	0.0826	0.0000467	0.0125	0.00128	0.000524	1.15	0.00106	0.00388	0.0556	0.00000246	0.000942
	Annual Mean	2.27	0.0877	0.000102	0.000478	0.0463	0.0000230	0.0103	0.000295	0.000166	0.207	0.000242	0.00223	0.0122	0.000000829	0.000662
	Annual Median	1.88	0.0890	<0.000100	0.000383	0.0427	<0.0000200	<0.0100	0.000127	<0.000100	0.0230	0.0000935	0.00200	0.00238	0.000000557	0.000648
	% < LRL	0%	0%	67%	0%	0%	89%	89%	11%	67%	0%	22%	0%	0%	44%	0%
	% > BCWQG[a]	0%	-	0%	-	0%	0%	0%	11%	0%	-	0%	-	0%	11%	0%
	% > BCWQG[b]	0%	0%	-	0%	-	-	-	-	0%	11%	0%	-	0%	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INTERNATIONAL BOUNDARY	n	4	0	0	0	0	0	0	0	0	0	4	0	0	2	0
	Annual Minimum	1.14	-	-	-	-	-	-	-	-	-	0.0000590	-	-	0.000000665	-
	Annual Maximum	4.89	-	-	-	-	-	-	-	-	-	0.000548	-	-	0.00000220	-
	Annual Mean	2.48	-	-	-	-	-	-	-	-	-	0.000227	-	-	0.00000143	-
	Annual Median	1.95	-	-	-	-	-	-	-	-	-	0.000150	-	-	0.00000143	-
	% < LRL	0%	-	-	-	-	-	-	-	-	-	0%	-	-	0%	-
	% > BCWQG[a]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	50%	-
	% > BCWQG[b]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TENMILE CREEK	n	4	0	0	0	0	0	0	0	0	0	4	0	0	2	0
	Annual Minimum	2.22	-	-	-	-	-	-	-	-	-	0.0000380	-	-	0.000000650	-
	Annual Maximum	3.55	-	-	-	-	-	-	-	-	-	0.000284	-	-	0.00000106	-
	Annual Mean	2.64	-	-	-	-	-	-	-	-	-	0.000103	-	-	0.000000858	-
	Annual Median	2.39	-	-	-	-	-	-	-	-	-	0.0000455	-	-	0.000000858	-
	% < LRL	0%	-	-	-	-	-	-	-	-	-	0%	-	-	0%	-
	% > BCWQG[a]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	0%	-
	% > BCWQG[b]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FOREBAY	n	4	0	0	0	0	0	0	0	0	0	4	0	0	2	0
	Annual Minimum	2.22	-	-	-	-	-	-	-	-	-	0.0000375	-	-	0.000000470	-
	Annual Maximum	2.98	-	-	-	-	-	-	-	-	-	0.0000920	-	-	0.000000870	-
	Annual Mean	2.52	-	-	-	-	-	-	-	-	-	0.0000511	-	-	0.000000670	-
	Annual Median	2.45	-	-	-	-	-	-	-	-	-	0.0000375	-	-	0.000000670	-
	% < LRL	0%	-	-	-	-	-	-	-	-	-	50%	-	-	0%	-
	% > BCWQG[a]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	0%	-
	% > BCWQG[b]	0%	-	-	-	-	-	-	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.16: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2018

Station	Summary Statistic	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	<0.000500	0.0000720	<0.0000100	<0.0000100	0.000616	<0.00300	<0.00300	<0.00000500	<0.000500	<0.0100
	Annual Maximum	0.00288	0.000137	0.0000122	0.0000232	0.00108	0.0128	0.0302	0.00000710	0.000502	0.0270
	Annual Mean	0.000703	0.000106	0.0000102	0.0000111	0.000882	0.00384	0.00843	0.00000522	0.000500	0.0137
	Annual Median	<0.000500	0.000108	<0.0000100	<0.0000100	0.000916	<0.00300	0.00655	<0.00000500	<0.000500	0.0101
	% < LRL	83%	0%	92%	92%	0%	83%	8%	83%	92%	50%
	% > BCWQG[a]	-	0%	0%	0%	0%	8%	0%	0%	8%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	0%	-	-	-	-	-	-	-	-
RG_KERRRD	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000124	<0.0000100	<0.0000100	0.000567	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.00216	0.000883	0.0000108	0.0000181	0.00109	0.00907	0.0259	0.00000522	<0.000500	0.0216
	Annual Mean	0.000750	0.000392	0.0000101	0.0000109	0.000734	0.00385	0.00845	0.00000502	0.000255	0.0123
	Annual Median	<0.000500	0.000388	<0.0000100	<0.0000100	0.000740	<0.00300	0.00558	<0.00000500	0.000250	<0.0100
	% < LRL	56%	0%	89%	89%	0%	78%	33%	89%	11%	78%
	% > BCWQG[a]	-	0%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	0%	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	<0.000500	0.00375	<0.0000100	<0.0000100	0.000704	<0.00300	<0.00300	0.00000520	<0.000500	<0.0100
	Annual Maximum	0.00459	0.00791	0.0000374	0.0000740	0.00108	0.0181	0.0261	0.0000134	<0.000500	0.0240
	Annual Mean	0.000893	0.00635	0.0000123	0.0000155	0.000942	0.00426	0.00787	0.00000828	<0.000500	0.0126
	Annual Median	0.000515	0.00688	<0.0000100	<0.0000100	0.000981	<0.00300	0.00362	0.00000760	<0.000500	<0.0100
	% < LRL	50%	0%	92%	75%	0%	92%	42%	0%	100%	67%
	% > BCWQG[a]	-	100%	0%	0%	0%	0%	0%	0%	33%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	0%	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	0%	0%	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	100%	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.16: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2018

Station	Summary Statistic	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_DSELK	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000770	<0.0000100	<0.0000100	0.000590	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.00406	0.00249	0.0000230	0.0000444	0.00101	0.0162	0.0261	0.00000610	<0.000500	0.0230
	Annual Mean	0.00115	0.00139	0.0000125	0.0000160	0.000730	0.00541	0.00922	0.00000525	0.000275	0.0121
	Annual Median	<0.000500	0.00147	<0.0000100	<0.0000100	0.000741	<0.00300	0.00587	<0.00000500	0.000250	<0.0100
	% < LRL	78%	0%	78%	78%	0%	78%	22%	56%	11%	67%
	% > BCWQG[a]	-	11%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	44%	-	-	-	-	-	-	-	-
RG_GRASMERE	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000891	<0.0000100	<0.0000100	0.000601	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.00265	0.00243	0.0000152	0.0000313	0.00113	0.0115	0.0626	0.0000177	0.000571	0.184
	Annual Mean	0.000975	0.00126	0.0000111	0.0000141	0.000728	0.00472	0.0132	0.00000643	0.000286	0.0302
	Annual Median	<0.000500	0.00118	<0.0000100	<0.0000100	0.000709	<0.00300	0.00627	<0.00000500	0.000250	<0.0100
	% < LRL	78%	0%	78%	78%	0%	78%	11%	56%	11%	67%
	% > BCWQG[a]	-	11%	0%	0%	0%	0%	11%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	11%	-	-	-	-	-	-	-	-
RG_USGOLD	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000832	<0.0000100	<0.0000100	0.000581	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.00250	0.00228	0.0000138	0.0000245	0.00115	0.0104	0.0247	0.00000589	<0.000500	0.0219
	Annual Mean	0.000890	0.00123	0.0000109	0.0000130	0.000714	0.00437	0.00876	0.00000519	0.000263	0.0117
	Annual Median	<0.000500	0.00114	<0.0000100	<0.0000100	0.000687	<0.00300	0.00607	<0.00000500	0.000250	<0.0100
	% < LRL	67%	0%	67%	78%	0%	78%	11%	67%	11%	67%
	% > BCWQG[a]	-	11%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	11%	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.16: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2018

Station	Summary Statistic	Nickel (mg/L)	Selenium (mg/L)	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_BORDER	n	9	9	9	9	9	9	9	9	9	9
	Annual Minimum	<0.000500	0.000922	<0.0000100	<0.0000100	0.000605	<0.00300	<0.00300	<0.00000500	0.000250	<0.0100
	Annual Maximum	0.00140	0.00219	0.0000103	0.0000177	0.00105	0.00517	0.0263	0.00000553	<0.000500	0.0249
	Annual Mean	0.000619	0.00120	0.0000100	0.0000109	0.000705	0.00324	0.00939	0.00000509	0.000287	0.0124
	Annual Median	<0.000500	0.00113	<0.0000100	<0.0000100	0.000672	<0.00300	0.00665	<0.00000500	0.000250	<0.0100
	% < LRL	67%	0%	89%	78%	0%	89%	22%	56%	11%	67%
	% > BCWQG[a]	-	11%	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	-	-	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	0%	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	0%	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	11%	-	-	-	-	-	-	-	-
INTERNATIONAL BOUNDARY	n	0	0	0	0	0	0	0	0	0	0
	Annual Minimum	-	-	-	-	-	-	-	-	-	-
	Annual Maximum	-	-	-	-	-	-	-	-	-	-
	Annual Mean	-	-	-	-	-	-	-	-	-	-
	Annual Median	-	-	-	-	-	-	-	-	-	-
	% < LRL	-	-	-	-	-	-	-	-	-	-
	% > BCWQG[a]	-	-	-	-	-	-	-	-	-	-
	% > BCWQG[b]	-	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-
TENMILE CREEK	n	0	0	0	0	0	0	0	0	0	0
	Annual Minimum	-	-	-	-	-	-	-	-	-	-
	Annual Maximum	-	-	-	-	-	-	-	-	-	-
	Annual Mean	-	-	-	-	-	-	-	-	-	-
	Annual Median	-	-	-	-	-	-	-	-	-	-
	% < LRL	-	-	-	-	-	-	-	-	-	-
	% > BCWQG[a]	-	-	-	-	-	-	-	-	-	-
	% > BCWQG[b]	-	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-
FOREBAY	n	0	0	0	0	0	0	0	0	0	0
	Annual Minimum	-	-	-	-	-	-	-	-	-	-
	Annual Maximum	-	-	-	-	-	-	-	-	-	-
	Annual Mean	-	-	-	-	-	-	-	-	-	-
	Annual Median	-	-	-	-	-	-	-	-	-	-
	% < LRL	-	-	-	-	-	-	-	-	-	-
	% > BCWQG[a]	-	-	-	-	-	-	-	-	-	-
	% > BCWQG[b]	-	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.17: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2019

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)	Dissolved Chloride (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12
	Annual Minimum	93.0	0	114	8.09	7.14	6.50	<0.500	83.0	0.0594	<0.00100	<0.00500	0.0540	<0.00100	0.00320	16.8	1.71
	Annual Maximum	171	16.1	226	8.23	8.75	16.7	2.24	164	0.176	0.00318	0.0493	0.207	0.00890	0.0368	51.6	8.32
	Annual Mean	140	7.09	176	8.16	8.09	11.2	1.36	119	0.124	0.00146	0.0218	0.110	0.00260	0.0122	37.2	5.08
	Annual Median	141	7.07	183	8.16	8.07	10.8	1.35	117	0.132	0.00115	0.0170	0.109	0.00155	0.0105	41.9	5.16
	% < LRL	0%	0%	0%	0%	0%	0%	8%	0%	0%	42%	8%	0%	25%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	17%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	17%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USELK	n	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Annual Minimum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Annual Maximum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Annual Mean	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Annual Median	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% < LRL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > BCWQG[a]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > BCWQG[b]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_KERRRD	n	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	Annual Minimum	96.1	5.97	114	8.09	8.20	8.36	0.654	91.3	0.0896	0.00101	0.00599	0.0595	<0.00100	0.00212	15.5	1.40
	Annual Maximum	140	20.2	168	8.37	8.62	11.1	1.76	130	0.191	0.00232	0.0164	0.126	0.00132	0.0130	34.3	4.29
	Annual Mean	125	13.2	143	8.24	8.37	9.78	1.10	108	0.118	0.00140	0.00936	0.0920	0.00111	0.00661	25.8	2.75
	Annual Median	130	12.5	145	8.22	8.32	9.72	0.984	110	0.107	0.00123	0.00878	0.0890	0.00106	0.00497	24.9	2.86
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12
	Annual Minimum	144	-0.0200	162	8.21	7.99	6.90	<0.500	115	0.682	0.00110	<0.00500	0.0730	<0.00100	<0.00200	28.2	0.852
	Annual Maximum	238	14.0	284	8.37	8.47	16.8	1.91	210	1.29	0.00540	0.0726	0.458	0.00383	0.0429	68.1	4.47
	Annual Mean	200	5.85	223	8.29	8.24	12.2	0.936	155	1.09	0.00225	0.0205	0.274	0.00157	0.0118	50.2	2.35
	Annual Median	212	4.78	234	8.30	8.25	12.1	0.775	154	1.18	0.00183	0.00925	0.263	0.00130	0.00360	54.8	2.36
	% < LRL	0%	0%	0%	0%	0%	0%	17%	0%	0%	0%	17%	0%	42%	36%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	8%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	8%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures. Data for Montana stations (International Boundary, Tenmile, and Forebay) not available at time of reporting.

[a] Long-term average BCQWG for the Protection of Aquatic Life.
[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.17: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2019

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)	Dissolved Chloride (mg/L)
RG_DSELK	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Annual Minimum	106	0.657	128	8.05	8.00	8.35	0.807	99.4	0.178	0.00114	0.00561	0.0807	<0.00100	0.00235	17.2	1.26
	Annual Maximum	182	20.1	225	8.34	8.72	12.3	1.83	161	0.389	0.00259	0.0271	3.31	0.00207	0.0114	50.9	6.08
	Annual Mean	139	11.4	162	8.24	8.33	10.1	1.18	118	0.258	0.00163	0.0125	0.432	0.00112	0.00589	29.8	2.84
	Annual Median	135	11.9	160	8.26	8.37	9.98	1.05	114	0.229	0.00158	0.0115	0.119	0.00100	0.00449	28.5	2.54
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	0%	-	0%	0%	0%	0%	20%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	0%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_GRASMERE	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Annual Minimum	105	1.43	127	8.18	7.96	7.53	0.739	99.0	0.210	<0.00100	0.00723	0.0553	<0.00100	0.00218	17.4	1.37
	Annual Maximum	178	18.5	216	8.31	8.55	13.0	1.76	148	0.377	0.00263	0.0128	0.116	0.00180	0.0100	44.8	4.97
	Annual Mean	136	11.4	159	8.25	8.35	10.1	1.16	116	0.260	0.00162	0.0104	0.0926	0.00114	0.00504	28.9	2.68
	Annual Median	135	11.7	155	8.25	8.39	10.1	1.12	114	0.233	0.00131	0.0103	0.0927	0.00103	0.00334	27.4	2.39
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	10%	0%	0%	30%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	10%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	10%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_USGOLD	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Annual Minimum	108	1.45	121	8.18	8.05	7.69	0.856	97.0	0.194	<0.00100	0.00876	0.0525	<0.00100	0.00223	18.2	1.47
	Annual Maximum	171	19.1	200	8.30	8.56	12.9	1.72	142	0.342	0.00309	0.0148	0.163	0.00122	0.0107	40.9	4.61
	Annual Mean	135	11.6	149	8.26	8.33	9.97	1.24	114	0.253	0.00179	0.0117	0.106	0.00105	0.00479	28.2	2.61
	Annual Median	133	12.0	142	8.27	8.33	9.86	1.19	112	0.238	0.00161	0.0116	0.107	0.00102	0.00299	26.9	2.38
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	20%	0%	0%	40%	0%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	10%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	10%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_BORDER	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Annual Minimum	111	2.26	139	8.15	8.05	7.70	0.736	103	0.206	<0.00100	0.00723	0.0625	<0.00100	<0.00200	18.6	1.58
	Annual Maximum	164	17.6	185	8.31	8.61	12.5	1.66	140	0.309	0.00257	0.0161	0.146	0.00113	0.00662	35.5	3.81
	Annual Mean	136	11.0	159	8.25	8.32	9.87	1.14	114	0.243	0.00176	0.0116	0.103	0.00104	0.00394	27.1	2.51
	Annual Median	137	11.2	156	8.26	8.34	9.80	1.13	111	0.232	0.00165	0.0111	0.101	0.00103	0.00344	27.7	2.48
	% < LRL	0%	0%	0%	0%	0%	0.0%	0%	0%	0%	10%	0%	0%	40%	20%	0%	0%
	% > BCWQG[a]	-	-	-	0%	0%	10%	-	0%	0%	0%	0%	0%	-	-	0%	0%
	% > BCWQG[b]	-	-	-	-	-	10%	-	-	0%	0%	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures. Data for Montana stations (International Boundary, Tenmile, and Forebay) not available at time of reporting.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.17: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2019

Station	Summary Statistic	Total Hardness (CaCO3 mg/L)	Temperature (Degrees C)	Total Dissolved Solids (mg/L)	Lab pH	Field pH	Dissolved Oxygen (mg/L)	Dissolved Organic Carbon (mg/L)	Alkalinity (CaCO3 mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Ammonia (mg/L)	Total Kjeldahl (mg/L)	Orthophosphate (mg/L)	Phosphorus (mg/L)	Sulphate (mg/L)	Dissolved Chloride (mg/L)
INTERNATIONAL BOUNDARY	n	7	0	0	0	0	0	0	7	0	0	7	0	7	7	6	6
	Annual Minimum	107	-	-	-	-	-	-	96.7	-	-	<0.00500	-	<0.00100	0.00353	23.9	2.83
	Annual Maximum	153	-	-	-	-	-	-	123	-	-	0.0357	-	0.00137	0.0124	32.7	3.93
	Annual Mean	127	-	-	-	-	-	-	109	-	-	0.0145	-	0.00105	0.00751	26.6	3.24
	Annual Median	122	-	-	-	-	-	-	108	-	-	0.0115	-	<0.00100	0.00683	25.5	3.23
	% < LRL	0%	-	-	-	-	-	-	0%	-	-	29%	-	86%	0%	0%	0%
	% > BCWQGa	-	-	-	-	-	-	-	0%	-	-	0%	-	-	-	0%	0%
	% > BCWQGb	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TENMILE CREEK	n	6	0	0	0	0	0	0	6	0	0	6	0	6	6	5	5
	Annual Minimum	123	-	-	-	-	-	-	106	-	-	<0.00500	-	<0.00100	0.00279	26.5	2.83
	Annual Maximum	145	-	-	-	-	-	-	117	-	-	0.0124	-	0.00137	0.00536	31.2	3.23
	Annual Mean	131	-	-	-	-	-	-	110	-	-	0.00655	-	0.00111	0.00398	27.9	3.06
	Annual Median	129	-	-	-	-	-	-	109	-	-	0.00501	-	<0.00100	0.00360	27.1	3.08
	% < LRL	0%	-	-	-	-	-	-	0%	-	-	50%	-	67%	0%	0%	0%
	% > BCWQGa	-	-	-	-	-	-	-	0%	-	-	0%	-	-	-	0%	0%
	% > BCWQGb	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FOREBAY	n	7	0	0	0	0	0	0	7	0	0	7	0	7	7	6	6
	Annual Minimum	125	-	-	-	-	-	-	105	-	-	<0.00500	-	<0.00100	0.00340	27.0	2.72
	Annual Maximum	142	-	-	-	-	-	-	120	-	-	0.0212	-	0.00128	0.00542	32.3	3.98
	Annual Mean	133	-	-	-	-	-	-	112	-	-	0.0111	-	0.00111	0.00427	28.5	3.29
	Annual Median	134	-	-	-	-	-	-	109	-	-	0.0123	-	0.00102	0.00388	27.7	3.23
	% < LRL	0%	-	-	-	-	-	-	0%	-	-	43%	-	43%	0%	0%	0%
	% > BCWQGa	-	-	-	-	-	-	-	0%	-	-	0%	-	-	-	0%	0%
	% > BCWQGb	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures. Data for Montana stations (International Boundary, Tenmile, and Forebay) not available at time of reporting.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.17: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2019

Station	Summary Statistic	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Selenium (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	0.0607	<0.000100	0.000400	0.0295	<0.0000200	<0.0100	0.000100	<0.000100	0.0460	<0.0000500	0.00130	0.00578	<0.000000500	0.000516	<0.000500	0.0000812
	Annual Maximum	0.105	0.000110	0.000738	0.0487	0.0000388	0.0280	0.000997	0.000708	1.23	0.00127	0.00257	0.0462	0.00000224	0.000804	0.00128	0.000153
	Annual Mean	0.0848	0.000101	0.000530	0.0394	0.0000226	0.0167	0.000291	0.000187	0.260	0.000306	0.00198	0.0167	0.000000878	0.000690	0.000612	0.000114
	Annual Median	0.0877	<0.000100	0.000519	0.0389	<0.0000200	0.0145	0.000187	<0.000100	0.0898	0.000119	0.00204	0.0159	0.000000700	0.000692	<0.000500	0.000110
	% < LRL	0%	83%	0%	0%	75%	33%	0%	58%	0%	8%	0%	0%	8%	0%	75%	0%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	17%	0%	-	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	8%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
RG_USELK	n	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Annual Minimum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Annual Maximum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Annual Mean	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Annual Median	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% < LRL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > BCWQG[a]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > BCWQG[b]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_KERRRD	n	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	Annual Minimum	0.0610	<0.000100	0.000327	0.0260	<0.0000200	<0.0100	0.000105	<0.000100	0.0127	0.0000517	0.00114	0.00177	<0.000000500	0.000502	<0.000500	0.000100
	Annual Maximum	0.0931	0.000100	0.000548	0.0403	0.0000213	0.0113	0.000333	0.000195	0.314	0.000448	0.00201	0.0182	0.000000986	0.000709	0.000568	0.000674
	Annual Mean	0.0783	0.000100	0.000408	0.0350	0.0000202	0.0102	0.000195	0.000130	0.123	0.000188	0.00160	0.00773	0.000000680	0.000602	0.000520	0.000373
	Annual Median	0.0783	<0.000100	0.000381	0.0378	<0.0000200	<0.0100	0.000150	0.000100	0.0462	0.0000978	0.00167	0.00389	0.000000568	0.000592	<0.000500	0.000366
	% < LRL	0%	88%	0%	0%	75%	63%	13%	50%	0%	0%	0%	0%	38%	0%	63%	0%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	0%	0%	-	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Annual Minimum	0.109	<0.000100	0.000220	0.0652	<0.0000200	<0.0100	0.000200	<0.000100	<0.0100	<0.0000500	0.00422	0.000720	<0.000000500	0.000720	<0.000500	0.00356
	Annual Maximum	0.189	0.000105	0.000432	0.103	0.0000345	<0.0100	0.000835	0.000250	0.493	0.000360	0.00840	0.0262	0.00000263	0.00113	0.00122	0.00743
	Annual Mean	0.148	0.000101	0.000304	0.0863	0.0000225	<0.0100	0.000368	0.000130	0.134	0.000128	0.00625	0.00681	0.000000980	0.000948	0.000637	0.00589
	Annual Median	0.138	<0.000100	0.000265	0.0891	<0.0000200	<0.0100	0.000273	<0.000100	0.0482	0.0000578	0.00655	0.00350	<0.000000500	0.000975	<0.000500	0.00632
	% < LRL	0%	75%	0%	0%	67%	100%	0%	67%	8%	50%	0%	0%	58%	0%	67%	0%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	25%	0%	-	100%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	0%
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	0%
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA River Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures. Data for Montana stations (International Boundary, Tenmile, and Forebay) not available at time of reporting.

[a] Long-term average BCQWG for the Protection of Aquatic Life.
[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.17: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2019

Station	Summary Statistic	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Selenium (mg/L)
RG_DSELK	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Annual Minimum	0.0745	<0.000100	0.000319	0.0341	<0.0000200	<0.0100	0.000112	<0.000100	0.0151	<0.0000500	0.00153	0.00159	<0.000000500	0.000536	<0.000500	0.000842
	Annual Maximum	0.106	0.000100	0.000465	0.0599	0.0000221	0.0167	0.000455	0.000166	0.261	0.000319	0.00307	0.0149	0.00000113	0.000845	0.000673	0.00174
	Annual Mean	0.0871	0.000100	0.000389	0.0458	0.0000202	0.0109	0.000225	0.000112	0.0761	0.000122	0.00222	0.00670	0.000000675	0.000667	0.000528	0.00122
	Annual Median	0.0825	<0.000100	0.000383	0.0450	<0.0000200	<0.0100	0.000151	<0.000100	0.0246	0.0000662	0.00206	0.00386	0.000000524	0.000657	<0.000500	0.00115
	% < LRL	0%	90%	0%	0%	90%	60%	0%	70%	0%	10%	0%	0%	50%	0%	60%	0%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	0%	0%	-	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20%
RG_GRASMERE	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Annual Minimum	0.0751	<0.000100	0.000306	0.0330	<0.0000200	<0.0100	0.000109	<0.000100	0.0124	<0.0000500	0.00145	0.00168	<0.000000500	0.000534	<0.000500	0.000730
	Annual Maximum	0.111	0.000104	0.000470	0.0586	0.0000205	0.0157	0.000335	0.000139	0.192	0.000262	0.00317	0.0131	0.000000985	0.000870	0.000558	0.00170
	Annual Mean	0.0890	0.000100	0.000387	0.0455	0.0000201	0.0107	0.000180	0.000109	0.0640	0.000106	0.00224	0.00605	0.000000624	0.000673	0.000513	0.00123
	Annual Median	0.0878	<0.000100	0.000380	0.0448	<0.0000200	<0.0100	0.000142	<0.000100	0.0246	0.0000548	0.00215	0.00344	<0.000000500	0.000668	<0.000500	0.00117
	% < LRL	0%	90%	0%	0%	90%	80%	0%	70%	0%	10%	0%	0%	60%	0%	60%	0%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	0%	0%	-	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20%
RG_USGOLD	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Annual Minimum	0.0662	<0.000100	0.000297	0.0352	<0.0000200	<0.0100	0.000112	<0.000100	0.0115	<0.0000500	0.00155	0.00148	<0.000000500	0.000533	<0.000500	0.000848
	Annual Maximum	0.105	<0.000100	0.000448	0.0590	0.0000201	0.0150	0.000321	0.000138	0.196	0.000282	0.00323	0.0123	0.000000998	0.000864	0.000514	0.00180
	Annual Mean	0.0874	<0.000100	0.000373	0.0450	0.0000200	0.0106	0.000166	0.000106	0.0544	0.000103	0.00220	0.00556	0.000000606	0.000662	0.000503	0.00120
	Annual Median	0.0879	<0.000100	0.000372	0.0434	<0.0000200	<0.0100	0.000136	<0.000100	0.0249	0.0000536	0.00214	0.00360	0.000000512	0.000665	<0.000500	0.00114
	% < LRL	0%	100%	0%	0%	90%	80%	0%	70%	0%	10%	0%	0%	50%	0%	70%	0%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	0%	0%	-	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10%
RG_BORDER	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Annual Minimum	0.0762	<0.000100	0.000317	0.0365	<0.0000200	<0.0100	0.000103	<0.000100	0.0123	<0.0000500	0.00173	0.00148	<0.000000500	0.000596	<0.000500	0.000897
	Annual Maximum	0.102	0.000106	0.000433	0.0574	<0.0000200	0.0108	0.000367	0.000118	0.122	0.000169	0.00278	0.00794	0.000000751	0.000785	0.000526	0.00153
	Annual Mean	0.0874	0.000101	0.000368	0.0456	<0.0000200	0.0101	0.000167	0.000103	0.0415	0.0000849	0.00216	0.00410	0.000000572	0.000657	0.000503	0.00117
	Annual Median	0.0860	<0.000100	0.000354	0.0451	<0.0000200	<0.0100	0.000131	<0.000100	0.0230	0.0000525	0.00211	0.00272	0.000000530	0.000654	<0.000500	0.00112
	% < LRL	0%	70%	0%	0%	100%	70%	0%	70%	0%	20%	0%	0%	40%	0%	90%	0%
	% > BCWQG[a]	-	0%	-	0%	0%	0%	0%	0%	-	0%	-	0%	0%	0%	-	0%
	% > BCWQG[b]	0%	-	0%	-	-	-	-	0%	0%	0%	-	0%	-	0%	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10%

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures. Data for Montana stations (International Boundary, Tenmile, and Forebay) not available at time of reporting.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.17: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2019

Station	Summary Statistic	Dissolve Fluoride (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Boron (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Selenium (mg/L)
INTERNATIONAL BOUNDARY	n	0	0	3	0	0	0	3	0	0	7	0	0	0	0	0	7
	Annual Minimum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000335	-	-	-	-	-	0.000865
	Annual Maximum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.000439	-	-	-	-	-	0.00124
	Annual Mean	-	-	<0.00200	-	-	-	<0.00200	-	-	0.000156	-	-	-	-	-	0.00103
	Annual Median	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000665	-	-	-	-	-	0.00106
	% < LRL	-	-	100%	-	-	-	100%	-	-	0%	-	-	-	-	-	0%
	% > BCWQGa	-	-	-	-	-	-	100%	-	-	0%	-	-	-	-	-	0%
	% > BCWQGb	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
TENMILE CREEK	n	0	0	2	0	0	0	2	0	0	6	0	0	0	0	0	6
	Annual Minimum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.00000900	-	-	-	-	-	0.000905
	Annual Maximum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.000129	-	-	-	-	-	0.00121
	Annual Mean	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000441	-	-	-	-	-	0.00107
	Annual Median	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000328	-	-	-	-	-	0.00107
	% < LRL	-	-	100%	-	-	-	100%	-	-	0%	-	-	-	-	-	0%
	% > BCWQGa	-	-	-	-	-	-	100%	-	-	0%	-	-	-	-	-	0%
	% > BCWQGb	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
FOREBAY	n	0	0	3	0	0	0	3	0	0	7	0	0	0	0	0	7
	Annual Minimum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.00000650	-	-	-	-	-	0.000935
	Annual Maximum	-	-	<0.00200	-	-	-	<0.00200	-	-	0.000361	-	-	-	-	-	0.00128
	Annual Mean	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000776	-	-	-	-	-	0.00112
	Annual Median	-	-	<0.00200	-	-	-	<0.00200	-	-	0.0000265	-	-	-	-	-	0.00109
	% < LRL	-	-	100%	-	-	-	100%	-	-	0%	-	-	-	-	-	0%
	% > BCWQGa	-	-	-	-	-	-	100%	-	-	0%	-	-	-	-	-	0%
	% > BCWQGb	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures. Data for Montana stations (International Boundary, Tenmile, and Forebay) not available at time of reporting.

[a] Long-term average BCQWG for the Protection of Aquatic Life.

[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.17: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2019

Station	Summary Statistic	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_WARDB	n	12	12	12	12	12	12	12	12
	Annual Minimum	<0.0000100	<0.0000100	0.000621	<0.00300	<0.00300	<0.00000500	<0.000200	<0.0100
	Annual Maximum	0.0000108	0.0000130	0.00106	0.00558	0.0152	0.00000780	<0.000500	0.0213
	Annual Mean	0.0000101	0.0000104	0.000835	0.00340	0.00692	0.00000529	0.000213	0.0128
	Annual Median	<0.0000100	<0.0000100	0.000807	<0.00300	0.00577	<0.00000500	<0.000200	0.0110
	% < LRL	83%	83%	0%	67%	17%	75%	92%	50%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	8%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-
RG_USELK	n	-	-	-	-	-	-	-	-
	Annual Minimum	-	-	-	-	-	-	-	-
	Annual Maximum	-	-	-	-	-	-	-	-
	Annual Mean	-	-	-	-	-	-	-	-
	Annual Median	-	-	-	-	-	-	-	-
	% < LRL	-	-	-	-	-	-	-	-
	% > BCWQG[a]	-	-	-	-	-	-	-	-
	% > BCWQG[b]	-	-	-	-	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
RG_KERRRD	n	8	8	8	8	8	8	8	8
	Annual Minimum	<0.0000100	<0.0000100	0.000557	<0.00300	0.00303	<0.00000500	0.000207	<0.0100
	Annual Maximum	0.0000136	0.0000107	0.000741	0.00472	0.0123	0.00000598	<0.000500	0.0133
	Annual Mean	0.0000104	0.0000101	0.000663	0.00331	0.00621	0.00000512	0.000263	0.0107
	Annual Median	<0.0000100	<0.0000100	0.000682	0.00301	0.00494	<0.00000500	0.000263	<0.0100
	% < LRL	88%	88%	0%	38%	0%	88%	75%	63%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
RG_ELKMOUTH	n	12	12	12	12	12	12	12	12
	Annual Minimum	<0.0000100	<0.0000100	0.000598	<0.00300	<0.00300	0.00000550	<0.000200	<0.0100
	Annual Maximum	0.0000130	0.0000198	0.00113	0.00507	0.0144	0.0000118	0.000673	0.0135
	Annual Mean	0.0000105	0.0000116	0.000891	0.00332	0.00559	0.00000824	0.000239	0.0105
	Annual Median	<0.0000100	<0.0000100	0.000928	<0.00300	0.00380	0.00000809	<0.000500	<0.0100
	% < LRL	75%	67%	0%	75%	25%	0%	92%	83%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	8%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	0%	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA River Guideline	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures. Data for Montana stations (International Boundary, Tenmile, and Forebay) not available at time of reporting.

[a] Long-term average BCQWG for the Protection of Aquatic Life.
[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.17: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2019

Station	Summary Statistic	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
RG_DSELK	n	10	10	10	10	10	10	10	10
	Annual Minimum	<0.0000100	<0.0000100	0.000555	<0.00300	0.00300	<0.00000500	0.000208	<0.0100
	Annual Maximum	<0.0000100	0.0000111	0.00106	0.00338	0.0109	0.0000107	<0.000500	0.0183
	Annual Mean	<0.0000100	0.0000101	0.000700	0.00306	0.00562	0.00000597	0.000261	0.0112
	Annual Median	<0.0000100	<0.0000100	0.000671	<0.00300	0.00393	0.00000510	0.000252	<0.0100
	% < LRL	100%	80%	0%	70%	0%	40%	70%	70%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
RG_GRASMERE	n	10	10	10	10	10	10	10	10
	Annual Minimum	<0.0000100	<0.0000100	0.000565	<0.00300	<0.00300	<0.00000500	0.000204	<0.0100
	Annual Maximum	0.0000109	0.0000102	0.000890	0.00375	0.0102	0.00000611	<0.000500	0.0105
	Annual Mean	0.0000101	0.0000100	0.000682	0.00310	0.00514	0.00000523	0.000253	0.0101
	Annual Median	<0.0000100	<0.0000100	0.000663	<0.00300	0.00366	0.00000507	0.000227	<0.0100
	% < LRL	80%	90%	0%	60%	30%	40%	70%	70%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
RG_USGOLD	n	10	10	10	10	10	10	10	10
	Annual Minimum	<0.0000100	<0.0000100	0.000562	<0.00300	<0.00300	<0.00000500	0.000201	<0.0100
	Annual Maximum	0.0000180	0.0000102	0.000861	0.00360	0.00989	0.00000586	0.000623	0.0104
	Annual Mean	0.0000108	0.0000100	0.000677	0.00306	0.00489	0.00000515	0.000291	0.0100
	Annual Median	<0.0000100	<0.0000100	0.000669	<0.00300	0.00352	0.00000501	0.000242	<0.0100
	% < LRL	90%	80%	0%	80%	30%	50%	60%	90%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
RG_BORDER	n	10	10	10	10	10	10	10	10
	Annual Minimum	<0.0000100	<0.0000100	0.000581	<0.00300	<0.00300	<0.00000500	0.000224	<0.0100
	Annual Maximum	0.0000105	0.0000108	0.000789	0.00382	0.00910	0.00000645	<0.000500	0.0104
	Annual Mean	0.0000100	0.0000101	0.000680	0.00316	0.00436	0.00000526	0.000283	0.0100
	Annual Median	<0.0000100	<0.0000100	0.000668	<0.00300	0.00328	0.00000506	0.000239	<0.0100
	% < LRL	90%	90%	0%	70%	20%	30%	70%	90%
	% > BCWQG[a]	0%	0%	0%	0%	0%	0%	0%	-
	% > BCWQG[b]	0%	-	-	0%	0%	0%	0%	0%
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures. Data for Montana stations (International Boundary, Tenmile, and Forebay) not available at time of reporting.

[a] Long-term average BCQWG for the Protection of Aquatic Life.
[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.17: Summary of Water Chemistry Data for Key Parameters for the Koocanusa Reservoir Monitoring Stations, 2019

Station	Summary Statistic	Silver (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)
INTERNATIONAL BOUNDARY	n	0	0	0	3	0	0	0	0
	Annual Minimum	-	-	-	<0.00500	-	-	-	-
	Annual Maximum	-	-	-	0.00600	-	-	-	-
	Annual Mean	-	-	-	0.00533	-	-	-	-
	Annual Median	-	-	-	<0.00500	-	-	-	-
	% < LRL	-	-	-	67%	-	-	-	-
	% > BCWQGa	-	-	-	0%	-	-	-	-
	% > BCWQGb	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
TENMILE CREEK	n	0	0	0	2	0	0	0	0
	Annual Minimum	-	-	-	<0.00500	-	-	-	-
	Annual Maximum	-	-	-	<0.00500	-	-	-	-
	Annual Mean	-	-	-	<0.00500	-	-	-	-
	Annual Median	-	-	-	<0.00500	-	-	-	-
	% < LRL	-	-	-	100%	-	-	-	-
	% > BCWQGa	-	-	-	0%	-	-	-	-
	% > BCWQGb	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-
FOREBAY	n	0	0	0	3	0	0	0	0
	Annual Minimum	-	-	-	<0.00500	-	-	-	-
	Annual Maximum	-	-	-	<0.00500	-	-	-	-
	Annual Mean	-	-	-	<0.00500	-	-	-	-
	Annual Median	-	-	-	<0.00500	-	-	-	-
	% < LRL	-	-	-	100%	-	-	-	-
	% > BCWQGa	-	-	-	0%	-	-	-	-
	% > BCWQGb	-	-	-	0%	-	-	-	-
	% > Level 1 Benchmark	-	-	-	-	-	-	-	-
	% > Level 2 Benchmark	-	-	-	-	-	-	-	-
	% > Level 3 Benchmark	-	-	-	-	-	-	-	-
	EPA Lake Guideline	-	-	-	-	-	-	-	-

> 5% of samples exceed the guideline or benchmark.
> 50% of samples exceed the guideline or benchmark.
> 95% of samples exceed the guideline or benchmark.

Notes: "LRL" = laboratory reporting limit. "BCWQG" = British Columbia Working or Accepted Water Quality Guideline. For guidelines dependent on other analytes (e.g., hardness or chloride), guidelines were screened using concurrent concentrations. When concurrent hardness or chloride concentrations were not measured, the most conservative concentration observed for that station was used to estimate the guidelines or benchmark. All summary statistics are reported to 3 significant figures. Data for Montana stations (International Boundary, Tenmile, and Forebay) not available at time of reporting.

[a] Long-term average BCQWG for the Protection of Aquatic Life.
[b] Short-term maximum BCQWG for the Protection of Aquatic Life.

Table B.18: **Comparison of Differences in Monthly Averages of Parameter Concentrations Among Upstream (RG_KERRRD) and Downstream Koocanusa Reservoir Stations, 2014 to 2019**

Parameter	Station	Q1. Does the difference in DS - US vary among DS stations and years (ANOVA) [a]			Q2. Is there a difference in concentrations downstream compared to RG_KERRRD? [b]						Q3. Does the difference in concentrations downstream of RG_KERRRD vary among years? [c]											
					2014	2015	2016	2017	2018	2019							MOD Relative to Base Year					
		Year	Station	Station x Year	MOD (%)	MOD (%)	MOD (%)	MOD (%)	MOD (%)	MOD (%)	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Total Antimony (mg/L)	RG_DSELK	0.012	0.163	0.852	ns	ns	ns	25	19	ns	B	AB	AB	A	A	AB	b	13	21	38	31	14
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					
Total Barium (mg/L)	RG_DSELK	<0.001	0.893	0.989	ns	25	21	24	20	26	B	A	A	A	A	A	b	19	15	18	14	19
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					
Total Boron (mg/L)	RG_DSELK	<0.001	0.770	1.000	ns	ns	-	ns	-22	ns	A	A	-	A	B	A	b	-0.76	-	-1.3	-21	-1.5
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					
Dissolved Cadmium (mg/L)	RG_DSELK	0.620	0.755	0.738	15		-	15			ns		-	ns			ns		-	ns		
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					
Total Lithium (mg/L)	RG_DSELK	<0.001	0.012	0.890	2.8	33	35	46	39	31	B	A	A	A	A	A	b	39	40	32	35	41
	RG_GRASMERE				-3.2	34	34	25	28	29												
	RG_USGOLD				11	29	32	20	27	36												
	RG_BORDER				-18	26	25	7.0	15	35												
Total Manganese (mg/L)	RG_DSELK	0.030	0.013	0.974	ns	ns	ns	ns	ns	ns	A	A	A	A	A	A	b	22	9.8	34	25	3.3
	RG_GRASMERE				-29	-9.4	-18	-6.0	-8.8	-27												
	RG_USGOLD				-20	-11	-34	-4.4	-	-												
	RG_BORDER				-40	-22	-13	-23	-25	-34												
Total Molybdenum (mg/L)	RG_DSELK	<0.001	0.046	0.880	-1.1	6.4	3.7	8.0	3.8	5.6	B	A	A	A	AB	A	b	13	11	12	8.0	15
	RG_GRASMERE				-1.5	6.8	5.6	5.4	0.80	7.1												
	RG_USGOLD				ns	ns	ns	ns	ns	ns												
	RG_BORDER				ns	ns	ns	ns	ns	ns												
Total Nickel (mg/L)	RG_DSELK	0.038	0.216	0.999	-37	ns	ns	-27	ns	ns	B	AB	AB	AB	A	AB	b	74	73	16	82	44
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					
Nitrate (mg/L)	RG_DSELK	<0.001	0.928	1.000	46	146	112	157	173	129	C	AB	B	AB	A	AB	b	69	45	76	87	57
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					

P-value < 0.05.

Downstream value higher than upstream (year greater than base year).

Downstream value lower than upstream (year less than base year).

Notes: "ns" indicates not significant (p-value > 0.05). "-" indicates insufficient data > laboratory reporting limit (LRL) for comparison. Insufficient sample size >LRL to complete analyses for cobalt.

[a] ANOVA Conducted on the difference in $\log_{10}$ concentrations Upstream (RG_KERRRD) and Downstream (RG_DSELK, RG_GRASMERE, RG_USGOLD, RG_BORDER) of the Elk River ($\log_{10}$[DS]-$\log_{10}$[US].

[b] Post-hoc contrasts testing the difference in $\log_{10}$(DS)-$\log_{10}$(US) against zero with the magnitude of difference (MOD) calculated as (DS-US)/US*100% and application of geometric means for concentrations. If there were no significant differences among depths and stations a t-test was conducted using the combined differences. Post-hoc tests were adjusted from the number of comparisons using Tukey's Honestly Significant Difference (HSD) tests.

[c] Post-hoc contrasts testing the difference in $\log_{10}$(DS)-$\log_{10}$(US) among depths with the MOD calculated as:[difference at lower depth ($10^{\log10(DS)-\log10(US)}$) - difference at higher depth(10log10(DS)-log10(US))]/difference at higher depth(10log10(DS)-log10(US)) *100. Post-hoc tests were adjusted from the number of comparisons using an Tukey's Honestly Significant Difference test (HSD).

Table B.18: **Comparison of Differences in Monthly Averages of Parameter Concentrations Among Upstream (RG_KERRRD) and Downstream Koocanusa Reservoir Stations, 2014 to 2019**

Parameter	Station	Q1. Does the difference in DS - US vary among DS stations and years (ANOVA) [a]			Q2. Is there a difference in concentrations downstream compared to RG_KERRRD? [b]						Q3. Does the difference in concentrations downstream of RG_KERRRD vary among years? [c]											
					2014	2015	2016	2017	2018	2019							MOD Relative to Base Year					
		Year	Station	Station x Year	MOD (%)	MOD (%)	MOD (%)	MOD (%)	MOD (%)	MOD (%)	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Nitrite (mg/L)	RG_DSELK	<0.001	0.229	0.997	15	46	55	20	19	13	BC	AB	A	BC	BC	C	b	27	35	4.6	3.5	-1.9
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					
Selenium (mg/L)	RG_DSELK	<0.001	0.968	1.000	103	237	262	348	288	361	B	A	A	A	A	A	b	66	78	120	90	127
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					
	INTERNATIONAL BOUNDARY																					
	TENMILE_CREEK																					
	FOREBAY																					
Sulphate (mg/L)	RG_DSELK	0.078	0.205	0.377	-1.8						ns						ns					
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					
	INTERNATIONAL BOUNDARY																					
	TENMILE_CREEK																					
	FOREBAY																					
Total Dissolved Solids (mg/L)	RG_DSELK	0.006	0.620	0.981	ns	ns	ns	ns	ns	6.4	B	AB	AB	B	B	A	b	3.8	4.0	0.51	-0.13	8.0
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					
Total Uranium (mg/L)	RG_DSELK	0.008	0.360	0.827	-5.0	ns	ns	ns	ns	-2.7	B	A	AB	A	AB	AB	b	6.5	3.6	5.5	3.2	2.4
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					
Total Zinc (mg/L)	RG_DSELK	0.063	0.899	0.906	-13				-	-13	ns				-	ns	ns				-	ns
	RG_GRASMERE																					
	RG_USGOLD																					
	RG_BORDER																					

P-value < 0.05.

Downstream value higher than upstream (year greater than base year).

Downstream value lower than upstream (year less than base year).

Notes: "ns" indicates not significant (p-value > 0.05). "-" indicates insufficient data > laboratory reporting limit (LRL) for comparison. Insufficient sample size >LRL to complete analyses for cobalt.

[a] ANOVA Conducted on the difference in $\log_{10}$ concentrations Upstream (RG_KERRRD) and Downstream (RG_DSELK, RG_GRASMERE, RG_USGOLD, RG_BORDER) of the Elk River ($\log_{10}$[DS]-$\log_{10}$[US].

[b] Post-hoc contrasts testing the difference in $\log_{10}$(DS)-$\log_{10}$(US) against zero with the magnitude of difference (MOD) calculated as (DS-US)/US*100% and application of geometric means for concentrations. If there were no significant differences among depths and stations a t-test was conducted using the combined differences. Post-hoc tests were adjusted from the number of comparisons using Tukey's Honestly Significant Difference (HSD) tests.

[c] Post-hoc contrasts testing the difference in $\log_{10}$(DS)-$\log_{10}$(US) among depths with the MOD calculated as:[difference at lower depth ($10^{\log10(DS)-\log10(US)}$) - difference at higher depth(10log10(DS)-log10(US))]/difference at higher depth(10log10(DS)-log10(US)) *100. Post-hoc tests were adjusted from the number of comparisons using an Tukey's Honestly Significant Difference test (HSD).

Table B.19: Seasonal Kendall Trend Analysis For Water Quality Parameters Collected at Routine Monitoring Stations, 2014 to 2019

Station	2014 to 2019									
	RG WARDB	RG KERRRD	RG ELKMOUTH	RG DSELK	RG GRASMERE	RG USGOLD	RG BORDER	International Boundary	Tenmile	Forebay
TDS	1.5	NS	NS	NS	NS	NS	NS	-	-	-
Nitrate	NS	NS	NS	NS	NS	NS	NS	-	-	-
Nitrite	NS	NS	NS	NS	NS	NS	NS	-	-	-
Dissolved Sulphate (mg/L)	1.9	NS	2.4	2.2	1.6	NS	1.8	3.8	3	3.3
Total Antimony (mg/L)	NS	NS	NS	NS	NS	NS	NS	-	-	-
Total Barium (mg/L)	NS	NS	NS	NS	NS	NS	NS	-	-	-
Total Boron (mg/L)	9.1	NS	0	0	NS	NS	NS	-	-	-
Total Lithium (mg/L)	-2.4	NS	2.3	NS	NS	NS	NS	-	-	-
Total Manganese (mg/L)	NS	NS	NS	NS	-5.1	NS	-5.1	-	-	-
Total Molybdenum (mg/L)	-2.0	NS	NS	-1.4	-1.6	NS	NS	-	-	-
Total Nickel (mg/L)	-9.0	NS	NS	-0.70	NS	NS	-2.3	-	-	-
Total Selenium (mg/L)	NS	NS	NS	4.1	NS	NS	NS	-2.4	NS	NS
Total Uranium (mg/L)	NS	NS	1.3	NS	NS	NS	NS	-	-	-
Total Zinc (mg/L)	-3.3	NS	NS	NS	NS	NS	NS	NS	NS	NS
Dissolved Cadmium (mg/L)	-10	NS	NS	NS	NS	NS	NS	NS	NS	NS
Dissolved Cobalt (mg/L)	NS	NS	NS	-3.3	NS	NS	NS	-	-	-

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: NS = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). "-" indicates no data or insufficient data (n < 5) to test for trend.

APPENDIX C
SEDIMENT

TABLES

Table C.1: Profundal Sediment Sampling Locations in Koocanusa Reservoir, August 2018

Station Identifier		UTM (NAD 83, Zone 11U)		Station Depth (m)	Average Ponar Fullness (%)	Sample Texture	Macrophytes in Sample	Algae in Sample
		Easting	Northing					
Upstream of Elk River	RG_TN-1	627394	5453542	14.0	75% - 100%	95% sand and finer, 5% organics	No	No
	RG_TN-2	627291	5453642	13.3	75%	90% sand and finer, 10% organics	No	No
	RG_TN-3	627343	5456370	14.6	75%	90% sand and finer, 10% organics	No	No
	RG_TN-4	627344	5453854	14.0	100%	95% sand and finer, 5% organics	No	No
	RG_TN-5	627175	5453986	14.3	100%	100% sand and finer, minimal organics	No	No
Downstream of Elk River	RG_T4-1	630074	5441765	25.1	75%	100% sand and finer	No	No
	RG_T4-2	629838	5442106	24.3	75%	100% sand and finer	No	No
	RG_T4-3	629706	5441670	24.4	100%	100% sand and finer	No	No
	RG_T4-4	629512	5441745	23.9	100%	100% sand and finer, minimal organics	No	No
	RG_T4-5	629460	5441543	24.8	100%	100% sand and finer	No	No

Table C.2: Littoral Sediment Sampling Locations in Koocanusa Reservoir, April 2018

Station Identifier		Comment	UTM (NAD 83, Zone 11U)		Station Depth (m)	Sample Texture	Macrophytes in Sample	Algae in Sample	Dominant Taxa
			Easting	Northing					
Sand Creek	RG_SC_01	-	625489	5458292	1.5	silty sand	no	no	chironomid
	RG_SC_02	-	625467	5458231	-	silty sand	no	no	chironomid, mayfly
	RG_SC_03	-	625577	5457631	1.0	silty sand	no	no	chironomid
	RG_SC_04	-	625652	5457353	1.3	silty sand	no	no	chironomid
	RG_SC_05	-	625680	5458260	1.5	silty sand	no	no	chironomid, mayfly
Elk River	RG_ER_01	downstream of mouth of Elk River	628309	5448218	< 0.5	100% sand and finer, minimal organics	no	no	mayfly, chironomid
	RG_ER_02	northern most braid at mouth of the Elk River	628475	5448196	0.4	100% sand and finer, minimal organics	no	no	stonefly, mayfly, chironomid
	RG_ER_03	southern most braid at mouth of the Elk River	628280	5448086	< 0.5	100% sand and finer, 10% organics	no	no	mayfly
	RG_ER_04	in sheltered bay downstream of the mouth	627989	5447672	< 0.5	100% sand and finer, minimal organics	no	no	chironomid
	RG_ER_05	in sheltered bay downstream of the mouth	627950	5447580	< 0.5	100% sand and finer, minimal organics	no	no	mayfly
Gold Creek	RG_GC_01	spooned at sediment-water interface	630805	5436307	0.1	100% sand and finer, minimal organics	no	no	chironomid, mayfly
	RG_GC_02	-	630906	5436212	0.1	100% sand and finer, minimal organics	no	no	mayfly, chironomid
	RG_GC_03	texture slightly coarser than -01 and -02	630825	5436436	0.1	100% sand and finer, minimal organics	no	no	stonefly, chironomid
	RG_GC_04	superfine, sticky material, from shoreline water interface	631158	5436077	0.1	100% sand and finer, minimal organics	no	no	chironomid, stonefly, mayfly
	RG_GC_05	very fine, less clay, less sticky than -04	631068	5436163	0.1	100% sand and finer, minimal organics	no	no	stonefly, mayfly, chironomid

Table C.3: Profundal Sediment Sampling Locations in Koocanusa Reservoir, August 2019

Station Identifier		UTM (NAD 83, Zone 11U)		Station Depth (m)	Average Ponar Fullness (%)	Sample Texture	Macrophytes in Sample	Algae in Sample
		Easting	Northing					
Upstream of Elk River	RG_TN-1	627394	5453542	13.0	75%	90% sand and finer, 10% organics	No	No
	RG_TN-2	627291	5453642	13.3	50%	90% sand and finer, 10% organics	No	No
	RG_TN-3	627343	5456370	13.0	50%	90% sand and finer, 10% organics	No	No
	RG_TN-4	627344	5453854	13.0	75%	90% sand and finer, 10% organics	No	No
	RG_TN-5	627175	5453986	13.0	75%	90% sand and finer, 10% organics	No	No
Downstream of Elk River	RG_T4-1	630074	5441765	23.0	75%	80% sand and finer, 20% organics	No	No
	RG_T4-2	629838	5442106	24.0	75%	80% sand and finer, 20% organics	No	No
	RG_T4-3	629706	5441670	24.0	75%	80% sand and finer, 20% organics	No	No
	RG_T4-4	629512	5441745	24.0	75%	80% sand and finer, 20% organics	No	No
	RG_T4-5	629460	5441543	23.0	75%	80% sand and finer, 20% organics	No	No

Table C.4: Profundal Sediment Quality in Koocanusa Reservoir, August 2018

Analytes	Units	BC Sediment Quality Guidelines [a]	Upstream of Elk River (RG_TN)				
			TN-1	TN-2	TN-3	TN-4	TN-5
Non-metals							
Moisture	%	-	41.5	38.7	41.6	33.2	35.8
pH (1:2 soil:water)	pH	-	8.40	8.59	8.35	8.83	8.77
Particle size[d]							
% Gravel	%	-	<1.0	<1.0	<1.0	<1.0	<1.0
% Sand	%	-	<1.0	6.70	2.00	44.9	30.7
% Silt	%	-	87.2	81.6	87.9	47.4	61.8
% Clay	%	-	12.5	11.6	10.1	7.4	7.4
Carbon							
TOC[e]	%	-	2.00	1.99	2.40	1.83	1.91
Metals (< 1mm fraction)							
Aluminum (Al)	mg/kg dw	-	12,100	12,300	12,100	9,220	9,860
Antimony (Sb)	mg/kg dw	-	0.29	0.30	0.34	0.26	0.29
Arsenic (As)	mg/kg dw	5.9/17 [b]	7.13	6.77	7.23	6.33	6.76
Barium (Ba)	mg/kg dw	-	71.1	71.7	73.8	57.3	59.5
Beryllium (Be)	mg/kg dw	-	0.37	0.35	0.37	0.27	0.32
Bismuth (Bi)	mg/kg dw	-	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	mg/kg dw	-	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	mg/kg dw	0.6/3.5 [b]	0.176	0.171	0.202	0.144	0.138
Calcium (Ca)	mg/kg dw	-	106,000	115,000	103,000	111,000	114,000
Chromium (Cr)	mg/kg dw	37.3/90 [b]	17.1	16.8	18.0	15.1	15.9
Cobalt (Co)	mg/kg dw	-	8.98	8.88	9.52	7.98	8.40
Copper (Cu)	mg/kg dw	35.7/197 [b]	16.3	15.2	17.5	12.1	13.1
Iron (Fe)	mg/kg dw	21,200/43,766 [c]	22,000	21,900	22,500	19,700	20,900
Lead (Pb)	mg/kg dw	35/91 [b]	16.5	15.5	18.0	14.2	14.7
Lithium (Li)	mg/kg dw	-	25.1	24.5	24.5	20.1	22.5
Magnesium (Mg)	mg/kg dw	-	22,200	24,600	23,500	24,900	26,100
Manganese (Mn)	mg/kg dw	460/1,100 [c]	423	430	429	382	402
Mercury (Hg)	mg/kg dw	0.170/0.486 [b]	0.0196	0.0150	0.0202	0.0141	0.0126
Molybdenum (Mo)	mg/kg dw	-	0.58	0.61	0.65	0.55	0.59
Nickel (Ni)	mg/kg dw	16/75 [c]	18.9	19.0	20.2	16.8	17.9
Phosphorus (P)	mg/kg dw	-	617	641	675	633	682
Potassium (K)	mg/kg dw	-	800	740	800	610	630
Selenium (Se)	mg/kg dw	2	<0.20	<0.20	0.23	<0.20	<0.20
Silver (Ag)	mg/kg dw	0.5	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	mg/kg dw	-	81	84	89	81	82
Strontium (Sr)	mg/kg dw	-	238	250	229	231	237
Sulfur (S)	mg/kg dw	-	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	mg/kg dw	-	0.087	0.078	0.085	0.066	0.067
Tin (Sn)	mg/kg dw	-	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	mg/kg dw	-	142	140	143	129	123
Tungsten (W)	mg/kg dw	-	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	mg/kg dw	-	0.794	0.729	0.881	0.582	0.576
Vanadium (V)	mg/kg dw	-	13.4	13.4	13.9	12.0	12.5
Zinc (Zn)	mg/kg dw	123/315 [b]	69.4	66.9	73.6	61.8	64.0
Zirconium (Zr)	mg/kg dw	-	<1.0	<1.0	1.5	1.3	1.4
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg dw	0.00671/0.0889 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	mg/kg dw	0.00587/0.128 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acridine	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	mg/kg dw	0.0469/0.245 [b]	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Benz(a)anthracene	mg/kg dw	0.0317/0.385 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	mg/kg dw	0.0319/0.782 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b&j)fluoranthene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(e)pyrene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	mg/kg dw	0.17/3.2 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	mg/kg dw	0.24/13.4 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	mg/kg dw	0.0571/0.862 [b]	0.022	<0.010	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	mg/kg dw	0.00622/0.135 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	mg/kg dw	0.111/2.355 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	mg/kg dw	0.021/0.144 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	mg/kg dw	0.2/3.2 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
1-Methylnaphthalene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
2-Methylnaphthalene	mg/kg dw	0.0202/0.201 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	mg/kg dw	0.0346/0.391 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Perylene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	mg/kg dw	0.0419/0.515 [b]	<0.010	0.011	<0.010	<0.010	<0.010
Pyrene	mg/kg dw	0.053/0.875 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
d10-Acenaphthene	%	-	94.4	91.6	85.2	73.8	82.5
d12-Chrysene	%	-	103.9	104.2	105.8	101.4	104.4
d8-Naphthalene	%	-	92.6	88.9	80.5	69.6	79.5
d10-Phenanthrene	%	-	95.9	93.9	92.5	84.5	88.6
B(a)P Total Potency Equivalent	mg/kg dw	-	<0.020	<0.020	<0.020	<0.020	<0.020
IACR (CCME)	mg/kg dw	-	<0.15	<0.15	<0.15	<0.15	<0.15

Notes: Shaded values were above the lower guidelines (ISQG[b] or LEL[c]). No values exceeded the upper (PEL[b] or SEL[c]) guidelines.

[a] Working sediment quality guidelines (BC MOE 2015).

[b] Interim Sediment Quality Guideline (ISQG; or Threshold Effect Level [LEL])/ Probable Effect Level (PEL).

[c] Lowest Effect Level (LEL)/ Severe Effect Level (SEL).

[d] Gravel = >2.0 mm; Sand = 0.063 to 2.0 mm; Silt = 0.004 to 0.063 mm; Clay = <0.004 mm.

[e] TOC = Total Organic Carbon.

Table C.4: Profundal Sediment Quality in Koocanusa Reservoir, August 2018

Analytes	Units	BC Sediment Quality Guidelines [a]	Downstream of Elk River (RG_T4)				
			T4-1	T4-2	T4-3	T4-4	T4-5
Non-metals							
Moisture	%	-	40.0	42.3	41.0	42.8	39.2
pH (1:2 soil:water)	pH	-	8.53	8.42	8.42	8.44	8.49
Particle size[d]							
% Gravel	%	-	<1.0	<1.0	<1.0	<1.0	<1.0
% Sand	%	-	<1.0	<1.0	2.20	1.65	2.90
% Silt	%	-	80.2	80.7	80.4	78.3	77.2
% Clay	%	-	19.7	19.1	17.2	20.1	19.8
Carbon							
TOC[e]	%	-	2.15	2.19	2.20	2.25	1.94
Metals (< 1mm fraction)							
Aluminum (Al)	mg/kg dw	-	10,500	13,200	12,000	14,100	13,400
Antimony (Sb)	mg/kg dw	-	0.46	0.48	0.41	0.43	0.42
Arsenic (As)	mg/kg dw	5.9/17 [b]	7.25	7.69	7.17	7.92	7.14
Barium (Ba)	mg/kg dw	-	161	166	135	142	116
Beryllium (Be)	mg/kg dw	-	0.50	0.55	0.47	0.49	0.45
Bismuth (Bi)	mg/kg dw	-	<0.20	<0.20	<0.20	0.21	<0.20
Boron (B)	mg/kg dw	-	5.0	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	mg/kg dw	0.6/3.5 [b]	0.586	0.573	0.486	0.458	0.336
Calcium (Ca)	mg/kg dw	-	117,000	119,000	115,000	131,000	120,000
Chromium (Cr)	mg/kg dw	37.3/90 [b]	17.6	20.0	18.7	21.1	19.6
Cobalt (Co)	mg/kg dw	-	9.08	10.3	9.45	10.7	9.83
Copper (Cu)	mg/kg dw	35.7/197 [b]	16.4	18.0	16.4	18.4	16.1
Iron (Fe)	mg/kg dw	21,200/43,766 [c]	22,200	24,500	22,800	25,800	23,900
Lead (Pb)	mg/kg dw	35/91 [b]	14.0	15.4	15.0	16.9	15.8
Lithium (Li)	mg/kg dw	-	24.1	26.1	24.2	26.7	24.8
Magnesium (Mg)	mg/kg dw	-	24,100	26,700	24,000	27,300	24,300
Manganese (Mn)	mg/kg dw	460/1,100 [c]	589	596	539	599	528
Mercury (Hg)	mg/kg dw	0.170/0.486 [b]	0.0323	0.0336	0.0286	0.0377	0.0208
Molybdenum (Mo)	mg/kg dw	-	1.03	1.01	0.94	1.00	0.85
Nickel (Ni)	mg/kg dw	16/75 [c]	22.4	24.8	22.5	24.8	22.0
Phosphorus (P)	mg/kg dw	-	912	979	812	853	734
Potassium (K)	mg/kg dw	-	950	1,110	1,020	1,135	1,010
Selenium (Se)	mg/kg dw	2	0.61	0.53	0.47	0.52	0.40
Silver (Ag)	mg/kg dw	0.5	0.11	0.11	<0.10	<0.10	<0.10
Sodium (Na)	mg/kg dw	-	92	100	91	103	103
Strontium (Sr)	mg/kg dw	-	216	227.0	226.0	269	263
Sulfur (S)	mg/kg dw	-	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	mg/kg dw	-	0.136	0.144	0.128	0.132	0.113
Tin (Sn)	mg/kg dw	-	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	mg/kg dw	-	54.8	76.9	84.1	100.3	102.0
Tungsten (W)	mg/kg dw	-	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	mg/kg dw	-	0.758	0.788	0.850	0.859	0.784
Vanadium (V)	mg/kg dw	-	18.0	20.2	17.9	19.5	17.2
Zinc (Zn)	mg/kg dw	123/315 [b]	81.6	88.7	79.8	86.6	77.2
Zirconium (Zr)	mg/kg dw	-	1.7	1.7	1.5	1.6	1.4
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg dw	0.00671/0.0889 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	mg/kg dw	0.00587/0.128 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acridine	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	mg/kg dw	0.0469/0.245 [b]	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Benz(a)anthracene	mg/kg dw	0.0317/0.385 [b]	0.012	0.013	<0.010	<0.010	<0.010
Benzo(a)pyrene	mg/kg dw	0.0319/0.782 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b&j)fluoranthene	mg/kg dw	-	0.020	0.020	0.014	0.015	<0.010
Benzo(e)pyrene	mg/kg dw	-	0.013	0.013	<0.010	0.01	<0.010
Benzo(g,h,i)perylene	mg/kg dw	0.17/3.2 [b]	<0.010	<0.010	<0.010	0.014	<0.010
Benzo(k)fluoranthene	mg/kg dw	0.24/13.4 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	mg/kg dw	0.0571/0.862 [b]	0.025	0.026	0.018	0.017	<0.010
Dibenz(a,h)anthracene	mg/kg dw	0.00622/0.135 [b]	<0.0050	<0.0050	<0.0050	0.0054	<0.0050
Fluoranthene	mg/kg dw	0.111/2.355 [b]	0.017	0.019	0.014	0.0135	<0.010
Fluorene	mg/kg dw	0.021/0.144 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	mg/kg dw	0.2/3.2 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
1-Methylnaphthalene	mg/kg dw	-	0.026	0.023	0.025	0.018	<0.010
2-Methylnaphthalene	mg/kg dw	0.0202/0.201 [b]	0.047	0.041	0.040	0.030	0.016
Naphthalene	mg/kg dw	0.0346/0.391 [b]	0.019	0.016	0.014	0.012	<0.010
Perylene	mg/kg dw	-	0.015	0.015	<0.010	0.011	<0.010
Phenanthrene	mg/kg dw	0.0419/0.515 [b]	0.045	0.039	0.041	0.028	0.017
Pyrene	mg/kg dw	0.053/0.875 [b]	0.013	0.014	0.011	0.011	<0.010
Quinoline	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
d10-Acenaphthene	%	-	87.8	88	87.2	87.3	79.8
d12-Chrysene	%	-	106.7	116.9	104.8	107.4	104.2
d8-Naphthalene	%	-	84.1	84.5	84.9	85.45	75.3
d10-Phenanthrene	%	-	94.7	94.7	91.4	92.4	87.7
B(a)P Total Potency Equivalent	mg/kg dw	-	<0.020	<0.020	<0.020	<0.020	<0.020
IACR (CCME)	mg/kg dw	-	0.23	0.23	0.17	0.18	<0.15

Notes: Shaded values were above the lower guidelines (ISQG[b] or LEL[c]). No values exceeded the upper (PEL[b] or SEL[c]) guidelines.

[a] Working sediment quality guidelines (BC MOE 2015).

[b] Interim Sediment Quality Guideline (ISQG; or Threshold Effect Level [LEL])/ Probable Effect Level (PEL).

[c] Lowest Effect Level (LEL)/ Severe Effect Level (SEL).

[d] Gravel = >2.0 mm; Sand = 0.063 to 2.0 mm; Silt = 0.004 to 0.063 mm; Clay = <0.004 mm.

[e] TOC = Total Organic Carbon.

Table C.5: Littoral Sediment Quality in Koocanusa Reservoir, April 2018

Analytes	Units	BC Sediment Quality Guidelines [a]	Upstream of Elk River (RG_SC)					Downstream of Elk River (RG_ER)				
			SC-1	SC-2	SC-3	SC-4	SC-5	ER-1	ER-2	ER-3	ER-4	ER-5
Non-metals												
Moisture	%	-	29.6	31.9	37.1	42.6	40.9	49.9	40.5	39.4	41.3	39.9
pH (1:2 soil:water)	pH	-	8.45	8.31	8.05	8.25	8.16	8.19	8.49	8.35	8.17	8.21
Particle size[d]												
% Gravel	%	-	<1.0	1.3	2.8	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
% Sand	%	-	43.2	29.6	27.3	47.2	5.8	9.2	72.8	53.5	10.8	3.8
% Silt	%	-	46.1	55.6	59.7	42.9	73.4	73.4	23.8	41.9	69.0	75.9
% Clay	%	-	10.6	13.2	9.8	8.6	19.7	15.7	3.2	4.6	19.2	18.0
Carbon												
TOC[e]	%	-	1.76	1.07	1.67	1.18	1.10	1.83	1.98	1.99	1.90	1.70
Metals (< 1mm fraction)												
Aluminum (Al)	mg/kg dw	-	9,820	9,760	10,500	10,500	13,000	11,000	8,260	7,440	9,830	12,100
Antimony (Sb)	mg/kg dw	-	0.23	0.24	0.36	0.29	0.30	0.46	0.40	0.41	0.36	0.39
Arsenic (As)	mg/kg dw	5.9/17 [b]	4.73	4.53	6.09	5.70	5.68	5.64	4.62	4.59	4.82	5.55
Barium (Ba)	mg/kg dw	-	61.3	70.5	68.9	71.5	97.0	206	131	166	137	151
Beryllium (Be)	mg/kg dw	-	0.33	0.34	0.38	0.41	0.46	0.61	0.47	0.47	0.48	0.51
Bismuth (Bi)	mg/kg dw	-	<0.20	<0.20	0.22	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	mg/kg dw	-	<5.0	<5.0	<5.0	<5.0	<5.0	6.9	5.8	5.4	<5.0	5.1
Cadmium (Cd)	mg/kg dw	0.6/3.5 [b]	0.136	0.147	0.198	0.187	0.196	0.688	0.457	0.516	0.438	0.447
Calcium (Ca)	mg/kg dw	-	105,000	107,000	102,000	105,000	122,000	84,200	55,600	57,700	91,400	102,000
Chromium (Cr)	mg/kg dw	37.3/90 [b]	14.0	14.6	15.3	16.0	18.0	16.3	11.5	11.8	14.9	16.6
Cobalt (Co)	mg/kg dw	-	6.97	6.97	7.63	7.98	9.09	7.33	4.46	4.75	7.07	7.97
Copper (Cu)	mg/kg dw	35.7/197 [b]	10.9	10.6	13.4	13.2	14.7	15.1	8.91	9.94	13.4	14.9
Iron (Fe)	mg/kg dw	21,200/43,766 [c]	18,100	17,900	19,900	19,200	22,300	17,600	12,900	12,600	16,900	19,100
Lead (Pb)	mg/kg dw	35/91 [b]	10.9	13.2	22.1	14.0	15.1	11.5	7.15	7.43	12.1	12.8
Lithium (Li)	mg/kg dw	-	20.5	20.4	21.8	22.0	26.9	20.0	14.4	13.4	20.1	23.3
Magnesium (Mg)	mg/kg dw	-	20,300	20,400	21,700	20,500	24,000	21,100	13,200	14,600	19,600	22,000
Manganese (Mn)	mg/kg dw	460/1,100 [c]	376	422	447	435	530	502	264	310	457	525
Mercury (Hg)	mg/kg dw	0.170/0.486 [b]	0.0110	0.0120	0.0140	0.0148	0.0151	0.0330	0.0214	0.0221	0.0265	0.0238
Molybdenum (Mo)	mg/kg dw	-	0.51	0.54	0.56	0.59	0.63	0.87	0.70	0.78	0.69	0.77
Nickel (Ni)	mg/kg dw	16/75 [c]	15.7	15.9	17.1	17.5	20.5	19.2	13.2	14.0	17.4	19.5
Phosphorus (P)	mg/kg dw	-	468	406	534	528	515	922	874	967	619	690
Potassium (K)	mg/kg dw	-	660	770	800	890	1,150	1,650	1,170	1,160	1,210	1,390
Selenium (Se)	mg/kg dw	2	<0.20	<0.20	0.22	0.20	0.21	0.96	0.56	0.65	0.52	0.64
Silver (Ag)	mg/kg dw	0.5	<0.10	<0.10	<0.10	<0.10	<0.10	0.13	<0.10	<0.10	<0.10	0.10
Sodium (Na)	mg/kg dw	-	100	152	97	108	118	129	144	87	140	120
Strontium (Sr)	mg/kg dw	-	257	252	220	204	306	151	74.2	78.8	185	216
Sulfur (S)	mg/kg dw	-	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
Thallium (Tl)	mg/kg dw	-	0.067	0.066	0.080	0.089	0.086	0.179	0.122	0.141	0.129	0.137
Tin (Sn)	mg/kg dw	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	mg/kg dw	-	102	100	109	188	135	65.8	33.6	39.1	72.6	76.7
Tungsten (W)	mg/kg dw	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	mg/kg dw	-	0.552	0.519	0.586	0.679	0.731	0.820	0.708	0.718	0.698	0.671
Vanadium (V)	mg/kg dw	-	11.5	11.5	12.9	13.6	14.6	22.1	18.3	19.6	16.8	18.0
Zinc (Zn)	mg/kg dw	123/315 [b]	47.7	52.4	61.7	59.5	63.6	67.3	50.1	54.4	62.5	66.7
Zirconium (Zr)	mg/kg dw	-	1.5	1.6	1.7	1.6	1.9	1.5	1.5	1.4	1.6	1.2
Polycyclic Aromatic Hydrocarbons												
Acenaphthene	mg/kg dw	0.00671/0.0889 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	mg/kg dw	0.00587/0.128 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0054	<0.0050	<0.0050	<0.0050
Acridine	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	mg/kg dw	0.0469/0.245 [b]	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.0057	0.0071	0.0064	<0.0040	<0.0040
Benz(a)anthracene	mg/kg dw	0.0317/0.385 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.028	0.073	0.027	<0.010	<0.010
Benzo(a)pyrene	mg/kg dw	0.0319/0.782 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.026	0.089	0.025	<0.010	<0.010
Benzo(b&j)fluoranthene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.044	0.131	0.043	0.012	0.014
Benzo(e)pyrene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.022	0.061	0.022	<0.010	<0.010
Benzo(g,h,i)perylene	mg/kg dw	0.17/3.2 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.038	0.012	<0.010	<0.010
Benzo(k)fluoranthene	mg/kg dw	0.24/13.4 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	0.040	0.012	<0.010	<0.010
Chrysene	mg/kg dw	0.0571/0.862 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.037	0.077	0.034	0.012	0.012
Dibenz(a,h)anthracene	mg/kg dw	0.00622/0.135 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0143	<0.0050	<0.0050	<0.0050
Fluoranthene	mg/kg dw	0.111/2.355 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.033	0.040	0.029	<0.010	0.011
Fluorene	mg/kg dw	0.021/0.144 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	mg/kg dw	0.2/3.2 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	0.040	0.012	<0.010	<0.010
1-Methylnaphthalene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.030	0.032	0.036	0.014	0.013
2-Methylnaphthalene	mg/kg dw	0.0202/0.201 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.051	0.054	0.060	0.026	0.025
Naphthalene	mg/kg dw	0.0346/0.391 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.021	0.027	0.025	0.011	0.011
Perylene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	0.037	0.018	0.013	<0.010
Phenanthrene	mg/kg dw	0.0419/0.515 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.054	0.047	0.058	0.020	0.023
Pyrene	mg/kg dw	0.053/0.875 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.029	0.040	0.024	<0.010	<0.010
Quinoline	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
d10-Acenaphthene	%	-	67.4	63.4	72.6	64.5	70.4	64	62	66.6	84.7	69.6
d12-Chrysene	%	-	86.2	88.3	85.6	76.7	93.2	88.5	79.3	92.5	95.5	84.5
d8-Naphthalene	%	-	63.8	61	69.3	60.4	66.4	57.6	57.3	62	83.3	65.4
d10-Phenanthrene	%	-	77	76	77.3	66.1	82.4	79	67.2	81.9	80.8	77.3
B(a)P Total Potency Equivalent	mg/kg dw	-	<0.020	<0.020	<0.020	<0.020	<0.020	0.039	0.133	0.037	<0.020	<0.020
IACR (CCME)	mg/kg dw	-	<0.15	<0.15	<0.15	<0.15	<0.15	0.56	1.65	0.52	0.15	0.16

Note: Shaded values were above the lower guidelines (ISQG[b] or LEL[c]). No values exceeded the upper (PEL[b] or SEL[c]) guidelines.

[a] Working sediment quality guidelines (BC MOE 2015).

[b] Interim Sediment Quality Guideline (ISQG; or Threshold Effect Level [LEL])/ Probable Effect Level (PEL).

[c] Lowest Effect Level (LEL)/ Severe Effect Level (SEL).

[d] Gravel = >2.0 mm; Sand = 0.063 to 2.0 mm; Silt = 0.004 to 0.063 mm; Clay = <0.004 mm.

[e] TOC = Total Organic Carbon.

Table C.5: Littoral Sediment Quality in Koocanusa Reservoir, April 2018

Analytes	Units	BC Sediment Quality Guidelines [a]	Downstream of Elk River (RG_GC)				
			GC-1	GC-2	GC-3	GC-4	GC-5
Non-metals							
Moisture	%	-	40.3	41.8	44.3	38.6	43.2
pH (1:2 soil:water)	pH	-	8.08	8.04	8.18	8.23	8.12
Particle size[d]							
% Gravel	%	-	<1.0	<1.0	<1.0	<1.0	<1.0
% Sand	%	-	7.40	1.60	18.7	29.8	6.10
% Silt	%	-	77.3	77.6	65.1	63.0	75.3
% Clay	%	-	15.1	20.1	15.6	6.3	17.9
Carbon							
TOC[e]	%	-	1.76	1.69	1.24	1.66	1.90
Metals (< 1mm fraction)							
Aluminum (Al)	mg/kg dw	-	11,100	14,200	9,870	14,000	12,900
Antimony (Sb)	mg/kg dw	-	0.28	0.34	0.27	0.36	0.31
Arsenic (As)	mg/kg dw	5.9/17 [b]	4.09	5.52	2.68	5.40	5.20
Barium (Ba)	mg/kg dw	-	117	157	105	138	135
Beryllium (Be)	mg/kg dw	-	0.48	0.57	0.36	0.53	0.51
Bismuth (Bi)	mg/kg dw	-	<0.20	0.21	<0.20	0.21	<0.20
Boron (B)	mg/kg dw	-	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	mg/kg dw	0.6/3.5 [b]	0.145	0.216	0.088	0.270	0.164
Calcium (Ca)	mg/kg dw	-	48,300	76,200	26,400	106,000	51,500
Chromium (Cr)	mg/kg dw	37.3/90 [b]	12.8	16.9	10.5	18.5	14.1
Cobalt (Co)	mg/kg dw	-	7.51	8.74	6.73	9.28	8.43
Copper (Cu)	mg/kg dw	35.7/197 [b]	12.5	15.2	10.19	15.3	13.7
Iron (Fe)	mg/kg dw	21,200/43,766 [c]	17,700	20,700	14,950	22,500	19,900
Lead (Pb)	mg/kg dw	35/91 [b]	7.90	10.9	6.08	13.3	8.93
Lithium (Li)	mg/kg dw	-	17.2	22.0	13.7	25.9	19.0
Magnesium (Mg)	mg/kg dw	-	14,100	17,900	12,050	21,100	16,100
Manganese (Mn)	mg/kg dw	460/1,100 [c]	460	601	250	556	455
Mercury (Hg)	mg/kg dw	0.170/0.486 [b]	0.0412	0.0347	0.0623	0.0257	0.0388
Molybdenum (Mo)	mg/kg dw	-	0.33	0.51	0.18	0.68	0.35
Nickel (Ni)	mg/kg dw	16/75 [c]	13.7	17.8	11.3	20.8	15.6
Phosphorus (P)	mg/kg dw	-	546	696	531	567	637
Potassium (K)	mg/kg dw	-	1,170	1,560	880	1,640	1,290
Selenium (Se)	mg/kg dw	2	0.38	0.38	0.21	0.38	0.40
Silver (Ag)	mg/kg dw	0.5	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	mg/kg dw	-	103	157	61	157	109
Strontium (Sr)	mg/kg dw	-	151	141	35.9	233	93.6
Sulfur (S)	mg/kg dw	-	<1,000	<1,000	<1,000	<1,000	<1,000
Thallium (Tl)	mg/kg dw	-	0.077	0.112	0.058	0.122	0.084
Tin (Sn)	mg/kg dw	-	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	mg/kg dw	-	190	191	204	152	180
Tungsten (W)	mg/kg dw	-	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	mg/kg dw	-	0.623	0.769	0.595	0.766	0.641
Vanadium (V)	mg/kg dw	-	14.5	18.4	12.8	18.1	15.5
Zinc (Zn)	mg/kg dw	123/315 [b]	32.9	47.3	22.4	62.6	37.9
Zirconium (Zr)	mg/kg dw	-	1.5	2.2	1.8	2.2	1.8
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg dw	0.00671/0.0889 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	mg/kg dw	0.00587/0.128 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acridine	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	mg/kg dw	0.0469/0.245 [b]	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Benz(a)anthracene	mg/kg dw	0.0317/0.385 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	mg/kg dw	0.0319/0.782 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b&j)fluoranthene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(e)pyrene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	mg/kg dw	0.17/3.2 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	mg/kg dw	0.24/13.4 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	mg/kg dw	0.0571/0.862 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	mg/kg dw	0.00622/0.135 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	mg/kg dw	0.111/2.355 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	mg/kg dw	0.021/0.144 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	mg/kg dw	0.2/3.2 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
1-Methylnaphthalene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
2-Methylnaphthalene	mg/kg dw	0.0202/0.201 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	mg/kg dw	0.0346/0.391 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Perylene	mg/kg dw	-	<0.010	<0.010	0.014	<0.010	<0.010
Phenanthrene	mg/kg dw	0.0419/0.515 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	mg/kg dw	0.053/0.875 [b]	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010
d10-Acenaphthene	%	-	68.6	64.8	67.5	65.7	76.6
d12-Chrysene	%	-	89.4	80.9	90.4	89.2	90.4
d8-Naphthalene	%	-	64.4	61.5	63.9	62.7	73.8
d10-Phenanthrene	%	-	82.4	68.9	78.15	71.5	86.7
B(a)P Total Potency Equivalent	mg/kg dw	-	<0.020	<0.020	<0.020	<0.020	<0.020
IACR (CCME)	mg/kg dw	-	<0.15	<0.15	<0.15	<0.15	<0.15

Note: Shaded values were above the lower guidelines (ISQG[b] or LEL[c]). No values exceeded the upper (PEL[b] or SEL[c]) guidelines.

[a] Working sediment quality guidelines (BC MOE 2015).

[b] Interim Sediment Quality Guideline (ISQG; or Threshold Effect Level [LEL])/ Probable Effect Level (PEL).

[c] Lowest Effect Level (LEL)/ Severe Effect Level (SEL).

[d] Gravel = >2.0 mm; Sand = 0.063 to 2.0 mm; Silt = 0.004 to 0.063 mm; Clay = <0.004 mm.

[e] TOC = Total Organic Carbon.

Table C.6: Profundal Sediment Quality in Koocanusa Reservoir, August 2019

Analytes	Units	BC Sediment Quality Guidelines [a]	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
			TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Non-metals												
Moisture	%	-	37	37	35	34	34	41	41	39	38	39
pH (1:2 soil:water)	pH	-	8.3	8.2	8.3	8.3	8.4	8.1	8.2	8.2	8.1	8.2
Particle size												
% Gravel (>2mm)	%	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
% Sand (2.00mm - 0.063mm)	%	-	5.9	8.5	5.5	18	23	0.0	0.0	2.8	5.8	3.6
% Silt (0.063mm - 0.004mm)	%	-	80	75	81	68	67	78	78	80	79	78
% Clay (<4um)	%	-	14	15	14	14	9.8	21	22	16	15	18
Carbon												
Total Organic Carbon	%	-	1.3	1.3	1.2	1.3	1.3	1.5	1.4	1.7	2.0	1.2
Metals												
Aluminum (Al)	mg/kg dw	-	11,900	12,400	12,000	11,300	11,400	12,200	12,200	12,700	12,000	12,300
Antimony (Sb)	mg/kg dw	-	0.27	0.26	0.25	0.24	0.27	0.40	0.40	0.39	0.38	0.33
Arsenic (As)	mg/kg dw	5.9/17 [b]	5.5	5.7	5.6	5.5	6.0	6.4	6.3	6.5	6.1	6.3
Barium (Ba)	mg/kg dw	-	72	76	71	71	64	151	148	134	120	115
Beryllium (Be)	mg/kg dw	-	0.39	0.42	0.38	0.36	0.36	0.54	0.57	0.54	0.51	0.48
Bismuth (Bi)	mg/kg dw	-	<0.20	0.20	<0.20	<0.20	<0.20	0.20	0.21	0.21	0.20	0.21
Boron (B)	mg/kg dw	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	mg/kg dw	0.6/3.5 [b]	0.17	0.17	0.15	0.16	0.16	0.51	0.50	0.45	0.41	0.33
Calcium (Ca)	mg/kg dw	-	105,000	112,000	109,000	112,000	98,200	98,800	100,000	103,000	96,200	105,000
Chromium (Cr)	mg/kg dw	37.3/90 [b]	18	19	18	17	18	19	19	21	19	19
Cobalt (Co)	mg/kg dw	-	8.5	8.7	8.5	8.1	8.2	8.4	8.4	9.0	8.7	8.6
Copper (Cu)	mg/kg dw	35.7/197 [b]	14	14	14	13	14	16	16	17	17	15
Iron (Fe)	mg/kg dw	21,200/43,766 [c]	22,000	23,100	22,400	21,500	21,900	22,000	22,100	23,100	21,700	22,500
Lead (Pb)	mg/kg dw	35/91 [b]	15	15	15	14	15	14	15	16	16	15
Lithium (Li)	mg/kg dw	-	26	26	25	24	24	22	24	24	24	25
Magnesium (Mg)	mg/kg dw	-	23,200	24,600	24,100	23,800	23,200	22,000	22,200	23,400	22,500	22,300
Manganese (Mn)	mg/kg dw	460/1,100 [c]	468	464	454	443	418	572	550	541	496	529
Mercury (Hg)	mg/kg dw	0.170/0.486 [b]	0.023	0.027	0.022	0.045	0.017	0.038	0.039	0.032	0.036	0.023
Molybdenum (Mo)	mg/kg dw	-	0.57	0.57	0.54	0.53	0.52	0.83	0.83	0.84	0.73	0.71
Nickel (Ni)	mg/kg dw	16/75 [c]	20	20	20	19	19	22	22	23	22	21
Phosphorus (P)	mg/kg dw	-	532	594	557	606	559	724	752	753	690	625
Potassium (K)	mg/kg dw	-	920	1,050	880	840	810	1,330	1,360	1,300	1,160	1,200
Selenium (Se)	mg/kg dw	2	<0.20	<0.20	<0.20	<0.20	<0.20	0.68	0.69	0.65	0.56	0.46
Silver (Ag)	mg/kg dw	0.5	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	0.10	0.10	<0.10	<0.10
Sodium (Na)	mg/kg dw	-	91	118	93	93	88	100	102	99	91	97
Strontium (Sr)	mg/kg dw	-	252	265	257	251	221	201	197	216	202	234
Sulfur (S)	mg/kg dw	-	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	mg/kg dw	-	0.088	0.090	0.081	0.077	0.079	0.15	0.16	0.15	0.13	0.12
Tin (Sn)	mg/kg dw	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	mg/kg dw	-	118	139	130	127	129	55	64	81	82	91
Tungsten (W)	mg/kg dw	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	mg/kg dw	-	0.74	0.71	0.71	0.65	0.61	0.76	0.76	0.82	0.82	0.77
Vanadium (V)	mg/kg dw	-	14	15	14	14	14	19	20	20	18	17
Zinc (Zn)	mg/kg dw	123/315 [b]	62	64	62	59	64	74	74	76	73	70
Zirconium (Zr)	mg/kg dw	-	1.5	1.5	1.6	2.2	1.5	1.5	1.5	1.5	1.5	1.3
Polycyclic Aromatic Hydrocarbons												
Acenaphthene	mg/kg dw	0.00671/0.0889 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	mg/kg dw	0.00587/0.128 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acridine	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010
Anthracene	mg/kg dw	0.0469/0.245 [b]	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Benz(a)anthracene	mg/kg dw	0.0317/0.385 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010
Benzo(a)pyrene	mg/kg dw	0.0319/0.782 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b&j)fluoranthene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	0.015	<0.010	0.011	<0.010
Benzo(b+j+k)fluoranthene	mg/kg dw	-	<0.015	<0.015	<0.015	<0.015	<0.015	0.015	0.019	<0.015	<0.015	<0.015
Benzo(e)pyrene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	mg/kg dw	0.17/3.2 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	mg/kg dw	0.24/13.4 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	mg/kg dw	0.0571/0.862 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.016	0.019	0.010	0.011	<0.010
Dibenz(a,h)anthracene	mg/kg dw	0.00622/0.135 [b]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	mg/kg dw	0.111/2.355 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	0.014	<0.010	0.011	<0.010
Fluorene	mg/kg dw	0.021/0.144 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	mg/kg dw	0.2/3.2 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
1-Methylnaphthalene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.026	0.030	0.018	0.017	0.016
2-Methylnaphthalene	mg/kg dw	0.0202/0.201 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.045	0.050	0.029	0.027	0.027
Naphthalene	mg/kg dw	0.0346/0.391 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	0.020	0.013	0.013	0.014
Perylene	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	<0.010	<0.010	<0.010
Phenanthrene	mg/kg dw	0.0419/0.515 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.037	0.042	0.023	0.022	0.025
Pyrene	mg/kg dw	0.053/0.875 [b]	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	0.012	<0.010	<0.010	<0.010
Quinoline	mg/kg dw	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
d10-Acenaphthene	%	-	73.0	75.0	79.9	79.4	77.2	82.5	81.6	77.0	80.3	85.0
d12-Chrysene	%	-	88.7	89.2	92.9	92.3	89.4	97.6	96.0	94.1	91.9	98.7
d8-Naphthalene	%	-	69.8	73.3	78.2	78.2	77.3	81.8	82.2	75.1	81.5	82.6
d10-Phenanthrene	%	-	86.4	90.3	90.9	92.6	90.4	91.8	90.2	92.9	88.9	100
B(a)P Total Potency Equivalent	mg/kg dw	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
IACR (CCME)	mg/kg dw	-	<0.15	<0.15	<0.15	<0.15	<0.15	0.15	0.2	<0.15	<0.15	<0.15

Notes: Shaded values were above the lower guidelines (ISQG [b] or LEL[c]). No values exceeded the upper (PEL [b] or SEL[c]) guidelines, "-" indicates no guideline.

[a] Working Sediment Quality Guidelines (BC MOE 2015).

[b] Interim Sediment Quality Guideline (ISQG; or Threshold Effect Level [LEL])/ Probable Effect Level (PEL).

[c] Lowest Effect Level (LEL)/ Severe Effect Level (SEL).

Table C.7: Statistical Comparisons of Particle Size, and Metal and PAH Concentrations Between Downstream (RG_T4) and Upstream (RG_TN) Profundal Transects, August 2018

Parameter	Test[a]	P-value	Magnitude of Difference for RG_T4 Relative to RG_TN (%)[b]
% Moisture	t	0.140	-
pH (1:2 soil:water)	t_{log}	0.260	-
% Gravel	nt	-	-
% Sand	Wilcoxon	0.163	-
% Silt	t	0.463	-
% Clay	t_{log}	0.002	100
TOC	t_{log}	0.286	-
Aluminum	t	0.132	-
Antimony	t_{log}	<0.001	49
Arsenic	t	0.030	8.6
Barium	t	<0.001	116
Beryllium	t	<0.001	46
Bismuth	Wilcoxon	0.317	-
Boron	nt	-	-
Cadmium	t_{log}	<0.001	191
Calcium	t_{log}	0.018	10
Chromium	t	0.007	17
Cobalt	t_{log}	0.021	13
Copper	t_{log}	0.081	-
Iron	t_{log}	0.016	11
Lead	t_{log}	0.684	-
Lithium	t	0.121	-
Magnesium	t_{log}	0.323	-
Manganese	t	<0.001	38
Mercury	t	0.002	88
Molybdenum	t_{log}	<0.001	62
Nickel	t_{log}	0.001	26
Phosphorus	t_{log}	0.001	32
Potassium	t_{log}	<0.001	47
Selenium	Wilcoxon	0.004	>158
Silver	Wilcoxon	0.134	-
Sodium	t_{log}	0.001	17
Strontium	t_{log}	0.837	-
Sulfur	nt	-	-
Thallium	t	<0.001	70
Tin	nt	-	-
Titanium	t	0.001	-38
Tungsten	nt	-	-
Uranium	t	0.167	-
Vanadium	t	<0.001	42
Zinc	t_{log}	0.001	23
Zirconium	Wilcoxon	0.020	19
Acenaphthene	nt	-	-
Acenaphthylene	nt	-	-
Acridine	nt	-	-
Anthracene	nt	-	-
Benz(a)anthracene	Wilcoxon	0.136	-
Benzo(a)pyrene	nt	-	-
Benzo(b&j)fluoranthene	Wilcoxon	0.016	>50
Benzo(e)pyrene	Wilcoxon	0.052	-

P-value < 0.05.
Comparison to Upstream (RG_TN) is significant (α = 0.05) and magnitude of difference is positive.
Comparison to Upstream (RG_TN) is significant (α = 0.05) and magnitude of difference is negative.

Notes: nt = not tested; ns = not significant, LRL = laboratory reporting limit.

[a] nt = not tested because all values were reported below the LRL; t = two-sample t-test; log = log10-transformation; MW = Mann-Whitney; Wilcoxon = Wilcoxon score test.

[b] Magnitude of difference calculated as $(MCT_{downstream} - MCT_{upstream})/(MCT_{upstream})\times 100\%$, where MCT is the measure of central tendency = mean (ANOVA), geometric mean ($ANOVA_{log}$), median (Wilcoxon or KW tests).

Table C.7: Statistical Comparisons of Particle Size, and Metal and PAH Concentrations Between Downstream (RG_T4) and Upstream (RG_TN) Profundal Transects, August 2018

Parameter	Test[a]	P-value	Magnitude of Difference for RG_T4 Relative to RG_TN (%)[b]
Benzo(g,h,i)perylene	Wilcoxon	0.317	-
Benzo(k)fluoranthene	nt	-	-
Chrysene	Wilcoxon	0.094	-
Dibenz(a,h)anthracene	Wilcoxon	0.317	-
Fluoranthene	Wilcoxon	0.017	>40
Fluorene	nt	-	-
Indeno(1,2,3-c,d)pyrene	nt	-	-
1-Methylnaphthalene	Wilcoxon	0.017	>130
2-Methylnaphthalene	Wilcoxon	0.004	>300
Naphthalene	Wilcoxon	0.017	>40
Perylene	Wilcoxon	0.052	-
Phenanthrene	Wilcoxon	0.004	>290
Pyrene	Wilcoxon	0.017	>10
Quinoline	nt	-	-
d10-Acenaphthene	t	0.898	-
d12-Chrysene	MW	0.075	-
d8-Naphthalene	t	0.891	-
d10-Phenanthrene	t	0.660	-
B(a)P Total Potency Equivalent	nt	-	-
IACR (CCME)	Wilcoxon	0.016	>20

P-value < 0.05.
Comparison to Upstream (RG_TN) is significant (α = 0.05) and magnitude of difference is positive.
Comparison to Upstream (RG_TN) is significant (α = 0.05) and magnitude of difference is negative.

Notes: nt = not tested; ns = not significant, LRL = laboratory reporting limit.

[a] nt = not tested because all values were reported below the LRL; t = two-sample t-test; log = log10-transformation; MW = Mann-Whitney; Wilcoxon = Wilcoxon score test.

[b] Magnitude of difference calculated as $(MCT_{downstream} - MCT_{upstream})/(MCT_{upstream})\times 100\%$, where MCT is the measure of central tendency = mean (ANOVA), geometric mean ($ANOVA_{log}$), median (Wilcoxon or KW tests).

Table C.8: Statistical Comparisons of Sediment Particle Size, and Metal and PAH Concentrations Among Areas for Sand Creek (RG_SC: Upstream), Elk River (RG_ER: Downstream), and Gold Creek (RG_GC: Downstream) Littoral Study Areas, April 2018

Parameter	Test[a]	P-value	Pairwise Comparisons Among Areas[b]			Magnitude of Difference Relative to Reference (RG_SC) (%)[c]	
			RG_SC	RG_ER	RG_GC	RG_ER	RG_GC
% Moisture	ANOVA	0.105	A	A	A	-	-
pH (1:2 soil:water)	$ANOVA_{log}$	0.173	A	A	A	-	-
% Gravel	Wilcoxon	0.024	A	A	A	-	-
% Sand	ANOVA	0.353	A	A	A	-	-
% Silt	ANOVA	0.229	A	A	A	-	-
% Clay	$ANOVA_{log}$	0.604	A	A	A	-	-
TOC	ANOVA	0.019	B	A	AB	39	-
Aluminum	$ANOVA_{log}$	0.087	A	A	A	-	-
Antimony	$ANOVA_{log}$	0.004	B	A	B	44	-
Arsenic	ANOVA	0.385	A	A	A	-	-
Barium	ANOVA	<0.001	B	A	A	114	76
Beryllium	ANOVA	0.024	B	A	AB	32	-
Bismuth	Wilcoxon	0.377	A	A	A	-	-
Boron	Wilcoxon	0.003	A	A	A	-	-
Cadmium	$ANOVA_{log}$	<0.001	B	A	B	194	-
Calcium	ANOVA	0.016	A	AB	B	-	-43
Chromium	$ANOVA_{log}$	0.634	A	A	A	-	-
Cobalt	$ANOVA_{log}$	0.077	A	A	A	-	-
Copper	$ANOVA_{log}$	0.774	A	A	A	-	-
Iron	ANOVA	0.085	A	A	A	-	-
Lead	$ANOVA_{log}$	0.044	A	AB	B	-	-38
Lithium	ANOVA	0.284	A	A	A	-	-
Magnesium	ANOVA	0.070	A	A	A	-	-
Manganese	ANOVA	0.748	A	A	A	-	-
Mercury	$ANOVA_{log}$	<0.001	C	B	A	89	193
Molybdenum	KW	0.006	AB	A	B	-	-
Nickel	ANOVA	0.723	A	A	A	-	-
Phosphorus	ANOVA	0.001	B	A	B	66	-
Potassium	$ANOVA_{log}$	0.009	B	A	A	55	52
Selenium	Wilcoxon	<0.001	C	A	B	220	90
Silver	Wilcoxon	0.108	A	A	A	-	-
Sodium	ANOVA	0.886	A	A	A	-	-
Strontium	ANOVA	0.017	A	B	B	-43	-47
Sulfur	nt	-	A	A	A	-	-
Thallium	$ANOVA_{log}$	0.002	B	A	B	82	-
Tin	nt	-	A	A	A	-	-
Titanium	$ANOVA_{log}$	<0.001	A	B	A	-56	-
Tungsten	nt	-	A	A	A	-	-
Uranium	$ANOVA_{log}$	0.107	A	A	A	-	-
Vanadium	ANOVA	0.001	B	A	AB	48	-
Zinc	ANOVA	0.027	AB	A	B	-	-
Zirconium	ANOVA	0.021	AB	B	A	-	-
Acenaphthene	nt	-	A	A	A	-	-
Acenaphthylene	Wilcoxon	0.368	A	A	A	-	-
Acridine	nt	-	A	A	A	-	-
Anthracene	Wilcoxon	0.024	A	A	A	-	-
Benz(a)anthracene	Wilcoxon	0.024	A	A	A	-	-
Benzo(a)pyrene	Wilcoxon	0.024	A	A	A	-	-
Benzo(b&j)fluoranthene	Wilcoxon	<0.001	B	A	B	>330	-
Benzo(e)pyrene	Wilcoxon	0.026	A	A	A	-	-
Benzo(g,h,i)perylene	Wilcoxon	0.024	A	A	A	-	-

P-value < 0.05.
Comparison to Upstream (RG_SC) is significant (α = 0.05) and magnitude of difference is positive.
Comparison to Upstream (RG_SC) is significant (α = 0.05) and magnitude of difference is negative.

Notes: nt = not tested; ns = not significant, LRL = laboratory reporting limit.

[a] nt = not tested because all values were reported below the LRL; ANOVA = analysis of variance; log = log10-transformation; KW = Kruskal-Wallis test; Wilcoxon = Wilcoxon score test.

[b] Areas that share a letter (e.g., A,B,C) do not differ significantly among areas. Letters are assigned such that A is assigned to the area with the highest concentration.

[c] Magnitude of difference calculated as $(MCT_{downstream} - MCT_{upstream})/(MCT_{upstream})\times 100\%$, where MCT is the measure of central tendency = mean (ANOVA), geometric mean ($ANOVA_{log}$), median (Wilcoxon or KW tests).

Table C.8: Statistical Comparisons of Sediment Particle Size, and Metal and PAH Concentrations Among Areas for Sand Creek (RG_SC: Upstream), Elk River (RG_ER: Downstream), and Gold Creek (RG_GC: Downstream) Littoral Study Areas, April 2018

Parameter	Test[a]	P-value	Pairwise Comparisons Among Areas[b]			Magnitude of Difference Relative to Reference (RG_SC) (%)[c]	
			RG_SC	RG_ER	RG_GC	RG_ER	RG_GC
Benzo(k)fluoranthene	Wilcoxon	0.024	A	A	A	-	-
Chrysene	Wilcoxon	<0.001	B	A	B	>240	-
Dibenz(a,h)anthracene	Wilcoxon	0.368	A	A	A	-	-
Fluoranthene	Wilcoxon	0.003	A	A	A	-	-
Fluorene	nt	-	A	A	A	-	-
Indeno(1,2,3-c,d)pyrene	Wilcoxon	0.024	A	A	A	-	-
1-Methylnaphthalene	Wilcoxon	<0.001	B	A	B	>200	-
2-Methylnaphthalene	Wilcoxon	<0.001	B	A	B	>410	-
Naphthalene	Wilcoxon	<0.001	B	A	B	>110	-
Perylene	Wilcoxon	0.012	A	A	A	-	-
Phenanthrene	Wilcoxon	<0.001	B	A	B	>370	-
Pyrene	Wilcoxon	0.024	A	A	A	-	-
Quinoline	nt	-	A	A	A	-	-
d10-Acenaphthene	$ANOVA_{log}$	0.933	A	A	A	-	-
d12-Chrysene	ANOVA	0.800	A	A	A	-	-
d8-Naphthalene	KW	0.779	A	A	A	-	-
d10-Phenanthrene	ANOVA	0.898	A	A	A	-	-
B(a)P Total Potency Equivalent	Wilcoxon	0.024	A	A	A	-	-
IACR (CCME)	Wilcoxon	<0.001	B	A	B	>247	-

P-value < 0.05.
Comparison to Upstream (RG_SC) is significant (α = 0.05) and magnitude of difference is positive.
Comparison to Upstream (RG_SC) is significant (α = 0.05) and magnitude of difference is negative.

Notes: nt = not tested; ns = not significant, LRL = laboratory reporting limit.

[a] nt = not tested because all values were reported below the LRL; ANOVA = analysis of variance; log = log10-transformation; KW = Kruskal-Wallis test; Wilcoxon = Wilcoxon score test.

[b] Areas that share a letter (e.g., A,B,C) do not differ significantly among areas. Letters are assigned such that A is assigned to the area with the highest concentration.

[c] Magnitude of difference calculated as $(MCT_{downstream} - MCT_{upstream})/(MCT_{upstream})\times 100\%$, where MCT is the measure of central tendency = mean (ANOVA), geometric mean ($ANOVA_{log}$), median (Wilcoxon or KW tests).

Table C.9: Statistical Comparisons of Sediment Particle Size, and Metal and PAH Concentrations Between Downstream (RG_T4) and Upstream (RG_TN) Profundal Transects, August 2019

Parameter	Units	Test [a]	Summary Statistics	Test P-value	MCT		MOD [b]
					RG_TN	RG_T4	
% Moisture	%	tequal	Mean	0.00188	35.5	39.4	11
pH (1:2 soil:water)	pH unit	tequal	Mean	0.00310	8.30	8.17	-1.6
% Gravel	%	nt	-	-	-	-	-
% Sand	%	nt	-	-	-	-	-
% Silt	%	tunequal	Mean	0.181	74.1	78.7	ns
% Clay	%	tequal	Mean	0.0152	13.3	18.4	39
TOC	%	tequal	Mean	0.0680	1.27	1.56	ns
Aluminum	mg/kg	tequal	Mean	0.0736	11,800	12,280	ns
Antimony	mg/kg	tequal	Mean	<0.001	0.258	0.380	47
Arsenic	mg/kg	tequal	Mean	<0.001	5.64	6.29	12
Barium	mg/kg	tunequal	Mean	<0.001	70.8	134	89
Beryllium	mg/kg	tequal	Mean	<0.001	0.382	0.528	38
Bismuth	mg/kg	M-W	Median	0.067	<0.20	0.21	ns
Boron	mg/kg	nt	-	-	-	-	-
Cadmium	mg/kg	tunequal	Mean	<0.001	0.160	0.440	174
Calcium	mg/kg	tequal	Mean	0.0596	107,240	100,600	ns
Chromium	mg/kg	tequal	Mean	0.0465	17.8	19.1	7.2
Cobalt	mg/kg	tequal	Mean	0.147	8.38	8.62	ns
Copper	mg/kg	tequal	Mean	<0.001	13.8	16.0	16
Iron	mg/kg	tequal	Mean	0.790	22,180	22,280	ns
Lead	mg/kg	tequal	Mean	0.468	14.8	15.2	ns
Lithium	mg/kg	tequal	Mean	0.247	24.8	23.9	ns
Magnesium	mg/kg	tequal	Mean	0.00718	23,780	22,480	-5.5
Manganese	mg/kg	tequal	Mean	<0.001	449	538	20
Mercury	mg/kg	tequal	Mean	0.237	0.0266	0.0337	ns
Molybdenum	mg/kg	tequal	Mean	<0.001	0.546	0.788	44
Nickel	mg/kg	tequal	Mean	<0.001	19.4	21.9	13
Phosphorous	mg/kg	tequal	Mean	<0.001	570	709	24
Potassium	mg/kg	tequal	Mean	<0.001	900	1,270	41
Selenium	mg/kg	M-W	Median	0.0075	<0.20	0.65	225
Silver	mg/kg	M-W	Median	0.424	<0.10	0.10	ns
Sodium	mg/kg	M-W	Median	0.344	93.0	99.0	ns
Strontium	mg/kg	tequal	Mean	0.00468	249	210	-16
Sulfur	mg/kg	nt	-	-	-	-	-
Thallium	mg/kg	tequal	Mean	<0.001	0.0830	0.143	72
Tin	mg/kg	nt	-	-	-	-	-
Titanium	mg/kg	tequal	Mean	<0.001	129	74.5	-42
Tungsten	mg/kg	nt	-	-	-	-	-
Uranium	mg/kg	tequal	Mean	0.00702	0.683	0.786	15
Vanadium	mg/kg	tequal	Mean	<0.001	14.0	18.8	35
Zinc	mg/kg	tequal	Mean	<0.001	62.0	73.3	18
Zirconium	mg/kg	M-W	Median	0.123	1.50	1.50	ns
Acenaphthene	mg/kg	nt	-	-	-	-	-
Acenaphthylene	mg/kg	nt	-	-	-	-	-
Acridine	mg/kg	nt	-	-	-	-	-
Anthracene	mg/kg	nt	-	-	-	-	-
Benz(a)anthracene	mg/kg	nt	-	-	-	-	-
Benzo(a)pyrene	mg/kg	nt	-	-	-	-	-
Benzo(b&j)fluoranthene	mg/kg	M-W	Median	0.072	<0.010	0.011	ns
Benzo(e)pyrene	mg/kg	nt	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg	nt	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	nt	-	-	-	-	-
Chrysene	mg/kg	M-W	Median	0.072	<0.010	0.011	ns
Dibenz(a,h)anthracene	mg/kg	nt	-	-	-	-	-
Fluoranthene	mg/kg	M-W	Median	0.072	<0.010	0.011	ns
Fluorene	mg/kg	nt	-	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg	nt	-	-	-	-	-
1-Methylnaphthalene	mg/kg	M-W	Median	0.0075	<0.010	0.018	80
2-Methylnaphthalene	mg/kg	M-W	Median	0.0073	<0.010	0.029	190
Naphthalene	mg/kg	M-W	Median	0.0073	<0.010	0.014	40
Perylene	mg/kg	nt	-	-	-	-	-
Phenanthrene	mg/kg	M-W	Median	0.0075	<0.010	0.025	150
Pyrene	mg/kg	nt	-	-	-	-	-
Quinoline	mg/kg	nt	-	-	-	-	-
d10-Acenaphthene	mg/kg	tequal	Mean	0.0459	76.9	81.3	5.7
d12-Chrysene	mg/kg	tequal	Mean	0.00874	90.5	95.7	5.7
d8-Naphthalene	mg/kg	M-W	Median	0.0593	77.3	81.8	ns
d10-Phenanthrene	mg/kg	tequal	Mean	0.262	90.1	92.8	ns
B(a)P Total Potency Equivalent	mg/kg	nt	-	-	-	-	-
IACR (CCME)	mg/kg	nt	-	-	-	-	-

Indicates significant difference between study areas at a P-value < 0.05.

Comparison to Upstream (RG_SC) is significant (α = 0.05) and magnitude of difference is positive.

Comparison to Upstream (RG_SC) is significant (α = 0.05) and magnitude of difference is negative.

Notes: nt = not tested; ns = not significant; M-W = Mann-Whitney, tequal = t-test equal variance; tunequal = t-test unequal variance. "-" indicates no data available.

[a] nt = not tested because more than 80% of the values were below the laboratory detection limit.

[b] Magnitude of difference calculated as $(MCT_{Mine\text{-}exposed} - MCT_{Reference})/(MCT_{Reference})\times 100\%$, where MCT is the measure of central tendency = mean (ANOVA, tunequal, and tequal), geometric mean ($ANOVA_{log}$), median (Mann–Whitney or KW tests).

Table C.10: Statistical Comparison of Chemical Sediment Characteristics Between Downstream and Upstream Profundal Transects, 2015 to 2019

Endpoint	Transformation	ANOVA P-Values			Year	MCT		Post-hoc Contrasts				
		Interaction	Area	Year		US	DS	Area MOD (%)[a]	Temporal MOD (%)[b]		Significant Differences[c]	
									US	DS	US	DS
Total Organic Carbon (%)	rank	0.007	-	-	2015	1.03	1.47	43.4	b		C	B
					2016	1.20	1.20	0	17.1	-18.4	BC	C
					2018	1.99	2.19	10.1	94.1	49.0	A	A
					2019	1.27	1.45	14.2	23.9	-1.36	BC	AB
Aluminum (Al) (mg/kg)	none	0.824	0.009	<0.001	2015	13,680	14,110	6.29	b		A	
					2016	11,280	12,260		-15.3		B	
					2018	11,116	12,520		-14.9		B	
					2019	11,800	12,280		-13.4		B	
Antimony (Sb) (mg/kg)	rank	0.575	<0.001	<0.001	2015	0.365	0.540	41.0	b		A	
					2016	0.260	0.390		-31.2		C	
					2018	0.290	0.420		-19.4		B	
					2019	0.260	0.390		-35.5		C	
Arsenic (As) (mg/kg)	log10	0.329	<0.001	<0.001	2015	6.84	7.68	10.7	b		A	
					2016	5.44	6.31		-19.1		B	
					2018	6.84	7.37		-2.13		A	
					2019	5.64	6.29		-17.9		B	
Barium (Ba) (mg/kg)	rank	0.591	<0.001	<0.001	2015	98.0	178	102	b		A	
					2016	67.5	133		-35.9		B	
					2018	71.1	141		-39.6		B	
					2019	71.2	134		-39.2		B	
Beryllium (mg/kg)	log10	0.857	<0.001	<0.001	2015	0.522	0.677	36.6	b		A	
					2016	0.412	0.590		-16.4		B	
					2018	0.336	0.490		-31.1		C	
					2019	0.382	0.528		-24.1		BC	
Bismuth (Bi) (mg/kg)	rank	0.623	0.180	<0.001	2015	0.250	0.235	ns	b		A	
					2016	0.100	0.100		-57.4		B	
					2018	0.100	0.100		-57.4		B	
					2019	0.100	0.210		-57.4		B	
Boron (B) (mg/kg)	rank	<0.001	-	-	2015	2.50	7.75	210	b		A	A
					2016	2.50	5.70	128	0	-26.5	A	B
					2018	2.50	2.50	0	0	-67.7	A	C
					2019	2.50	2.50	0	0	-67.7	A	C
Cadmium (Cd) (mg/kg)	rank	0.793	<0.001	<0.001	2015	0.240	0.675	203	b		A	
					2016	0.187	0.528		-37.1		B	
					2018	0.171	0.486		-49.6		BC	
					2019	0.156	0.450		-53.0		C	
Calcium (Ca) (mg/kg)	none	0.042	-	-	2015	106,650	100,190	-6.06	b	b	A	B
					2016	102,180	96,100	-5.95	-4.19	-4.08	A	B
					2018	109,800	118,600	8.01	2.95	18.4	A	A
					2019	107,240	100,600	-6.19	0.553	0.409	A	B
Chromium (Cr) (mg/kg)	log10	0.835	<0.001	<0.001	2015	20.3	22.7	11.4	b		A	
					2016	15.8	17.4		-22.8		C	
					2018	16.6	19.3		-16.7		BC	
					2019	17.8	19.1		-14.1		B	
Cobalt (Co) (mg/kg)	log10	0.018	-	-	2015	10.2	9.60	-6.07	b	b	A	A
					2016	7.99	8.02	0.300	-21.8	-16.5	B	B
					2018	8.75	9.77	11.7	-14.4	1.79	B	A
					2019	8.38	8.62	2.86	-18.0	-10.2	B	B
Copper (Cu) (mg/kg)	log10	0.495	0.040	<0.001	2015	17.5	18.8	5.85	b		B	
					2016	23.4	22.4		25.7		A	
					2018	14.8	16.9		-12.8		C	
					2019	13.8	16.0		-17.9		C	

Model significant (p-value < 0.1).

MOD > 0 (Downstream greater than Upstream, or year greater than baseline).

MOD < 0 (Dowstream less than Upstream, or year less than baseline).

Note: "-" indicates not applicable as no data were collected for this species in the given year. DS =Downtrean and US = upstream.

[a] Signifcant differences determined using a Tukey's Honestly Significant Difference Test (α of 0.1) and magnitudes of difference (MOD) reported as (DS - US)/US*100 % for significant differences.

[b] Signifcant differences from base year determined using a Tukey's Honestly Significant Difference Test (α of 0.1) and MOD reported as (Year - Base

[c] Years that do not share a letter are significantly different from each other.

Table C.10: Statistical Comparison of Chemical Sediment Characteristics Between Downstream and Upstream Profundal Transects, 2015 to 2019

Endpoint	Transformation	ANOVA P-Values			Year	MCT		Post-hoc Contrasts				
		Interaction	Area	Year		US	DS	Area MOD (%)[a]	Temporal MOD (%)[b]		Significant Differences[c]	
									US	DS	US	DS
Iron (Fe) (mg/kg)	none	0.004	-	-	2015	23,520	22,720	-3.40	b	b	A	A
					2016	19,980	20,240	1.30	-15.1	-10.9	C	B
					2018	21,400	23,620	10.4	-9.01	3.96	BC	A
					2019	22,180	22,280	0.451	-5.70	-1.94	AB	A
Lead (Pb) (mg/kg)	log10	0.080	-	-	2015	15.5	14.5	-6.46	b	b	A	AB
					2016	14.0	13.4	-4.71	-9.43	-7.73	B	C
					2018	15.8	15.2	-3.55	1.94	5.11	A	A
					2019	14.8	15.2	2.29	-4.13	4.83	AB	A
Lithium (Li) (mg/kg)	none	0.045	-	-	2015	26.7	24.9	-7.00	b	b	A	A
					2016	24.9	24.4	-2.25	-6.77	-2.01	AB	A
					2018	23.3	25.0	6.94	-12.7	0.402	B	A
					2019	24.8	23.9	-3.31	-7.37	-3.70	B	A
Magnesium (Mg) (mg/kg)	none	0.292	0.003	<0.001	2015	21,880	19,620	-6.49	b		B	
					2016	19,820	18,020		-8.82		C	
					2018	24,260	25,060		18.8		A	
					2019	23,780	22,480		11.5		A	
Manganese (Mn) (mg/kg)	rank	0.253	<0.001	<0.001	2015	501	613	31.8	b		A	
					2016	398	518		-22.0		B	
					2018	423	568		-19.4		B	
					2019	454	541		-18.9		B	
Mercury (Hg) (mg/kg)	rank	0.769	<0.001	<0.001	2015	0.0312	0.0497	51.9	b		A	
					2016	0.0167	0.0290		-43.6		C	
					2018	0.0150	0.0291		-51.3		C	
					2019	0.0231	0.0360		-29.8		B	
Molybdenum (Mo) (mg/kg)	log10	0.980	<0.001	<0.001	2015	0.891	1.33	50.5	b		A	
					2016	0.630	0.942		-29.2		BC	
					2018	0.596	0.954		-30.1		BC	
					2019	0.546	0.788		-39.9		C	
Nickel (Ni) (mg/kg)	log10	0.351	<0.001	<0.001	2015	24.5	26.7	12.5	b		A	
					2016	19.3	21.6		-20.1		B	
					2018	18.6	23.1		-18.5		B	
					2019	19.4	21.9		-19.2		B	
Phosphorus (P) (mg/kg)	log10	0.177	<0.001	<0.001	2015	564	806	34.1	b		B	
					2016	493	670		-15.1		C	
					2018	650	853		9.76		A	
					2019	570	709		-6.64		B	
Potassium (K) (mg/kg)	log10	0.717	<0.001	<0.001	2015	1,572	2,450	57.1	b		A	
					2016	834	1,504		-41.9		C	
					2018	716	1,050		-56.1		D	
					2019	900	1,270		-46.0		CD	
Selenium (Se) (mg/kg)	rank	0.002	-	-	2015	0.265	0.715	170	b		A	A
					2016	0.100	0.670	570	-62.3	-6.29	C	AB
					2018	0.100	0.510	410	-62.3	-28.7	BC	C
					2019	0.100	0.650	550	-62.3	-9.09	C	BC
Silver (Ag) (mg/kg)	rank	0.021	-	-	2015	0.0500	0.135	169	b		A	A
					2016	0.0500	0.120	140	0	-10.8	A	AB
					2018	0.0500	0.0500	0	0	-62.8	A	BC
					2019	0.0500	0.0500	0	0	-62.8	A	C
Sodium (Na) (mg/kg)	rank	0.197	<0.001	<0.001	2015	113	126	15.2	b		B	
					2016	91.0	111		-14.5		C	
					2018	82.0	100		-27.7		D	
					2019	93.0	99.0		-23.7		CD	

Model significant (p-value < 0.1).

MOD > 0 (Downstream greater than Upstream, or year greater than baseline).

MOD < 0 (Dowstream less than Upstream, or year less than baseline).

Note: "-" indicates not applicable as no data were collected for this species in the given year. DS =Downtrean and US = upstream.

[a] Signifcant differences determined using a Tukey's Honestly Significant Difference Test (α of 0.1) and magnitudes of difference (MOD) reported as (DS - US)/US*100 % for significant differences.

[b] Signifcant differences from base year determined using a Tukey's Honestly Significant Difference Test (α of 0.1) and MOD reported as (Year - Base

[c] Years that do not share a letter are significantly different from each other.

Table C.10: Statistical Comparison of Chemical Sediment Characteristics Between Downstream and Upstream Profundal Transects, 2015 to 2019

Endpoint	Transformation	ANOVA P-Values			Year	MCT		Post-hoc Contrasts				
		Interaction	Area	Year		US	DS	Area MOD (%)[a]	Temporal MOD (%)[b]		Significant Differences[c]	
									US	DS	US	DS
Strontium (Sr) (mg/kg)	none	0.275	<0.001	<0.001	2015	218	177	-14.0	b		B	
					2016	229	195		7.79		AB	
					2018	237	236		20.1		A	
					2019	249	210		16.5		A	
Thallium (Tl) (mg/kg)	log10	0.992	<0.001	<0.001	2015	0.149	0.236	65.6	b		A	
					2016	0.0846	0.155		-37.9		BC	
					2018	0.0766	0.130		-46.3		C	
					2019	0.0830	0.143		-41.4		C	
Tin (Sn) (mg/kg)	rank	0.224	0.562	0.560	2015	1.00	1.00	ns	ns		ns	
					2016	1.00	1.00					
					2018	1.00	1.00					
					2019	1.00	1.00					
Titanium (Ti) (mg/kg)	none	0.190	<0.001	<0.001	2015	102	74.7	-32.8	b		BC	
					2016	87.3	61.3		-15.7		C	
					2018	135	83.5		24.1		A	
					2019	129	74.5		15.2		AB	
Uranium (U) (mg/kg)	log10	0.729	<0.001	<0.001	2015	0.778	0.917	14.0	b		AB	
					2016	0.685	0.810		-11.8		C	
					2018	0.712	0.798		-10.9		BC	
					2019	0.683	0.786		-13.4		C	
Vanadium (V) (mg/kg)	rank	0.445	<0.001	<0.001	2015	17.4	28.2	56.8	b		A	
					2016	12.3	19.4		-33.5		C	
					2018	13.4	18.0		-34.9		C	
					2019	13.8	19.2		-32.8		BC	
Zinc (Zn) (mg/kg)	rank	0.435	<0.001	<0.001	2015	77.3	90.1	20.1	b		A	
					2016	65.7	78.1		-14.9		B	
					2018	66.9	81.6		-10.0		B	
					2019	61.9	73.5		-20.2		C	
Zirconium (Zr) (mg/kg)	rank	0.001	-	-	2015	1.30	1.10	-15.4	b		AB	B
					2016	1.20	0.500	-58.3	-7.69	-54.5	B	B
					2018	1.30	1.50	15.4	0	36.4	B	A
					2019	1.50	1.50	0	15.4	36.4	A	A
1-Methylnaphthalene (mg/kg)	rank	0.459	<0.001	0.453	2015	-	-	310	ns		ns	
					2016	-	-					
					2018	0.00500	0.0230					
					2019	0.00500	0.0180					
2-Methylnaphthalene (mg/kg)	rank	0.157	<0.001	0.179	2015	0.00500	0.0590	760	ns		ns	
					2016	0.00500	0.0540					
					2018	0.00500	0.0400					
					2019	0.00500	0.0290					
Acenaphthene (mg/kg)	rank	0.405	0.324	0.404	2015	0.00250	0.00250	ns	ns		ns	
					2016	0.00250	0.00250					
					2018	0.00250	0.00250					
					2019	0.00250	0.00250					
Anthracene (mg/kg)	rank	0.405	0.324	0.404	2015	0.00200	0.00200	ns	ns		ns	
					2016	0.00200	0.00200					
					2018	0.00200	0.00200					
					2019	0.00200	0.00200					
Benz(a)anthracene (mg/kg)	rank	0.425	<0.001	0.422	2015	0.00500	0.0150	0	ns		ns	
					2016	0.00500	0.0110					
					2018	0.00500	0.00500					
					2019	0.00500	0.00500					
Benzo(a)pyrene (mg/kg)	rank	0.065	-	-	2015	0.00500	0.00500	0	b		A	A
					2016	0.00500	0.00500	0	0	0	A	B
					2018	0.00500	0.00500	0	0	0	A	B
					2019	0.00500	0.00500	0	0	0	A	B
Benzo(b&j)fluoranthene (mg/kg)	rank	0.015	-	-	2015	0.00500	0.0250	400	b		A	A
					2016	0.00500	0.0180	260	0	-28.0	A	A
					2018	0.00500	0.0150	200	0	-40.0	A	AB
					2019	0.00500	0.0110	120	0	-56.0	A	B

Model significant (p-value < 0.1).

MOD > 0 (Downstream greater than Upstream, or year greater than baseline).

MOD < 0 (Dowstream less than Upstream, or year less than baseline).

Note: "-" indicates not applicable as no data were collected for this species in the given year. DS =Downtrean and US = upstream.

[a] Signifcant differences determined using a Tukey's Honestly Significant Difference Test (α of 0.1) and magnitudes of difference (MOD) reported as (DS - US)/US*100 % for significant differences.

[b] Signifcant differences from base year determined using a Tukey's Honestly Significant Difference Test (α of 0.1) and MOD reported as (Year - Base

[c] Years that do not share a letter are significantly different from each other.

Table C.10: Statistical Comparison of Chemical Sediment Characteristics Between Downstream and Upstream Profundal Transects, 2015 to 2019

Endpoint	Transformation	ANOVA P-Values			Year	MCT		Post-hoc Contrasts				
		Interaction	Area	Year		US	DS	Area MOD (%)[a]	Temporal MOD (%)[b]		Significant Differences[c]	
									US	DS	US	DS
Benzo(b+j+k)fluoranthene (mg/kg)	rank	0.067	-	-	2015	0.00750	0.0250	233	b		A	A
					2016	0.00750	0.0180	140	0	-28.0	A	A
					2018	-	-	-	-	-	-	-
					2019	0.00750	0.00750	0	0	-70.0	A	B
Benzo(e)pyrene (mg/kg)	rank	0.122	0.151	0.138	2015	-	-	ns	ns		ns	
					2016	-	-					
					2018	0.00500	0.00500					
					2019	0.00500	0.00500					
Benzo(g,h,i)perylene (mg/kg)	rank	0.252	0.075	0.265	2015	0.00500	0.00500	0	ns		ns	
					2016	0.00500	0.00500					
					2018	0.00500	0.00500					
					2019	0.00500	0.00500					
Chrysene (mg/kg)	rank	0.064	-	-	2015	0.00500	0.0260	420	b	b	A	A
					2016	0.00500	0.0250	400	0	-3.85	A	A
					2018	0.00500	0.0180	260	0	-30.8	A	AB
					2019	0.00500	0.0110	120	0	-57.7	A	B
Dibenz(a,h)anthracene (mg/kg)	rank	0.578	0.155	0.566	2015	0.00250	0.00250	ns	ns		ns	
					2016	0.00250	0.00250					
					2018	0.00250	0.00250					
					2019	0.00250	0.00250					
Fluoranthene (mg/kg)	rank	0.041	-	-	2015	0.00500	0.0210	320	b		A	A
					2016	0.00500	0.0160	220	0	-23.8	A	A
					2018	0.00500	0.0140	180	0	-33.3	A	AB
					2019	0.00500	0.0110	120	0	-47.6	A	B
Naphthalene (mg/kg)	rank	0.042	-	-	2015	0.00500	0.0290	480	b		A	A
					2016	0.00500	0.0210	320	0	-27.6	A	A
					2018	0.00500	0.0140	180	0	-51.7	A	B
					2019	0.00500	0.0140	180	0	-51.7	A	AB
Perylene (mg/kg)	rank	0.027	-	-	2015	-	-	-	-	-	-	-
					2016	-	-	-	-	-	-	-
					2018	0.00500	0.0110	120	b		A	A
					2019	0.00500	0.00500	0	0	-54.5	A	B
Phenanthrene (mg/kg)	rank	0.027	-	-	2015	0.00500	0.0600	1,100	b		A	A
					2016	0.00500	0.0460	820	0	-23.3	A	AB
					2018	0.00500	0.0390	680	0	-35.0	A	BC
					2019	0.00500	0.0250	400	0	-58.3	A	C
Pyrene (mg/kg)	rank	0.185	<0.001	0.205	2015	0.00500	0.0180	140	ns		ns	
					2016	0.00500	0.0140					
					2018	0.00500	0.0110					
					2019	0.00500	0.00500					

Model significant (p-value < 0.1).

MOD > 0 (Downstream greater than Upstream, or year greater than baseline).

MOD < 0 (Dowstream less than Upstream, or year less than baseline).

Note: "-" indicates not applicable as no data were collected for this species in the given year. DS =Downtrean and US = upstream.

[a] Signifcant differences determined using a Tukey's Honestly Significant Difference Test (α of 0.1) and magnitudes of difference (MOD) reported as (DS - US)/US*100 % for significant differences.

[b] Signifcant differences from base year determined using a Tukey's Honestly Significant Difference Test (α of 0.1) and MOD reported as (Year - Base Year)/Base Year*100 % for significant differences.

[c] Years that do not share a letter are significantly different from each other.

APPENDIX D
PHYTOPLANKTON

TABLES

Table D.1: Density (no. of cells/L) of Phytoplankton Species, August 2018

	Species	Upstream of Elk River					Downstream of Elk River				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Chlorophyte	*Carteria* spp.	0	0	0	7,184	0	0	0	0	0	0
	Chlamydomonas spp.	0	46,696	14,368	14,368	14,368	21,552	21,552	14,368	28,736	28,736
	Chlorogonium maximum	0	100	0	0	0	0	0	0	0	0
	Sphaerocystis schroeteri	0	17,960	0	0	0	0	0	0	0	0
	Pediastrum duplex	0	0	0	0	0	0	0	0	0	200
	Oocystis lacustris	43,104	0	57,472	7,184	28,736	14,368	0	0	0	0
	Paulschulzia pseudovolvox	0	0	0	0	0	0	0	0	200	0
	Scenedesmus denticulatus	0	28,736	0	0	14,368	0	0	14,368	14,368	14,368
	Coelastrum microporum	0	100	0	0	0	0	0	0	0	0
	Elakatothrix gelatinosa	0	0	0	0	0	0	7,184	7,184	0	0
	Cosmarium sp.	0	100	0	0	0	0	0	0	0	0
	Spondylosium planum	0	7,184	0	0	0	0	0	0	0	0
	Botryococcus braunii	0	0	600	0	1,000	200	0	0	0	0
	Tetraedron caudatum	7,184	0	0	0	0	0	0	0	0	0
	Ankistrodesmus spiralis	0	3,592	0	0	14,368	57,472	0	0	0	0
Chrysophyte	*Small chrysophyceae*	79,024	32,328	43,104	2,341,984	71,840	71,840	129,312	86,208	43,104	79,024
	Large chrysophyceae	14,368	3,592	7,184	28,736	0	7,184	7,184	35,920	7,184	0
	Chrysochromulina parva	43,104	96,984	186,784	301,728	265,808	7,184	57,472	172,416	165,232	193,968
	Chrysococcus sp.	122,128	46,696	71,840	79,024	172,416	100,576	122,128	93,392	93,392	100,576
	Kephyrion sp.	71,840	64,656	71,840	64,656	7,184	71,840	14,368	21,552	100,576	43,104
	Spiniferomonas serrata	0	7,184	7,184	0	0	0	0	0	0	0
	Mallomonas crassisquama	400	0	0	400	0	0	400	200	600	200
	Dinobryon mucronatom	0	0	0	7,184	0	28,736	21,552	14,368	14,368	43,104
	Dinobryon bavaricum	79,024	57,472	114,944	100,576	93,392	136,496	114,944	86,208	194,168	266,608
	Dinobryon sertularia	58,072	46,896	79,024	122,128	43,704	400	21,752	21,552	21,752	28,736
	Chrysolykos skuja	0	0	0	0	0	7,184	0	0	50,288	0
	Ochromonas sp.	0	0	0	0	0	0	0	7,184	0	0
	Bitrichia chodatii	0	10,776	0	14,368	0	7,184	7,184	0	7,184	0
	Chrysochromulina laurentiana	7,184	7,184	0	0	0	14,368	7,184	0	7,184	7,184
	Salpingoeca frequentissima	0	0	0	0	0	21,552	0	0	0	0
Diatom	*Cyclotella stelligera*	3,600	5,400	2,400	8,400	7,200	9,400	12,600	11,600	16,200	14,000
	Cyclotella pseudostelligera	2,485,664	3,254,352	1,803,184	1,975,600	1,185,360	2,500,032	2,370,720	1,479,904	1,278,752	1,343,408
	Rhizosolenia eriense	0	0	0	0	7,184	0	0	7,184	0	0
	Tabellaria fenestrata	200	1,100	0	200	200	400	2,600	0	0	800
	Tabellaria flocculosa	400	0	0	200	400	0	0	0	0	0
	Fragilaria crotonensis	5,400	1,600	10,000	9,400	1,200	10,600	5,200	2,000	8,400	45,600
	Synedra ulna	600	1,800	2,000	1,200	2,400	600	2,200	200	1,400	1,200
	Asterionella formosa	0	0	0	2,000	0	400	400	1,600	0	4,400
	Cyclotella michiganiana	1,875,024	1,422,432	1,975,600	0	1,580,480	1,443,984	1,767,264	2,270,144	2,198,304	1,479,904
	Cyclotella bodanica	200	0	200	200	200	200	600	600	1,400	1,400
	Fragilaria capucina	0	0	0	2,000	0	0	0	0	0	0
Cryptophyte	*Rhodomonas minuta*	215,520	344,832	114,944	258,624	71,840	237,072	316,096	136,496	215,520	172,416
	Cryptomonas erosa	14,600	16,300	10,200	25,200	10,600	8,000	14,000	13,000	22,200	12,800
	Cryptomonas rostratiformis	0	0	200	200	200	0	0	0	0	0
	Katablepharis ovalis	7,184	35,920	0	50,288	0	14,368	0	0	7,184	0
Dinoflagellate	*Gymnodinium* sp.	400	200	0	0	200	0	200	200	200	200
	Peridinium pusillum	800	900	400	400	400	200	400	400	600	2,000
	Ceratium hirundinella	200	200	200	0	400	0	200	600	200	1,400
Total number of cells		**5,135,224**	**5,563,272**	**4,573,672**	**5,423,432**	**3,595,448**	**4,793,392**	**5,024,696**	**4,498,848**	**4,498,696**	**3,885,336**
Total number of taxa		**25**	**30**	**22**	**27**	**26**	**28**	**26**	**26**	**27**	**25**

Table D.2: Density (no. of cells/L) of Phytoplankton Species by Major Groups, August 2018

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Chlorophyte	50,288	104,468	72,440	28,736	72,840	93,592	28,736	35,920	43,304	43,304
Chrysophyte	475,144	373,768	581,904	3,060,784	654,344	474,544	503,480	539,000	705,032	762,504
Diatom	4,371,088	4,686,684	3,793,384	1,999,200	2,784,624	3,965,616	4,161,584	3,773,232	3,504,456	2,890,712
Cryptophyte	237,304	397,052	125,344	334,312	82,640	259,440	330,096	149,496	244,904	185,216
Dinoflagellate	1,400	1,300	600	400	1,000	200	800	1,200	1,000	3,600
Total number of cells	**5,135,224**	**5,563,272**	**4,573,672**	**5,423,432**	**3,595,448**	**4,793,392**	**5,024,696**	**4,498,848**	**4,498,696**	**3,885,336**
Total number of groups	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**

Table D.3: Percent Composition of Phytoplankton Species Based on Total Density (no. of cells/L), August 2018

	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Chlorophyte	*Carteria* spp.	0	0	0	0.1	0	0	0	0	0	0
	Chlamydomonas spp.	0	0.8	0.3	0.3	0.4	0.4	0.4	0.3	0.6	0.7
	Chlorogonium maximum	0	0.0	0	0	0	0	0	0	0	0
	Sphaerocystis schroeteri	0	0.3	0	0	0	0	0	0	0	0
	Pediastrum duplex	0	0	0	0	0	0	0	0	0	0.0
	Oocystis lacustris	0.8	0	1.3	0.1	0.8	0.3	0	0	0	0
	Paulschulzia pseudovolvox	0	0	0	0	0	0	0	0	0.0	0
	Scenedesmus denticulatus	0	0.5	0	0	0.4	0	0	0.3	0.3	0.4
	Coelastrum microporum	0	0.0	0	0	0	0	0	0	0	0
	Elakatothrix gelatinosa	0	0	0	0	0	0	0.1	0.2	0	0
	Cosmarium sp.	0	0.0	0	0	0	0	0	0	0	0
	Spondylosium planum	0	0.13	0	0	0	0	0	0	0	0
	Botryococcus braunii	0	0	0.0	0	0.0	0.0	0	0	0	0
	Tetraedron caudatum	0.1	0	0	0	0	0	0	0	0	0
	Ankistrodesmus spiralis	0	0.065	0	0	0.4	1.2	0	0	0	0
Chrysophyte	*Small chrysophyceae*	1.5	0.58	0.9	43.2	2.0	1.5	2.6	1.9	1.0	2.0
	Large chrysophyceae	0.3	0.065	0.2	0.5	0	0.1	0.1	0.8	0.2	0
	Chrysochromulina parva	0.8	1.7	4.1	5.6	7.4	0.1	1.1	3.8	3.7	5.0
	Chrysococcus sp.	2.4	0.84	1.6	1.5	4.8	2.1	2.4	2.1	2.1	2.6
	Kephyrion sp.	1.4	1.2	1.6	1.2	0.2	1.5	0.3	0.5	2.2	1.1
	Spiniferomonas serrata	0	0.1	0.2	0	0	0	0	0	0	0
	Mallomonas crassisquama	0.0	0	0	0.0	0	0	0.0	0.0	0.0	0.0
	Dinobryon mucronatom	0	0	0	0.1	0	0.6	0.4	0.3	0.3	1.1
	Dinobryon bavaricum	1.5	1.0	2.5	1.9	2.6	2.8	2.3	1.9	4.3	6.9
	Dinobryon sertularia	1.1	0.84	1.7	2.3	1.2	0.0	0.4	0.5	0.5	0.7
	Chrysolykos skuja	0	0	0	0	0	0.1	0	0	1.1	0
	Ochromonas sp.	0	0	0	0	0	0	0	0.2	0	0
	Bitrichia chodatii	0	0.19	0	0.3	0	0.1	0.1	0	0.2	0
	Chrysochromulina laurentiana	0.1	0.13	0	0	0	0.3	0.1	0	0.2	0.2
	Salpingoeca frequentissima	0	0	0	0	0	0.4	0	0	0	0
Diatoms	*Cyclotella stelligera*	0.1	0.10	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
	Cyclotella pseudostelligera	48.4	58.5	39.4	36.4	33.0	52.2	47.2	32.9	28.4	34.6
	Rhizosolenia eriense	0	0	0	0	0.2	0	0	0.2	0	0
	Tabellaria fenestrata	0.0	0.020	0	0.0	0.0	0.0	0.1	0	0	0.0
	Tabellaria flocculosa	0.0	0	0	0.0	0.0	0	0	0	0	0
	Fragilaria crotonensis	0.1	0.029	0.2	0.2	0.0	0.2	0.1	0.0	0.2	1.2
	Synedra ulna	0.0	0.032	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
	Asterionella formosa	0	0	0	0.0	0	0.0	0.0	0.0	0	0.1
	Cyclotella michiganiana	36.5	25.6	43.2	0	44.0	30.1	35.2	50.5	48.9	38.1
	Cyclotella bodanica	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fragilaria capucina	0	0	0	0.0	0	0	0	0	0	0
Cryptophyte	*Rhodomonas minuta*	4.2	6.2	2.5	4.8	2.0	4.9	6.3	3.0	4.8	4.4
	Cryptomonas erosa	0.3	0.3	0.2	0.5	0.3	0.2	0.3	0.3	0.5	0.3
	Cryptomonas rostratiformis	0	0	0.0	0.0	0.0	0	0	0	0	0
	Katablepharis ovalis	0.1	0.65	0	0.9	0	0.3	0	0	0.2	0
Dinoflagellates	*Gymnodinium* sp.	0.0	0.0036	0	0	0.0	0	0.0	0.0	0.0	0.0
	Peridinium pusillum	0.0	0.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Ceratium hirundinella	0.0	0.0036	0.0	0	0.0	0	0.0	0.0	0.0	0.0
Total number of cells		**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Total number of taxa		**25**	**30**	**22**	**27**	**26**	**28**	**26**	**26**	**27**	**25**

Table D.4: Biomass (µg/L dw) of Phytoplankton Species, August 2018

	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Chlorophyte	*Carteria* spp.	0	0	0	0.66	0	0	0	0	0	0
	Chlamydomonas spp.	0	2.2	0.72	0.72	0.64	0.92	1.1	0.72	1.4	1.4
	Chlorogonium maximum	0	0.23	0	0	0	0	0	0	0	0
	Sphaerocystis schroeteri	0	0.28	0	0	0	0	0	0	0	0
	Pediastrum duplex	0	0	0	0	0	0	0	0	0	0.75
	Oocystis lacustris	1.2	0	1.6	0.36	1.4	0.41	0	0	0	0
	Paulschulzia pseudovolvox	0	0	0	0	0	0	0	0	0.54	0
	Scenedesmus denticulatus	0	2.0	0	0	0.67	0	0	1.1	0.65	0.67
	Coelastrum microporum	0	0.27	0	0	0	0	0	0	0	0
	Elakatothrix gelatinosa	0	0	0	0	0	0	0.16	0.16	0	0
	Cosmarium sp.	0	0.19	0	0	0	0	0	0	0	0
	Spondylosium planum	0	0.27	0	0	0	0	0	0	0	0
	Botryococcus braunii	0	0	0.31	0	0.52	0.10	0	0	0	0
	Tetraedron caudatum	0.03	0	0	0	0	0	0	0	0	0
	Ankistrodesmus spiralis	0	0.22	0	0	0.90	4.1	0	0	0	0
Chrysophyte	*Small chrysophyceae*	0.81	0.14	0.44	147	0.83	0.92	1.2	0.79	0.55	0.44
	Large chrysophyceae	2.6	0.65	1.3	5.2	0	1.3	1.3	6.5	1.3	0
	Chrysochromulina parva	2.8	6.3	12.2	19.7	17.4	0.47	3.8	11.3	10.8	12.7
	Chrysococcus sp.	8.0	2.4	4.7	5.2	11.3	6.6	8.0	6.1	6.1	6.6
	Kephyrion sp.	1.8	2.7	1.4	1.6	0.11	1.1	0.27	0.53	1.7	0.81
	Spiniferomonas serrata	0	0.94	0.66	0	0	0	0	0	0	0
	Mallomonas crassisquama	0.41	0	0	0.41	0	0	0.42	0.21	0.63	0.21
	Dinobryon mucronatom	0	0	0	0.94	0	3.8	2.8	1.9	1.8	5.1
	Dinobryon bavaricum	17.9	13	26.0	22.8	21.1	30.9	26.0	19.5	44.6	61.1
	Dinobryon sertularia	14.2	11	17.9	27.6	10.5	0.50	5.1	4.9	5.1	6.5
	Chrysolykos skuja	0	0	0	0	0	0.20	0	0	1.4	0
	Ochromonas sp.	0	0	0	0	0	0	0	0.70	0	0
	Bitrichia chodatii	0	0.54	0	0.72	0	0.36	0.36	0	1.0	0
	Chrysochromulina laurentiana	3.1	2.8	0	0	0	5.7	2.8	0	3.1	2.8
	Salpingoeca frequentissima	0	0	0	0	0	0.74	0	0	0	0
Diatom	*Cyclotella stelligera*	7.7	11	5.7	18.8	16.3	18.6	24.9	26.3	35.3	33.0
	Cyclotella pseudostelligera	704	997	387	436	277	506	555	376	282	280
	Rhizosolenia eriense	0	0	0	0	0.46	0	0	0.46	0	0
	Tabellaria fenestrata	0.17	0.84	0	0.17	0.15	0.30	2.0	0	0	0.60
	Tabellaria flocculosa	0.51	0	0	0.24	0.51	0	0	0	0	0
	Fragilaria crotonensis	2.3	0.65	4.2	3.9	0.51	4.4	2.2	0.85	3.7	19.7
	Synedra ulna	3.8	12	13.6	8.2	15.4	3.7	16.4	1.4	8.8	9.9
	Asterionella formosa	0	0	0	0.20	0	0.03	0.04	0.15	0	0.47
	Cyclotella michiganiana	48.8	35	48.4	0	32.2	29.5	43.3	62.7	57.2	38.5
	Cyclotella bodanica	1.5	0	1.2	1.4	1.2	1.5	4.6	3.8	9.9	8.2
	Fragilaria capucina	0	0	0	0.34	0	0	0	0	0	0
Cryptophyte	*Rhodomonas minuta*	32.5	52	17.3	39.0	10.8	35.8	47.7	20.6	32.5	26.0
	Cryptomonas erosa	25.4	28	17.2	43.1	18.3	14.2	24.3	22.5	38.9	22.7
	Cryptomonas rostratiformis	0	0.0	0.45	0.45	0.42	0	0	0	0	0
	Katablepharis ovalis	0.46	2.6	0	2.4	0	0.74	0	0	0.37	0
Dinoflagellate	*Gymnodinium* sp.	6.2	3.1	0	0	3.1	0	2.3	2.3	2.8	3.4
	Peridinium pusillum	3.2	3.8	1.6	1.7	1.7	0.76	1.6	1.6	2.3	7.6
	Ceratium hirundinella	10.1	9.2	9.4	0	19.8	0	10.1	28.6	10.1	70.4
Total biomass of cells		**900**	**1,202**	**573**	**789**	**464**	**673**	**787**	**602**	**565**	**620**
Total number of taxa		**25**	**30**	**22**	**27**	**26**	**28**	**26**	**26**	**27**	**25**

Table D.5: Biomass (µg/L dw) of Phytoplankton Species by Group, August 2018

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Chlorophyte	1.3	5.7	2.7	1.7	4.2	5.5	1.2	2.0	2.6	2.9
Chrysophyte	52	41	65	231	61	52	52	52	78	96
Diatom	769	1,057	460	470	344	564	648	472	397	390
Cryptophyte	58	83	35	85	30	51	72	43	72	49
Dinoflagellate	19	16	11	1.7	25	0.76	14	32	15	81
Total biomass of cells	**900**	**1,202**	**573**	**789**	**464**	**673**	**787**	**602**	**565**	**620**
Total number of groups	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**

Table D.6: Percent Composition of Phytoplankton Species Based on Total Biomass (µg/L dw), August 2018

	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
												Minimum		Median		Maximum		Mean		Standard Deviation	
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Chlorophyte	*Carteria* spp.	0	0	0	0.083	0	0	0	0	0	0	0.083	0	0.083	0	0.083	0	0.083	0	0	0.059
	Chlamydomonas spp.	0	0.36	0.13	0.092	0.14	0.14	0.14	0.12	0.26	0.23	0.092	0.12	0.13	0.14	0.36	0.26	0.18	0.18	0.12	0.075
	Chlorogonium maximum	0	0.038	0	0	0	0	0	0	0	0	0.038	0	0.038	0	0.038	0	0.038	0	0	0.027
	Sphaerocystis schroeteri	0	0.046	0	0	0	0	0	0	0	0	0.046	0	0.046	0	0.046	0	0.046	0	0	0.033
	Pediastrum duplex	0	0	0	0	0	0	0	0	0	0.12	0	0.12	0	0.12	0	0.12	0	0.12	0	0.070
	Oocystis lacustris	0.14	0	0.28	0.046	0.31	0.060	0	0	0	0	0.046	0.060	0.21	0.060	0.31	0.060	0.19	0.060	0.13	0.010
	Paulschulzia pseudovolvox	0	0	0	0	0	0	0	0	0.095	0	0	0.095	0	0.095	0	0.095	0	0.095	0	0.055
	Scenedesmus denticulatus	0	0.17	0	0	0.14	0	0	0.18	0.11	0.11	0.14	0.11	0.16	0.11	0.17	0.18	0.16	0.13	0.017	0.031
	Coelastrum microporum	0	0.044	0	0	0	0	0	0	0	0	0.044	0	0.044	0	0.044	0	0.044	0	0	0.031
	Elakatothrix gelatinosa	0	0	0	0	0	0	0.020	0.026	0	0	0	0.020	0	0.023	0	0.026	0	0.023	0	0.014
	Cosmarium sp.	0	0.031	0	0	0	0	0	0	0	0	0.031	0	0.031	0	0.031	0	0.031	0	0	0.022
	Spondylosium planum	0	0.045	0	0	0	0	0	0	0	0	0.045	0	0.045	0	0.045	0	0.045	0	0	0.032
	Botryococcus braunii	0	0	0.055	0	0.11	0.016	0	0	0	0	0.055	0.016	0.084	0.016	0.11	0.016	0.084	0.016	0.041	0.028
	Tetraedron caudatum	0.0038	0	0	0	0	0	0	0	0	0	0.0038	0	0.0038	0	0.0038	0	0.0038	0	0	0.0027
	Ankistrodesmus spiralis	0	0.037	0	0	0.19	0.61	0	0	0	0	0.037	0.61	0.12	0.61	0.19	0.61	0.12	0.61	0.11	0.40
Chrysophyte	*Small chrysophyceae*	0.090	0.011	0.077	19	0.18	0.14	0.15	0.13	0.10	0.071	0.011	0.071	0.090	0.13	19	0.15	3.8	0.12	8.3	0.044
	Large chrysophyceae	0.29	0.11	0.23	0.65	0	0.19	0.16	1.1	0.23	0	0.11	0.16	0.26	0.21	0.65	1.1	0.32	0.41	0.24	0.46
	Chrysochromulina parva	0.31	0.53	2.1	2.5	3.8	0.070	0.48	1.9	1.9	2.0	0.31	0.070	2.1	1.9	3.8	2.0	1.8	1.3	1.4	0.97
	Chrysococcus sp.	0.89	0.20	0.82	0.66	2.4	0.98	1.0	1.0	1.1	1.1	0.20	0.98	0.82	1.0	2.4	1.1	1.0	1.0	0.85	0.38
	Kephyrion sp.	0.19	0.23	0.24	0.20	0.024	0.17	0.034	0.087	0.31	0.13	0.024	0.034	0.20	0.13	0.24	0.31	0.18	0.15	0.087	0.11
	Spiniferomonas serrata	0	0.16	0.12	0	0	0	0	0	0	0	0.12	0	0.14	0	0.16	0	0.14	0	0.029	0.082
	Mallomonas crassisquama	0.046	0	0	0.052	0	0	0.053	0.035	0.11	0.034	0.046	0.034	0.049	0.044	0.052	0.11	0.049	0.058	0.0045	0.034
	Dinobryon mucronatom	0	0	0	0.12	0	0.56	0.36	0.31	0.32	0.83	0.12	0.31	0.12	0.36	0.12	0.83	0.12	0.48	0	0.27
	Dinobryon bavaricum	2.0	1.1	4.5	2.9	4.6	4.6	3.3	3.2	7.9	9.9	1.1	3.2	2.9	4.6	4.6	9.9	3.0	5.8	1.5	3.7
	Dinobryon sertularia	1.6	0.91	3.1	3.5	2.3	0.074	0.65	0.81	0.91	1.0	0.91	0.074	2.3	0.81	3.5	1.0	2.3	0.70	1.1	0.39
	Chrysolykos skuja	0	0	0	0	0	0.030	0	0	0.25	0	0	0.030	0	0.14	0	0.25	0	0.14	0	0.14
	Ochromonas sp.	0	0	0	0	0	0	0	0.12	0	0	0	0.12	0	0.12	0	0.12	0	0.12	0	0.067
	Bitrichia chodatii	0	0.045	0	0.092	0	0.054	0.046	0	0.18	0	0.045	0.046	0.068	0.054	0.092	0.18	0.068	0.093	0.033	0.078
	Chrysochromulina laurentia	0.35	0.23	0	0	0	0.84	0.36	0	0.55	0.46	0.23	0.36	0.29	0.51	0.35	0.84	0.29	0.55	0.080	0.14
	Salpingoeca frequentissima	0	0	0	0	0	0.11	0	0	0	0	0	0.11	0	0.11	0	0.11	0	0.11	0	0.077
Diatoms	*Cyclotella stelligera*	0.86	0.95	0.99	2.4	3.5	2.8	3.2	4.4	6.2	5.3	0.86	2.8	0.99	4.4	3.5	6.2	1.7	4.4	1.2	2.1
	Cyclotella pseudostelligera	78	83	68	55	60	75	70	63	50	45	55	45	68	63	83	75	69	61	12	7.4
	Rhizosolenia eriense	0	0	0	0	0.10	0	0	0.076	0	0	0.10	0.076	0.10	0.076	0.10	0.076	0.10	0.076	0	0.013
	Tabellaria fenestrata	0.018	0.070	0	0.021	0.033	0.045	0.26	0	0	0.10	0.018	0.045	0.027	0.10	0.070	0.26	0.036	0.13	0.024	0.040
	Tabellaria flocculosa	0.057	0	0	0.030	0.11	0	0	0	0	0	0.030	0	0.057	0	0.11	0	0.066	0	0.041	0.021
	Fragilaria crotonensis	0.25	0.054	0.73	0.50	0.11	0.66	0.28	0.14	0.66	3.2	0.054	0.14	0.25	0.66	0.73	3.2	0.33	0.98	0.28	1.3
	Synedra ulna	0.42	0.96	2.4	1.0	3.3	0.55	2.1	0.23	1.6	1.6	0.42	0.23	1.0	1.6	3.3	2.1	1.6	1.2	1.2	0.71
	Asterionella formosa	0	0	0	0.025	0	0.0049	0.0048	0.025	0	0.075	0.025	0.0048	0.025	0.015	0.025	0.075	0.025	0.028	0	0.030
	Cyclotella michiganiana	5.4	2.9	8.4	0	7.0	4.4	5.5	10	10	6.2	2.9	4.4	6.2	6.2	8.4	10	5.9	7.3	2.4	3.4
	Cyclotella bodanica	0.17	0	0.22	0.18	0.25	0.23	0.59	0.64	1.7	1.3	0.17	0.23	0.20	0.64	0.25	1.7	0.20	0.90	0.037	0.69
	Fragilaria capucina	0	0	0	0.044	0	0	0	0	0	0	0.044	0	0.044	0	0.044	0	0.044	0	0	0.031
Cryptophyte	*Rhodomonas minuta*	3.6	4.3	3.0	4.9	2.3	5.3	6.1	3.4	5.8	4.2	2.3	3.4	3.6	5.3	4.9	6.1	3.6	4.9	1.0	1.3
	Cryptomonas erosa	2.8	2.3	3.0	5.5	3.9	2.1	3.1	3.7	6.9	3.7	2.3	2.1	3.0	3.7	5.5	6.9	3.5	3.9	1.2	1.9
	Cryptomonas rostratiformis	0	0	0.079	0.057	0.092	0	0	0	0	0	0.057	0	0.079	0	0.092	0	0.076	0.0	0.017	0.040
	Katablepharis ovalis	0.051	0.21	0	0.31	0	0.11	0	0	0.066	0	0.051	0.066	0.21	0.088	0.31	0.11	0.19	0.088	0.13	0.0082
Dinoflagellates	*Gymnodinium* sp.	0.69	0.26	0	0	0.67	0	0.29	0.38	0.50	0.55	0.26	0.29	0.67	0.44	0.69	0.55	0.54	0.43	0.25	0.13
	Peridinium pusillum	0.35	0.31	0.28	0.21	0.36	0.11	0.20	0.26	0.40	1.2	0.21	0.11	0.31	0.26	0.36	1.2	0.30	0.44	0.061	0.45
	Ceratium hirundinella	1.1	0.76	1.6	0	4.3	0	1.3	4.8	1.8	11	0.76	1.3	1.4	3.3	4.3	11	1.9	4.8	1.6	4.4

Table D.7: Phytoplankton Community Metric Comparisons Between Koocanusa Reservoir Areas Downstream (RG_T4) and Upstream (RG_TN) of the Elk River, August 2018

Endpoint	Units	Data Transformation	Test	Test P-value	Mean or Median [a]		Observed Effect Size (RG_T4 - RG_TN)/SD
					RG_T4	RG_TN	
Richness	# of taxa	rank	MW	0.676	26	25	1.12
Total Density	1,000 cells/L	none	T	0.428	4,893	4,540	0.53
Chlorophyte	1,000 cells/L	log_{10}	T	0.307	64	45	0.69
Chrysophyte	1,000 cells/L	rank	MW	0.917	582	539	0.32
Diatom	1,000 cells/L	none	T	0.854	3,553	3,659	-0.12
Cryptophyte	1,000 cells/L	square-root	T	0.851	217	230	-0.12
Dinoflagellate	1,000 cells/L	log_{10}	T	0.721	1	1	-0.23
Total Biomass	mg/m^3	log_{10}	T	0.460	744	645	0.49
Chlorophyte	mg/m^3	log_{10}	T	0.800	64	45	0.17
Chrysophyte	mg/m^3	rank	MW	0.754	582	52	0.91
Diatom	mg/m^3	log_{10}	T	0.481	3,385	3,631	0.47
Cryptophyte	mg/m^3	log_{10}	T	0.827	199	225	-0.14
Dinoflagellate	mg/m^3	square-root	T	0.393	0.80	1.14	-0.57
NMDS Axis 1	Density	rank	MW	0.347	0.06	0.02	0.52
NMDS Axis 2	Density	none	T	0.779	0.01	-0.01	0.18
NMDS Axis 3	Density	none	T	0.006	-0.06	0.06	-2.3
NMDS Axis 1	Biomass	none	T	0.772	0.01	-0.01	-0.19
NMDS Axis 2	Biomass	none	T	0.099	0.01	-0.01	-1.2
NMDS Axis 3	Biomass	none	T	0.057	-0.06	0.06	1.4

P-value < 0.1.

Absolute effect size magnitude is > 2.

Note: (Downstream-Upstream)/ Standard Deviation (SD) for transformed data; SD for all data.

[a] For transformed data, the back-transformed mean is reported; for ranked data, the median is reported.

Table D.8: Phytoplankton Community Summary Statistics, Koocanusa, 2014 to 2018

Site	Endpoint	2014						
		N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
RG_TN[a]	Density (#/L)	5	4,460,771	1,738,223	777,357	3,162,088	3,822,048	7,509,024
	Biomass (mg/m³)	5	950	364	163	633	847	1,572
	LPL Richness (# taxa)	5	24.6	2.30	1.03	23.0	23.0	28.0
	% Chlorophyte Ind.	5	1.82	0.676	0.302	1.05	1.75	2.82
	% Chrysophyte Ind.	5	16.0	5.45	2.44	10.1	14.4	21.9
	% Cryptophyte Ind.	5	3.70	1.47	0.657	2.18	3.97	5.78
	% Cyanophyte Ind.	5	0.0837	0.115	0.0516	0	0	0.227
	% Diatom Ind.	5	78.2	6.72	3.00	70.1	82.0	84.7
	% Dinoflagellate Ind.	5	0.121	0.166	0.0742	0.0209	0.0443	0.415
	Chlorophyte Density (#/L)	5	74,954	19,898	8,898	57,672	65,456	107,760
	Chrystophyte Density (#/L)	5	661,648	136,806	61,181	467,360	683,280	812,392
	Cryptophyte Density (#/L)	5	165,122	89,831	40,174	89,408	131,912	298,144
	Cyanophyte Density (#/L)	5	4,310	6,426	2,874	0	0	14,368
	Diatom Density (#/L)	5	3,549,904	1,629,563	728,763	2,272,856	3,154,120	6,358,968
	Dinoflagellates Density (#/L)	5	4,834	5,995	2,681	800	3,200	15,368
	Chlorophyte Biomass (mg/m³)	5	5.05	3.30	1.48	2.25	4.33	10.7
	Chrystophye Biomass (mg/m³)	5	53.9	22.8	10.2	30.0	43.4	84.4
	Cryptophyte Biomass (mg/m³)	5	22.1	9.51	4.25	13.5	17.4	34.5
	Cyanophyte Biomass (mg/m³)	5	0.335	0.505	0.226	0	0	1.14
	Diatom Biomass (mg/m³)	5	835	337	151	559	778	1,411
	Dinoflageellate Biomass (mg/m³)	5	34.2	29.9	13.4	10.7	27.7	83.8
	% Chlorophyte Biomass	5	0.605	0.418	0.187	0.143	0.489	1.27
	% Chrysophyte Biomass	5	5.87	2.23	1.00	3.54	5.37	9.20
	% Cryptophyte Biomass	5	2.40	0.909	0.407	1.45	2.20	3.90
	% Cyanophyte Biomass	5	0.0315	0.0433	0.0194	0	0	0.0851
	% Diatom Biomass	5	87.5	3.70	1.65	82.9	88.2	91.9
	% Dinoflagellate Biomass	5	3.61	3.14	1.40	1.26	2.40	9.01
	NMDS 1	5	-0.113	0.101	0.0452	-0.240	-0.151	-0.00302
	NMDS 2	5	0.353	0.0197	0.00883	0.328	0.348	0.381
	NMDS 3	5	-0.000879	0.0940	0.0420	-0.104	0.0226	0.0879
RG_T4	Density (#/L)	5	5,669,326	5,439,272	2,432,516	2,696,312	3,296,336	15,377,272
	Biomass (mg/m³)	5	1,111	825	369	604	765	2,574
	LPL Richness (# taxa)	5	24.6	1.82	0.812	23.0	24.0	27.0
	% Chlorophyte Ind.	5	1.24	0.745	0.333	0.436	1.29	2.40
	% Chrysophyte Ind.	5	21.6	11.1	4.95	12.9	15.9	39.1
	% Cryptophyte Ind.	5	3.10	0.595	0.266	2.65	2.76	4.03
	% Cyanophyte Ind.	5	0.0878	0.120	0.0538	0	0	0.221
	% Diatom Ind.	5	73.8	11.1	4.97	56.9	79.3	82.8
	% Dinoflagellate Ind.	5	0.215	0.360	0.161	0.00650	0.0425	0.851
	Chlorophyte Density (#/L)	5	69,856	74,229	33,196	14,368	43,104	198,415
	Chrystophyte Density (#/L)	5	1,636,063	2,447,121	1,094,386	419,072	592,088	6,009,133
	Cryptophyte Density (#/L)	5	167,027	140,992	63,053	74,440	110,560	413,830
	Cyanophyte Density (#/L)	5	2,874	3,935	1,760	0	0	7,184
	Diatom Density (#/L)	5	3,787,276	2,809,136	1,256,284	1,835,016	2,702,048	8,754,894
	Dinoflagellates Density (#/L)	5	6,230	9,483	4,241	1,000	1,400	22,952
	Chlorophyte Biomass (mg/m³)	5	3.76	4.56	2.04	0.723	1.68	11.8
	Chrystophye Biomass (mg/m³)	5	163	225	100	51.8	63.2	564
	Cryptophyte Biomass (mg/m³)	5	23.1	17.8	7.98	10.1	15.6	54.3
	Cyanophyte Biomass (mg/m³)	5	0.432	0.703	0.314	0	0	1.62
	Diatom Biomass (mg/m³)	5	889	599	268	479	671	1,943
	Dinoflageellate Biomass (mg/m³)	5	31.3	23.3	10.4	1.06	24.5	60.5
	% Chlorophyte Biomass	5	0.294	0.192	0.0858	0.102	0.187	0.539
	% Chrysophyte Biomass	5	11.2	6.19	2.77	6.77	9.20	21.9
	% Cryptophyte Biomass	5	2.04	0.220	0.0985	1.68	2.07	2.29
	% Cyanophyte Biomass	5	0.0598	0.0989	0.0442	0	0	0.228
	% Diatom Biomass	5	82.0	4.94	2.21	75.5	81.6	87.7
	% Dinoflagellate Biomass	5	4.44	3.67	1.64	0.0410	3.21	8.53
	NMDS 1	5	-0.157	0.110	0.0492	-0.277	-0.166	-0.0302
	NMDS 2	5	0.350	0.0872	0.0390	0.248	0.362	0.447
	NMDS 3	5	-0.0192	0.144	0.0643	-0.196	-0.0571	0.131

[a] RG_T2 was sampled in 2014 instead of RG_TN.

Table D.8: Phytoplankton Community Summary Statistics, Koocanusa, 2014 to 2018

Site	Endpoint	2015						
		N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
RG_TN[a]	Density (#/L)	5	12,690,374	2,141,882	957,879	10,302,297	12,672,877	15,194,906
	Biomass (mg/m³)	5	3,153	540	241	2,595	3,130	3,896
	LPL Richness (# taxa)	5	18.0	2.65	1.18	15.0	17.0	22.0
	% Chlorophyte Ind.	5	1.95	1.14	0.511	0.385	2.20	3.29
	% Chrysophyte Ind.	5	2.35	0.813	0.364	1.38	2.82	3.08
	% Cryptophyte Ind.	5	2.14	0.567	0.253	1.66	1.89	3.09
	% Cyanophyte Ind.	5	0.00340	0.00215	0.000963	0	0.00395	0.00553
	% Diatom Ind.	5	93.5	1.19	0.532	91.6	93.7	94.8
	% Dinoflagellate Ind.	5	0.0716	0.121	0.0542	0.00555	0.0272	0.287
	Chlorophyte Density (#/L)	5	253,971	150,063	67,110	39,683	317,464	396,830
	Chrystophyte Density (#/L)	5	285,918	65,145	29,134	198,415	317,664	357,147
	Cryptophyte Density (#/L)	5	263,588	35,273	15,775	238,898	240,498	318,064
	Cyanophyte Density (#/L)	5	440	261	117	0	600	600
	Diatom Density (#/L)	5	11,876,080	2,097,712	938,125	9,624,086	11,913,100	14,234,314
	Dinoflagellates Density (#/L)	5	10,377	18,657	8,343	800	2,800	43,683
	Chlorophyte Biomass (mg/m³)	5	11.8	12.3	5.52	1.19	8.75	33.1
	Chrystophye Biomass (mg/m³)	5	37.6	14.8	6.61	21.0	44.7	51.2
	Cryptophyte Biomass (mg/m³)	5	35.8	3.55	1.59	30.1	36.7	39.3
	Cyanophyte Biomass (mg/m³)	5	0.633	0.395	0.177	0	0.795	1.04
	Diatom Biomass (mg/m³)	5	3,049	537	240	2,487	3,049	3,802
	Dinoflageellate Biomass (mg/m³)	5	18.2	12.2	5.46	1.64	17.8	32.7
	% Chlorophyte Biomass	5	0.357	0.352	0.157	0.0459	0.231	0.960
	% Chrysophyte Biomass	5	1.26	0.615	0.275	0.539	1.42	1.97
	% Cryptophyte Biomass	5	1.17	0.279	0.125	0.773	1.26	1.46
	% Cyanophyte Biomass	5	0.0198	0.0128	0.00573	0	0.0254	0.0300
	% Diatom Biomass	5	96.6	0.844	0.377	95.8	96.6	97.6
	% Dinoflagellate Biomass	5	0.550	0.324	0.145	0.0610	0.686	0.840
	NMDS 1	5	0.562	0.183	0.0817	0.358	0.625	0.798
	NMDS 2	5	0.0820	0.152	0.0680	-0.0985	0.153	0.214
	NMDS 3	5	0.0474	0.161	0.0718	-0.154	0.0979	0.245
RG_T4	Density (#/L)	5	14,893,832	781,658	349,568	13,921,250	15,199,706	15,720,385
	Biomass (mg/m³)	5	4,285	531	238	3,788	4,265	5,074
	LPL Richness (# taxa)	5	18.6	2.30	1.03	15.0	19.0	21.0
	% Chlorophyte Ind.	5	2.31	1.71	0.763	0.522	2.57	4.64
	% Chrysophyte Ind.	5	2.72	0.623	0.278	2.02	2.85	3.61
	% Cryptophyte Ind.	5	3.79	1.97	0.883	1.68	2.88	6.09
	% Cyanophyte Ind.	5	0.0611	0.111	0.0496	0	0.00144	0.256
	% Diatom Ind.	5	90.9	3.17	1.42	85.5	92.0	93.4
	% Dinoflagellate Ind.	5	0.229	0.216	0.0967	0.0165	0.277	0.537
	Chlorophyte Density (#/L)	5	341,274	258,092	115,422	79,366	357,147	714,294
	Chrystophyte Density (#/L)	5	404,847	98,782	44,177	317,464	396,830	555,562
	Cryptophyte Density (#/L)	5	574,235	321,892	143,954	239,298	437,913	956,992
	Cyanophyte Density (#/L)	5	9,573	17,437	7,798	0	200	40,283
	Diatom Density (#/L)	5	13,529,517	670,276	299,756	12,803,126	13,184,556	14,283,797
	Dinoflagellates Density (#/L)	5	34,386	33,167	14,833	2,600	40,883	82,766
	Chlorophyte Biomass (mg/m³)	5	14.4	12.9	5.76	3.02	10.8	34.8
	Chrystophye Biomass (mg/m³)	5	38.2	9.89	4.43	27.2	37.5	53.9
	Cryptophyte Biomass (mg/m³)	5	109	52.6	23.5	39.2	111	174
	Cyanophyte Biomass (mg/m³)	5	2.46	4.01	1.79	0	0.524	9.53
	Diatom Biomass (mg/m³)	5	4,099	507	227	3,574	4,118	4,873
	Dinoflageellate Biomass (mg/m³)	5	21.5	13.9	6.21	6.23	19.6	44.2
	% Chlorophyte Biomass	5	0.312	0.245	0.110	0.0798	0.253	0.685
	% Chrysophyte Biomass	5	0.910	0.304	0.136	0.658	0.837	1.42
	% Cryptophyte Biomass	5	2.55	1.24	0.553	1.03	2.20	3.89
	% Cyanophyte Biomass	5	0.0618	0.107	0.0478	0	0.0117	0.252
	% Diatom Biomass	5	95.7	1.56	0.697	93.9	96.0	97.6
	% Dinoflagellate Biomass	5	0.494	0.304	0.136	0.164	0.413	0.987
	NMDS 1	5	0.516	0.177	0.0793	0.315	0.574	0.741
	NMDS 2	5	-0.0298	0.125	0.0559	-0.215	0.0450	0.0628
	NMDS 3	5	0.0350	0.241	0.108	-0.376	0.114	0.254

[a] RG_T2 was sampled in 2014 instead of RG

Table D.8: Phytoplankton Community Summary Statistics, Koocanusa, 2014 to 2018

Site	Endpoint	2016						
		N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
RG_TN[a]	Density (#/L)	5	3,394,325	761,729	340,656	2,405,120	3,844,552	4,064,424
	Biomass (mg/m³)	5	643	147	65.7	435	639	810
	LPL Richness (# taxa)	5	24.8	0.837	0.374	24.0	25.0	26.0
	% Chlorophyte Ind.	5	3.08	1.66	0.743	1.43	2.39	4.95
	% Chrysophyte Ind.	5	20.4	3.94	1.76	15.2	22.8	23.9
	% Cryptophyte Ind.	5	4.72	1.48	0.661	2.35	5.30	6.22
	% Cyanophyte Ind.	5	0	0	0	0	0	0
	% Diatom Ind.	5	71.7	6.50	2.91	66.8	67.4	80.5
	% Dinoflagellate Ind.	5	0.0566	0.0294	0.0132	0.0246	0.0416	0.0884
	Chlorophyte Density (#/L)	5	104,130	61,036	27,296	39,120	93,392	201,152
	Chrystophyte Density (#/L)	5	695,134	219,600	98,208	474,944	583,304	935,320
	Cryptophyte Density (#/L)	5	159,834	66,711	29,834	90,440	127,528	243,488
	Cyanophyte Density (#/L)	5	0	0	0	0	0	0
	Diatom Density (#/L)	5	2,433,347	580,516	259,615	1,607,680	2,638,944	3,095,368
	Dinoflagellates Density (#/L)	5	1,880	1,026	459	1,000	1,600	3,400
	Chlorophyte Biomass (mg/m³)	5	6.60	4.06	1.81	1.54	6.12	12.1
	Chrystophye Biomass (mg/m³)	5	52.8	11.7	5.24	43.2	45.2	68.5
	Cryptophyte Biomass (mg/m³)	5	38.4	10.4	4.63	22.7	38.8	48.0
	Cyanophyte Biomass (mg/m³)	5	0	0	0	0	0	0
	Diatom Biomass (mg/m³)	5	517	133	59.5	330	493	665
	Dinoflageellate Biomass (mg/m³)	5	28.5	7.00	3.13	17.4	29.8	36.7
	% Chlorophyte Biomass	5	1.07	0.701	0.313	0.266	0.957	2.02
	% Chrysophyte Biomass	5	8.37	1.61	0.720	5.97	8.46	9.94
	% Cryptophyte Biomass	5	5.96	0.945	0.422	5.18	5.84	7.51
	% Cyanophyte Biomass	5	0	0	0	0	0	0
	% Diatom Biomass	5	79.9	3.21	1.44	76.0	81.1	83.3
	% Dinoflagellate Biomass	5	4.70	1.68	0.749	2.15	4.87	6.85
	NMDS 1	5	-0.0658	0.0694	0.0310	-0.130	-0.0649	0.0408
	NMDS 2	5	-0.135	0.0234	0.0105	-0.158	-0.140	-0.0953
	NMDS 3	5	-0.197	0.0360	0.0161	-0.225	-0.206	-0.136
RG_T4	Density (#/L)	5	2,700,043	1,496,497	669,254	920,216	2,383,952	4,686,080
	Biomass (mg/m³)	5	554	342	153	200	571	1,041
	LPL Richness (# taxa)	5	22.8	4.44	1.98	19.0	21.0	30.0
	% Chlorophyte Ind.	5	1.49	0.814	0.364	0.788	1.08	2.77
	% Chrysophyte Ind.	5	18.0	10.1	4.50	7.40	18.4	32.8
	% Cryptophyte Ind.	5	5.70	2.86	1.28	1.20	6.68	8.62
	% Cyanophyte Ind.	5	0.638	0.849	0.380	0	0.0683	1.71
	% Diatom Ind.	5	74.0	11.7	5.23	58.8	71.1	89.0
	% Dinoflagellate Ind.	5	0.115	0.137	0.0614	0	0.0671	0.345
	Chlorophyte Density (#/L)	5	46,778	48,565	21,719	9,984	36,520	129,912
	Chrystophyte Density (#/L)	5	375,765	87,050	38,930	272,992	388,136	476,744
	Cryptophyte Density (#/L)	5	132,765	81,351	36,381	44,304	121,744	226,320
	Cyanophyte Density (#/L)	5	17,267	23,400	10,465	0	3,200	51,936
	Diatom Density (#/L)	5	2,123,555	1,386,529	620,074	541,016	1,694,856	3,833,736
	Dinoflagellates Density (#/L)	5	3,914	6,877	3,076	0	1,200	16,168
	Chlorophyte Biomass (mg/m³)	5	2.86	2.07	0.926	0.723	2.92	5.81
	Chrystophye Biomass (mg/m³)	5	34.7	14.3	6.38	19.2	28.7	55.7
	Cryptophyte Biomass (mg/m³)	5	32.6	16.6	7.41	8.40	33.0	49.5
	Cyanophyte Biomass (mg/m³)	5	3.23	4.15	1.85	0	0.760	8.68
	Diatom Biomass (mg/m³)	5	457	323	144	113	449	892
	Dinoflageellate Biomass (mg/m³)	5	23.1	21.4	9.58	0	28.5	45.9
	% Chlorophyte Biomass	5	0.832	1.16	0.521	0.193	0.361	2.91
	% Chrysophyte Biomass	5	7.98	4.91	2.20	4.01	5.34	15.9
	% Cryptophyte Biomass	5	8.09	5.76	2.58	1.21	8.10	16.5
	% Cyanophyte Biomass	5	0.866	1.42	0.633	0	0.0730	3.29
	% Diatom Biomass	5	76.9	14.2	6.35	56.7	78.6	93.4
	% Dinoflagellate Biomass	5	5.33	5.94	2.66	0	3.82	14.3
	NMDS 1	5	-0.0181	0.156	0.0698	-0.258	-0.00522	0.127
	NMDS 2	5	-0.338	0.274	0.123	-0.771	-0.324	-0.0968
	NMDS 3	5	-0.123	0.184	0.0823	-0.399	-0.102	0.0971

[a] RG_T2 was sampled in 2014 instead of RG

Table D.8: Phytoplankton Community Summary Statistics, Koocanusa, 2014 to 2018

Site	Endpoint	2018						
		N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
RG_TN[a]	Density (#/L)	5	4,893,331	842,913	376,962	3,595,248	5,135,224	5,739,080
	Biomass (mg/m³)	5	790	304	136	454	789	1,235
	LPL Richness (# taxa)	5	25.4	2.07	0.927	22.0	26.0	27.0
	% Chlorophyte Ind.	5	1.53	0.793	0.355	0.530	1.58	2.51
	% Chrysophyte Ind.	5	20.7	20.4	9.13	6.89	12.7	56.4
	% Cryptophyte Ind.	5	4.50	1.97	0.881	2.30	4.62	6.69
	% Cyanophyte Ind.	5	0	0	0	0	0	0
	% Diatom Ind.	5	73.3	20.6	9.19	36.9	82.9	85.1
	% Dinoflagellate Ind.	5	0.0175	0.00774	0.00346	0.00738	0.0174	0.0273
	Chlorophyte Density (#/L)	5	73,677	43,375	19,398	28,736	72,440	144,080
	Chrystophyte Density (#/L)	5	1,033,499	1,137,609	508,754	395,320	581,904	3,060,784
	Cryptophyte Density (#/L)	5	232,717	129,688	57,998	82,640	237,304	383,984
	Cyanophyte Density (#/L)	5	0	0	0	0	0	0
	Diatom Density (#/L)	5	3,552,598	1,153,649	515,928	1,999,200	3,793,384	4,814,696
	Dinoflagellates Density (#/L)	5	840	385	172	400	800	1,400
	Chlorophyte Biomass (mg/m³)	5	3.36	2.30	1.03	1.25	2.66	6.95
	Chrystophye Biomass (mg/m³)	5	90.6	78.6	35.2	45.3	61.2	231
	Cryptophyte Biomass (mg/m³)	5	57.9	25.6	11.4	29.5	58.3	85.0
	Cyanophyte Biomass (mg/m³)	5	0	0	0	0	0	0
	Diatom Biomass (mg/m³)	5	626	302	135	344	470	1,087
	Dinoflageellate Biomass (mg/m³)	5	12.3	6.67	2.98	1.68	14.7	19.4
	% Chlorophyte Biomass	5	0.461	0.309	0.138	0.139	0.465	0.919
	% Chrysophyte Biomass	5	12.7	10.1	4.51	3.67	11.3	29.2
	% Cryptophyte Biomass	5	7.30	1.95	0.874	6.11	6.51	10.8
	% Cyanophyte Biomass	5	0	0	0	0	0	0
	% Diatom Biomass	5	77.8	11.2	5.03	59.6	80.3	88.0
	% Dinoflagellate Biomass	5	1.75	1.13	0.504	0.212	1.91	3.24
	NMDS 1	5	-0.321	0.143	0.0640	-0.495	-0.265	-0.162
	NMDS 2	5	-0.146	0.101	0.0453	-0.230	-0.167	0.0251
	NMDS 3	5	0.132	0.108	0.0482	-0.0605	0.175	0.188
RG_T4	Density (#/L)	5	4,540,194	427,528	191,196	3,885,336	4,498,848	5,024,696
	Biomass (mg/m³)	5	649	86.4	38.6	565	620	787
	LPL Richness (# taxa)	5	26.4	1.14	0.510	25.0	26.0	28.0
	% Chlorophyte Ind.	5	1.08	0.528	0.236	0.572	0.963	1.95
	% Chrysophyte Ind.	5	13.4	4.17	1.87	9.90	12.0	19.6
	% Cryptophyte Ind.	5	5.10	1.19	0.531	3.32	5.41	6.57
	% Cyanophyte Ind.	5	0	0	0	0	0	0
	% Diatom Ind.	5	80.3	4.05	1.81	74.4	82.7	83.9
	% Dinoflagellate Ind.	5	0.0323	0.0348	0.0155	0.00417	0.0222	0.0927
	Chlorophyte Density (#/L)	5	48,971	25,666	11,478	28,736	43,304	93,592
	Chrystophyte Density (#/L)	5	596,912	128,616	57,519	474,544	539,000	762,504
	Cryptophyte Density (#/L)	5	233,830	69,859	31,242	149,496	244,904	330,096
	Cyanophyte Density (#/L)	5	0	0	0	0	0	0
	Diatom Density (#/L)	5	3,659,120	493,407	220,658	2,890,712	3,773,232	4,161,584
	Dinoflagellates Density (#/L)	5	1,360	1,307	584	200	1,000	3,600
	Chlorophyte Biomass (mg/m³)	5	2.84	1.62	0.725	1.24	2.63	5.51
	Chrystophye Biomass (mg/m³)	5	66.3	20.2	9.03	52.1	52.5	96.3
	Cryptophyte Biomass (mg/m³)	5	57.2	13.6	6.10	43.1	50.7	72.0
	Cyanophyte Biomass (mg/m³)	5	0	0	0	0	0	0
	Diatom Biomass (mg/m³)	5	494	111	49.6	390	472	648
	Dinoflageellate Biomass (mg/m³)	5	28.8	31.5	14.1	0.765	15.1	81.4
	% Chlorophyte Biomass	5	0.446	0.244	0.109	0.158	0.463	0.819
	% Chrysophyte Biomass	5	10.5	3.95	1.76	6.61	8.69	15.5
	% Cryptophyte Biomass	5	8.88	2.26	1.01	7.16	7.86	12.7
	% Cyanophyte Biomass	5	0	0	0	0	0	0
	% Diatom Biomass	5	75.6	8.75	3.91	63.0	78.4	83.7
	% Dinoflagellate Biomass	5	4.62	5.14	2.30	0.114	2.68	13.1
	NMDS 1	5	-0.404	0.0208	0.00932	-0.431	-0.401	-0.376
	NMDS 2	5	-0.137	0.0747	0.0334	-0.223	-0.114	-0.0405
	NMDS 3	5	0.126	0.0678	0.0303	0.0226	0.123	0.199

[a] RG_T2 was sampled in 2014 instead of RG

Table D.9: Temporal Comparisons of Phytoplankton Community Endpoints Between Koocanusa Reservoir Downstream and Upstream Transects, 2014 to 2018

Endpoint	Transformation	ANOVA P-Values			Year	MCT		Q1. Does the magnitude of difference between upstream and downstream areas differ over time?	Q2. Do upstream and downstream areas differ over time?	Q3. Have there been changes within upstream and downstream sites over time?			
								US vs. DS Contrast[a]	US vs. DS MOD[b]	Temporal Differences		Temporal MOD vs Baseline[c]	
		Int.	Area	Year		US	DS			US	DS	US	DS
Density (#/L)	rank	0.706	0.735	<0.01	2014	3,822,048	3,296,336	ns	ns	AB		-	
					2015	12,672,877	15,199,706			C		b	
					2016	3,844,552	2,383,952			A		-13.4	
					2018	5,135,224	4,498,848			B		-11.3	
Biomass (mg/m³)	log_{10}	0.337	0.862	<0.01	2014	904	946	ns	ns	A		-	
					2015	3,117	4,259			B		b	
					2016	628	465			C		-4.94	
					2018	744	645			AC		-4.30	
LPL Richness (# taxa)	log_{10}	0.471	0.879	<0.01	2014	24.5	24.5	ns	ns	A		-	
					2015	17.8	18.5			B		b	
					2016	24.8	22.5			A		2.41	
					2018	25.3	26.4			A		3.24	
Chlorophyte Density (#/L)	log_{10}	0.307	0.110	<0.01	2014	73,083	46,957	ns	ns	A		-	
					2015	195,201	253,756			B		b	
					2016	90,544	31,152			A		-1.87	
					2018	64,294	44,834			A		-1.85	
Chlorophyte Biomass (mg/m³)	log_{10}	0.412	0.233	0.021	2014	4.38	2.31	ns	ns	A		-	
					2015	7.35	10.1			B		b	
					2016	5.37	2.19			AB		-1.06	
					2018	2.79	2.52			A		-1.36	
Chrysophyte Density (#/L)	rank	0.011	-	-	2014	683,280	592,088	AB	-0.744	A	A	-	-
					2015	317,664	396,830	A	0.646	B	B	b	b
					2016	583,304	388,136	B	-1.59	A	B	2.17	-0.0709
					2018	581,904	539,000	A	-0.350	A	A	2.16	1.16
Chrysophyte Biomass (mg/m³)	rank	0.103	1.000	<0.01	2014	43.4	63.2	ns	ns	AB		-	
					2015	44.7	37.5			C		b	
					2016	45.2	28.7			AC		-0.293	
					2018	61.2	52.5			B		1.11	
Cryptophyte Density (#/L)	log_{10}	0.252	0.584	<0.01	2014	147,272	134,508	ns	ns	A		-	
					2015	261,803	501,365			B		b	
					2016	148,966	110,580			A		-1.93	
					2018	199,440	225,318			AB		-0.996	
Cryptophyte Biomass (mg/m³)	log_{10}	0.025	-	-	2014	20.6	19.2	A	-0.146	A	A	-	-
					2015	35.6	97.1	B	2.10	AB	B	b	b
					2016	37.1	27.8	A	-0.605	AB	AC	0.0856	-2.62
					2018	53.0	56.0	AB	0.114	B	BC	0.832	-1.15
Cyanophyte Density (#/L)	rank	0.220	0.187	0.014	2014	0	0	ns	ns	AB		-	
					2015	600	200			A		b	
					2016	0	3,200			AB		-	
					2018	0	0			B		-	
Cyanophyte Biomass (mg/m³)	rank	0.224	0.192	<0.01	2014	0	0	ns	ns	AB		-	
					2015	0.795	0.524			A		b	
					2016	0	0.760			AB		-	
					2018	0	0			B		-	
Diatom Density (#/L)	rank	0.903	0.790	<0.01	2014	3,154,120	2,702,048	ns	ns	AB		-	
					2015	11,913,100	13,184,556			C		b	
					2016	2,638,944	1,694,856			A		-12.9	
					2018	3,793,384	3,773,232			B		-10.9	
Diatom Biomass (mg/m³)	log_{10}	0.409	0.670	<0.01	2014	790	775	ns	ns	A		-	
					2015	3,012	4,075			B		b	
					2016	502	352			C		-4.81	
					2018	574	485			AC		-4.30	
Dinoflagellate Density (#/L)	rank	0.402	0.401	<0.01	2014	3,200	1,400	ns	ns	A		-	
					2015	2,800	40,883			A		b	
					2016	1,600	1,200			AB		-23.0	
					2018	800	1,000			B		-23.5	
Dinoflagellate Biomass (mg/m³)	rank	0.681	0.730	0.391	2014	27.7	24.5	ns	ns	ns		-	
					2015	17.8	19.6					b	
					2016	29.8	28.5					ns	
					2018	14.7	15.1						
NMDS 1	none	0.718	0.446	<0.01	2014	-0.113	-0.157	ns	ns	A		-	
					2015	0.562	0.516			B		b	
					2016	-0.0658	-0.0181			A		-4.44	
					2018	-0.321	-0.404			C		-6.88	
NMDS 2	rank	0.407	0.331	<0.01	2014	0.348	0.362	ns	ns	A		-	
					2015	0.153	0.0450			B		b	
					2016	-0.140	-0.324			C		-4.98	
					2018	-0.167	-0.114			C		-3.60	
NMDS 3	rank	0.715	0.559	<0.01	2014	0.0226	-0.0571	ns	ns	AB		-	
					2015	0.0979	0.114			AC		b	
					2016	-0.206	-0.102			B		-2.93	
					2018	0.175	0.123			C		0.487	

P-Value < 0.1 and Magnitude of Difference (MOD) < 0.

P-Value < 0.1 and MOD > 0.

P-Value <0.1.

Notes: MCT = Measure of Central Tendancy (mean when untransformed, geometric mean when log10-transformed, and median when rank transformed). "ns" = non-significant. "-" = not applicable. All pariwise contrasts done using Tukey's Honest Significant Differences (α=0.1). Pairwise contrasts of upstream vs downstream differences conducted on the same scale as analysis (i.e., as ratios on log10 transformed endpoints, otherwise additive).

[a] Letters indicate pairwise contrasts between Upstream and Downstream differences over time (i.e., years that share a letter have similar MODs).

[b] MOD between Upstream and Downstream calculated for each year as MOD = $MCT_{Downstream}$ - $MCT_{Upstream}/SD_{pooled.}$

[c] MOD = MCT_{year} - $MCT_{baseline}/SD_{pooled}$, where MCT_{year} is the Measure of Central Tendandancy for the year of interest, $MCT_{baseline}$ is the Measure of Central Tendancy for 2015, and SD_{pooled} is the pooled standard deviation. "b" = indicates baseline year, and is considered to be the first year RG_TN was sampled (RG_T2 was sampled in 2014).

APPENDIX E
ZOOPLANKTON

TABLES

Table E.1: Zooplankton Community and Biomass Results as Provided by the Analytical Laboratory, June 2018 [a]

		Species	Life Stage [b]	Upstream of Elk River (RG_TN)										Downstream of Elk River (RG_T4)									
				TN-1		TN-2		TN-3		TN-4		TN-5		T4-1		T4-2		T4-3		T4-4		T4-5	
				Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass
				#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw
Copepoda	Calanoid	*Epischura nevadensis*	AF	0.11	21.7	0.02	4.0	0.03	5.5	0.06	11.5	0.05	9.6	0	0	0.01	1.9	0	0.38	0	0.38	0	0.36
			AM	0.04	6.1	0.02	4.1	0.06	9.9	0.09	14.8	0.04	6.8	0	0.58	0	0.32	0	0.32	0.02	3.4	0	0.31
			IM	0	0	0	0	0	0	0.08	4.0	0.08	4.0	0	0	0	0.10	0	0	0	0	0	0.09
		Diaptomus pallidus	AF	0.15	10.7	0.09	6.3	0.07	5.1	0.12	8.9	0.16	11.9	0	0.13	0.02	1.5	0.31	22.7	0.06	4.5	0.04	2.8
			GF	0	0	0	0	0.04	3.1	0.03	2.0	0.03	2.0	0	0	0	0	0	0.14	0	0	0	0
			AM	0.11	5.0	0.13	5.9	0.35	15.9	0.16	7.4	0.21	9.3	0	0	0.10	4.6	0	0	0	0	0	0
			IM 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			IM 1.0	0.19	6.9	0.04	1.6	0	0	0.08	2.9	0.12	4.4	0	0	0	0	0.31	11.6	0.31	11.6	0	0
			IM 0.75	0	0	0.08	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0.31	5.7	0.30	5.4
			IM 0.5	0.04	0.24	0.08	0.54	0.07	0.46	0	0	0	0	0	0	0	0	0.31	2.1	0	0	0	0
		Diaptomus tyrrelli	AF	0	0	0	0	0	0	0	0	0	1.2	0	0	0	0	0	0	0	0	0	0
			GF	0.01	1.3	0	0.37	0.14	12.6	0	0	0	0	0.02	1.7	0.04	3.7	0.01	0.87	0.06	5.5	0.01	0.50
			AM	0.01	0.43	0	0	0	0.21	0	0.24	0.06	3.4	0	0.11	0.02	1.2	0	0.12	0	0	0	0
			IM 2.0	0.11	6.4	0.13	7.6	0.07	4.1	0.04	2.4	0	0	0.04	2.1	0.06	3.6	0	0.11	0.04	2.4	0.02	0.97
			IM 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.30	11.0
			IM 0.75	0	0	0.17	3.0	0.21	3.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			IM 0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Calanoid nauplius	Small	0.56	1.7	0.66	1.9	0.01	0.03	0.78	2.3	0.39	1.1	0.56	1.7	1.3	3.7	0.31	0.92	0	0	0.30	0.87
			Large	0.07	0.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.30	1.1
	Cylcopoid	*Cyclops bicuspidatus thomasi*	AF	0.07	1.4	0	0	0.21	4.1	0	0	0.08	1.5	2.5	49.1	0.63	12.1	3.8	72.8	1.9	36.4	4.2	80.4
			GF	0	0	0	0	0	0.07	0	0.08	0.02	0.44	0.28	5.5	0.16	3.2	0.25	4.8	0.12	2.4	0.08	1.5
			AM	0.07	0.70	0	0	0.14	1.4	0.08	0.78	0	0	3.0	29.3	0.63	6.2	1.9	18.6	1.3	12.4	1.5	14.7
			IM 1.0	0	0	0.08	2.8	0.07	2.4	0.08	2.7	0	0	2.8	96.8	0.94	32.3	2.2	75.3	0.94	32.3	0.89	30.6
			IM 0.75	1.1	17.0	0.25	4.0	1.8	28.3	0.24	3.8	0.51	8.2	24.0	385	9.4	151	11.9	191	28.5	458	16.9	272
			IM 0.5	0.28	1.5	0.08	0.44	2.5	13.1	0.86	4.6	0.71	3.7	38.7	205	12.9	68.3	32.6	173	38.6	205	36.0	191
		Acanthocyclops vernalis	IM 0.5	0.14	0.78	0.08	0.46	0.07	0.39	0	0	0	0	0.28	1.6	0.94	5.2	0.31	1.7	0.31	1.7	0	0
		Cyclopoid nauplius	-	0	0	0.08	0.23	0.07	0.19	0.16	0.43	0.04	0.11	8.2	22.5	6.6	18.1	13.2	36.2	10.7	29.3	2.4	6.5
Cladocera		*Daphnia schoedleri*	2	0	0	0	0	0	0	0.24	109	0.12	54.6	0.56	262	0.31	146	0.63	291	0.63	291	0.30	138
		Daphnia schoedleri	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Daphnia schoedleri	1	0	0	0	0	0	0	0.24	13.1	0.20	10.9	0.28	15.8	0.63	35.0	1.6	87.6	3.5	193	1.2	66.4
		Daphnia schoedleri	0.5	0	0	0	0	0	0	0	0	0	0	0	0	1.3	9.0	1.3	9.0	1.3	9.0	2.1	14.8
		Daphnia galeata mendotae	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Daphnia galeata mendotae	1.5	0.14	47.4	0.25	83.6	1.3	450	0.94	316	0.47	158	0.99	332	0	0	0	0	0.63	211	1.2	399
		Daphnia galeata mendotae	1	1.8	76.3	1.8	79.0	3.6	156	3.4	146	1.7	74.6	2.5	110	1.3	54.3	2.2	94.9	1.9	81.4	4.2	180
		Daphnia galeata mendotae	0.5	0.49	1.4	1.2	3.3	3.7	10.6	2.0	5.5	1.2	3.4	2.4	6.8	0.63	1.8	1.9	5.3	3.1	8.9	5.3	15.1
		Daphnia retrocurva Forbes	2	0	0	0	0	0.07	20.6	0	0	0	0	0	0	0	0	0	0	0	0	0.30	86.5
		Daphnia retrocurva	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Daphnia retrocurva	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Holopedium gibberum	-	0	0	0	0	0	0	0	0	0	0	0	0	0.63	11.5	0	0	0	0	0	0
		Bosmina longirostris	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.30	48.8
		Bosmina longirostris	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Bosmina longirostris	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0.31	5.2	0.31	5.2	1.3	20.7	0.89	14.7
		Bosmina longirostris	0.25	0	0	0	0	1.1	1.7	0	0	0	0	5.5	8.8	3.8	6.0	4.4	7.1	11.9	19.2	11.9	19.1
		Scapholeberis kingii	-	0	7.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Leptodora kindtii	-	0.04	0.60	0	0	0	0.60	0	0.67	0	0.67	0	0	0.01	1.3	0	0.34	0.02	3.0	0	0
		Diaphanosoma leuchtenbergianum	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rotifera		*Kellicottia* spp.	-	1.6	0.33	0.75	0.16	2.1	0.45	1.2	0.25	0.98	0.21	49.4	10.6	17.9	3.8	24.8	5.3	32.6	7.0	12.8	2.7
		Keratella spp.	-	0.78	0.12	0.33	0.05	1.3	0.21	0.08	0.01	0.67	0.10	170	26.7	104	16.4	213	33.4	151	23.7	106	16.7
		Polyarthra spp.	-	0	0	0	0	0	0	0.08	0.05	0	0	1.7	0.99	7.2	4.2	11.3	6.6	5.6	3.3	4.5	2.6
		Conochilus spp.	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.63	0.38	0.94	0.56	0.59	0.36
		Gastropus spp.	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Synchaeta spp.	-	0	0	0	0	0	0	0	0	0	0	0	0	0.31	0.31	1.9	1.9	0.63	0.63	0	0
		Brachionus spp.	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Sampled entire water column (1.5 m from the bottom to the surface).

[b] AF: adult female; AM: adult male; GF: gravid female; IM: immature followed by body size in millimetres (mm) when available; numbers represent body size in mm.

Table E.2: Zooplankton Community and Biomass Results as Provided by the Analytical Laboratory, August 2018 [a]

		Species	Life Stage [b]	Upstream of Elk River (RG_TN)										Downstream of Elk River (RG_T4)									
				TN-1		TN-2		TN-3		TN-4		TN-5		T4-1		T4-2		T4-3		T4-4		T4-5	
				Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass
				#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw
Copepoda	Calanoid	*Epischura nevadensis*	AF	0.15	28.9	0.15	28.9	0.22	28.9	0.15	28.9	0	0.69	0.07	14.4	0.07	14.4	0.04	7.2	0.04	7.2	0.04	7.2
			AM	0.22	36.6	0.14	23.2	0.26	42.7	0.11	18.3	0	0	0	0	0.07	12.2	0.07	12.2	0.04	6.1	0.19	30.5
			IM	0.85	43.1	0.28	21.5	0.42	14.4	0.28	14.4	0	0.18	0	0	0.14	7.2	0	0	0.14	7.2	0.56	28.7
		Diaptomus pallidus	AF	0.28	20.4	0	10.2	0.14	0	0.07	5.1	0	0	0	0	0	0	0	0	0	0	0.28	20.4
			GF	0	0	0	5.4	0.01	0	0.01	0.89	0	0	0	0.26	0	0	0	0	0.01	0.51	0.04	2.7
			AM	0.28	12.7	0	19.1	0.07	0	0.11	5.0	0	0	0.14	6.4	0.14	6.4	0.14	6.4	0.28	12.7	0.14	6.4
			IM 2.0	0	0	0	0	0	0	0.07	3.0	0	0	0	0	0	0	0	0	0	0	0.14	5.9
			IM 1.0	0	0	0	10.4	0.14	0	0.14	5.2	0	0	0	0	0	0	0	0	0	0	0.56	20.9
			IM 0.75	0.14	2.6	0.14	12.9	0.28	2.6	0.14	2.6	0	0	0.28	5.2	0.85	15.5	0.28	5.2	0	0	0	0
			IM 0.5	0.28	1.8	0	3.7	0	0	0.07	0.46	0	0	0.28	1.8	0.14	0.92	0.28	1.8	0.28	1.8	0.14	0.92
		Diaptomus tyrrelli	AF	0	0	0.14	12.6	0.11	12.6	0.13	11.6	0	0	0.14	12.6	0.04	3.3	0.42	37.8	0.14	12.6	0	0
			GF	0	0	0.01	3.5	0.02	1.3	0.02	1.9	0	0	0.05	4.7	0.06	5.3	0.07	6.6	0.04	3.1	0.04	3.3
			AM	0	0.21	0.14	0	0.19	8.5	0.17	10.1	0	0	1.1	68.1	1.1	68.1	0.85	51.1	0.85	51.1	0.56	34.0
			IM 2.0	0.04	2.1	0	16.3	0.14	0	0.28	16.3	0	0	0.28	16.3	0.14	8.2	0.14	8.2	0.14	8.2	0	0
			IM 1.0	0	0	0.14	5.2	0.14	5.2	0.07	2.6	0	0	0	0	1.1	41.8	0.42	15.7	0	0	0	0
			IM 0.75	0.28	5.2	0	0	0	0	0	0	0	0	0.28	5.2	0	0	0	0	0	0	0	0
			IM 0.5	0	0	0	0	0	0	0.06	0.36	0	0	0	0	0	0	0	0	0	0	0	0
		Calanoid nauplius	Small	0.14	0.41	0.56	2.9	0.28	1.7	0.56	1.7	0	0	1.3	3.7	0.14	0.41	0.71	2.1	0.99	2.9	0.99	2.9
			Large	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cylcopoid	*Cyclops bicuspidatus thomasi*	AF	0.14	2.7	0.56	16.4	0.42	10.9	0.49	9.6	0.01	0.14	1.6	30.0	1.3	24.6	2.7	51.8	1.3	24.6	1.4	27.3
			GF	0	0	0	2.7	0	0	0	0.03	0	0	0	0.07	0.01	0.20	0.07	1.4	0	0.07	0.14	2.7
			AM	0.42	4.2	0.28	8.4	0.85	2.8	0.71	7.0	0	0	1.3	12.6	0.99	9.8	2.8	27.9	0.28	2.8	0.85	8.4
			IM 1.0	0.28	9.7	0	0	0	0	0.07	2.4	0	0	0	0	0	0	0	0	0	0	0	0
			IM 0.75	5.2	83.8	3.1	43.1	3.5	49.9	2.8	45.3	0	0.06	7.5	120	7.5	120	9.2	147	6.1	97.4	11.7	188
			IM 0.5	6.5	34.5	4.0	21.7	3.8	21.0	3.2	17.2	0	0	12.8	68.2	12.3	65.2	13.7	72.7	17.2	91.5	28.4	151
		Acanthocyclops vernalis	IM 0.5	0.71	3.9	0.14	1.6	0.14	0.78	0.14	0.78	0	0	0.28	1.6	0	0	0	0	0.28	1.6	0.28	1.6
		Cyclopoid nauplius	-	1.7	4.7	3.5	6.6	2.3	9.7	2.5	7.0	0.07	0.19	1.1	3.1	2.3	6.2	2.5	7.0	3.2	8.9	2.5	7.0
Cladocera		*Daphnia schoedleri*	2	0.71	327	0.07	17.2	0.42	34.4	0.28	131	0	0	0.14	65.5	0.04	17.2	0	0	0	0	0	0
			1.5	0	0	0.11	7.2	0	21.7	0.07	13.8	0	0.69	0	0	0.14	27.5	0	0	0	0	0	0
			1	0.14	7.9	0.14	0	0.14	7.9	0.07	3.9	0	0	0	0	0	0	0	0	0	0	0	0
			0.5	0	0	0.42	0.26	0	3.0	0	0	0	0	0.42	3.0	0	0	0.14	1.0	0	0	0	0
		Daphnia galeata mendotae	2	0.28	126	0.28	503	0.56	126	0.85	377	0.01	3.1	0	0	0	0	0.28	126	0.42	189	0.28	126
			1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			1	0	0	0.14	0	0.56	6.1	0.49	21.4	0	0	0.56	24.4	1.1	48.8	1.3	54.9	0.42	18.3	0.42	18.3
			0.5	0	0	0.14	0.40	0.28	0.40	0.42	1.2	0	0	0.56	1.6	0.85	2.4	1.8	5.2	0.85	2.4	0.85	2.4
		Daphnia retrocurva	2	0.28	82.2	0.02	43.2	0.28	5.1	0.21	61.7	0	0	0.28	82.2	0.11	32.4	0	0	0.14	41.1	0.14	41.1
			1	0.14	2.4	0	0	0	0	0	0	0	0	0.28	4.8	0	0	0.14	2.4	0	0	0.14	2.4
			0.5	0.14	0.55	0	0.55	0	0	0	0	0	0	0.14	0.55	0	0	0.28	1.1	0.14	0.55	0.14	0.55
		Holopedium gibberum	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Bosmina longirostris	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Scapholeberis kingii	-	0	0	0	0	0	0	0	0	0	0	0.01	1.5	0	0.75	0	0	0.01	1.5	0	0
		Leptodora kindtii	-	0.02	3.6	0	1.8	0	0	0	0	0	0	0.01	1.8	0	0	0.01	1.8	0	0	0.01	1.2
		Diaphanosoma leuchtenbergianum	-	0.01	0.13	0.28	2.0	0.07	5.2	0.18	3.3	0	0	0	0	0.71	13.0	0.99	18.2	0.22	4.1	0.19	3.4
Rotifera		*Kellicottia* spp.	-	1.3	0.27	0.85	0.15	0.85	0.18	0.92	0.20	0.14	0.03	1.8	0.39	1.8	0.39	3.2	0.70	4.2	0.91	2.8	0.60
		Keratella spp.	-	1.1	0.18	1.6	0.18	2.0	0.24	1.8	0.28	0.07	0.01	4.2	0.67	3.1	0.49	5.4	0.84	6.2	0.98	7.1	1.1
		Polyarthra spp.	-	0.28	0.17	1.6	0.50	2.1	0.91	1.6	0.95	0	0	0.42	0.25	0.28	0.17	0	0	0.99	0.58	0.71	0.41
		Conochilus spp.	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Gastropus spp.	-	2.5	0.54	4.0	0.79	3.0	0.85	3.3	0.71	0	0	6.2	1.3	6.4	1.4	6.9	1.5	3.2	0.70	4.0	0.85
		Synchaeta spp.	-	0	0	0	0.14	0.07	0	0.18	0.18	0	0	0	0	0	0	0	0	0.14	0.14	0	0
		Brachionus spp.	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Sampled from a depth of 10 m to the surface

[b] AF: adult female; AM: adult male; GF: gravid female; IM: immature followed by body size in millimetres (mm) when available; numbers represent body size in mm.

Table E.3: Zooplankton Community and Biomass Results as Provided by the Analytical Laboratory, September 2018[a]

			Species	Life Stage [b]	Upstream of Elk River (RG_TN)										Downstream of Elk River (RG_T4)									
					TN-1		TN-2		TN-3		TN-4		TN-5		T4-1		T4-2		T4-3		T4-4		T4-5	
					Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass	Density	Biomass
					#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw	#/L	µg/L dw
Copepoda	Calanoid		*Epischura nevadensis*	AF	0.053	10	0.055	11	0.089	17	0.25	48	0.25	48	0.035	6.9	0.10	20	0.034	6.6	0.034	6.6	0.067	13
				AM	0.040	6.5	0.071	12	0.18	29	0.37	61	0.19	30	0.018	2.9	0.017	2.8	0.034	5.5	0.017	2.8	0.051	8.3
				IM	0.25	13	0.12	6.2	0.23	11	0.12	6.0	0.24	12	0.20	10	0.064	3.3	0.064	3.3	0.064	3.3	0.32	16
			Diaptomus pallidus	AF	0.25	18	0.25	18	0.11	8.2	0.031	2.2	0.12	8.5	0	0	0	0	0	0	0	0	0	0
				GF	0.0076	0.55	0.0092	0.67	0.0028	0.20	0.0029	0.21	0.0029	0.21	0.0034	0.24	0	0	0	0	0	0	0	0
				AM	0.013	0.60	0.12	5.5	0	0	0.031	1.4	0	0	0	0	0.19	8.7	0	0	0	0	0	0
				IM 2.0	0.050	2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0016	0.067
				IM 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				IM 0.75	0.10	1.8	0	0	0	0	0	0	0	0	0.067	1.2	0	0	0	0	0.064	1.2	0.064	1.2
				IM 0.5	0	0	0	0	0	0	0	0	0	0	0.067	0.44	0.064	0.42	0.064	0.42	0	0	0.064	0.42
			Diaptomus tyrrelli	AF	0.066	5.9	0.12	11	0.059	5.3	0.031	2.8	0.12	10	0.053	4.7	0	0	0.064	5.7	0.13	11	0.32	29
				GF	0.018	1.6	0.0061	0.55	0.0085	0.76	0.0029	0.26	0.0088	0.79	0.013	1.2	0.011	1.0	0.0032	0.29	0.0096	0.86	0.030	2.7
				AM	0.11	6.4	0.12	7.4	0.11	6.8	0.71	43	0.24	14	0.21	13	0.45	27	0.064	3.9	0.19	12	0.26	15
				IM 2.0	0	0	0.12	7.1	0	0	0	0	0	0	0	0	0.13	7.4	0	0	0	0	0.064	3.7
				IM 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.064	2.4	0.064	2.4	0	0	0.13	4.7
				IM 0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.064	1.2
				IM 0.5	0	0	0	0	0.059	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Calanoid nauplius	Small	0.81	2.4	1.4	4.0	0.34	1.0	0.71	2.1	0.82	2.4	0.81	2.4	2.1	6.0	1.0	3.0	2.0	5.8	1.2	3.4
				Large	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.064	0.24	0	0	0	0
	Cyclopoid		*Cyclops bicuspidatus thomasi*	AF	0.15	2.9	0.37	7.1	0.11	2.2	0	0	0	0	0.94	18	0.90	17	0.38	7.4	0.19	3.7	0.38	7.4
				GF	0.0063	0.12	0	0	0	0	0	0	0.031	0.60	0.035	0.68	0.0016	0.031	0.051	1.0	0.0048	0.093	0.19	3.7
				AM	0.20	2.0	0.12	1.2	0.34	3.4	0.12	1.2	0.12	1.2	0.13	1.3	1.0	10	0.13	1.3	0.13	1.3	0.64	6.4
				IM 1.0	0.15	5.2	0	0	0	0	0	0	0.12	4.0	0	0	0.064	2.2	0	0	0	0	0	0
				IM 0.75	1.7	27	0.12	2.0	0.34	5.4	0.47	7.6	0.47	7.6	3.1	50	3.6	58	1.7	27	1.2	20	2.9	46
				IM 0.5	0.35	1.9	1.2	6.5	0.11	0.60	0.47	2.5	0.47	2.5	3.6	19	4.1	22	2.8	15	3.3	17	3.8	20
			Acanthocyclops vernalis	IM 0.5	0.10	0.56	0.74	4.1	0.11	0.62	0.24	1.3	0.12	0.65	0.27	1.5	0.13	0.71	0.064	0.35	0.19	1.1	0.19	1.1
			Cyclopoid nauplius	-	2.8	7.6	3.1	8.4	2.9	8.1	3.4	9.4	2.0	5.5	3.3	9.0	4.0	11	3.1	8.6	4.2	11	4.6	13
Cladocera			*Daphnia schoedleri*	2	0.11	49	0.032	15	0.089	41	0	0	0.0029	1.4	0.13	62	0	0	0.0064	3.0	0.0016	0.74	0	0
				1.5	0.040	7.7	0	0	0.089	17	0.031	6.0	0.031	6.0	0.067	13	0	0	0.0032	0.63	0.0032	0.63	0.0080	1.6
				1	0.013	0.74	0.064	3.6	0.059	3.3	0	0	0.031	1.7	0	0	0.064	3.6	0	0	0	0	0	0
				0.5	0	0	0	0	0.030	0.21	0	0	0	0	0	0	0.064	0.46	0.017	0.12	0.19	1.4	0	0
			Daphnia galeata mendotae	2	0.066	29	0.13	57	0.27	119	0.25	110	0.22	96	0	0	0.064	29	0.064	29	0.064	29	0.19	86
				1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				1	0.12	5.1	0.064	2.8	0.12	5.1	0.062	2.7	0.031	1.3	0.067	2.9	0.064	2.8	0	0	0.19	8.3	0.064	2.8
				0.5	0.30	0.86	0.12	0.35	0.11	0.32	0.24	0.67	0.24	0.67	0	0	0.26	0.73	0.13	0.36	0.064	0.18	0.064	0.18
			Daphnia retrocurva	2	0.093	27	0.064	19	0.24	69	0.22	63	0.19	54	0.27	78	0.19	56	0.064	19	0.064	19	0.13	37
				1	0.013	0.22	0	0	0.059	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.064	1.1
				0.5	0.064	0.25	0	0	0.11	0.44	0	0	0.062	0.24	0	0	0.064	0.25	0.064	0.25	0	0	0.064	0.25
			Holopedium gibberum	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Bosmina longirostris	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				0.75	0	0	0	0	0	0	0	0	**0**	0	0.067	4.3	0	0	0	0	0	0	**0**	**0**
				0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Scapholeberis kingii	-	0	0	0	0	0	0	0.0029	0.62	0.0029	0.62	0	0	0	0	0	0	0	0	0	0
			Leptodora kindtii	-	0.019	3.2	0.018	3.2	0.014	2.4	0.0029	0.50	0.0059	1.0	0.0017	0.29	0	0	0	0	0	0	0	0
			Diaphanosoma leuchtenbergianum	-	0.36	6.6	0.13	2.4	0.059	1.1	0.19	3.4	0.12	2.3	0.13	2.5	0.45	8.3	0.51	9.4	0.26	4.7	0.19	3.5
Rotifera			*Kellicottia* spp.	-	0.45	0.10	0.74	0.16	0.90	0.19	0.94	0.20	0.71	0.15	2.4	0.52	3.0	0.63	1.8	0.38	2.0	0.43	1.9	0.41
			Keratella spp.	-	1.2	0.19	1.5	0.23	1.0	0.16	1.5	0.24	2.4	0.37	3.1	0.49	2.8	0.44	2.4	0.37	1.9	0.30	2.4	0.37
			Polyarthra spp.	-	0.55	0.32	8.8	5.2	1.9	1.1	1.4	0.83	0.94	0.55	0.74	0.43	1.4	0.83	1.0	0.60	1.8	1.1	1.0	0.60
			Conochilus spp.	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Gastropus spp.	-	2.1	0.44	2.1	0.45	2.5	0.53	1.4	0.30	1.3	0.28	1.6	0.35	1.5	0.32	0.58	0.12	0.90	0.19	1.9	0.40
			Synchaeta spp.	-	0.10	0.050	0.37	0.37	0	0	0.12	0.12	0.12	0.12	0	0	0	0	0	0	0.13	0.13	0.064	0.064
			Brachionus spp.	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.064	0.040	0	0

[a] Sampled entire water column (1.5 m from the bottom to the surface).

[b] AF: adult female; AM: adult male; GF: gravid female; IM: immature followed by body size in millimetres (mm) when available; numbers represent body size in mm.

Table E.4: Zooplankton Community Density Data (no. of organisms/L), June 2018[a]

		Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
			TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Copepoda	Calanoid	*Epischura nevadensis*	0.15	0.046	0.088	0.23	0.17	0	0.014	0	0.023	0.0056
		Diaptomus pallidus	0.48	0.43	0.54	0.39	0.52	0	0.12	0.94	0.69	0.34
		Diaptomus tyrrelli	0.13	0.30	0.43	0.045	0.071	0.057	0.12	0.014	0.10	0.32
		Calanoid nauplius	0.64	0.66	0.011	0.78	0.39	0.56	1.3	0.31	0	0.59
	Cyclopoid	*Cyclops bicuspidatus thomasi*	1.5	0.42	4.7	1.3	1.3	0	25	53	71	60
		Acanthocyclops vernalis	0.14	0.083	0.071	0	0	0.28	0.94	0.31	0.31	0
		Cyclopoid nauplius	0	0.083	0.071	0.16	0.039	8.2	6.6	13	11	2.4
Cladocera		*Daphnia schoedleri*	0	0	0	0.47	0.31	0.85	2.2	3.5	5.3	3.6
		Daphnia galeata mendotae	2.4	3.2	8.7	6.3	3.4	5.9	1.9	4.1	5.6	11
		Daphnia retrocurva	0	0	0.071	0	0	0	0	0	0	0.30
		Holopedium gibberum	0	0	0	0	0	0	0.63	0	0	0
		Bosmina longirostris	0	0	1.1	0	0	5.5	4.1	4.7	13	13
		Scapholeberis kingii	0	0	0	0	0	0	0	0	0	0
		Leptodora kindtii	0.037	0	0	0	0	0	0.0078	0	0.018	0
		Diaphanosoma leuchtenbergianum	0	0	0	0	0	0	0	0	0	0
Rotifera		*Kellicottia* spp.	1.6	0.75	2.1	1.2	0.98	49	18	25	33	13
		Keratella spp.	0.78	0.33	1.3	0.078	0.67	170	104	213	151	106
		Polyarthra spp.	0	0	0	0.078	0	1.7	7.2	11	5.6	4.5
		Conochilus spp.	0	0	0	0	0	0	0	0.63	0.94	0.59
		Gastropus spp.	0	0	0	0	0	0	0	0	0	0
		Synchaeta spp.	0	0	0	0	0	0	0.31	1.9	0.63	0
		Brachionus spp.	0	0	0	0	0	0	0	0	0	0
Total number of organisms/L			**7.8**	**6.3**	**19**	**11**	**7.9**	**243**	**172**	**331**	**298**	**215**
Total number of taxa			**11**	**10**	**13**	**12**	**11**	**12**	**16**	**16**	**15**	**14**

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.5: Zooplankton Community Density Data (no. of organisms/L), August 2018[a]

		Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
			TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Copepoda	Calanoid	*Epischura nevadensis*	1.2	0.69	0.79	0.54	0.0071	0.074	0.29	0.11	0.22	0.79
		Diaptomus pallidus	0.99	0.14	0.65	0.62	0	0.71	1.1	0.71	0.57	1.3
		Diaptomus tyrrelli	0.32	0.44	0.60	0.73	0	1.9	2.5	1.9	1.2	0.60
		Calanoid nauplius	0.14	0.56	0.28	0.56	0	1.3	0.14	0.71	0.99	0.99
	Cyclopoid	*Cyclops bicuspidatus thomasi*	12.6	7.9	8.6	7.3	0.011	23	22	28	25	42
		Acanthocyclops vernalis	0.71	0.14	0.14	0.14	0	0.28	0	0	0.28	0.28
		Cyclopoid nauplius	1.7	3.5	2.3	2.5	0.071	1.1	2.3	2.5	3.2	2.5
Cladocera		*Daphnia schoedleri*	0.85	0.75	0.56	0.42	0	0.56	0.18	0.14	0	0
		Daphnia galeata mendotae	0.28	0.56	1.4	1.8	0.0071	1.1	2.0	3.4	1.7	1.6
		Daphnia retrocurva	0.56	0.018	0.28	0.21	0	0.71	0.11	0.42	0.28	0.42
		Holopedium gibberum	0	0	0	0	0	0	0	0	0	0
		Bosmina longirostris	0	0	0	0	0	0	0	0	0	0
		Scapholeberis kingii	0	0	0	0	0	0.0071	0	0	0.0071	0
		Leptodora kindtii	0.021	0	0	0	0	0.011	0	0.011	0	0.0071
		Diaphanosoma leuchtenbergianum	0.0071	0.28	0.074	0.18	0	0	0.71	0.99	0.22	0.19
Rotifera		*Kellicottia* spp.	1.3	0.85	0.85	0.92	0.14	1.8	1.8	3.2	4.2	2.8
		Keratella spp.	1.1	1.6	2.0	1.8	0.071	4.2	3.1	5.4	6.2	7.1
		Polyarthra spp.	0.28	1.6	2.1	1.6	0	0.42	0.28	0	0.99	0.71
		Conochilus spp.	0	0	0	0	0	0	0	0	0	0
		Gastropus spp.	2.5	4.0	3.0	3.3	0	6.2	6.4	6.9	3.2	4.0
		Synchaeta spp.	0	0	0.074	0.18	0	0	0	0	0.14	0
		Brachionus spp.	0	0	0	0	0	0	0	0	0	0
Total number of organisms/L			**25**	**23**	**24**	**23**	**0.31**	**44**	**43**	**55**	**48**	**66**
Total number of taxa			**16**	**15**	**16**	**16**	**7**	**16**	**15**	**14**	**16**	**15**

[a] Sampled from a depth of 10m to the surface

Table E.6: Zooplankton Community Density Data (no. of organisms/L), September 2018[a]

Species			Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
			TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Copepoda	Calanoid	*Epischura nevadensis*	0.34	0.25	0.49	0.74	0.67	0.25	0.18	0.13	0.11	0.44
		Diaptomus pallidus	0.42	0.38	0.12	0.065	0.12	0.14	0.26	0.064	0.064	0.13
		Diaptomus tyrrelli	0.19	0.37	0.24	0.74	0.36	0.28	0.65	0.20	0.33	0.86
		Calanoid nauplius	0.81	1.4	0.34	0.71	0.82	0.81	2.1	1.1	2.0	1.2
	Cyclopoid	*Cyclops bicuspidatus thomasi*	2.5	1.8	0.90	1.1	1.2	7.8	9.7	5.0	4.8	7.9
		Acanthocyclops vernalis	0.10	0.74	0.11	0.24	0.12	0.27	0.13	0.064	0.19	0.19
		Cyclopoid nauplius	2.8	3.1	2.9	3.4	2.0	3.3	4.0	3.1	4.2	4.6
Cladocera		*Daphnia schoedleri*	0.16	0.10	0.27	0	0.065	0.20	0.13	0	0.20	0
		Daphnia galeata mendotae	0.49	0.32	0.50	0.54	0.48	0.067	0.38	0.19	0.32	0.32
		Daphnia retrocurva	0.17	0.064	0.41	0.22	0.25	0.27	0.26	0.13	0.064	0.26
		Holopedium gibberum	0	0	0	0	0	0	0	0	0	0
		Bosmina longirostris	0	0	0	0	0	0.067	0	0	0	0
		Scapholeberis kingii	0	0	0	0	0	0	0	0	0	0
		Leptodora kindtii	0	0	0	0	0	0	0	0	0	0
		Diaphanosoma leuchtenbergianum	0.36	0.13	0.059	0.19	0.12	0.13	0.45	0.51	0.26	0.19
Rotifera		*Kellicottia* spp.	0.45	0.74	0.90	0.94	0.71	2.4	3.0	1.8	2.0	1.9
		Keratella spp.	1.2	1.5	1.0	1.5	2.4	3.1	2.8	2.4	1.9	2.4
		Polyarthra spp.	0.55	8.8	1.9	1.4	0.94	0.74	1.4	1.0	1.8	1.0
		Conochilus spp.	0	0	0	0	0	0	0	0	0	0
		Gastropus spp.	2.1	2.1	2.5	1.4	1.3	1.6	1.5	0.58	0.90	1.9
		Synchaeta spp.	0.10	0.37	0	0.12	0.12	0	0	0	0.13	0.064
		Brachionus spp.	0	0	0	0	0	0	0	0	0.064	0
Total number of organisms/L			**13**	**22**	**13**	**13**	**12**	**21**	**27**	**16**	**19**	**23**
Total number of taxa			**17**	**17**	**16**	**18**	**18**	**17**	**15**	**15**	**17**	**16**

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.7: Zooplankton Density (no. of organisms/L) Organized by Major Groups, June 2018[a]

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Copepoda	3.0	2.0	5.9	2.9	2.5	9.1	34	67	83	63
Cladocera	2.4	3.2	9.8	6.7	3.7	12	8.8	12	24	28
Rotifera	2.3	1.1	3.5	1.3	1.6	221	130	251	190	124
Total number of organisms/L	**8**	**6**	**19**	**11**	**8**	**243**	**172**	**331**	**298**	**215**
Total number of groups	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.8: Zooplankton Density (no. of organisms/L) Organized by Major Groups, August 2018[a]

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Copepoda	18	13	13	12	0.088	29	28	34	31	49
Cladocera	1.7	1.6	2.3	2.6	0.011	2.4	3.0	5.0	2.2	2.2
Rotifera	5.2	7.9	8.0	7.8	0.21	13	12	16	15	15
Total number of organisms/L	**25**	**23**	**24**	**23**	**0.31**	**44**	**43**	**55**	**48**	**66**
Total number of groups	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

[a] Sampled from a depth of 10m to the surface

Table E.9: Zooplankton Density (no. of organisms/L) Organized by Major Groups, September 2018[a]

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	**TN-2**	**TN-3**	**TN-4**	**TN-5**	**T4-1**	**T4-2**	**T4-3**	**T4-4**	**T4-5**
Copepoda	7.2	8.0	5.1	6.9	5.3	13	17	9.7	12	15
Cladocera	1.2	0.62	1.2	0.98	0.93	0.74	1.2	0.86	0.84	0.78
Rotifera	4.4	14	6.3	5.4	5.4	7.9	8.7	5.8	6.8	7.2
Total number of organisms/L	**13**	**22**	**13**	**13**	**12**	**21**	**27**	**16**	**19**	**23**
Total number of groups	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.10: Relative Density (%) of Zooplankton Species, June 2018[a]

	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
												Minimum		Median		Maximum		Mean		Standard Deviation	
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Copepoda	*Epischura nevadensis*	1.9	0.72	0.46	2.1	2.1	0	0.0080	0	0.0076	0	0.46	0	1.9	0	2.1	0.0080	1.5	0	0.80	0
	Diaptomus pallidus	6.2	6.7	2.8	3.6	6.5	0	0.072	0.28	0.23	0.16	2.8	0	6.2	0.16	6.7	0.28	5.2	0.15	1.8	0.12
	Diaptomus tyrrelli	1.7	4.7	2.2	0.41	0.90	0.024	0.072	0	0.035	0.15	0.41	0	1.7	0.035	4.7	0.15	2.0	0.057	1.7	0.057
	Calanoid nauplius	8.2	10	0.055	7.2	5.0	0.23	0.73	0.095	0	0.28	0.055	0	7.2	0.23	10	0.73	6.2	0.27	3.9	0.28
	Cyclops bicuspidatus thomasi	19	6.6	24	11	17	0	14	16	24	28	6.6	0	17	16	24	28	16	16	6.9	11
	Acanthocyclops vernalis	1.8	1.3	0.37	0	0	0.12	0.55	0.095	0.11	0	0	0	0.37	0.11	1.8	0.55	0.70	0.17	0.82	0.21
	Cyclopoid nauplius	0	1.3	0.37	1.4	0.50	3.4	3.8	4.0	3.6	1.1	0	1.1	0.50	3.6	1.4	4.0	0.72	3.2	0.62	1.2
Cladocera	*Daphnia schoedleri*	0	0	0	4.3	4.0	0.35	1.3	1.0	1.8	1.7	0	0.35	0	1.3	4.3	1.8	1.7	1.2	2.3	0.57
	Daphnia galeata mendotae	31	51	45	57	43	2.4	1.1	1.2	1.9	5.0	31	1.1	45	1.9	57	5.0	46	2.3	9.9	1.6
	Daphnia retrocurva	0	0	0.37	0	0	0	0	0	0	0.14	0	0	0	0	0.37	0.14	0.074	0.028	0.16	0.062
	Holopedium gibberum	0	0	0	0	0	0	0.36	0	0	0	0	0	0	0	0	0.36	0	0.073	0	0.16
	Bosmina longirostris	0	0	5.5	0	0	2.3	2.4	1.4	4.4	6.1	0	1.4	0	2.4	5.5	6.1	1.1	3.3	2.5	1.9
	Scapholeberis kingii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Leptodora kindtii	0.48	0	0.018	0.036	0.050	0	0	0	0.0059	0	0	0	0.036	0	0.48	0.0059	0.12	0	0.20	0
	Diaphanosoma leuchtenbergianum	0.045	0	0	0	0	0	0	0	0	0	0	0	0	0	0.045	0	0.0091	0	0.020	0
Rotifera	*Kellicottia* spp.	20	12	11	11	12	20	10	7.5	11	5.9	11	5.9	12	10	20	20	13	11	3.8	5.6
	Keratella spp.	10	5.2	7.0	0.72	8.5	70	61	64	51	49	0.72	49	7.0	61	10	70	6.3	59	3.6	8.9
	Polyarthra spp.	0	0	0	0.72	0	0.70	4.2	3.4	1.9	2.1	0	0.70	0	2.1	0.72	4.2	0.14	2.5	0.32	1.4
	Conochilus spp.	0	0	0	0	0	0	0	0.19	0.32	0.28	0	0	0	0.19	0	0.32	0	0.16	0	0.15
	Gastropus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Synchaeta spp.	0	0	0	0	0	0	0.18	0.57	0.21	0	0	0	0	0.18	0	0.57	0	0.19	0	0.23
	Brachionus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.11: **Relative Density (%) of Zooplankton Species, August 2018**[a]

Species		Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
												Minimum		Median		Maximum		Mean		Standard Deviation	
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Copepoda	*Epischura nevadensis*	5.0	3.0	3.4	2.4	2.3	0.17	0.67	0.20	0.45	1.2	2.3	0.17	3.0	0.45	5.0	1.2	3.2	0.54	1.1	0.42
	Diaptomus pallidus	4.0	0.62	2.7	2.7	0	1.6	2.6	1.3	1.2	2.0	0	1.2	2.7	1.6	4.0	2.6	2.0	1.7	1.7	0.59
	Diaptomus tyrrelli	1.3	1.9	2.5	3.2	0	4.3	5.8	3.5	2.4	0.92	0	0.92	1.9	3.5	3.2	5.8	1.8	3.4	1.2	1.9
	Calanoid nauplius	0.57	2.5	1.2	2.5	0	2.9	0.33	1.3	2.0	1.5	0	0.33	1.2	1.5	2.5	2.9	1.3	1.6	1.1	0.95
	Cyclops bicuspidatus thomasi	51	34	36	32	3.4	53	51	52	51	65	3.4	51	34	52	51	65	32	54	17	5.7
	Acanthocyclops vernalis	2.9	0.62	0.60	0.62	0	0.65	0	0	0.58	0.43	0	0	0.62	0.43	2.9	0.65	0.94	0.33	1.1	0.31
	Cyclopoid nauplius	6.9	15	9.6	11	23	2.6	5.3	4.6	6.7	3.9	6.9	2.6	11	4.6	23	6.7	13	4.6	6.2	1.5
Cladocera	*Daphnia schoedleri*	3.4	3.3	2.4	1.9	1.1	1.3	0.42	0.26	0	0	1.1	0	2.4	0.26	3.4	1.3	2.4	0.39	0.97	0.53
	Daphnia galeata mendotae	1.1	2.5	6.0	7.7	2.3	2.6	4.6	6.2	3.5	2.4	1.1	2.4	2.5	3.5	7.7	6.2	3.9	3.8	2.8	1.6
	Daphnia retrocurva	2.3	0.077	1.2	0.93	0	1.6	0.26	0.77	0.58	0.64	0	0.26	0.93	0.64	2.3	1.6	0.90	0.78	0.94	0.51
	Holopedium gibberum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bosmina longirostris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Scapholeberis kingii	0	0	0	0	0	0.016	0.0082	0	0.015	0	0	0	0	0.0082	0	0.016	0	0.0078	0	0.0077
	Leptodora kindtii	0.086	0	0	0	0	0.024	0	0.019	0	0.011	0	0	0	0.011	0.086	0.024	0.017	0.011	0.039	0.011
	Diaphanosoma leuchtenbergianum	0.029	1.2	0.31	0.78	0	0	1.6	1.8	0.46	0.28	0	0	0.31	0.46	1.2	1.8	0.47	0.84	0.53	0.83
Rotifera	*Kellicottia* spp.	5.2	3.7	3.6	4.0	45	4.2	4.3	5.9	8.8	4.3	3.6	4.2	4.0	4.3	45	8.8	12	5.5	18	2.0
	Keratella spp.	4.6	6.8	8.4	7.7	23	9.7	7.2	9.8	13	11	4.6	7.2	7.7	9.8	23	13	10	10	7.2	2.0
	Polyarthra spp.	1.1	6.8	9.0	7.1	0	0.97	0.66	0	2.0	1.1	0	0	6.8	0.97	9.0	2.0	4.8	0.95	4.0	0.74
	Conochilus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gastropus spp.	10	17	13	15	0	14	15	13	6.7	6.0	0	6.0	13	13	17	15	11	11	6.6	4.2
	Synchaeta spp.	0	0	0.31	0.78	0	0	0	0	0.29	0	0	0	0	0	0.78	0.29	0.22	0.058	0.34	0.13
	Brachionus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Sampled from a depth of 10m to the surface

Table E.12: Relative Density (%) of Zooplankton Species, September 2018[a]

	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
												Minimum		Median		Maximum		Mean		Standard Deviation	
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Copepoda	*Epischura nevadensis*	2.7	1.1	3.9	5.5	5.7	1.2	0.68	0.81	0.59	1.9	1.1	0.59	3.9	0.81	5.7	1.9	3.8	1.0	1.9	0.53
	Diaptomus pallidus	3.3	1.7	0.91	0.48	1.0	0.64	0.96	0.39	0.33	0.56	0.48	0.33	1.0	0.56	3.3	0.96	1.5	0.58	1.1	0.25
	Diaptomus tyrrelli	1.5	1.7	1.9	5.5	3.1	1.3	2.4	1.2	1.7	3.7	1.5	1.2	1.9	1.7	5.5	3.7	2.7	2.1	1.7	1.0
	Calanoid nauplius	6.3	6.1	2.7	5.3	7.1	3.8	7.7	6.7	10	5.0	2.7	3.8	6.1	6.7	7.1	10	5.5	6.7	1.7	2.5
	Cyclops bicuspidatus thomasi	20	8.3	7.1	7.9	10	36	36	31	25	34	7.1	25	8.3	34	20	36	11	32	5.2	4.8
	Acanthocyclops vernalis	0.79	3.3	0.89	1.8	1.0	1.3	0.48	0.39	1.0	0.83	0.79	0.39	1.0	0.83	3.3	1.3	1.6	0.79	1.1	0.36
	Cyclopoid nauplius	22	14	23	26	17	15	15	19	22	20	14	15	22	19	26	22	20	18	4.7	2.9
Cladocera	*Daphnia schoedleri*	1.2	0.44	2.1	0.23	0.56	0.94	0.48	0.16	1.0	0.034	0.23	0.034	0.56	0.48	2.1	1.0	0.91	0.53	0.76	0.44
	Daphnia galeata mendotae	3.8	1.4	3.9	4.1	4.1	0.31	1.4	1.2	1.7	1.4	1.4	0.31	3.9	1.4	4.1	1.7	3.5	1.2	1.2	0.52
	Daphnia retrocurva	1.3	0.29	3.2	1.6	2.1	1.3	0.96	0.79	0.33	1.1	0.29	0.33	1.6	0.96	3.2	1.3	1.7	0.89	1.1	0.35
	Holopedium gibberum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bosmina longirostris	0	0	0	0	0	0.31	0	0	0	0	0	0	0	0	0	0.31	0	0.063	0	0.14
	Scapholeberis kingii	0	0	0	0.022	0.025	0	0	0	0	0	0	0	0	0	0.025	0	0.0095	0	0.013	0
	Leptodora kindtii	0.15	0.083	0.11	0.022	0.051	0.0078	0	0	0	0	0.022	0	0.083	0	0.15	0.0078	0.083	0	0.050	0
	Diaphanosoma leuchtenbergianum	2.8	0.58	0.47	1.4	1.1	0.63	1.7	3.1	1.3	0.83	0.47	0.63	1.1	1.3	2.8	3.1	1.3	1.5	0.94	1.0
Rotifera	*Kellicottia* spp.	3.6	3.3	7.1	7.1	6.1	11	11	11	10	8.3	3.3	8.3	6.1	11	7.1	11	5.4	10	1.9	1.2
	Keratella spp.	9.5	6.7	8.0	11	20	14	11	15	10	10	6.7	10	9.5	11	20	15	11	12	5.4	2.3
	Polyarthra spp.	4.4	40	15	11	8.1	3.4	5.3	6.3	9.3	4.4	4.4	3.4	11	5.3	40	9.3	16	5.7	14	2.3
	Conochilus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gastropus spp.	16	9.4	20	11	11	7.5	5.5	3.5	4.6	8.0	9.4	3.5	11	5.5	20	8.0	13	5.8	4.3	1.9
	Synchaeta spp.	0.79	1.7	0	0.88	1.0	0	0	0	0.66	0.28	0	0	0.88	0	1.7	0.66	0.87	0.19	0.59	0.29
	Brachionus spp.	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0.33	0	0.066	0	0.15

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.13: Zooplankton Community Biomass Data (µg/L dw), June 2018[a]

	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Copepoda	*Epischura nevadensis*	28	8.1	15	30	20	0.58	2.3	0.70	3.8	0.76
	Diaptomus pallidus	23	16	25	21	28	0.13	6.1	37	22	8.3
	Diaptomus tyrrelli	8.1	11	21	2.6	4.7	3.9	8.5	1.1	7.9	12
	Calanoid nauplius	1.9	1.9	0.031	2.3	1.1	1.7	3.7	0.92	0	2.0
	Cyclops bicuspidatus thomasi	21	7.3	49	12	14	771	273	536	747	590
	Acanthocyclops vernalis	0.78	0.46	0.39	0	0	1.6	5.2	1.7	1.7	0
	Cyclopoid nauplius	0	0.23	0.19	0.43	0.11	22	18	36	29	6.5
Cladocera	*Daphnia schoedleri*	0	0	0	122	66	278	190	388	493	219
	Daphnia galeata mendotae	125	166	616	467	236	448	56	100	301	594
	Daphnia retrocurva	0	0	21	0	0	0	0	0	0	87
	Holopedium gibberum	0	0	0	0	0	0	11	0	0	0
	Bosmina longirostris	0	0	1.7	0	0	8.8	11	12	40	83
	Scapholeberis kingii	7.8	0	0	0	0	0	0	0	0	0
	Leptodora kindtii	0.60	0	0.60	0.67	0.67	0	1.3	0.34	3.0	0
	Diaphanosoma leuchtenbergianum	0	0	0	0	0	0	0	0	0	0
Rotifera	*Kellicottia* spp.	0.33	0.16	0.45	0.25	0.21	11	3.8	5.3	7.0	2.7
	Keratella spp.	0.12	0.052	0.21	0.012	0.10	27	16	33	24	17
	Polyarthra spp.	0	0	0	0.046	0	0.99	4.2	6.6	3.3	2.6
	Conochilus spp.	0	0	0	0	0	0	0	0.38	0.56	0.36
	Gastropus spp.	0	0	0	0	0	0	0	0	0	0
	Synchaeta spp.	0	0	0	0	0	0	0.31	1.9	0.63	0
	Brachionus spp.	0	0	0	0	0	0	0	0	0	0
Total biomass of organisms		**216**	**211**	**750**	**659**	**370**	**1,575**	**611**	**1,161**	**1,683**	**1,625**
Total number of taxa		**11**	**10**	**13**	**12**	**11**	**13**	**16**	**16**	**15**	**14**

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.14: Zooplankton Community Biomass Data (µg/L dw), August 2018[a]

	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Copepoda	*Epischura nevadensis*	109	74	86	62	0.87	14	34	19	20	66
	Diaptomus pallidus	38	62	2.6	22	0	14	23	13	15	57
	Diaptomus tyrrelli	7.5	38	28	43	0	107	127	119	75	37
	Calanoid nauplius	0.41	2.9	1.7	1.7	0	3.7	0.41	2.1	2.9	2.9
	Cyclops bicuspidatus thomasi	135	92	85	82	0.19	231	220	301	216	377
	Acanthocyclops vernalis	3.9	1.6	0.78	0.78	0	1.6	0	0	1.6	1.6
	Cyclopoid nauplius	4.7	6.6	9.7	7.0	0.19	3.1	6.2	7.0	8.9	7.0
Cladocera	*Daphnia schoedleri*	335	25	67	149	0.69	69	45	1.0	0	0
	Daphnia galeata mendotae	126	503	132	400	3.1	26	51	186	209	146
	Daphnia retrocurva	85	44	5.1	62	0	88	32	3.5	42	44
	Holopedium gibberum	0	0	0	0	0	0	0	0	0	0
	Bosmina longirostris	0	0	0	0	0	0	0	0	0	0
	Scapholeberis kingii	0	0	0	0	0	1.5	0.75	0	1.5	0
	Leptodora kindtii	3.6	1.8	0	0	0	1.8	0	1.8	0	1.2
	Diaphanosoma leuchtenbergianum	0.13	2.0	5.2	3.3	0	0	13	18	4.1	3.4
Rotifera	*Kellicottia* spp.	0.27	0.15	0.18	0.20	0.030	0.39	0.39	0.70	0.91	0.60
	Keratella spp.	0.18	0.18	0.24	0.28	0.011	0.67	0.49	0.84	0.98	1.1
	Polyarthra spp.	0.17	0.50	0.91	0.95	0	0.25	0.17	0	0.58	0.41
	Conochilus spp.	0	0	0	0	0	0	0	0	0	0
	Gastropus spp.	0.54	0.79	0.85	0.71	0	1.3	1.4	1.5	0.70	0.85
	Synchaeta spp.	0	0.14	0	0.18	0	0	0	0	0.14	0
	Brachionus spp.	0	0	0	0	0	0	0	0	0	0
Total biomass of organisms		**849**	**854**	**425**	**833**	**5.1**	**562**	**554**	**676**	**600**	**748**
Total number of taxa		**16**	**17**	**15**	**16**	**7**	**16**	**15**	**14**	**16**	**15**

[a] Sampled from a depth of 10m to the surface

Table E.15: Zooplankton Community Biomass Data (µg/L dw), September 2018[a]

	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Copepoda	*Epischura nevadensis*	30	29	58	115	91	20	26	15	13	38
	Diaptomus pallidus	23	24	8.4	3.8	8.7	1.9	9.1	0.42	1.2	1.7
	Diaptomus tyrrelli	14	26	13	46	25	19	38	12	24	56
	Calanoid nauplius	2.4	4.0	0.99	2.1	2.4	2.4	6.0	3.2	5.8	3.4
	Cyclops bicuspidatus thomasi	39	17	12	11	16	89	109	51	42	84
	Acanthocyclops vernalis	0.56	4.1	0.62	1.3	0.65	1.5	0.71	0.35	1.1	1.1
	Cyclopoid nauplius	7.6	8.4	8.1	9.4	5.5	9.0	11	8.6	11	13
Cladocera	*Daphnia schoedleri*	58	19	62	6.0	9.1	75	4.0	3.7	2.7	1.6
	Daphnia galeata mendotae	35	61	124	113	98	2.9	32	29	37	89
	Daphnia retrocurva	27	19	71	63	54	78	56	19	19	39
	Holopedium gibberum	0	0	0	0	0	0	0	0	0	0
	Bosmina longirostris	0	0	0	0	0	4.3	0	0	0	0
	Scapholeberis kingii	0	0	0	0.62	0.62	0	0	0	0	0
	Leptodora kindtii	3.2	3.2	2.4	0.50	1.0	0.29	0	0	0	0
	Diaphanosoma leuchtenbergianum	6.6	2.4	1.1	3.4	2.3	2.5	8.3	9.4	4.7	3.5
Rotifera	*Kellicottia* spp.	0.10	0.16	0.19	0.20	0.15	0.52	0.63	0.38	0.43	0.41
	Keratella spp.	0.19	0.23	0.16	0.24	0.37	0.49	0.44	0.37	0.30	0.37
	Polyarthra spp.	0.32	5.2	1.1	0.83	0.55	0.43	0.83	0.60	1.1	0.60
	Conochilus spp.	0	0	0	0	0	0	0	0	0	0
	Gastropus spp.	0.44	0.45	0.53	0.30	0.28	0.35	0.32	0.12	0.19	0.40
	Synchaeta spp.	0.050	0.37	0	0.12	0.12	0	0	0	0.13	0.064
	Brachionus spp.	0	0	0	0	0	0	0	0	0.040	0
Total biomass of organisms		**248**	**222**	**363**	**377**	**316**	**308**	**303**	**154**	**163**	**331**
Total number of taxa		**17**	**17**	**16**	**18**	**18**	**17**	**15**	**15**	**17**	**16**

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.16: Biomass (µg/L dw) of Zooplankton by Group, June 2018[a]

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-2	T4-3	T4-4	T4-5	T4-6
Copepoda	82	45	111	69	68	802	317	613	811	620
Cladocera	133	166	639	590	302	735	270	500	836	982
Rotifera	0.45	0.21	0.66	0.31	0.31	38	25	48	35	22
Total biomass of organisms	**216**	**211**	**750**	**659**	**370**	**1,575**	**611**	**1,161**	**1,683**	**1,625**
Total number of groups	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.17: Biomass (µg/L dw) of Zooplankton by Group, August 2018[a]

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-2	T4-3	T4-4	T4-5	T4-6
Copepoda	298	276	213	218	1.3	374	410	462	340	550
Cladocera	550	576	210	613	3.8	185	142	210	257	195
Rotifera	1.2	1.8	2.2	2.3	0.041	2.6	2.4	3.0	3.3	3.0
Total biomass of organisms	**849**	**854**	**425**	**833**	**5**	**562**	**554**	**676**	**600**	**748**
Total number of groups	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

[a] Sampled from a depth of 10m to the surface

Table E.18: Biomass (µg/L dw) of Zooplankton by Group, September 2018[a]

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-2	T4-3	T4-4	T4-5	T4-6
Copepoda	116	112	101	188	149	143	200	91	98	197
Cladocera	130	103	260	187	165	164	101	61	63	133
Rotifera	1.1	6.4	2.0	1.7	1.5	1.8	2.2	1.5	2.1	1.8
Total biomass of organisms	**248**	**222**	**363**	**377**	**316**	**308**	**303**	**154**	**163**	**331**
Total number of groups	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.19: Relative Biomass (%) of Zooplankton Species, June 2018[a]

Species		Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
												Minimum		Median		Maximum		Mean		Standard Deviation	
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Copepoda	*Epischura nevadensis*	13	3.9	2.0	4.6	5.5	0.037	0.38	0.061	0.22	0.047	2.0	0.037	4.6	0.061	13	0.38	5.8	0.15	4.2	0.15
	Diaptomus pallidus	11	7.5	3.3	3.2	7.4	0.0081	1.0	3.1	1.3	0.51	3.2	0.0081	7.4	1.0	11	3.1	6.4	1.2	3.2	1.2
	Diaptomus tyrrelli	3.8	5.2	2.8	0.40	1.3	0.25	1.4	0.10	0.47	0.77	0.40	0.10	2.8	0.47	5.2	1.4	2.7	0.59	1.9	0.51
	Calanoid nauplius	0.89	0.92	0	0.35	0.31	0.10	0.60	0.079	0	0.12	0	0	0.35	0.10	0.92	0.60	0.49	0.18	0.40	0.24
	Cyclops bicuspidatus thomasi	9.5	3.5	6.6	1.8	3.8	49	45	46	44	36	1.8	36	3.8	45	9.5	49	5.0	44	3.0	4.7
	Acanthocyclops vernalis	0.36	0.22	0.052	0	0	0.10	0.85	0.15	0.10	0	0	0	0.052	0.10	0.36	0.85	0.13	0.24	0.16	0.34
	Cyclopoid nauplius	0	0.11	0.026	0.065	0.029	1.4	3.0	3.1	1.7	0.40	0	0.40	0.029	1.7	0.11	3.1	0.046	1.9	0.042	1.1
Cladocera	*Daphnia schoedleri*	0	0	0	19	18	18	31	33	29	13	0	13	0	29	19	33	7.3	25	9.9	8.8
	Daphnia galeata mendotae	58	79	82	71	64	28	9.2	8.6	18	37	58	8.6	71	18	82	37	71	20	10	12
	Daphnia retrocurva	0	0	2.7	0	0	0	0	0	0	5.3	0	0	0	0	2.7	5.3	0.55	1.1	1.2	2.4
	Holopedium gibberum	0	0	0	0	0	0	1.9	0	0	0	0	0	0	0	0	1.9	0	0.38	0	0.84
	Bosmina longirostris	0	0	0.23	0	0	0.56	1.8	1.1	2.4	5.1	0	0.56	0	1.8	0.23	5.1	0.045	2.2	0.10	1.8
	Scapholeberis kingii	3.6	0	0	0	0	0	0	0	0	0	0	0	0	0	3.6	0	0.73	0	1.6	0
	Leptodora kindtii	0.28	0	0.081	0.10	0.18	0	0.22	0.029	0.18	0	0	0	0.10	0.029	0.28	0.22	0.13	0.086	0.11	0.11
	Diaphanosoma leuchtenbergianum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rotifera	*Kellicottia* spp.	0.15	0.076	0.060	0.038	0.057	0.67	0.63	0.46	0.42	0.17	0.038	0.17	0.060	0.46	0.15	0.67	0.077	0.47	0.045	0.20
	Keratella spp.	0.056	0.025	0.028	0	0.028	1.7	2.7	2.9	1.4	1.0	0	1.0	0.028	1.7	0.056	2.9	0.028	1.9	0.019	0.81
	Polyarthra spp.	0	0	0	0.0070	0	0.063	0.69	0.57	0.20	0.16	0	0.063	0	0.20	0.0070	0.69	0	0.34	0	0.28
	Conochilus spp.	0	0	0	0	0	0	0	0.032	0.034	0.022	0	0	0	0.022	0	0.034	0	0.018	0	0.017
	Gastropus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Synchaeta sp.	0	0	0	0	0	0	0.051	0.16	0.037	0	0	0	0	0.037	0	0.16	0	0.050	0	0.067
	Brachionus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.20: Relative Biomass (%) of Zooplankton Species, August 2018[a]

	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
												Minimum		Median		Maximum		Mean		Standard Deviation	
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Copepoda	*Epischura nevadensis*	13	8.6	20	7.4	17	2.6	6.1	2.9	3.4	8.9	7.4	2.6	13	3.4	20	8.9	13	4.8	5.4	2.7
	Diaptomus pallidus	4.4	7.2	0.61	2.7	0	2.4	4.1	2.0	2.5	7.7	0	2.0	2.7	2.5	7.2	7.7	3.0	3.7	2.9	2.3
	Diaptomus tyrrelli	0.89	4.4	6.5	5.1	0	19	23	18	12	5.0	0	5.0	4.4	18	6.5	23	3.4	15	2.8	6.9
	Calanoid nauplius	0.049	0.34	0.39	0.20	0	0.66	0.075	0.31	0.48	0.39	0	0.075	0.20	0.39	0.39	0.66	0.20	0.38	0.17	0.22
	Cyclops bicuspidatus thomasi	16	11	20	9.8	3.8	41	40	45	36	50	3.8	36	11	41	20	50	12	42	6.2	5.5
	Acanthocyclops vernalis	0.46	0.18	0.18	0.093	0	0.28	0	0	0.26	0.21	0	0	0.18	0.21	0.46	0.28	0.18	0.15	0.17	0.14
	Cyclopoid nauplius	0.55	0.77	2.3	0.84	3.8	0.55	1.1	1.0	1.5	0.93	0.55	0.55	0.84	1.0	3.8	1.5	1.6	1.0	1.4	0.34
Cladocera	*Daphnia schoedleri*	40	2.9	16	18	13	12	8.1	0.15	0	0	2.9	0	16	0.15	40	12	18	4.1	13	5.7
	Daphnia galeata mendotae	15	59	31	48	61	4.6	9.2	28	35	20	15	4.6	48	20	61	35	43	19	20	13
	Daphnia retrocurva	10	5.1	1.2	7.4	0	16	5.8	0.51	6.9	5.9	0	0.51	5.1	5.9	10	16	4.8	7.0	4.2	5.4
	Holopedium gibberum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bosmina longirostris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Scapholeberis kingii	0	0	0	0	0	0.27	0.13	0	0.25	0	0	0	0	0.13	0	0.27	0	0.13	0	0.13
	Leptodora kindtii	0.43	0.21	0	0	0	0.32	0	0.27	0	0.16	0	0	0	0.16	0.43	0.32	0.13	0.15	0.19	0.15
	Diaphanosoma leuchtenbergianum	0.015	0.24	1.2	0.39	0	0	2.3	2.7	0.68	0.46	0	0	0.24	0.68	1.2	2.7	0.37	1.2	0.50	1.2
Rotifera	*Kellicottia* spp.	0.032	0.018	0.043	0.024	0.59	0.070	0.071	0.10	0.15	0.081	0.018	0.070	0.032	0.081	0.59	0.15	0.14	0.10	0.25	0.034
	Keratella spp.	0.021	0.021	0.057	0.033	0.22	0.12	0.088	0.12	0.16	0.15	0.021	0.088	0.033	0.12	0.22	0.16	0.070	0.13	0.083	0.029
	Polyarthra spp.	0.019	0.058	0.21	0.11	0	0.044	0.030	0	0.10	0.055	0	0	0.058	0.044	0.21	0.10	0.081	0.045	0.086	0.035
	Conochilus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gastropus spp.	0.064	0.092	0.20	0.085	0	0.24	0.25	0.22	0.12	0.11	0	0.11	0.085	0.22	0.20	0.25	0.088	0.19	0.072	0.066
	Synchaeta sp.	0	0.017	0	0.021	0	0	0	0	0.024	0	0	0	0	0	0.021	0.024	0.0076	0	0.011	0.011
	Brachionus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Sampled from a depth of 10m to the surface

Table E.21: Relative Biomass (%) of Zooplankton Species, September 2018[a]

	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
												Minimum		Median		Maximum		Mean		Standard Deviation	
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Copepoda	*Epischura nevadensis*	12	13	16	31	29	6.5	8.5	10	7.7	11	12	6.5	16	8.5	31	11	20	8.8	8.9	1.9
	Diaptomus pallidus	9.4	11	2.3	1.0	2.8	0.62	3.0	0.27	0.72	0.50	1.0	0.27	2.8	0.62	11	3.0	5.3	1.0	4.5	1.1
	Diaptomus tyrrelli	5.6	12	3.6	12	8.1	6.1	13	8.0	15	17	3.6	6.1	8.1	13	12	17	8.2	12	3.7	4.6
	Calanoid nauplius	0.95	1.8	0.27	0.55	0.76	0.77	2.0	2.1	3.6	1.0	0.27	0.77	0.76	2.0	1.8	3.6	0.86	1.9	0.57	1.1
	Cyclops bicuspidatus thomasi	16	7.6	3.2	3.0	5.0	29	36	33	26	25	3.0	25	5.0	29	16	36	6.9	30	5.2	4.7
	Acanthocyclops vernalis	0.22	1.8	0.17	0.34	0.21	0.48	0.23	0.23	0.65	0.32	0.17	0.23	0.22	0.32	1.8	0.65	0.56	0.38	0.72	0.18
	Cyclopoid nauplius	3.1	3.8	2.2	2.5	1.7	2.9	3.6	5.6	7.0	3.8	1.7	2.9	2.5	3.8	3.8	7.0	2.7	4.6	0.80	1.7
Cladocera	*Daphnia schoedleri*	23	8.4	17	1.6	FALSE	24	1.3	2.4	1.7	0.47	1.6	0.47	12.7	1.7	23	24	13	6.1	9.5	10
	Daphnia galeata mendotae	14	27	34	30	31	0.94	11	19	23	27	14	0.94	30	19	34	27	27	16	7.7	10
	Daphnia retrocurva	11	8.5	19	17	17	25	19	12	11	12	8.5	11	17	12	19	25	15	16	4.6	6.1
	Holopedium gibberum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bosmina longirostris	0	0	0	0	0	1.4	0	0	0	0	0	0	0	0	0	1.4	0	0.28	0	0.63
	Scapholeberis kingii	0	0	0	0.16	0.20	0	0	0	0	0	0	0	0	0	0.20	0	0.072	0	0.10	0
	Leptodora kindtii	1.3	1.4	0.67	0.13	0.32	0.093	0	0	0	0	0.13	0	0.67	0	1.4	0.093	0.77	0.019	0.58	0.042
	Diaphanosoma leuchtenbergianum	2.7	1.1	0.30	0.90	0.72	0.80	2.7	6.1	2.9	1.1	0.30	0.80	0.90	2.7	2.7	6.1	1.1	2.7	0.90	2.1
Rotifera	*Kellicottia* spp.	0.039	0.071	0.053	0.053	0.048	0.17	0.21	0.25	0.26	0.12	0.039	0.12	0.053	0.21	0.071	0.26	0.053	0.20	0.012	0.057
	Keratella spp.	0.077	0.10	0.044	0.064	0.12	0.16	0.15	0.24	0.19	0.11	0.044	0.11	0.077	0.16	0.12	0.24	0.081	0.17	0.030	0.049
	Polyarthra spp.	0.13	2.3	0.31	0.22	0.17	0.14	0.27	0.39	0.64	0.18	0.13	0.14	0.22	0.27	2.3	0.64	0.63	0.33	0.95	0.20
	Conochilus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gastropus spp.	0.18	0.20	0.15	0.080	0.088	0.11	0.10	0.080	0.12	0.12	0.080	0.080	0.15	0.11	0.20	0.12	0.14	0.11	0.054	0.016
	Synchaeta sp.	0.020	0.17	0	0.031	0.037	0	0	0	0.079	0.019	0	0	0.031	0	0.17	0.079	0.051	0.020	0.066	0.034
	Brachionus spp.	0	0	0	0	0	0	0	0	0.025	0	0	0	0	0	0	0.025	0	0	0	0.011

[a] Sampled entire water column (1.5m from the bottom to the surface).

Table E.22: Zooplankton Community Density Data (no. organisms/L), June 2019

Taxa Group	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Cladocera	*Alona sps*	0.00588	0.124	0	0	0	0	0	0	0	0
	Bosmina longirostris	0	0	0.00588	0	0.241	43.0	77.1	50.8	38.5	16.9
	Chydorus sps	0	0	0	0	0.0176	0	0	0	0	0
	Daphnia galeata mendotae	0.0618	0	0	0	0.00588	0.622	0.399	0.798	0.0463	0.223
	Daphnia retrocurva	0	0	0	0	0	0.139	0.200	0.0926	0.0926	0.0232
	Daphnia schoedleri	0	0	0	0	0	0.176	0.116	0	0.0695	0.139
	Diaphanosoma leuchtenbergianum	0	0	0	0	0	0	0	0.0232	0	0.0232
	Leptodora kindtii	0	0	0	0	0	0.0463	0.116	0.00221	0.0132	0.00662
Copepoda	*Calanoid nauplii*	0	0	0	0	0	0.176	0	0	0.706	0.353
	Cyclopoid nauplii	0	0	0	0	0.235	4.23	8.29	7.06	6.70	8.29
	Cyclops bicuspidatus	0	0	0	0	0.241	9.89	19.0	15.3	11.7	9.91
	Cyclops capillatus	0	0	0	0	0.00588	0	0	0	0	0
	Cyclops vernalis	0	0	0	0	0	0.176	0	0	0	0
	Diaptomus pallidus	0	0	0	0	0	0.176	0	0	0	0
	Diaptomus tyrrelli	0	0	0	0	0	0.615	0.324	0.723	0.862	1.15
	Epischura nevadensis	0.0118	0	0	0	0	0.208	0.608	0.116	0.116	0.469
	Eucyclops agilis	0	0.00588	0.0118	0.0118	0	0	0	0	0	0
Rotifera	*Asplanchna sps*	0	0	0	0	0.235	3.71	3.88	1.76	2.82	0.353
	Brachionus sps	0	0	0	0	0	0	0.529	0	0	0.176
	Kellicottia sps	0	0	0	0	0.470	30.9	35.1	36.3	38.1	14.8
	Keratella sp.	0	0	0	0	0.235	1.94	3.88	3.18	2.12	1.24
	Polyarthra sps	0	0	0	0	0	0.529	1.59	0.353	1.06	1.06
	Unknown rotifer	0	0.470	0	0	0	0	0	0	0	0
Total Number of Organisms/L:		**0.07939**	**0.599859**	**0.017643**	**0.011762**	**1.687838**	**96.55633**	**151.1369**	**116.5501**	**102.8923**	**55.17157**
Total Number of Taxa:		**3**	**3**	**2**	**1**	**9**	**16**	**14**	**13**	**14**	**16**

Table E.23: Zooplankton Community Density Data (no. organisms/L), August 2019

Taxa Group	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Cladocera	*Bosmina longirostris*	0.109	0	0	0	0.109	0.0161	0	0.0161	0.245	0
	Daphnia galeata mendotae	1.75	0.765	0.714	1.66	1.63	0.875	0.982	0.614	0.471	1.51
	Daphnia retrocurva	0.109	0	0	0.109	0.217	0.123	0.245	0	0	0
	Daphnia schoedleri	0.109	0	0	0	0	0	0	0.00153	0	0
	Diaphanosoma leuchtenbergianum	0.00271	0	0	0.00271	0	0	0	0	0	0
	Leptodora kindtii	0	0.00271	0	0.00271	0.00543	0	0.00153	0.00307	0	0.00307
	Scapholeberis kingii	0	0.0285	0.00271	0.0570	0.0163	0	0.123	0	0	0
	Sida crystallina	0	0	0.00271	0	0	0	0	0	0.00153	0
Copepoda	*Calanoid nauplii*	0.109	0	0.434	0.434	0.543	0.368	0.368	0.859	0	0
	Cyclopoid nauplii	1.95	0.977	2.28	1.09	2.50	3.50	3.19	3.68	1.96	6.38
	Cyclops bicuspidatus	4.86	5.59	3.80	9.23	8.80	4.19	4.08	8.87	11.3	7.63
	Cyclops vernalis	0	0	0	0.109	0	0.0614	0	0	0	0
	Diaptomus pallidus	0.546	0	0.760	0.434	0.217	0.368	0.123	0.245	0.998	0
	Diaptomus tyrrelli	0.194	0.0624	0.0909	0.434	0.394	0.203	0.372	0.227	0.258	0.185
	Epischura nevadensis	0.0163	0.0339	0.0190	0.247	0.171	0.00920	0.0368	0.0322	0.113	0.0805
Rotifera	*Gastropus sps*	0.109	0	0.326	0.326	0.869	0.307	0.982	0.491	0.491	1.72
	Kellicottia sps	0.434	0.217	0.109	0.543	0.869	1.23	2.33	0.982	0.736	1.72
	Keratella sp.	0.977	0.651	1.52	0.977	0.977	1.66	3.19	1.96	3.93	4.66
	Polyarthra sps	0.760	0.651	1.30	0.869	1.52	0.736	0.368	0.614	0	0.245
	Unknown rotifer	0	0	0	0	0	0	0	0	0.245	0
Total Number of Organisms/L:		**12.0**	**8.98**	**11.4**	**16.5**	**18.8**	**13.6**	**16.4**	**18.6**	**20.8**	**24.1**
Total Number of Taxa:		**15**	**10**	**13**	**16**	**15**	**14**	**14**	**14**	**12**	**10**

Table E.24: Zooplankton Density (no. of organisms/L) Organized by Major Groups, June 2019

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Copepoda	0.0118	0.00588	0.0118	0.0118	0.482	15.5	28.2	23.2	20.1	20.2
Cladocera	0.0676	0.124	0.00588	0	0.265	44.0	77.9	51.7	38.7	17.4
Rotifera	0	0.470	0	0	0.941	37.1	45.0	41.6	44.1	17.6
Total number of organisms/L	**0.0794**	**0.600**	**0.0176**	**0.0118**	**1.69**	**96.6**	**151**	**117**	**103**	**55.2**
Total number of groups	**2**	**3**	**2**	**1**	**3**	**3**	**3**	**3**	**3**	**3**

Table E.25: Zooplankton Density (no. of organisms/L) Organized by Major Groups, August 2019

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Copepoda	7.68	6.67	7.38	12.0	12.6	8.70	8.17	13.9	14.7	14.3
Cladocera	2.07	0.797	0.719	1.83	1.98	1.01	1.35	0.634	0.718	1.51
Rotifera	2.28	1.52	3.26	2.71	4.23	3.93	6.87	4.05	5.40	8.35
Total number of organisms/L	**12.0**	**8.98**	**11.4**	**16.5**	**18.8**	**13.6**	**16.4**	**18.6**	**20.8**	**24.1**
Total number of groups	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Table E.26: Relative Density (%) of Zooplankton Species, June 2019

Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
											Minimum		Median		Maximum		Mean		Standard Deviation	
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Acanthocyclops vernalis	1.81	1.31	0.369	0	0	0	0	0	0	0	0	0	0.369	0	1.81	0	0.698	0	0.821	0
Alona sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asplanchna sps	0	0	0	0	0	3.84	2.57	1.51	2.74	0.640	0	0.640	0	2.57	0	3.84	0	2.26	0	1.22
Bosmina longirostris	0	0	5.53	0	0	44.6	51.0	43.6	37.4	30.7	0	30.7	0	43.6	5.53	51.0	1.11	41.5	2.47	7.71
Brachionus sps	0	0	0	0	0	0	0.350	0	0	0.320	0	0	0	0	0	0.350	0	0.134	0	0.184
Calanoid nauplius	0	0	0	0	0	0.183	0	0	0.686	0.640	0	0	0	0.183	0	0.686	0	0.302	0	0.338
Calanoid nauplius	8.15	10.5	0.0553	7.16	5.60	0	0	0	0	0	0.0553	0	7.16	0	10.5	0	6.29	0	3.91	0
Chydorus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conochilus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclopoid nauplius	0	1.31	0.369	1.43	0.933	4.39	5.49	6.06	6.52	15.0	0	4.39	0.933	6.06	1.43	15.0	0.809	7.49	0.613	4.29
Cyclops bicuspidatus thomasi	19.0	6.55	24.4	11.5	14.0	10.2	12.6	13.1	11.4	18.0	6.55	10.2	14.0	12.6	24.4	18.0	15.1	13.1	6.86	2.96
Cyclops capillatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclops vernalis	0	0	0	0	0	0.183	0	0	0	0	0	0	0	0	0	0.183	0	0.0365	0	0.0817
Daphnia galeata mendotae	30.8	51.1	45.4	57.3	47.6	0.644	0.264	0.685	0.0450	0.404	30.8	0.0450	47.6	0.404	57.3	0.685	46.4	0.408	9.83	0.267
Daphnia retrocurva	0	0	0.369	0	0	0.144	0.132	0.0795	0.0900	0.0420	0	0.0420	0	0.0900	0.369	0.144	0.0738	0.097	0.165	0.0413
Daphnia schoedleri	0	0	0	4.30	4.66	0.183	0.0766	0	0.0675	0.252	0	0	0	0.0766	4.66	0.252	1.79	0.116	2.46	0.100
Diaphanosoma leuchtenbergianum	0	0	0	0	0	0	0	0.0199	0	0.0420	0	0	0	0	0	0.0420	0	0.0124	0	0.0187
Diaptomus pallidus	6.18	6.75	2.80	3.60	5.67	0.183	0	0	0	0	2.80	0	5.67	0	6.75	0.183	5.00	0.0365	1.71	0.0817
Diaptomus tyrrelli	1.70	4.75	2.23	0.412	0.793	0.637	0.214	0.621	0.838	2.09	0.412	0.214	1.70	0.637	4.75	2.09	1.98	0.879	1.71	0.712
Epischura nevadensis	1.90	0.721	0.461	2.08	2.05	0.216	0.402	0.099	0.113	0.849	0.461	0.099	1.90	0.216	2.08	0.849	1.44	0.336	0.786	0.312
Eucyclops agilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Holopedium gibberum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kellicottia sps	19.9	11.8	11.1	10.7	12.1	32.0	23.2	31.2	37.0	26.9	10.7	23.2	11.8	31.2	19.9	37.0	13.1	30.1	3.84	5.26
Keratella sps	10.0	5.24	7.01	0.716	6.53	2.01	2.57	2.72	2.06	2.24	0.716	2.01	6.53	2.24	10.0	2.72	5.89	2.32	3.37	0.315
Leptodora kindtii	0.0453	0	0.0184	0.0358	0.0466	0.0480	0.0766	0	0.0129	0.0120	0	0	0.0358	0.0129	0.0466	0.0766	0.0292	0.0303	0.0198	0.0312
Polyarthra sps	0	0	0	0.716	0	0.548	1.05	0.303	1.03	1.92	0	0.303	0	1.03	0.716	1.92	0.143	0.970	0.320	0.619
Scapholeberis kingii	0.476	0	0	0	0	0	0	0	0	0	0	0	0	0	0.476	0	0.095	0	0.213	0
Sida crystallina O.F.Mueller	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Synchaeta sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown rotifer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table E.27: Relative Density (%) of Zooplankton Species, August 2019

Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
											Minimum		Median		Maximum		Mean		Standard Deviation	
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Acanthocyclops vernalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alona sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asplanchna sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bosmina longirostris	0.902	0	0	0	0.576	0.118	0	0.0866	1.18	0	0	0	0	0.0866	0.902	1.18	0.296	0.277	0.421	0.508
Brachionus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calanoid nauplius	0.902	0	3.82	2.63	2.88	2.70	2.25	4.62	0	0	0	0	2.63	2.25	3.82	4.62	2.05	1.91	1.56	1.96
Calanoid nauplius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chydorus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conochilus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclopoid nauplius	16.2	10.9	20.1	6.57	13.3	25.6	19.5	19.8	9.45	26.5	6.57	9.45	13.3	19.8	20.1	26.5	13.4	20.2	5.14	6.80
Cyclops bicuspidatus thomasi	40.4	62.3	33.4	55.9	46.7	30.7	24.9	47.7	54.5	31.6	33.4	24.9	46.7	31.6	62.3	54.5	47.7	37.9	11.6	12.6
Cyclops capillatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclops vernalis	0	0	0	0.657	0	0.450	0	0	0	0	0	0	0	0	0.657	0.450	0.131	0.0900	0.294	0.201
Daphnia galeata mendotae	14.5	8.52	6.28	10.0	8.67	6.42	5.99	3.30	2.27	6.24	6.28	2.27	8.67	5.99	14.5	6.42	9.60	4.84	3.05	1.92
Daphnia retrocurva	0.902	0	0	0.657	1.15	0.900	1.50	0	0	0	0	0	0.657	0	1.15	1.50	0.542	0.479	0.525	0.690
Daphnia schoedleri	0.902	0	0	0	0	0	0	0.00825	0	0	0	0	0	0	0.902	0.00825	0.180	0.00165	0.403	0.00369
Diaphanosoma leuchtenbergianum	0.0226	0	0	0.0164	0	0	0	0	0	0	0	0	0	0	0.0226	0	0.00780	0	0.0109	0
Diaptomus pallidus	4.53	0	6.69	2.63	1.15	2.70	0.748	1.32	4.80	0	0	0	2.63	1.32	6.69	4.80	3.00	1.91	2.67	1.89
Diaptomus tyrrelli	1.61	0.695	0.800	2.63	2.09	1.49	2.27	1.22	1.24	0.766	0.695	0.766	1.61	1.24	2.63	2.27	1.57	1.40	0.830	0.553
Epischura nevadensis	0.135	0.378	0.167	1.50	0.908	0.0675	0.225	0.173	0.542	0.334	0.135	0.0675	0.378	0.225	1.50	0.542	0.617	0.268	0.581	0.181
Eucyclops agilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropus sps	0.902	0	2.87	1.97	4.61	2.25	5.99	2.64	2.36	7.12	0	2.25	1.97	2.64	4.61	7.12	2.07	4.07	1.79	2.31
Holopedium gibberum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kellicottia sps	3.61	2.42	0.956	3.29	4.61	9.00	14.2	5.28	3.54	7.12	0.956	3.54	3.29	7.12	4.61	14.2	2.98	7.83	1.38	4.11
Keratella sps	8.12	7.25	13.4	5.92	5.19	12.1	19.5	10.6	18.9	19.3	5.19	10.6	7.25	18.9	13.4	19.5	7.97	16.1	3.23	4.35
Leptodora kindtii	0	0.0302	0	0.0164	0.0288	0	0.00936	0.0165	0	0.0127	0	0	0.0164	0.00936	0.0302	0.0165	0.0151	0.00771	0.0148	0.00748
Polyarthra sps	6.31	7.25	11.5	5.26	8.07	5.40	2.25	3.30	0	1.02	5.26	0	7.25	2.25	11.5	5.40	7.67	2.39	2.37	2.09
Scapholeberis kingii	0	0.317	0.0239	0.345	0.0865	0	0.748	0	0	0	0	0	0.0865	0	0.345	0.748	0.155	0.150	0.165	0.335
Sida crystallina O.F.Mueller	0	0	0.0239	0	0	0	0	0	0.00738	0	0	0	0	0	0.0239	0.00738	0.00478	0.00148	0.0107	0.00330
Synchaeta sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown rotifer	0	0	0	0	0	0	0	0	1.18	0	0	0	0	0	0	1.18	0	0.236	0	0.528

Table E.28: Zooplankton Community Biomass Data (µg/L dw), June 2019

Taxa Group	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Cladocera	*Alona sps*	0.0595	1.25	0	0	0	0	0	0	0	0
	Bosmina longirostris	0	0	0.0971	0	0.475	130	229	140	104	58.8
	Chydorus sps	0	0	0	0	0.187	0	0	0	0	0
	Daphnia galeata mendotae	20.7	0	0	0	1.97	123	16.5	376	8.77	2.50
	Daphnia retrocurva	0	0	0	0	0	13.3	14.6	7.52	10.3	1.54
	Daphnia schoedleri	0	0	0	0	0	19.9	13.0	0	7.83	15.7
	Diaphanosoma leuchtenbergianum	0	0	0	0	0	0	0	0.426	0	0.426
	Leptodora kindtii	0	0	0	0	0	7.94	19.8	0.378	2.27	1.13
Copepoda	*Calanoid nauplii*	0	0	0	0	0	0.517	0	0	2.07	1.03
	Cyclopoid nauplii	0	0	0	0	0.646	11.6	22.8	19.4	18.4	22.8
	Cyclops bicuspidatus	0	0	0	0	3.81	126	209	220	178	157
	Cyclops capillatus	0	0	0	0	0.367	0	0	0	0	0
	Cyclops vernalis	0	0	0	0	0	0.974	0	0	0	0
	Diaptomus pallidus	0	0	0	0	0	3.23	0	0	0	0
	Diaptomus tyrrelli	0	0	0	0	0	33.1	22.2	34.1	55.9	62.4
	Epischura nevadensis	1.94	0	0	0	0	23.9	66.8	13.4	14.3	43.2
	Eucyclops agilis	0	0.104	0.208	0.208	0	0	0	0	0	0
Rotifera	*Asplanchna sps*	0	0	0	0	0.353	5.56	5.83	2.65	4.24	0.530
	Brachionus sps	0	0	0	0	0	0	0.333	0	0	0.111
	Kellicottia sps	0	0	0	0	0.101	6.62	7.52	7.79	8.17	3.18
	Keratella sp.	0	0	0	0	0.0370	0.305	0.610	0.499	0.333	0.194
	Polyarthra sps	0	0	0	0	0	0.310	0.930	0.207	0.620	0.620
	Unknown rotifer	0	0.101	0	0	0	0	0	0	0	0
Total Number of Organisms/L:		**22.7**	**1.45**	**0.306**	**0.208**	**7.95**	**505**	**629**	**822**	**415**	**371**
Total Number of Taxa:		**4**	**4**	**3**	**2**	**10**	**17**	**15**	**14**	**15**	**17**

Table E.29: Zooplankton Community Biomass Data (µg/L dw), August 2019

Taxa Group	Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Cladocera	*Alona sps*	0	0	0	0	0	0	0	0	0	0
	Bosmina longirostris	0.174	0	0	0	0.174	0.266	0	0.0259	4.05	0
	Chydorus sps	0	0	0	0	0	0	0	0	0	0
	Daphnia galeata mendotae	275	85.6	70.8	202	137	101	145	98.3	86.3	355
	Daphnia retrocurva	7.21	0	0	13.6	15.5	11.8	23.5	0	0	0
	Daphnia schoedleri	12.2	0	0	0	0	0	0	0.173	0	0
	Diaphanosoma leuchtenbergianum	0.0499	0	0	0.0499	0	0	0	0	0	0
	Leptodora kindtii	0	0.465	0	0.465	0.931	0	0.263	0.526	0	0.526
	Scapholeberis kingii	0	6.03	0.574	12.1	3.44	0	26.0	0	0	0
	Sida crystallina	0	0	0.969	0	0	0	0	0	0.548	0
Copepoda	*Calanoid nauplii*	0.318	0	1.27	1.27	1.59	1.08	1.08	2.52	0	0
	Cyclopoid nauplii	5.37	2.68	6.26	2.98	6.86	9.61	8.77	10.1	5.40	17.5
	Cyclops bicuspidatus	54.8	63.2	44.6	106	93.4	42.5	37.6	83.5	110	68.9
	Cyclops capillatus	0	0	0	0	0	0	0	0	0	0
	Cyclops vernalis	0	0	0	0.599	0	0.339	0	0	0	0
	Diaptomus pallidus	8.75	0	18.1	8.70	6.59	4.28	0.802	3.05	17.9	0
	Diaptomus tyrrelli	10.0	4.74	5.57	29.3	22.1	8.71	25.3	11.1	16.9	12.8
	Epischura nevadensis	2.65	2.67	3.37	19.1	29.9	1.59	6.08	5.79	15.8	10.5
	Eucyclops agilis	0	0	0	0	0	0	0	0	0	0
Rotifera	*Asplanchna sps*	0	0	0	0	0	0	0	0	0	0
	Brachionus sps	0	0	0	0	0	0	0	0	0	0
	Kellicottia sps	0.0931	0.0465	0.0233	0.116	0.186	0.263	0.500	0.210	0.158	0.368
	Keratella sp.	0.154	0.102	0.239	0.154	0.154	0.260	0.501	0.309	0.617	0.733
	Polyarthra sps	0.445	0.382	0.763	0.509	0.891	0.432	0.216	0.360	0	0.144
	Unknown rotifer	0	0	0	0	0	0	0	0	0.0526	0
Total Number of Organisms/L:		**377**	**166**	**153**	**398**	**319**	**182**	**276**	**216**	**258**	**467**
Total Number of Taxa:		**15**	**11**	**13**	**16**	**15**	**14**	**14**	**14**	**12**	**10**

Table E.30: Biomass (µg/L dw) of Zooplankton by Group, June 2019

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	**TN-2**	**TN-3**	**TN-4**	**TN-5**	**T4-1**	**T4-2**	**T4-3**	**T4-4**	**T4-5**
Copepoda	1.94	0.104	0.208	0.208	4.82	199	321	287	269	286
Cladocera	20.8	1.25	0.097	0	2.64	294	293	524	133	80.0
Rotifera	0	0.101	0	0	0.491	12.8	15.2	11.1	13.4	4.63
Total biomass of organisms	**22.7**	**1.45**	**0.306**	**0.208**	**7.95**	**505**	**629**	**822**	**415**	**371**
Total number of groups	**2**	**3**	**2**	**1**	**3**	**3**	**3**	**3**	**3**	**3**

Table E.31: Biomass (µg/L dw) of Zooplankton by Group, August 2019

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	**TN-2**	**TN-3**	**TN-4**	**TN-5**	**T4-1**	**T4-2**	**T4-3**	**T4-4**	**T4-5**
Copepoda	81.9	73.3	79.1	168	160	68.1	79.6	116	166	110
Cladocera	294	92.1	72.4	229	157	113	195	99.0	90.9	356
Rotifera	0.715	0.531	1.10	0.849	1.42	1.02	1.43	0.984	0.933	1.61
Total biomass of organisms	**377**	**166**	**153**	**398**	**319**	**182**	**276**	**216**	**258**	**467**
Total number of groups	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Table E.32: **Relative Biomass (%) of Zooplankton Species, June 2019**

Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
											Minimum		Median		Maximum		Mean		Standard Deviation	
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Acanthocyclops vernalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alona sps	7.4	20.6	0	0	0	0	0	0	0	0	0	0	0	0	20.6	0	5.6	0	9.0	0
Ascomorpha ovalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asplanchna sps	0	0	0	0	13.9	3.8	2.6	1.5	2.7	0.640	0	0.640	0	2.6	13.9	3.8	2.8	2.3	6.2	1.2
Bosmina longirostris	0	0	33.3	0	14.3	44.6	51.0	43.6	37.4	30.7	0	30.7	0	43.6	33.3	51.0	9.5	41.5	14.7	7.7
Brachionus sps	0	0	0	0	0	0	0.350	0	0	0.320	0	0	0	0	0	0.350	0	0.134	0	0.184
Calanoid copepodids	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calanoid nauplii	0	0	0	0	0	0.183	0	0	0.686	0.640	0	0	0	0.183	0	0.686	0	0.302	0	0.338
Ceriodaphnia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chydorus sps	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	1.0	0	0.209	0	0.467	0
Collotheca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conochilus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclopoid copepodids	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclopoid nauplii	0	0	0	0	13.9	4.4	5.5	6.1	6.5	15.0	0	4.4	0	6.1	13.9	15.0	2.8	7.5	6.2	4.3
Cyclops bicuspidatus	0	0	0	0	14.3	10.2	12.6	13.1	11.4	18.0	0	10.2	0	12.6	14.3	18.0	2.9	13.1	6.4	3.0
Cyclops capillatus	0	0	0	0	0.348	0	0	0	0	0	0	0	0	0	0.348	0	0.0697	0	0.156	0
Cyclops vernalis	0	0	0	0	0	0.183	0	0	0	0	0	0	0	0	0	0.183	0	0.0365	0	0.0817
Daphnia galeata mendotae	77.8	0	0	0	0.348	0.644	0.264	0.685	0.0450	0.404	0	0.0450	0	0.404	77.8	0.685	15.6	0.408	34.7	0.267
Daphnia retrocurva	0	0	0	0	0	0.144	0.132	0.0795	0.0900	0.0420	0	0.0420	0	0.0900	0	0.144	0	0.0975	0	0.0413
Daphnia schoedleri	0	0	0	0	0	0.183	0.0766	0	0.0675	0.252	0	0	0	0.0766	0	0.252	0	0.116	0	0.100
Diaphanosoma birgei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diaphanosoma leuchtenbergianum	0	0	0	0	0	0	0	0.0199	0	0.0420	0	0	0	0	0	0.0420	0	0.0124	0	0.0187
Diaptomus oregonensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diaptomus pallidus	0	0	0	0	0	0.183	0	0	0	0	0	0	0	0	0	0.183	0	0.0365	0	0.0817
Diaptomus sicilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diaptomus tyrrelli	0	0	0	0	0	0.637	0.214	0.621	0.838	2.1	0	0.214	0	0.637	0	2.1	0	0.879	0	0.712
Epischura lacustris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epischura nevadensis	14.8	0	0	0	0	0.216	0.402	0.0993	0.113	0.849	0	0.0993	0	0.216	14.8	0.849	3.0	0.336	6.6	0.312
Eucyclops agilis	0	0.980	66.7	100	0	0	0	0	0	0	0	0	0.980	0	100	0	33.5	0	47.0	0
Gastropus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropus stylifer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Holopedium gibberum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kellicottia longispina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kellicottia sps	0	0	0	0	27.9	32.0	23.2	31.2	37.0	26.9	0	23.2	0	31.2	27.9	37.0	5.6	30.1	12.5	5.3
Keratella cochlearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Keratella crassa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Keratella sp.	0	0	0	0	13.9	2.0	2.6	2.7	2.1	2.2	0	2.0	0	2.2	13.9	2.7	2.8	2.3	6.2	0.315
Keratella taurocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptodora kindtii	0	0	0	0	0	0.0480	0.0766	0.00189	0.0129	0.0120	0	0.00189	0	0.0129	0	0.0766	0	0.0303	0	0.0312
Monostyla sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orthocyclops modestus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyarthra remata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyarthra sps	0	0	0	0	0	0.548	1.1	0.303	1.0	1.9	0	0.303	0	1.0	0	1.9	0	0.970	0	0.619
Polyarthra vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scapholeberis kingii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scapholeberis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida crystallina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Synchaeta sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichocerca (sp 2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichocerca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichocerca sp. (sp 1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tropocyclops sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown rotifer	0	78.4	0	0	0	0	0	0	0	0	0	0	0	0	78.4	0	15.7	0	35.1	0

Table E.33: Relative Biomass (%) of Zooplankton Species, August 2019

Species	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
											Minimum		Median		Maximum		Mean		Standard Deviation	
	TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Acanthocyclops vernalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alona sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ascomorpha ovalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asplanchna sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bosmina longirostris	0.902	0	0	0	0.576	0.118	0	0.0866	1.18	0	0	0	0	0.0866	0.902	1.18	0.296	0.277	0.421	0.508
Brachionus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calanoid copepodids	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calanoid nauplii	0.902	0	3.82	2.63	2.88	2.70	2.25	4.62	0	0	0	0	2.63	2.25	3.82	4.62	2.05	1.91	1.56	1.96
Ceriodaphnia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chydorus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Collotheca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conochilus sps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclopoid copepodids	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclopoid nauplii	16.2	10.9	20.1	6.57	13.3	25.6	19.5	19.8	9.45	26.5	6.57	9.45	13.3	19.8	20.1	26.5	13.4	20.2	5.14	6.80
Cyclops bicuspidatus	40.4	62.3	33.4	55.9	46.7	30.7	24.9	47.7	54.5	31.6	33.4	24.9	46.7	31.6	62.3	54.5	47.7	37.9	11.6	12.6
Cyclops capillatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyclops vernalis	0	0	0	0.657	0	0.450	0	0	0	0	0	0	0	0	0.657	0.450	0.131	0.0900	0.294	0.201
Daphnia galeata mendotae	14.5	8.52	6.28	10.0	8.67	6.42	5.99	3.30	2.27	6.24	6.28	2.27	8.67	5.99	14.5	6.42	9.60	4.84	3.05	1.92
Daphnia retrocurva	0.902	0	0	0.657	1.15	0.900	1.50	0	0	0	0	0	0.657	0	1.15	1.50	0.542	0.479	0.525	0.690
Daphnia schoedleri	0.902	0	0	0	0	0	0	0.00825	0	0	0	0	0	0	0.902	0.00825	0.180	0.00165	0.403	0.00369
Diaphanosoma birgei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diaphanosoma leuchtenbergianum	0.0226	0	0	0.0164	0	0	0	0	0	0	0	0	0	0	0.0226	0	0.00780	0	0.0109	0
Diaptomus oregonensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diaptomus pallidus	4.53	0	6.69	2.63	1.15	2.70	0.748	1.32	4.80	0	0	0	2.63	1.32	6.69	4.80	3.00	1.91	2.67	1.89
Diaptomus sicilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diaptomus tyrrelli	1.61	0.695	0.800	2.63	2.09	1.49	2.27	1.22	1.24	0.766	0.695	0.766	1.61	1.24	2.63	2.27	1.57	1.40	0.830	0.553
Epischura lacustris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epischura nevadensis	0.135	0.378	0.167	1.50	0.908	0.0675	0.225	0.173	0.542	0.334	0.135	0.0675	0.378	0.225	1.50	0.542	0.617	0.268	0.581	0.181
Eucyclops agilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gastropus sps	0.902	0	2.87	1.97	4.61	2.25	5.99	2.64	2.36	7.12	0	2.25	1.97	2.64	4.61	7.12	2.07	4.07	1.79	2.31
Gastropus stylifer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Holopedium gibberum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kellicottia longispina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kellicottia sps	3.61	2.42	0.956	3.29	4.61	9.00	14.2	5.28	3.54	7.12	0.956	3.54	3.29	7.12	4.61	14.2	2.98	7.83	1.38	4.11
Keratella cochlearis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Keratella crassa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Keratella sp.	8.12	7.25	13.4	5.92	5.19	12.1	19.5	10.6	18.9	19.3	5.19	10.6	7.25	18.9	13.4	19.5	7.97	16.1	3.23	4.35
Keratella taurocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptodora kindtii	0	0.0302	0	0.0164	0.0288	0	0.00936	0.0165	0	0.0127	0	0	0.0164	0.00936	0.0302	0.0165	0.0151	0.00771	0.0148	0.00748
Monostyla sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orthocyclops modestus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyarthra remata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polyarthra sps	6.31	7.25	11.5	5.26	8.07	5.40	2.25	3.30	0	1.02	5.26	0	7.25	2.25	11.5	5.40	7.67	2.39	2.37	2.09
Polyarthra vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scapholeberis kingii	0	0.317	0.0239	0.345	0.0865	0	0.748	0	0	0	0	0	0.0865	0	0.345	0.748	0.155	0.150	0.165	0.335
Scapholeberis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sida crystallina	0	0	0.0239	0	0	0	0	0	0.00738	0	0	0	0	0	0.0239	0.00738	0.00478	0.00148	0.0107	0.00330
Synchaeta sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichocerca (sp 2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichocerca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichocerca sp. (sp 1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tropocyclops sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown rotifer	0	0	0	0	0	0	0	0	1.18	0	0	0	0	0	0	1.18	0	0.236	0	0.528

Table E.34: Zooplankton Community Summary Statistics, Koocanusa, 2014 to 2019

Site	Endpoint	2014							2015							2016						
		N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum	N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum	N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
RG_TN[a]	Density (#/m²)	5	86.7	14.1	6.30	63.5	90.6	99.2	5	13.4	7.60	3.40	8.18	10.7	26.5	5	25.5	3.01	1.34	21.9	26.0	29.6
	Biomass (mg/m³)	5	90.6	18.0	8.06	62.1	95.1	106	5	6.41	2.22	0.992	3.35	6.27	9.53	5	53.1	9.90	4.43	44.6	48.3	64.4
	LPL Richness (# taxa)	5	20.2	1.10	0.490	19.0	20.0	22.0	5	17.4	0.894	0.400	16.0	18.0	18.0	5	17.4	1.67	0.748	16.0	17.0	20.0
	Cladocera Density (#/L)	5	1.98	0.426	0.191	1.32	2.04	2.47	5	0.505	0.281	0.126	0.217	0.423	0.940	5	3.52	0.756	0.338	2.71	3.23	4.59
	Copepoda Density (#/L)	5	24.5	5.20	2.32	17.3	24.1	30.3	5	1.50	0.717	0.321	0.852	1.31	2.71	5	5.87	1.38	0.618	4.25	5.55	7.92
	Rotifera Density (#/L)	5	60.2	9.35	4.18	44.9	62.8	68.6	5	11.4	6.72	3.01	6.12	9.00	22.8	5	16.1	2.50	1.12	13.9	14.8	19.5
	% Cladocera Ind.	5	2.27	0.223	0.100	2.06	2.25	2.58	5	4.00	1.93	0.864	2.60	3.23	7.39	5	13.7	2.04	0.912	10.4	14.7	15.5
	% Copepoda Ind.	5	28.1	2.62	1.17	24.5	28.4	31.7	5	11.9	3.56	1.59	8.75	10.3	17.8	5	23.1	5.11	2.29	18.7	20.0	29.7
	% Rotifera Ind.	5	69.6	2.69	1.20	65.7	69.3	73.1	5	84.1	5.39	2.41	74.8	86.2	88.0	5	63.2	5.67	2.54	55.5	65.8	69.5
	Cladocera Biomass (ug/L)	5	15.5	3.12	1.39	11.6	16.0	19.5	5	1.63	0.961	0.430	0.454	1.35	2.80	5	35.7	7.86	3.52	27.0	32.7	46.6
	Copepoda Biomass (ug/L)	5	71.3	15.5	6.93	47.6	78.3	84.0	5	4.26	1.12	0.500	2.58	4.29	5.69	5	16.5	4.22	1.89	11.2	16.3	22.9
	Rotifera Biomass (ug/L)	5	3.75	0.586	0.262	2.93	4.05	4.33	5	0.512	0.303	0.136	0.287	0.412	1.03	5	0.920	0.235	0.105	0.580	0.978	1.20
	% Cladocera Biomass	5	17.3	2.51	1.12	14.1	18.4	20.1	5	23.7	8.44	3.77	13.5	22.9	34.6	5	67.1	5.97	2.67	60.5	65.0	73.8
	% Copepoda Biomass	5	78.5	2.95	1.32	75.1	77.7	82.4	5	68.3	7.56	3.38	59.7	70.1	77.0	5	31.1	6.11	2.73	24.3	33.8	37.1
	% Rotifera Biomass	5	4.21	0.538	0.241	3.53	4.15	4.77	5	7.92	2.57	1.15	4.11	8.16	10.8	5	1.77	0.516	0.231	1.20	1.90	2.31
	NMDS 1	5	-0.456	0.0429	0.0192	-0.492	-0.469	-0.384	5	-0.779	0.0813	0.0364	-0.873	-0.745	-0.679	5	-0.429	0.0253	0.0113	-0.451	-0.439	-0.387
	NMDS 2	5	0.544	0.0378	0.0169	0.511	0.531	0.608	5	-0.677	0.196	0.0875	-0.896	-0.699	-0.360	5	0.424	0.0555	0.0248	0.344	0.454	0.475
	NMDS 3	5	-0.268	0.0668	0.0299	-0.321	-0.302	-0.157	5	-0.000241	0.0571	0.0256	-0.0688	-0.0217	0.0671	5	0.282	0.0311	0.0139	0.249	0.294	0.315
RG_T4	Density (#/m²)	5	72.9	14.9	6.64	56.3	70.4	89.8	5	10.6	2.87	1.28	7.66	9.61	14.3	5	38.1	11.9	5.34	22.8	40.2	51.8
	Biomass (mg/m³)	5	87.6	31.1	13.9	57.9	91.1	133	5	2.98	1.20	0.537	1.75	2.40	4.57	5	68.9	28.2	12.6	36.4	84.4	96.9
	LPL Richness (# taxa)	5	19.6	1.14	0.510	18.0	20.0	21.0	5	14.0	2.00	0.894	11.0	15.0	16.0	5	16.6	0.548	0.245	16.0	17.0	17.0
	Cladocera Density (#/L)	5	1.56	0.441	0.197	0.881	1.61	2.06	5	0.118	0.0426	0.0190	0.0705	0.106	0.170	5	2.75	1.43	0.640	1.35	2.78	4.65
	Copepoda Density (#/L)	5	22.8	6.18	2.77	14.8	25.6	29.4	5	0.859	0.280	0.125	0.593	0.799	1.16	5	10.9	3.56	1.59	5.80	13.2	13.6
	Rotifera Density (#/L)	5	48.5	11.0	4.91	39.2	42.7	62.6	5	9.61	2.94	1.31	6.71	8.94	13.6	5	24.5	7.48	3.34	15.6	24.2	34.9
	% Cladocera Ind.	5	2.15	0.512	0.229	1.43	2.38	2.59	5	1.18	0.549	0.246	0.615	1.24	1.99	5	6.89	2.00	0.895	4.59	6.90	10.0
	% Copepoda Ind.	5	31.2	6.11	2.73	26.3	29.0	41.8	5	8.67	3.70	1.65	4.14	8.88	13.7	5	28.4	3.03	1.35	25.5	28.7	32.9
	% Rotifera Ind.	5	66.7	6.31	2.82	55.7	69.6	71.2	5	90.1	4.08	1.83	85.1	89.8	95.2	5	64.7	3.97	1.78	60.2	66.7	68.6
	Cladocera Biomass (ug/L)	5	13.6	4.44	1.98	7.46	13.4	19.9	5	0.147	0.0839	0.0375	0.0307	0.158	0.253	5	28.2	14.8	6.63	13.6	27.9	47.9
	Copepoda Biomass (ug/L)	5	70.9	29.4	13.2	42.5	72.4	118	5	2.41	1.16	0.518	1.33	1.92	3.82	5	39.4	14.9	6.68	21.3	46.9	55.4
	Rotifera Biomass (ug/L)	5	3.12	0.796	0.356	2.46	2.58	4.08	5	0.422	0.130	0.0580	0.292	0.395	0.601	5	1.18	0.319	0.143	0.802	1.12	1.68
	% Cladocera Biomass	5	16.2	5.17	2.31	10.0	15.6	22.2	5	4.95	2.64	1.18	1.75	5.53	7.82	5	39.8	6.94	3.10	33.0	39.4	49.5
	% Copepoda Biomass	5	79.9	5.95	2.66	73.4	79.9	88.1	5	79.0	8.52	3.81	66.5	80.0	89.2	5	58.3	6.70	3.00	49.3	58.4	65.6
	% Rotifera Biomass	5	3.83	1.12	0.503	1.85	4.35	4.48	5	16.1	7.97	3.56	8.10	12.2	26.5	5	1.88	0.600	0.268	1.25	1.95	2.67
	NMDS 1	5	-0.462	0.0427	0.0191	-0.519	-0.465	-0.408	5	-0.926	0.0717	0.0321	-1.00	-0.926	-0.818	5	-0.480	0.0412	0.0184	-0.531	-0.486	-0.438
	NMDS 2	5	0.513	0.0623	0.0279	0.420	0.540	0.572	5	-0.875	0.0629	0.0281	-0.950	-0.874	-0.778	5	0.556	0.0622	0.0278	0.470	0.571	0.624
	NMDS 3	5	-0.182	0.0680	0.0304	-0.286	-0.176	-0.0978	5	-0.00213	0.0842	0.0377	-0.108	-0.000201	0.116	5	0.181	0.0602	0.0269	0.133	0.152	0.280

[a] RG_T2 was sampled in 2014 instead of RG_TN.

Table E.34: Zooplankton Community Summary Statistics, Koocanusa, 2014 to 2019

Site	Endpoint	2018							2019						
		N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum	N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
RG_TN[a]	Density (#/m²)	5	14.3	4.43	1.98	11.6	12.7	22.1	5	13.5	4.02	1.80	8.98	12.0	18.8
	Biomass (mg/m³)	5	324	47.3	21.2	259	316	376	5	282	116	52.0	153	319	398
	LPL Richness (# taxa)	5	17.0	1.00	0.447	16.0	17.0	18.0	5	13.8	2.39	1.07	10.0	15.0	16.0
	Cladocera Density (#/L)	5	1.08	0.376	0.168	0.624	0.982	1.62	5	1.48	0.665	0.298	0.719	1.83	2.07
	Copepoda Density (#/L)	5	6.30	1.19	0.533	5.14	6.12	8.00	5	9.27	2.80	1.25	6.67	7.68	12.6
	Rotifera Density (#/L)	5	6.92	3.78	1.69	3.93	5.41	13.5	5	2.80	1.02	0.457	1.52	2.71	4.23
	% Cladocera Ind.	5	8.38	4.02	1.80	2.82	7.96	13.9	5	10.8	4.04	1.81	6.33	10.5	17.2
	% Copepoda Ind.	5	45.3	7.14	3.19	36.1	45.5	52.4	5	68.5	4.61	2.06	63.8	67.0	74.2
	% Rotifera Ind.	5	46.3	10.3	4.59	33.7	46.5	61.0	5	20.7	5.06	2.26	16.4	18.9	28.7
	Cladocera Biomass (ug/L)	5	179	50.7	22.7	124	165	260	5	169	93.0	41.6	72.4	157	294
	Copepoda Biomass (ug/L)	5	143	31.4	14.1	101	143	188	5	113	47.4	21.2	73.3	81.9	168
	Rotifera Biomass (ug/L)	5	1.60	0.311	0.139	1.19	1.57	2.01	5	0.921	0.345	0.154	0.531	0.849	1.42
	% Cladocera Biomass	5	54.8	9.66	4.32	47.8	52.3	71.7	5	57.5	12.2	5.46	47.4	55.5	78.1
	% Copepoda Biomass	5	44.7	9.70	4.34	27.8	47.2	51.7	5	42.1	12.1	5.39	21.7	44.2	51.9
	% Rotifera Biomass	5	0.496	0.0707	0.0316	0.418	0.464	0.587	5	0.377	0.215	0.0964	0.190	0.320	0.718
	NMDS 1	5	0.842	0.0164	0.00732	0.830	0.837	0.870	5	0.856	0.0174	0.00778	0.834	0.857	0.880
	NMDS 2	5	-0.227	0.0489	0.0219	-0.278	-0.235	-0.155	5	-0.148	0.0554	0.0248	-0.231	-0.144	-0.0788
	NMDS 3	5	-0.192	0.108	0.0482	-0.333	-0.208	-0.0390	5	0.231	0.138	0.0619	0.0741	0.212	0.444
RG_T4	Density (#/m²)	5	21.4	3.98	1.78	16.3	21.5	26.8	5	18.7	4.02	1.80	13.6	18.6	24.1
	Biomass (mg/m³)	5	195	125	55.8	23.3	163	331	5	280	111	49.5	182	258	467
	LPL Richness (# taxa)	5	16.0	1.00	0.447	15.0	16.0	17.0	5	12.8	1.79	0.800	10.0	14.0	14.0
	Cladocera Density (#/L)	5	0.887	0.191	0.0856	0.741	0.839	1.22	5	1.05	0.382	0.171	0.634	1.01	1.51
	Copepoda Density (#/L)	5	13.3	2.88	1.29	9.68	12.9	16.9	5	11.9	3.22	1.44	8.17	13.9	14.7
	Rotifera Density (#/L)	5	7.27	1.09	0.487	5.77	7.25	8.66	5	5.72	1.89	0.846	3.93	5.40	8.35
	% Cladocera Ind.	5	4.19	0.806	0.361	3.34	4.34	5.27	5	5.76	2.24	1.00	3.41	6.25	8.24
	% Copepoda Ind.	5	61.7	2.62	1.17	59.3	60.5	65.6	5	63.6	9.79	4.38	49.8	63.8	74.8
	% Rotifera Ind.	5	34.1	2.32	1.04	31.1	35.2	36.6	5	30.6	7.85	3.51	21.8	28.8	41.9
	Cladocera Biomass (ug/L)	5	71.6	49.4	22.1	0.778	63.2	133	5	171	111	49.8	90.9	113	356
	Copepoda Biomass (ug/L)	5	120	78.3	35.0	15.3	98.1	200	5	108	38.2	17.1	68.1	110	166
	Rotifera Biomass (ug/L)	5	2.96	2.42	1.08	1.48	1.97	7.25	5	1.20	0.305	0.136	0.933	1.02	1.61
	% Cladocera Biomass	5	31.0	15.7	7.02	3.34	38.7	40.0	5	58.0	17.1	7.66	35.2	62.1	76.2
	% Copepoda Biomass	5	62.1	3.38	1.51	59.4	60.1	66.0	5	41.5	17.1	7.67	23.5	37.3	64.4
	% Rotifera Biomass	5	6.91	13.5	6.05	0.558	0.964	31.1	5	0.448	0.0940	0.0420	0.346	0.455	0.560
	NMDS 1	5	0.906	0.0336	0.0150	0.856	0.908	0.949	5	0.927	0.0731	0.0327	0.861	0.908	1.02
	NMDS 2	5	-0.0710	0.0364	0.0163	-0.107	-0.0690	-0.0144	5	-0.0395	0.100	0.0448	-0.150	-0.0597	0.107
	NMDS 3	5	-0.119	0.0324	0.0145	-0.142	-0.137	-0.0659	5	0.0699	0.0839	0.0375	0.00418	0.0474	0.211

[a] RG_T2 was sampled in 2014 instead of RG_TN

Table E.35: Statistical Comparisons Zooplankton Communities of the Surficial 10m (August) and Entire Water Column (September), Koocanusa Reservoir Monitoring Program, 2018

Endpoint	Transformation	ANOVA P-Values			Magnitude of Difference[a]	
		Method x Area Interaction	Method	Area	RG_TN	RG_T4
Richness	rank	0.576	0.034	0.146	-6.7	-7.1
Total Density (ind/L)	none	0.002	-	-	-	139
Total Calanoida (ind/L)	none	0.267	0.054	0.082	-	-
Total Cyclopoida (ind/L)	rank	0.498	<0.001	<0.001	149	149
Total Cladocera (ind/L)	none	0.028	-	-	-	231
Total Rotifera (ind/L)	none	0.004	-	-	-	90
Total Biomass (µg/L)	rank	0.443	<0.001	0.769	181	143
Total Calanoida (µg/L)	none	0.078	0.020	0.748	15	155
Total Cyclopoida (µg/L)	none	0.007	-	-	-	220
Total Cladocera (µg/L)	rank	0.435	0.019	0.124	233	93
Total Rotifera (µg/L)	square-root	0.089	0.927	0.255	-	-
Selenium (ug/g dw)	none	0.135	0.397	<0.001	-	-

P-value < 0.05

[a] Magnitude of difference are shown only when pairwise differences between 10m and Entire Column (EC) samples differed, and was calculated as (10m-EC)/EC*100

Table E.36: Pairwise Comparison of Zooplankton Community Endpoints for the Entire Water Column Between Koocanusa Reservoir Downstream and Upstream Transects, 2018 to 2019

Endpoint	Transformation	Season	Year	MCT[a]		MOD (DS vs US)
				DS	US	
Density (#/m²)	log_{10}	Spring	2018	245	9.72	8.8
			2019	99.3	0.111	18.6
		Summer	2018	21.2	13.8	1.2
			2019	18.4	13.1	0.9
Biomass (mg/m³)	log_{10}	Spring	2018	912	404	2.0
			2019	526	1.76	14.0
		Summer	2018	142	321	-2.0
			2019	265	261	0.0
LPL Richness (# taxa)	none	Spring	2018	14.6	11.4	3.9
			2019	14.6	3.60	13.5
		Summer	2018	16.0	17.0	-1.2
			2019	12.8	13.8	-1.2
Cladocera Density (#/L)	log_{10} + 1	Spring	2018	15.5	4.80	7.1
			2019	41.4	0.0882	24.7
		Summer	2018	0.880	1.05	-0.6
			2019	1.02	1.40	-1.2
Copepoda Density (#/L)	log_{10}	Spring	2018	40.5	3.02	7.8
			2019	21.0	0.022	20.8
		Summer	2018	13.0	6.21	2.2
			2019	11.6	8.94	0.8
Rotifera Density (#/L)	log_{10} + 1	Spring	2018	176	1.84	29.9
			2019	35.3	0.233	24.5
		Summer	2018	7.21	6.35	0.8
			2019	5.51	2.69	4.1
Cladocera Biomass (µg/L)	log_{10} + 1	Spring	2018	490	322	1.0
			2019	217	1.87	10.5
		Summer	2018	38.5	174	-3.6
			2019	148	148	0.0
Copepoda Biomass (µg/L)	log_{10}	Spring	2018	336	70.8	4.1
			2019	269	0.531	16.5
		Summer	2018	88.4	140	-1.2
			2019	103	105	-0.1
Rotifera Biomass (µg/L)	log_{10} + 1	Spring	2018	30.5	0.381	25.1
			2019	10.7	0.104	19.0
		Summer	2018	2.54	1.59	2.5
			2019	1.18	0.897	1.1

Upstream (US) is significantly ($P < 0.05$) lower than Downstream (DS)

Upstream is significantly ($P < 0.05$) greater than Downstream

[a] For transformed data, the back-transformed mean is reported; for ranked data, the median is reported.

Notes: MOD = $MCT_{downstream}$ - MOD $_{upstream}/SD_{pooled}$, where $MCT_{downstream}$ and $MCT_{upstream}$ are the measures of central tendency for the downstream and upstream sites respectively, and SD_{pooled} is the SD for all samples pooled.

Table E.37: Temporal Comparisons of Zooplankton Community Endpoints for the Surficial 10m of the Water Column Between Koocanusa Reservoir Downstream and Upstream Transects, 2014 to 2018

Endpoint	Transformation	ANOVA P-Values			Year	MCT		Q1. Does the magnitude of difference between upstream and downstream areas differ over time?	Q2. Do upstream and downstream areas differ over time?	Q3. Have there been changes within upstream and downstream sites over time?			
								DS vs. US Contrast[a]	US vs. DS MOD[b]	Temporal Differences		Temporal MOD vs Baseline[c]	
		Int.	Area	Year		US	DS			US	DS	US	DS
Density (#/m²)	none	<0.01	-	-	2014	86.7	72.9	A	-1.353	A	A	-	-
					2015	13.4	10.6	AB	-0.270	B	B	b	b
					2016	25.5	38.1	BC	1.23	B	C	1.19	2.69
					2018	19.1	51.1	C	3.13	B	C	0.562	3.96
Biomass (mg/m³)	rank	0.354	0.340	<0.01	2014	95.1	91.1	ns	ns	A		-	
					2015	6.27	2.40			B		b	
					2016	48.3	84.4			C		5.81	
					2018	818	596			D		65.9	
LPL Richness (# taxa)	rank	0.015	-	-	2014	20.0	20.0	A	0	A	A	-	-
					2015	18.0	15.0	B	-2.02	B	B	b	b
					2016	17.0	17.0	A	0	B	C	-0.67	1.35
					2018	16.0	15.0	A	-0.674	C	B	-1.35	0.00
Cladocera Density (#/L)	rank	<0.01	-	-	2014	2.04	1.61	A	-1.58	A	A	-	-
					2015	0.423	0.106	A	-1.16	B	B	b	b
					2016	3.23	2.78	A	-1.63	C	AC	10.2	9.76
					2018	1.722	2.42	B	2.53	AB	C	4.73	8.42
Copepoda Density (#/L)	rank	<0.01	-	-	2014	24.1	25.6	A	1.35	A	A	-	-
					2015	1.31	0.799	A	-0.448	B	B	b	b
					2016	5.55	13.2	A	6.71	BC	C	3.71	10.9
					2018	13.41	31.3	B	15.7	C	A	10.6	26.7
Rotifera Density (#/L)	none	<0.01	-	-	2014	60.2	48.5	A	-1.80	A	A	-	-
					2015	11.35	9.6	AB	-0.268	BC	B	b	b
					2016	16.1	24.5	B	1.29	B	C	0.739	2.29
					2018	5.56	13.83	B	1.27	C	B	-0.892	0.651
Cladocera Biomass (µg/L)	rank	0.801	<0.01	<0.01	2014	16.0	13.4	ns	-31.83	A		-	
					2015	1.35	0.158			B		b	
					2016	32.7	27.9			C		9.92	
					2018	565	193.9			D		127.0	
Copepoda Biomass (µg/L)	log10	<0.01	-	-	2014	69.7	66.4	AB	-0.122	A	A	-	-
					2015	4.13	2.20	A	-1.58	B	B	b	b
					2016	16.0	36.9	C	2.09	C	A	3.40	7.06
					2018	232	322.1	BC	0.820	D	C	10.1	12.5
Rotifera Biomass (µg/L)	none	0.115	0.966	<0.01	2014	3.75	3.12	ns	ns	A		-	
					2015	0.512	0.422			B		b	
					2016	0.920	1.18			C		1.09	
					2018	1.88	2.38			D		3.12	
NMDS 1	rank	0.095	-	-	2014	-22.1	-22.3	AB	-0.0353	A	A	-	-
					2015	-64.5	-86.0	AB	-3.74	B	B	b	b
					2016	-16.0	-20.3	A	-0.748	C	A	8.48	11.5
					2018	115.2	121.5	B	1.12	D	C	31.4	36.3
NMDS 2	rank	<0.01	-	-	2014	-57.2	-58.5	A	-0.298	A	A	-	-
					2015	62.7	79.5	A	3.93	B	B	b	b
					2016	-43.7	-59.1	B	-3.60	C	A	-24.8	-32.4
					2018	20.9	6.1	B	-3.46	B	C	-9.76	-17.1
NMDS 3	rank	0.034	-	-	2014	-32.1	-17.9	AB	2.67	A	A	-	-
					2015	-5.3	-6.8	AB	-0.283	B	AB	b	b
					2016	37.2	23.2	A	-2.63	C	C	7.96	5.61
					2018	-16.6	6.2	B	4.27	B	BC	-2.13	2.42

P-Value < 0.1 and MOD < 0
P-Value < 0.1 and MOD > 0
P-Value <0.1

Note: MCT = Measure of Central Tendency (mean when untransformed, geometric mean when log10-transformed, and median when rank transformed). "ns" = non-significant. "-" = not applicable. All pairwise contrasts done using Tukey's Honest Significant Differences (α=0.1). Pairwise contrasts of upstream vs downstream differences conducted on the same scale as analysis (i.e., as ratios on log10 transformed endpoints, otherwise additive).

[a] Letters indicate pairwise contrasts between Upstream and Downstream differences over time (i.e., years that share a letter have similar MODs)

[b] MOD = Magnitude of difference between Upstream and Downstream calculated for each year as $MOD = MCT_{Downstream} - MCT_{Upstream}/SD_{pooled}$

[c] $MOD = MCT_{year} - MCT_{baseline}/SD_{pooled}$, where MCT_{year} is the Measure of Central Tendency for the year of interest, $MCT_{baseline}$ is the Measure of Central Tendency for 2015, and SD_{pooled} is the pooled standard deviation.

Table E.38: Raw Density Values of Zooplankton Groups in the Montana Portion of the Koocaunusa Reservoir, 2006 to 2017

Station	Taxa	Date	Density (#/L)
International Boundary	Cladocera	2006-04-18	1.6
		2006-05-22	4.5
		2006-06-20	8.7
		2006-07-24	4.6
		2006-08-29	3.4
		2006-09-26	4.7
		2006-10-24	18
		2007-04-23	0
		2007-05-21	0.81
		2007-06-25	16
		2007-07-22	3.0
		2007-08-19	1.2
		2007-10-22	9.6
		2008-05-27	14
		2008-06-17	20
		2008-07-27	5.9
		2008-08-24	2.9
		2008-09-22	2.9
		2008-10-27	24
		2009-04-20	2.0
		2009-05-18	19
		2009-06-22	84
		2009-07-28	6.2
		2009-08-18	0.79
		2009-09-21	9.2
		2009-10-22	6.5
		2010-04-26	6.9
		2010-05-24	12
		2010-06-21	4.6
		2010-08-09	6.7
		2010-08-31	2.9
		2010-09-27	22
		2010-10-25	5.5
		2011-04-25	0.085
		2011-06-21	5.3
		2011-07-26	5.4
		2011-08-16	3.8
		2011-09-28	2.4
		2011-10-19	0.67
		2012-04-18	1.3
		2012-05-22	8.1
		2012-07-23	11
		2012-08-14	2.4
		2012-09-25	3.0
		2012-10-23	1.0
		2013-04-16	0.46
		2013-05-29	4.4
		2013-06-18	7.9
		2013-07-16	2.1
		2013-08-13	1.2
		2013-09-17	1.7
		2014-04-29	1.2
		2014-05-20	35
		2014-06-10	28
		2014-07-22	3.5
		2014-08-19	1.9
		2014-09-23	1.1
		2014-10-22	0.10
		2015-04-14	6.9
		2015-05-18	0.33
		2015-06-09	2.4
		2015-07-28	0.15
		2015-08-18	0.21
		2015-09-22	1.0
		2015-10-20	11
		2016-04-12	0.31
		2016-05-17	1.1
		2016-06-14	2.8
		2016-07-26	0.57
		2016-08-16	0.41
		2016-09-20	0.95
		2016-10-18	1.1
		2017-04-26	0.0028
		2017-05-16	2.9
		2017-06-22	17
		2017-07-25	3.4
		2017-08-29	0.21
		2017-09-26	2.2

Table E.38: Raw Density Values of Zooplankton Groups in the Montana Portion of the Koocaunusa Reservoir, 2006 to 2017

Station	Taxa	Date	Density (#/L)
International Boundary	Cladocera	2017-10-24	1.1
	Copepoda	2006-04-18	163
		2006-05-22	73
		2006-06-20	16
		2006-07-24	24
		2006-08-29	21
		2006-09-26	15
		2006-10-24	8.0
		2007-04-23	5.8
		2007-05-21	9.2
		2007-06-25	102
		2007-07-22	18
		2007-08-19	11
		2007-10-22	13
		2008-05-27	5.9
		2008-06-17	58
		2008-07-27	34
		2008-08-24	29
		2008-09-22	18
		2008-10-27	22
		2009-04-20	16
		2009-05-18	68
		2009-06-22	222
		2009-07-28	17
		2009-08-18	14
		2009-09-21	15
		2009-10-22	15
		2010-04-26	5.1
		2010-05-24	30
		2010-06-21	27
		2010-08-09	13
		2010-08-31	14
		2010-09-27	6.6
		2010-10-25	2.5
		2011-04-25	1.9
		2011-05-24	0.15
		2011-06-21	31
		2011-07-26	17
		2011-08-16	38
		2011-09-28	17
		2011-10-19	12
		2012-04-18	55
		2012-05-22	61
		2012-07-23	19
		2012-08-14	12
		2012-09-25	9.8
		2012-10-23	14
		2013-04-16	23
		2013-05-29	27
		2013-06-18	21
		2013-07-16	6.9
		2013-08-13	11
		2013-09-17	8.8
		2014-04-29	15
		2014-05-20	72
		2014-06-10	46
		2014-07-22	28
		2014-08-19	11
		2014-09-23	7.4
		2014-10-22	4.1
		2015-04-14	11
		2015-05-18	0.25
		2015-06-09	2.0
		2015-07-28	9.4
		2015-08-18	3.4
		2015-09-22	3.0
		2015-10-20	5.3
		2016-04-12	18
		2016-05-17	1.1
		2016-06-14	9.1
		2016-07-26	10
		2016-08-16	6.6
		2016-09-20	3.8
		2016-10-18	5.2
		2017-04-26	0.19
		2017-05-16	63
		2017-06-22	30
		2017-07-25	7.9

Table E.38: Raw Density Values of Zooplankton Groups in the Montana Portion of the Koocaunusa Reservoir, 2006 to 2017

Station	Taxa	Date	Density (#/L)
International Boundary	Copepoda	2017-08-29	8.5
		2017-09-26	6.3
		2017-10-24	3.0
	Rotifera	2006-04-18	176
		2006-05-22	61
		2006-06-20	4.2
		2006-07-24	3.5
		2006-08-29	1.8
		2006-09-26	2.8
		2006-10-24	0.71
		2007-04-23	0.41
		2007-05-21	2.9
		2007-06-25	11
		2007-07-22	10
		2007-08-19	5.0
		2007-10-22	2.5
		2008-05-27	4.6
		2008-06-17	9.2
		2008-07-27	16
		2008-08-24	7.9
		2008-09-22	1.2
		2008-10-27	4.4
		2009-04-20	37
		2009-05-18	112
		2009-06-22	87
		2009-07-28	13
		2009-08-18	3.1
		2009-09-21	2.0
		2009-10-22	4.8
		2010-04-26	20
		2010-05-24	15
		2010-06-21	16
		2010-08-09	2.4
		2010-08-31	5.6
		2010-09-27	8.6
		2010-10-25	7.1
		2011-04-25	87
		2011-05-24	0.67
		2011-06-21	35
		2011-07-26	47
		2011-08-16	117
		2011-09-28	25
		2011-10-19	7.5
		2012-04-18	23
		2012-05-22	137
		2012-07-23	73
		2012-08-14	38
		2012-09-25	10
		2012-10-23	5.0
		2013-04-16	17
		2013-05-29	48
		2013-06-18	51
		2013-07-16	38
		2013-08-13	8.5
		2013-09-17	2.7
		2014-04-29	5.5
		2014-05-20	73
		2014-06-10	73
		2014-07-22	3.8
		2014-08-19	4.9
		2014-09-23	2.9
		2014-10-22	0.37
		2015-04-14	14
		2015-05-18	0.23
		2015-06-09	6.0
		2015-07-28	6.4
		2015-08-18	0.67
		2015-09-22	0.51
		2015-10-20	1.8
		2016-04-12	1.5
		2016-05-17	3.1
		2016-06-14	29
		2016-07-26	14
		2016-08-16	3.5
		2016-09-20	4.2
		2016-10-18	18
		2017-04-26	0.26
		2017-05-16	9.3

Table E.38: Raw Density Values of Zooplankton Groups in the Montana Portion of the Koocaunusa Reservoir, 2006 to 2017

Station	Taxa	Date	Density (#/L)
International Boundary	Rotifera	2017-06-22	59
		2017-07-25	11
		2017-08-29	6.8
		2017-09-26	5.4
		2017-10-24	2.3
Forebay	Cladocera	2006-04-18	0.038
		2006-05-22	0.81
		2006-06-20	4.3
		2006-07-24	8.7
		2006-08-29	2.5
		2006-09-26	2.2
		2006-10-24	1.8
		2007-04-23	0.33
		2007-06-25	2.6
		2007-07-22	5.7
		2007-08-19	1.6
		2007-10-22	3.0
		2008-05-27	13
		2008-06-17	1.0
		2008-07-27	6.5
		2008-08-24	1.1
		2008-09-22	1.2
		2008-10-27	2.0
		2009-04-20	0.064
		2009-05-18	0.0085
		2009-06-22	29
		2009-07-28	1.9
		2009-08-18	0.33
		2009-09-21	0.71
		2009-10-22	3.7
		2010-04-26	0.038
		2010-05-24	0.31
		2010-06-21	12
		2010-08-09	5.6
		2010-08-31	6.6
		2010-09-27	14
		2010-10-25	6.5
		2011-04-25	0.0035
		2011-05-24	0.071
		2011-06-21	0.58
		2011-07-26	12
		2011-08-16	0.85
		2011-09-28	1.3
		2011-10-19	0.85
		2012-04-18	0.065
		2012-06-26	1.8
		2012-07-23	5.4
		2012-08-14	1.7
		2012-09-25	2.5
		2012-10-23	1.3
		2013-04-16	0.24
		2013-05-29	0.88
		2013-06-18	9.2
		2013-07-16	2.0
		2013-08-13	0.76
		2013-09-17	1.7
		2014-04-29	0.057
		2014-05-20	0.57
		2014-06-10	8.5
		2014-07-22	4.7
		2014-08-19	0.68
		2014-09-23	0.34
		2014-10-22	0.078
		2015-04-14	0.67
		2015-05-18	62
		2015-06-09	8.2
		2015-07-28	5.6
		2015-08-18	0.45
		2015-09-22	0.14
		2015-10-20	39
		2016-04-12	0.28
		2016-05-17	7.8
		2016-06-14	4.5
		2016-07-26	0.79
		2016-08-16	0.81
		2016-09-20	1.1
		2016-10-18	0.34
		2017-04-26	0.058

Table E.38: Raw Density Values of Zooplankton Groups in the Montana Portion of the Koocaunusa Reservoir, 2006 to 2017

Station	Taxa	Date	Density (#/L)
Forebay	Cladocera	2017-05-16	0.57
		2017-06-22	1.8
		2017-07-25	3.2
		2017-08-29	0.71
		2017-09-26	4.7
		2017-10-24	0.49
	Copepoda	2006-04-18	4.2
		2006-05-22	183
		2006-06-20	21
		2006-07-24	21
		2006-08-29	11
		2006-09-26	20
		2006-10-24	9.0
		2007-04-23	8.6
		2007-06-25	17
		2007-07-22	24
		2007-08-19	13
		2007-10-22	35
		2008-05-27	141
		2008-06-17	22
		2008-07-27	23
		2008-08-24	27
		2008-09-22	8.9
		2008-10-27	15
		2009-04-20	4.4
		2009-05-18	3.4
		2009-06-22	86
		2009-07-28	20
		2009-08-18	12
		2009-09-21	12
		2009-10-22	17
		2010-04-26	0.52
		2010-05-24	24
		2010-06-21	133
		2010-08-09	20
		2010-08-31	29
		2010-09-27	9.3
		2010-10-25	9.2
		2011-04-25	1.1
		2011-05-24	53
		2011-06-21	10
		2011-07-26	27
		2011-08-16	46
		2011-09-28	15
		2011-10-19	18
		2012-04-18	5.4
		2012-06-26	22
		2012-07-23	17
		2012-08-14	22
		2012-09-25	14
		2012-10-23	10
		2013-04-16	1.5
		2013-05-29	69
		2013-06-18	24
		2013-07-16	11
		2013-08-13	7.1
		2013-09-17	7.1
		2014-04-29	2.7
		2014-05-20	11
		2014-06-10	35
		2014-07-22	29
		2014-08-19	22
		2014-09-23	13
		2014-10-22	1.7
		2015-04-14	1.4
		2015-05-18	166
		2015-06-09	28
		2015-07-28	61
		2015-08-18	16
		2015-09-22	1.1
		2015-10-20	11
		2016-04-12	2.8
		2016-05-17	70
		2016-06-14	18
		2016-07-26	7.2
		2016-08-16	6.5
		2016-09-20	2.9
		2016-10-18	2.6

Table E.38: Raw Density Values of Zooplankton Groups in the Montana Portion of the Koocaunusa Reservoir, 2006 to 2017

Station	Taxa	Date	Density (#/L)
Forebay	Copepoda	2017-04-26	3.1
		2017-05-16	33
		2017-06-22	19
		2017-07-25	7.4
		2017-08-29	8.5
		2017-09-26	16
		2017-10-24	7.4
	Rotifera	2006-04-18	4.1
		2006-05-22	125
		2006-06-20	4.6
		2006-07-24	8.8
		2006-08-29	0.66
		2006-09-26	1.2
		2006-10-24	10
		2007-04-23	2.5
		2007-06-25	2.5
		2007-07-22	6.8
		2007-08-19	7.0
		2007-10-22	4.9
		2008-05-27	38
		2008-06-17	3.8
		2008-07-27	35
		2008-08-24	12
		2008-09-22	2.2
		2008-10-27	0.84
		2009-04-20	16
		2009-05-18	1.6
		2009-06-22	19
		2009-07-28	3.8
		2009-08-18	6.1
		2009-09-21	2.0
		2009-10-22	3.5
		2010-04-26	1.7
		2010-05-24	38
		2010-06-21	68
		2010-08-09	11
		2010-08-31	6.9
		2010-09-27	16
		2010-10-25	8.3
		2011-04-25	31
		2011-05-24	932
		2011-06-21	8.7
		2011-07-26	57
		2011-08-16	112
		2011-09-28	13
		2011-10-19	6.2
		2012-04-18	14
		2012-06-26	67
		2012-07-23	40
		2012-08-14	46
		2012-09-25	9.2
		2012-10-23	6.9
		2013-04-16	6.0
		2013-05-29	101
		2013-06-18	25
		2013-07-16	24
		2013-08-13	6.3
		2013-09-17	1.4
		2014-04-29	5.3
		2014-05-20	38
		2014-06-10	58
		2014-07-22	6.3
		2014-08-19	13
		2014-09-23	1.0
		2014-10-22	0.064
		2015-04-14	1.5
		2015-05-18	254
		2015-06-09	77
		2015-07-28	21
		2015-08-18	0.45
		2015-09-22	0.35
		2015-10-20	4.8
		2016-04-12	1.8
		2016-05-17	178
		2016-06-14	6.4
		2016-07-26	13
		2016-08-16	8.5
		2016-09-20	4.1

Table E.38: Raw Density Values of Zooplankton Groups in the Montana Portion of the Koocaunusa Reservoir, 2006 to 2017

Station	Taxa	Date	Density (#/L)
Forebay	Rotifera	2016-10-18	11
		2017-04-26	13
		2017-05-16	132
		2017-06-22	28
		2017-07-25	6.9
		2017-08-29	5.2
		2017-09-26	11
		2017-10-24	8.5
Tenmile	Cladocera	2006-04-18	0.57
		2006-05-22	15
		2006-06-20	5.2
		2006-07-24	9.4
		2006-08-29	7.4
		2006-09-26	5.4
		2006-10-24	5.3
		2007-04-23	1.5
		2007-05-21	14
		2007-06-25	3.1
		2007-07-22	5.2
		2007-08-19	9.1
		2007-10-22	5.0
		2008-05-27	17
		2008-06-17	4.7
		2008-07-27	5.9
		2008-08-24	1.5
		2008-09-22	2.0
		2008-10-27	3.4
		2009-04-20	0.041
		2009-05-18	0.31
		2009-06-22	13
		2009-07-28	13
		2009-08-18	0.58
		2009-09-21	5.4
		2009-10-22	12
		2010-04-26	0.20
		2010-05-24	6.1
		2010-06-21	4.1
		2010-08-09	9.3
		2010-08-31	1.5
		2010-09-27	7.0
		2010-10-25	2.3
		2011-04-25	0.018
		2011-05-24	0.42
		2011-06-21	0.25
		2011-07-26	8.4
		2011-08-16	1.5
		2011-09-28	1.2
		2011-10-19	1.3
		2012-04-18	0.41
		2012-05-22	0.32
		2012-06-26	2.9
		2012-07-23	13
		2012-08-14	1.8
		2012-09-25	3.4
		2012-10-23	1.7
		2013-04-16	0.67
		2013-05-29	5.9
		2013-06-18	19
		2013-07-16	3.1
		2013-08-13	0.81
		2013-09-17	2.1
		2014-04-29	0.85
		2014-05-20	1.4
		2014-06-10	14
		2014-07-22	0.84
		2014-09-23	1.2
		2014-10-22	0.30
		2015-04-14	1.2
		2015-05-18	20
		2015-06-09	4.5
		2015-07-28	0.67
		2015-08-18	0.53
		2015-09-22	0.19
		2015-10-20	2.2
		2016-04-12	0.28
		2016-05-17	8.2
		2016-06-14	4.1
		2016-07-26	1.7

Table E.38: Raw Density Values of Zooplankton Groups in the Montana Portion of the Koocaunusa Reservoir, 2006 to 2017

Station	Taxa	Date	Density (#/L)
Tenmile	Cladocera	2016-08-16	0.57
		2016-09-20	0.37
		2016-10-18	0.54
		2017-04-26	0.18
		2017-05-16	2.7
		2017-06-22	11
		2017-07-25	2.7
		2017-08-29	0.057
		2017-09-26	1.0
		2017-10-24	1.3
	Copepoda	2006-04-18	18
		2006-05-22	293
		2006-06-20	16
		2006-07-24	12
		2006-08-29	22
		2006-09-26	18
		2006-10-24	14
		2007-04-23	24
		2007-05-21	101
		2007-06-25	16
		2007-07-22	21
		2007-08-19	11
		2007-10-22	15
		2008-05-27	26
		2008-06-17	38
		2008-07-27	15
		2008-08-24	18
		2008-09-22	18
		2008-10-27	10
		2009-04-20	4.2
		2009-05-18	15
		2009-06-22	24
		2009-07-28	48
		2009-08-18	8.4
		2009-09-21	24
		2009-10-22	31
		2010-04-26	3.1
		2010-05-24	71
		2010-06-21	31
		2010-08-09	39
		2010-08-31	8.4
		2010-09-27	2.2
		2010-10-25	6.2
		2011-04-25	1.7
		2011-05-24	50
		2011-06-21	10
		2011-07-26	29
		2011-08-16	28
		2011-09-28	12
		2011-10-19	15
		2012-04-18	22
		2012-05-22	32
		2012-06-26	15
		2012-07-23	14
		2012-08-14	22
		2012-09-25	14
		2012-10-23	9.1
		2013-04-16	3.8
		2013-05-29	41
		2013-06-18	23
		2013-07-16	8.2
		2013-08-13	8.6
		2013-09-17	8.0
		2014-04-29	7.9
		2014-05-20	39
		2014-06-10	30
		2014-07-22	5.6
		2014-09-23	16
		2014-10-22	3.7
		2015-04-14	3.1
		2015-05-18	18
		2015-06-09	16
		2015-07-28	11
		2015-08-18	7.9
		2015-09-22	3.4
		2015-10-20	1.7
		2016-04-12	19
		2016-05-17	41

Table E.38: Raw Density Values of Zooplankton Groups in the Montana Portion of the Koocaunusa Reservoir, 2006 to 2017

Station	Taxa	Date	Density (#/L)
Tenmile	Copepoda	2016-06-14	15
		2016-07-26	12
		2016-08-16	3.1
		2016-09-20	1.2
		2016-10-18	3.5
		2017-04-26	6.3
		2017-05-16	65
		2017-06-22	8.4
		2017-07-25	7.4
		2017-08-29	7.9
		2017-09-26	2.8
		2017-10-24	7.1
	Rotifera	2006-04-18	30
		2006-05-22	156
		2006-06-20	4.1
		2006-07-24	3.2
		2006-08-29	1.6
		2006-09-26	1.8
		2006-10-24	11
		2007-04-23	8.5
		2007-05-21	197
		2007-06-25	4.9
		2007-07-22	13
		2007-08-19	6.7
		2007-10-22	1.5
		2008-05-27	24
		2008-06-17	43
		2008-07-27	20
		2008-08-24	17
		2008-09-22	3.6
		2008-10-27	1.9
		2009-04-20	21
		2009-05-18	53
		2009-06-22	14
		2009-07-28	14
		2009-08-18	1.1
		2009-09-21	3.7
		2009-10-22	3.3
		2010-04-26	11
		2010-05-24	35
		2010-06-21	38
		2010-08-09	11
		2010-08-31	13
		2010-09-27	12
		2010-10-25	12
		2011-04-25	80
		2011-05-24	164
		2011-06-21	65
		2011-07-26	48
		2011-08-16	81
		2011-09-28	14
		2011-10-19	7.9
		2012-04-18	27
		2012-05-22	207
		2012-06-26	36
		2012-07-23	29
		2012-08-14	48
		2012-09-25	8.3
		2012-10-23	10
		2013-04-16	77
		2013-05-29	197
		2013-06-18	68
		2013-07-16	19
		2013-08-13	7.1
		2013-09-17	0.74
		2014-04-29	25
		2014-05-20	116
		2014-06-10	211
		2014-07-22	6.0
		2014-09-23	2.0
		2014-10-22	0.47
		2015-04-14	11
		2015-05-18	25
		2015-06-09	41
		2015-07-28	5.7
		2015-08-18	1.6
		2015-09-22	0.27
		2015-10-20	3.3

Table E.38: Raw Density Values of Zooplankton Groups in the Montana Portion of the Koocaunusa Reservoir, 2006 to 2017

Station	Taxa	Date	Density (#/L)
Tenmile	Rotifera	2016-04-12	78
		2016-05-17	162
		2016-06-14	12
		2016-07-26	26
		2016-08-16	4.0
		2016-09-20	0.49
		2016-10-18	13
		2017-04-26	15
		2017-05-16	210
		2017-06-22	40
		2017-07-25	9.3
		2017-08-29	13
		2017-09-26	5.7
		2017-10-24	5.6

APPENDIX F
BENTHIC INVERTEBRATES

Table F.1: Benthic Invertebrate Community and Tissue Sampling Locations in Koocanusa Reservoir, August 2018

Station Identifier		UTM (NAD 83, Zone 11U)		Station Depth (m)	Average Ponar Fullness (%)	Sample Texture	Macrophytes in Sample	Algae in Sample
		Easting	Northing					
Upstream of Elk River (RG_TN)	RG_TN-1	627394	5453542	14.0	75% - 100%	95% sand and finer, 5% organics	No	No
	RG_TN-2	627291	5453642	13.3	75%	90% sand and finer, 10% organics	No	No
	RG_TN-3	627343	5456370	14.6	75%	90% sand and finer, 10% organics	No	No
	RG_TN-4	627344	5453854	14.0	100%	95% sand and finer, 5% organics	No	No
	RG_TN-5	627175	5453986	14.3	100%	100% sand and finer, minimal organics	No	No
Downstream of Elk River (RG_T4)	RG_T4-1	630074	5441765	25.1	75%	100% sand and finer	No	No
	RG_T4-2	629838	5442106	24.3	75%	100% sand and finer	No	No
	RG_T4-3	629706	5441670	24.4	100%	100% sand and finer	No	No
	RG_T4-4	629512	5441745	23.9	100%	100% sand and finer, minimal organics	No	No
	RG_T4-5	629460	5441543	24.8	100%	100% sand and finer	No	No

Table F.2: Benthic Invertebrate Tissue Locations in Koocanusa Reservoir, April 2018

Station Identifier		Comment	UTM (NAD 83, Zone 11U)		Station Depth (m)	Sample Texture	Macrophytes in Sample	Algae in Sample	Dominant Taxa
			Easting	Northing					
Sand Creek (RG_SC)	RG_SC_01	-	625489	5458292	1.5	silty sand	no	no	chironomid
	RG_SC_02	-	625467	5458231	-	silty sand	no	no	chironomid, mayfly
	RG_SC_03	-	625577	5457631	1.0	silty sand	no	no	chironomid
	RG_SC_04	-	625652	5457353	1.3	silty sand	no	no	chironomid
	RG_SC_05	-	625680	5458260	1.5	silty sand	no	no	chironomid, mayfly
RG_TN	RG_TN	very strong current, sandy half grabs	677112	5453388	1.5	100% sand and finer, minimal organics	no	no	chironomid
Elk River (RG_ER)	RG_ER_01	downstream of mouth of Elk River	628309	5448218	< 0.5	100% sand and finer, minimal organics	no	no	mayfly, chironomid
	RG_ER_02	northern most braid at mouth of the Elk River	628475	5448196	0.4	100% sand and finer, minimal organics	no	no	stonefly, mayfly, chironomid
	RG_ER_03	southern most braid at mouth of the Elk River	628280	5448086	< 0.5	100% sand and finer, 10% organics	no	no	mayfly
	RG_ER_04	in sheltered bay downstream of the mouth	627989	5447672	< 0.5	100% sand and finer, minimal organics	no	no	chironomid
	RG_ER_05	in sheltered bay downstream of the mouth	627950	5447580	< 0.5	100% sand and finer, minimal organics	no	no	mayfly
RG_T4	RG_T4	some flow in area, moved behind bar to hold in place	629235	5441654	0.75	100% sand and finer, minimal organics	no	no	chironomid
Gold Creek (RG_GC)	RG_GC_01	spooned at sediment-water interface	630805	5436307	0.1	100% sand and finer, minimal organics	no	no	chironomid, mayfly
	RG_GC_02	-	630906	5436212	0.1	100% sand and finer, minimal organics	no	no	mayfly, chironomid
	RG_GC_03	texture slightly coarser than -01 and -02	630825	5436436	0.1	100% sand and finer, minimal organics	no	no	stonefly, chironomid
	RG_GC_04	superfine, sticky material, from shoreline water interface	631158	5436077	0.1	100% sand and finer, minimal organics	no	no	chironomid, stonefly, mayfly
	RG_GC_05	very fine, less clay, less sticky than -04	631068	5436163	0.1	100% sand and finer, minimal organics	no	no	stonefly, mayfly, chironomid

Note: "-" indicates no data available.

Table F.3: Benthic Invertebrate Density (No. of Organisms per m^2) Reported to the Lowest Practical Level, August 2018

Organism		Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5
Nematode	P. Nemata	34	34	69	17	34	8.6	8.6	69	0	0
Oligochaete	S.F. Naidinae	-	-	-	-	-	-	-	-	-	-
	Dero	0	0	0	0	0	0	0	121	0	0
	S.F. Tubificinae	-	-	-	-	-	-	-	-	-	-
	Aulodrilus limnobius	0	379	388	784	1,405	17	0	621	0	0
	Limnodrilus hoffmeisteri	0	0	0	0	0	8.6	17	0	0	26
	Limnodrilus udekemianus	103	379	112	284	69	0	0	0	0	0
	Tubifex tubifex	0	112	164	69	0	0	8.6	250	112	78
	immatures with hair chaetae[a]	241	164	276	422	129	138	43	1,121	1,595	78
	immatures without hair chaetae[a]	138	52	164	147	0	43	86	371	569	319
Ostracod	Cl. Ostracoda	-	-	-	-	-	-	-	-	-	-
	Indeterminate	0	0	0	0	0	0	0	0	0	8.6
	F. Candonidae	-	-	-	-	-	-	-	-	-	-
	Candona	103	69	69	43	103	0	8.6	0	69	0
	F. Cyprididae	-	-	-	-	-	-	-	-	-	-
	Isocypris	0	34	34	17	17	0	0	0	0	8.6
	F. Cytherideidae	-	-	-	-	-	-	-	-	-	-
	Cytherissa lacustris	0	52	0	34	34	17	0	0	34	17
Insect	F. Chaoboridae	-	-	-	-	-	-	-	-	-	-
	Chaoborus flavicans	0	0	0	0	0	0	8.6	0	0	0
	F. Chironomidae	-	-	-	-	-	-	-	-	-	-
	chironomid pupae[b]	**0**	**0**	**34**	**17**	**0**	**0**	**8.6**	**0**	**0**	**17**
	S.F. Chironominae	-	-	-	-	-	-	-	-	-	-
	Chironomus	207	121	103	60	241	17	43	0	0	8.6
	Harnischia	34	0	0	0	52	0	0	0	34	0
	Phaenopsectra	0	17	69	0	17	17	26	0	34	0
	Tanytarsus	172	103	34	17	86	43	60	207	69	0
	S.F. Prodiamesinae	-	-	-	-	-	-	-	-	-	-
	Monodiamesa	0	34	0	0	17	0	8.6	0	0	0
	S.F. Tanypodinae	-	-	-	-	-	-	-	-	-	-
	Procladius	690	569	345	310	397	190	293	897	586	448
Bivalve Mollusc	F. Sphaeriidae	-	-	-	-	-	-	-	-	-	-
	Pisidium (Cyclocalyx)	0	0	0	0	0	0	0	0	0	8.6
	Pisidium (Cyclocalyx)/Neopisidi	103	0	0	17	0	0	34	0	34	0
Total Number of Organisms		**1,828**	**2,121**	**1,862**	**2,241**	**2,603**	**500**	**655**	**3,655**	**3,138**	**1,017**
Total Number of Taxa		**10**	**14**	**12**	**13**	**13**	**10**	**13**	**8**	**10**	**10**

Note: "-" indicates no available data.

[a] Immature Tubificinae were combined for data analyses

[b] Bold entries excluded from taxon count

Table F.4: Densities (No. of Organisms per m^2) of Major Benthic Invertebrate Groups, August 2018

Group	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)				
	TN-1	**TN-2**	**TN-3**	**TN-4**	**TN-5**	**T4-1**	**T4-2**	**T4-3**	**T4-4**	**T4-5**
Nemata	34	34	69	17	34	8.6	8.6	69	0	0
Oligochaeta	483	1,086	1,103	1,707	1,603	207	155	2,483	2,276	500
Ostracoda	103	155	103	95	155	17	8.6	0	103	34
Insect	1,103	845	586	405	845	267	448	1,103	724	474
Bivalvia	103	0	0	17	0	0	34	0	34	8.6
Total Number of Organisms	**1,828**	**2,121**	**1,862**	**2,241**	**2,638**	**500**	**655**	**3,655**	**3,138**	**1,017**
Total Number of Groups	**5**	**4**	**4**	**5**	**4**	**4**	**5**	**3**	**4**	**4**

Table F.5: **Relative Densities (%) of Benthic Invertebrates Reported to the Lowest Practical Level, August 2018**

	Organism	Upstream of Elk River (RG_TN)					Downstream of Elk River (RG_T4)					Summary Statistics									
												Minimum		Median		Maximum		Mean		Standard Deviation	
		TN-1	TN-2	TN-3	TN-4	TN-5	T4-1	T4-2	T4-3	T4-4	T4-5	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4	RG_TN	RG_T4
Nematode	P. Nemata	1.9	1.6	3.7	0.77	1.3	1.7	1.3	1.9	0	0	0.77	0	1.6	1.3	3.7	1.9	1.9	0.99	1.1	0.92
Oligochaete	S.F. Naidinae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dero	0	0	0	0	0	0	0	3.3	0	0	0	0	0	0	0	3.3	0	0.66	0	1.5
	S.F. Tubificinae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aulodrilus limnobius	0	18	21	35	54	3.4	0	17	0	0	0	0	21	0	54	17	26	4.1	20	7.4
	Limnodrilus hoffmeisteri	0	0	0	0	0	1.7	2.6	0	0	2.5	0	0	0	1.7	0	2.6	0	1.4	0	1.3
	Limnodrilus udekemianus	5.7	18	6.0	13	2.6	0	0	0	0	0	2.6	0	6.0	0	18	0	9.0	0	6.2	0
	Tubifex tubifex	0	5.3	8.8	3.1	0	0	1.3	6.8	3.6	7.6	0	0	3.1	3.6	8.8	7.6	3.4	3.9	3.7	3.3
	immatures with hair chaetae[a]	13	7.7	15	19	5.0	28	6.6	31	51	7.6	5.0	6.6	13	28	19	51	12	25	5.6	18
	immatures without hair chaetae[a]	7.5	2.4	8.8	6.5	0	8.6	13	10	18	31	0	8.6	6.5	13	8.8	31	5.1	16	3.7	9.2
Ostracod	Cl. Ostracoda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indeterminate	0	0	0	0	0	0	0	0	0	0.85	0	0	0	0	0	0.85	0	0.17	0	0.38
	F. Candonidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Candona	5.7	3.3	3.7	1.9	4.0	0	1.3	0	2.2	0	1.9	0	3.7	0	5.7	2.2	3.7	0.70	1.3	1.0
	F. Cyprididae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Isocypris	0	1.6	1.9	0.77	0.66	0	0	0	0	0.85	0	0	0.77	0	1.9	0.85	0.98	0.17	0.76	0.38
	F. Cytherideidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cytherissa lacustris	0	2.4	0	1.5	1.3	3.4	0	0	1.1	1.7	0	0	1.3	1.1	2.4	3.4	1.1	1.2	1.1	1.4
Insect	F. Chaoboridae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chaoborus flavicans	0	0	0	0	0	0	1.3	0	0	0	0	0	0	0	0	1.3	0	0.26	0	0.59
	F. Chironomidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	chironomid pupae	0	0	1.9	0.77	0	0	1.3	0	0	1.7	0	0	0	0	1.9	1.7	0.52	0.60	0.81	0.84
	S.F. Chironominae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chironomus	11	5.7	5.6	2.7	9.3	3.4	6.6	0	0	0.85	2.7	0	5.7	0.85	11	6.6	6.9	2.2	3.4	2.8
	Harnischia	1.9	0	0	0	2.0	0	0	0	1.1	0	0	0	0	0	2.0	1.1	0.77	0.22	1.1	0.49
	Phaenopsectra	0	0.81	3.7	0	0.66	3.4	3.9	0	1.1	0	0	0	0.66	1.1	3.7	3.9	1.0	1.7	1.5	1.9
	Tanytarsus	9.4	4.9	1.9	0.77	3.3	8.6	9.2	5.7	2.2	0	0.77	0	3.3	5.7	9.4	9.2	4.0	5.1	3.4	4.0
	S.F. Prodiamesinae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Monodiamesa	0	1.6	0	0	0.66	0	1.3	0	0	0	0	0	0	0	1.6	1.3	0.46	0.26	0.71	0.59
	S.F. Tanypodinae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Procladius	38	27	19	14	15	38	45	25	19	44	14	19	19	38	38	45	22	34	9.9	12
Bivalve Mollusc	F. Sphaeriidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pisidium (Cyclocalyx)	0	0	0	0	0	0	0	0	0	0.85	0	0	0	0	0	0.85	0	0.17	0	0.38
	Pisidium (Cyclocalyx)/Neopisidium	5.7	0	0	0.77	0	0	5.3	0	1.1	0	0	0	0	0	5.7	5.3	1.3	1.3	2.5	2.3

Notes: Summary statistics were provided to determine taxa (bolded) that comprise at least 5% of the total number of organisms at one or more stations within an area (as shown in Figure 6.3); "-" indicates no data available.

[a] Immature Tubificinae were combined for data analyses.

Table F.6: Summary of Benthic Invertebrate Community Metrics and Statistical Comparisons for TN (upstream) and T4 (downstream), Koocanusa 2018

Endpoint	Units	Data Transformation	Test	Test P-value	Mean or Median [a]		Observed ES (T4 - TN)/SD
					T4	TN	
Richness	-	none	T	0.049	9.00	11.6	-1.50
Total Density	ind/m^2	square-root	T	0.424	1,548	2,131	-0.53
Nemata	ind/m^2	fourth-root	T	0.074	2.55	35.5	-1.30
Oligochaeta	ind/m^2	log_{10}	T	0.386	621	1,101	-0.58
Ostracoda	ind/m^2	square-root	T	0.007	21.5	121	-2.30
Chironomidae	ind/m^2	log_{10}	T	0.373	539	712	-0.60
Bivalvia	ind/m^2	$log_{10}(X+1)$	T	0.776	6.57	4.54	0.19
Nemata	%	none	T	0.212	17.3	38.1	-0.86
Oligochaeta	%	none	T	0.750	1,129	1,202	-0.21
Ostracoda	%	none	T	0.004	32.89	123	-2.60
Chironomidae	%	log_{10}	T	0.487	539	712	0.46
Bivalvia	%	fourth-root	T	0.654	2.98	1.20	0.29
NMDS Axis 1	-	none	T	0.073	-0.151	0.151	-1.30
NMDS Axis 2	-	none	T	0.080	-0.131	0.131	-1.30
NMDS Axis 3	-	none	T	0.689	-0.025	0.025	-0.26

P-value < 0.05

Effect size magnitude > 2

Notes: (Exp-ref)/SD for trans data; SD for all data; "-" indicates no data available.

[a] For transformed data, the back-transformed mean is reported; for ranked data, the median is reported.

Table F.7: Benthic Invertebrate Community Summary Statistics, Koocanusa Reservoir Monitoring Program 2018

Site	Endpoint	Units	N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
Upstream of the Elk River (RG_TN)	Richness	-	5	11.6	1.7	0.7	9	12	13
	Total Density	ind/m^2	5	2,139.9	317.5	142.0	1,835	2,130	2,614
	Nemata	ind/m^2	5	38.1	19.0	8.5	17	35	69
	Oligochaeta	ind/m^2	5	1,201.5	491.0	219.6	485	1,108	1,714
	Ostracoda	ind/m^2	5	122.9	30.2	13.5	95	104	156
	Chironomidae	ind/m^2	5	753.1	267.2	119.5	407	814	1,108
	Bivalvia	ind/m^2	5	24.2	45.1	20.2	0	0	104
	Nemata	%	5	1.9	1.1	0.5	1	2	4
	Oligochaeta	%	5	54.9	18.3	8.2	26	59	76
	Ostracoda	%	5	5.7	1.1	0.5	4	6	7
	Chironomidae	%	5	36.2	15.6	7.0	18	31	60
	Bivalvia	%	5	1.3	2.5	1.1	0	0	6
	NMDS Axis 1	-	5	0.2	0.2	0.1	0	0	0
	NMDS Axis 2	-	5	0.1	0.2	0.1	0	0	0
	NMDS Axis 3	-	5	0.0	0.1	0.1	0	0	0
Downstream of the Elk River (RG_T4)	Richness	-	5	9.0	1.9	0.8	7	9	12
	Total Density	ind/m^2	5	1,800.6	1,493.2	667.8	502	1,021	3,670
	Nemata	ind/m^2	5	17.3	29.4	13.1	0	9	69
	Oligochaeta	ind/m^2	5	1,128.8	1,160.5	519.0	156	502	2,493
	Ostracoda	ind/m^2	5	32.9	41.7	18.6	0	17	104
	Chironomidae	ind/m^2	5	604.2	325.8	145.7	268	476	1,108
	Bivalvia	ind/m^2	5	15.6	17.7	7.9	0	9	35
	Nemata	%	5	17.3	29.4	13.1	0	9	69
	Oligochaeta	%	5	1,128.8	1,160.5	519.0	156	502	2,493
	Ostracoda	%	5	32.9	41.7	18.6	0	17	104
	Chironomidae	%	5	604.2	325.8	145.7	268	476	1,108
	Bivalvia	%	5	15.6	17.7	7.9	0	9	35
	NMDS Axis 1	-	5	-0.2	0.3	0.1	0	0	0
	NMDS Axis 2	-	5	-0.1	0.2	0.1	0	0	0
	NMDS Axis 3	-	5	0.0	0.2	0.1	0	0	0

"-" indicates no unit of measure.

Table F.8: Station Scores for a Non-Metric Multidimensional Scaling of Bray-Curtis Dissimilarities Calculated for Benthic Invertebrate Relative Densities at the LPL Level of Identification for Downstream (RG_T4) and Upstream (RG_TN) of the Elk River, Koocanusa Reservoir Monitoring Program, August 2018

Area	Replicate	NMDS Axis 1	NMDS Axis 2	NMDS Axis 3
RG_TN	1	-0.030	0.401	0.131
	2	0.273	0.050	0.017
	3	0.281	0.048	0.041
	4	-0.017	-0.039	0.145
	5	0.247	0.197	-0.210
RG_T4	1	0.066	-0.281	-0.223
	2	-0.168	0.125	-0.220
	3	0.203	-0.374	0.252
	4	-0.437	0.123	0.181
	5	-0.419	-0.250	-0.114

Table F.9: Spearman Correlations of Fourth-Root Transformed Relative Densities with Non-Metric Multidimensional Scaling of Bray-Curtis Dissimilarities Calculated for Benthic Invertebrate Relative Densities at the LPL Level of Identification for Downstream (RG_T4) and Upstream (RG_TN) of the Elk River, Koocanusa Monitoring Program 2018

Taxa	NMDS Axis 1		NMDS Axis 2		NMDS Axis 3	
	r_s	P-value	r_s	P-value	r_s	P-value
Nematoda	0.669	0.035	-0.128	0.725	0.073	0.841
Aulodrilus limnobius	0.782	0.008	-0.106	0.770	0.031	0.932
Limnodrilus hoffmeisteri	-0.455	0.187	-0.172	0.636	-0.693	0.026
Limnodrilus udekemianus	0.588	0.074	0.265	0.459	0.162	0.656
Tubifex tubifex	0.166	0.647	-0.485	0.156	0.399	0.254
Tubificinae	-0.491	0.154	-0.624	0.060	0.503	0.143
Candona	0.313	0.379	0.816	0.004	0.117	0.748
Cytherissa lacustris	0.031	0.932	-0.344	0.331	-0.425	0.221
Chironomus	0.310	0.383	0.736	0.015	-0.486	0.154
Harnischia	-0.157	0.666	0.738	0.015	0.097	0.790
Phaenopsectra	0.144	0.692	0.169	0.641	-0.500	0.141
Tanytarsus	0.006	1.000	0.309	0.387	-0.273	0.448
Monodiamesa	0.276	0.440	0.440	0.203	-0.455	0.187
Procladius	-0.309	0.387	-0.067	0.865	-0.539	0.113
Pisidium/Neopisidium	-0.821	0.004	0.511	0.131	0.110	0.762
Cyprididae	0.524	0.120	-0.110	0.762	-0.058	0.873

P-value < 0.05

$|r_s| > 0.5$

Table F.10: Benthic Invertebrate Community Summary Statistics, Koocanusa, 2014 to 2018

Site	Endpoint	2014						
		N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
RG_TN[a]	LPL Richness (# taxa)	5	8.20	1.92	0.860	6.00	8.00	11.0
	Density (#/m²)	5	3,193	3,468	1,551	396	1,128	7,431
	Shannon's Diversity	5	1.32	0.292	0.131	0.906	1.26	1.67
	% Nematoda	5	8.73	10.6	4.75	0	4.58	26.7
	% Oligochaeta	5	62.5	24.4	10.9	28.3	67.2	88.5
	% Ostracoda	5	1.16	1.71	0.767	0	0	3.82
	% Chironomidae	5	26.8	26.6	11.9	5.56	23.7	71.7
	% Bivalvia	5	0.666	1.15	0.516	0	0	2.67
	Nematoda Density (#/m²)	5	217	287	128	0	138	715
	Oligochaeta Density (#/m²)	5	2,563	3,009	1,346	112	758	5,950
	Ostracdoa Density (#/m²)	5	37.9	63.5	28.4	0	0	146
	Chironomidae Density (#/m²)	5	324	151	67.6	129	284	525
	Bivalvia Density (#/m²)	5	48.2	85.8	38.4	0	0	198
	NMDS 1	5	-0.300	0.225	0.101	-0.530	-0.390	-0.0308
	NMDS 2	5	-0.290	0.246	0.110	-0.616	-0.231	0.000372
	NMDS 3	5	0.182	0.261	0.117	-0.273	0.292	0.370
RG_T4	LPL Richness (# taxa)	5	8.60	1.34	0.600	7.00	8.00	10.0
	Density (#/m²)	5	2,606	972	435	1,748	2,170	4,228
	Shannon's Diversity	5	1.12	0.102	0.0455	0.953	1.13	1.23
	% Nematoda	5	0.581	0.550	0.246	0	0.400	1.48
	% Oligochaeta	5	57.5	16.2	7.27	38.8	60.0	79.8
	% Ostracoda	5	34.8	14.3	6.41	15.3	33.6	53.0
	% Chironomidae	5	6.31	1.65	0.740	4.80	6.35	8.87
	% Bivalvia	5	0.643	0.475	0.212	0	0.631	1.20
	Nematoda Density (#/m²)	5	12.1	9.82	4.39	0	8.61	25.8
	Oligochaeta Density (#/m²)	5	1,579	1,031	461	784	1,292	3,376
	Ostracdoa Density (#/m²)	5	840	343	153	629	723	1,447
	Chironomidae Density (#/m²)	5	157	39.6	17.7	103	155	207
	Bivalvia Density (#/m²)	5	13.8	9.82	4.39	0	17.2	25.8
	NMDS 1	5	-0.335	0.0669	0.0299	-0.408	-0.338	-0.229
	NMDS 2	5	0.147	0.134	0.0601	-0.0656	0.193	0.280
	NMDS 3	5	0.161	0.121	0.0541	0.00348	0.211	0.306

[a] RG_T2 was sampled in 2014 instead of RG_TN.

Table F.10: Benthic Invertebrate Community Summary Statistics, Koocanusa, 2014 to 2018

Site	Endpoint	2015						
		N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
RG_TN[a]	LPL Richness (# taxa)	5	7.40	1.52	0.678	5.00	8.00	9.00
	Density (#/m²)	5	983	530	237	353	792	1,662
	Shannon's Diversity	5	1.19	0.183	0.0820	0.948	1.19	1.45
	% Nematoda	5	2.09	2.00	0.893	0	1.19	4.97
	% Oligochaeta	5	49.6	11.5	5.12	38.0	47.8	65.9
	% Ostracoda	5	7.79	5.92	2.65	2.44	4.76	16.1
	% Chironomidae	5	40.3	11.1	4.95	26.4	42.9	53.6
	% Bivalvia	5	0.228	0.314	0.140	0	0	0.621
	Nematoda Density (#/m²)	5	24.1	26.8	12.0	0	17.2	68.9
	Oligochaeta Density (#/m²)	5	484	302	135	233	301	930
	Ostracdoa Density (#/m²)	5	91.3	103	46.1	8.61	51.7	267
	Chironomidae Density (#/m²)	5	381	174	77.9	112	388	594
	Bivalvia Density (#/m²)	5	3.44	4.72	2.11	0	0	8.61
	NMDS 1	5	0.569	0.0730	0.0326	0.470	0.563	0.665
	NMDS 2	5	-0.141	0.212	0.0947	-0.481	-0.0842	0.0828
	NMDS 3	5	-0.0202	0.117	0.0522	-0.161	-0.00139	0.149
RG_T4	LPL Richness (# taxa)	5	8.60	1.14	0.510	7.00	9.00	10.0
	Density (#/m²)	5	3,529	361	161	3,126	3,608	3,884
	Shannon's Diversity	5	1.19	0.141	0.0633	0.959	1.22	1.33
	% Nematoda	5	0.463	0.412	0.184	0	0.443	1.12
	% Oligochaeta	5	37.2	15.8	7.07	16.5	43.2	51.8
	% Ostracoda	5	47.9	15.9	7.13	31.4	41.1	70.0
	% Chironomidae	5	14.3	2.10	0.941	11.3	14.6	16.8
	% Bivalvia	5	0.188	0.311	0.139	0	0	0.716
	Nematoda Density (#/m²)	5	17.2	16.1	7.20	0	17.2	43.1
	Oligochaeta Density (#/m²)	5	1,319	578	258	517	1,559	1,938
	Ostracdoa Density (#/m²)	5	1,684	534	239	999	1,490	2,265
	Chironomidae Density (#/m²)	5	501	73.9	33.1	413	525	594
	Bivalvia Density (#/m²)	5	6.89	11.2	5.02	0	0	25.8
	NMDS 1	5	0.423	0.0363	0.0162	0.394	0.406	0.483
	NMDS 2	5	0.150	0.0522	0.0233	0.0964	0.147	0.228
	NMDS 3	5	0.109	0.111	0.0496	-0.0523	0.0973	0.229

[a] RG_T2 was sampled in 2014 instead of RG_TN.

Table F.10: Benthic Invertebrate Community Summary Statistics, Koocanusa, 2014 to 2018

Site	Endpoint	2016						
		N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
RG_TN[a]	LPL Richness (# taxa)	5	10.4	1.52	0.678	9.00	10.0	13.0
	Density (#/m²)	5	2,478	2,160	966	990	1,602	6,252
	Shannon's Diversity	5	1.64	0.285	0.127	1.38	1.66	2.08
	% Nematoda	5	0.438	0.835	0.373	0	0	1.92
	% Oligochaeta	5	52.8	14.0	6.28	39.1	47.0	69.4
	% Ostracoda	5	12.7	5.11	2.29	7.53	13.0	19.9
	% Chironomidae	5	32.7	13.0	5.82	14.6	32.5	46.1
	% Bivalvia	5	1.11	1.58	0.707	0	0.826	3.83
	Nematoda Density (#/m²)	5	12.1	18.9	8.44	0	0	43.1
	Oligochaeta Density (#/m²)	5	1,469	1,627	728	388	947	4,340
	Ostracdoa Density (#/m²)	5	324	343	154	121	181	930
	Chironomidae Density (#/m²)	5	641	285	128	422	456	990
	Bivalvia Density (#/m²)	5	29.3	38.3	17.1	0	8.61	86.1
	NMDS 1	5	0.0458	0.0680	0.0304	-0.0256	0.0291	0.158
	NMDS 2	5	-0.150	0.216	0.0966	-0.384	-0.236	0.104
	NMDS 3	5	0.00681	0.147	0.0657	-0.184	0.0515	0.181
RG_T4	LPL Richness (# taxa)	5	9.80	1.30	0.583	9.00	9.00	12.0
	Density (#/m²)	5	3,207	966	432	2,118	3,582	4,280
	Shannon's Diversity	5	1.32	0.164	0.0733	1.15	1.26	1.58
	% Nematoda	5	0.422	0.587	0.262	0	0	1.20
	% Oligochaeta	5	49.9	22.5	10.1	24.0	40.8	77.6
	% Ostracoda	5	33.4	19.4	8.69	9.76	40.6	56.2
	% Chironomidae	5	15.3	3.13	1.40	11.4	14.9	18.8
	% Bivalvia	5	0.990	0.790	0.353	0	0.805	2.16
	Nematoda Density (#/m²)	5	15.5	21.4	9.59	0	0	43.1
	Oligochaeta Density (#/m²)	5	1,445	330	147	913	1,559	1,748
	Ostracdoa Density (#/m²)	5	1,207	871	390	207	1,455	2,136
	Chironomidae Density (#/m²)	5	508	219	98.1	241	637	715
	Bivalvia Density (#/m²)	5	31.0	28.9	12.9	0	25.8	77.5
	NMDS 1	5	-0.0772	0.0654	0.0292	-0.187	-0.0543	-0.0186
	NMDS 2	5	0.326	0.0548	0.0245	0.236	0.349	0.378
	NMDS 3	5	0.0222	0.201	0.0899	-0.209	0.0787	0.274

[a] RG_T2 was sampled in 2014 instead of RG_TN.

Table F.10: Benthic Invertebrate Community Summary Statistics, Koocanusa, 2014 to 2018

Site	Endpoint	2018						
		N	Mean	Standard Deviation	Standard Error	Minimum	Median	Maximum
RG_TN[a]	LPL Richness (# taxa)	5	9.60	0.894	0.400	9.00	9.00	11.0
	Density (#/m²)	5	2,129	316	141	1,826	2,118	2,601
	Shannon's Diversity	5	1.75	0.154	0.0688	1.57	1.80	1.93
	% Nematoda	5	1.86	1.11	0.497	0.769	1.63	3.70
	% Oligochaeta	5	54.9	18.3	8.19	26.4	59.3	76.2
	% Ostracoda	5	5.74	1.10	0.493	4.23	5.66	7.32
	% Chironomidae	5	36.2	15.6	6.98	18.1	31.5	60.4
	% Bivalvia	5	1.29	2.47	1.10	0	0	5.66
	Nematoda Density (#/m²)	5	37.9	18.9	8.44	17.2	34.4	68.9
	Oligochaeta Density (#/m²)	5	1,195	488	218	482	1,102	1,705
	Ostracdoa Density (#/m²)	5	122	30.1	13.5	94.7	103	155
	Chironomidae Density (#/m²)	5	749	266	119	405	809	1,102
	Bivalvia Density (#/m²)	5	24.1	44.9	20.1	0	0	103
	NMDS 1	5	0.0402	0.0416	0.0186	-0.00353	0.0204	0.0990
	NMDS 2	5	-0.0706	0.0401	0.0179	-0.125	-0.0589	-0.0198
	NMDS 3	5	-0.209	0.108	0.0483	-0.294	-0.268	-0.0423
RG_T4	LPL Richness (# taxa)	5	7.80	2.17	0.970	6.00	7.00	11.0
	Density (#/m²)	5	1,791	1,485	664	499	1,016	3,651
	Shannon's Diversity	5	1.30	0.346	0.155	0.891	1.35	1.70
	% Nematoda	5	0.985	0.923	0.413	0	1.32	1.89
	% Oligochaeta	5	50.9	19.9	8.92	23.7	49.2	72.5
	% Ostracoda	5	2.29	1.56	0.698	0	3.30	3.45
	% Chironomidae	5	44.1	17.7	7.93	23.1	46.6	67.1
	% Bivalvia	5	1.44	2.19	0.981	0	0.847	5.26
	Nematoda Density (#/m²)	5	17.2	29.2	13.1	0	8.61	68.9
	Oligochaeta Density (#/m²)	5	1,123	1,154	516	155	499	2,480
	Ostracdoa Density (#/m²)	5	32.7	41.5	18.5	0	17.2	103
	Chironomidae Density (#/m²)	5	601	324	145	267	474	1,102
	Bivalvia Density (#/m²)	5	15.5	17.6	7.89	0	8.61	34.4
	NMDS 1	5	-0.366	0.134	0.0601	-0.537	-0.371	-0.162
	NMDS 2	5	0.0265	0.139	0.0620	-0.0926	-0.0195	0.264
	NMDS 3	5	-0.252	0.328	0.147	-0.713	-0.234	0.163

[a] RG_T2 was sampled in 2014 instead of RG_TN.

Table F.11: Statistical Comparison of Benthic Invertebrate Community Endpoints Between Downstream and Upstream Transects and Time, Koocanusa Reservoir Monitoring Program, 2014 to 2018

Endpoint	Transformation	ANOVA P-Values			Year	MCT		Q1. Do upstream and downstream areas differ over time?	Q2. Does the magnitude of difference between upstream and downstream areas differ over time?	Q3. Have there been changes within upstream and downstream sites over time?			
								US vs. DS MOD[a]	US vs. DS Contrast[b]	Temporal Differences		Temporal MOD vs Baseline[c]	
		Int.	Area	Year		US	DS			US	DS	US	DS
LPL Richness (# taxa)	log10	0.107	0.773	0.038	2014	8.02	8.52	ns	ns	AB		-	
					2015	7.26	8.54			A		b	
					2016	10.3	9.74			B		1.33	
					2018	9.57	7.58			AB		0.433	
Density (#/m²)	log10	0.041	-	-	2014	1,619	2,482	0.614	AB	A	A	-	-
					2015	858	3,514	2.03	A	A	A	b	b
					2016	1,961	3,082	0.650	AB	A	A	1.19	-0.188
					2018	2,111	1,306	-0.690	B	A	A	1.29	-1.42
Shannon's Diversity	none	0.157	<0.01	<0.01	2014	1.32	1.12	-1.09	ns	A		-	
					2015	1.19	1.19			A		b	
					2016	1.64	1.32			B		1.28	
					2018	1.75	1.30			B		1.48	
Nematoda Density (#/m²)	log10(x+1)	0.392	0.094	0.160	2014	61.5	7.53	-0.562	ns	ns	ns	-	-
					2015	11.7	9.71					b	b
					2016	2.81	3.35					ns	ns
					2018	34.5	4.78						
Oligochaeta Density (#/m²)	log10	0.305	0.317	0.551	2014	937	1,381	ns	ns	ns	ns	-	-
					2015	417	1,192					b	b
					2016	1,006	1,410					ns	ns
					2018	1,095	618						
Ostracoda Density (#/m²)	log10(x+1)	<0.01	-	-	2014	4.79	797	3.93	A	A	A	-	-
					2015	53.0	1,613	2.71	AB	B	A	b	b
					2016	233	854	1.04	B	B	A	1.17	-0.507
					2018	119	13.5	-1.69	C	B	B	0.640	-3.76
Chironomidae Density (#/m²)	none	0.402	0.234	<0.01	2014	324	157	ns	ns	A		-	
					2015	381	501			AB		b	
					2016	641	508			BC		0.624	
					2018	749	601			C		1.10	
Bivalvia Density (#/m²)	log10(x+1)	0.993	0.452	0.311	2014	5.15	8.69	ns	ns	ns	ns	-	-
					2015	1.47	2.04					b	b
					2016	7.49	15.9					ns	ns
					2018	3.53	5.55						
NMDS 1	rank	<0.01	-	-	2014	-0.390	-0.338	1.26	A	A	A	-	-
					2015	0.563	0.406	-3.80	A	B	B	b	b
					2016	0.0291	-0.0543	-2.02	A	C	C	-12.9	-11.2
					2018	0.0204	-0.371	-9.50	B	C	A	-13.1	-18.8
NMDS 2	none	0.045	-	-	2014	-0.290	0.147	2.79	A	A	AB	-	-
					2015	-0.141	0.150	1.86	AB	A	AB	b	b
					2016	-0.150	0.326	3.04	A	A	A	-0.0575	1.12
					2018	-0.0706	0.0265	0.62	B	A	B	0.446	-0.789
NMDS 3	none	0.752	0.730	<0.01	2014	0.182	0.161	ns	ns	A		-	
					2015	-0.0202	0.109			A		b	
					2016	0.00681	0.0222			A		-0.157	
					2018	-0.209	-0.252			B		-1.44	

P-Value < 0.1 and Magnitude of Difference (MOD) < 0

P-Value < 0.1 and MOD > 0

P-Value <0.1

Note: MCT = Measure of Central Tendency (mean when untransformed, geometric mean when log10-transformed, and median when rank transformed). "ns" = non-significant. "-" = not applicable. All pairwise contrasts done using Tukey's Honest Significant Differences (α=0.1). Pairwise contrasts of upstream vs downstream differences conducted on the same scale as analysis (i.e., as ratios on log10 transformed endpoints, otherwise additive).

[a] MOD between Upstream and Downstream calculated for each year as MOD = $MCT_{Downstream}$ - $MCT_{Upstream}$/Sdpooled.

[b] Letters indicate pairwise contrasts between Upstream and Downstream differences over time (i.e., years that share a letter have similar MODs).

[c] MOD = MCT_{year} - $MCT_{baseline}$/SD_{pooled}, where MCT_{year} is the Measure of Central Tendency for the year of interest, $MCT_{baseline}$ is the Measure of Central Tendency for 2015, and SD_{pooled} is the pooled standard deviation. "b" = indicates baseline year, and is considered to be the first year RG_TN was sampled (RG_T2 was sampled in 2014).

APPENDIX G
FISH

Table G.1: Hoop Net Records for Fish Caught in Koocanusa Reservoir, April 2018

Area	Station	Size	Location (11U, NAD83)		Set Date	Removal Date	Set Time	Removal Time	Fishing Hours (hrs)	Depth Range (m)		Effort (Fishing days)	Brook Trout			Bull Trout			Burbot			Largescale Sucker		
			Easting	Northing									Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE*	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Sand Creek	RG_SC_HN_01_20180424	medium	623775	5461216	24-Apr-18	25-Apr-18	12:23	9:30	21.1	1.3	1.5	0.880	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_HN_02_20180424	medium	625743	5458191	24-Apr-18	25-Apr-18	13:45	10:45	21.0	1.5	2.0	0.875	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_HN_03_20180425	medium	625706	5457684	25-Apr-18	26-Apr-18	10:30	9:30	23.0	1.0	1.5	0.958	0	0	0	0	0	0	0	0	0	1	0	1.14
	RG_SC_HN_04_20180425	medium	625628	5457337	25-Apr-18	26-Apr-18	11:20	9:50	22.5	1.3	1.8	0.938	0	0	0	0	0	0	0	0	0	2	0	2.09
	RG_SC_HN_05_20180426	medium	625706	5457684	26-Apr-18	27-Apr-18	9:43	9:25	23.7	1.2	1.7	0.987	0	0	0	1	0	1.01	0	0	0	4	0	4.27
	RG_SC_HN_06_20180426	medium	625628	5457337	26-Apr-18	27-Apr-18	10:00	10:46	24.8	1.2	1.7	1.03	0	0	0	0	0	0	0	0	0	34	0	34.4
	RG_SC_HN_07_20180427	medium	625476	5458232	27-Apr-18	28-Apr-18	10:30	9:15	22.7	1.0	1.5	0.948	0	0	0	0	0	0	0	0	0	16	0	15.5
	RG_SC_HN_08_20180427	medium	625621	5457346	27-Apr-18	28-Apr-18	11:10	10:30	23.3	1.0	1.3	0.972	0	0	0	1	0	1.03	0	0	0	37	0	39.0
	RG_SC_HN_09_20180428	medium	625666	5458230	28-Apr-18	29-Apr-18	9:35	9:30	23.9	0.0	1.5	1.00	0	0	0	0	0	0	0	0	0	13	0	13.4
	RG_SC_HN_10_20180428	medium	625621	5457346	28-Apr-18	29-Apr-18	10:00	9:00	23.0	1.0	1.5	0.958	0	0	0	0	0	0	0	0	0	7	0	7.02
								Total	**208**	**-**	**-**	**9.55**	**0**	**0**	**0**	**2**	**0**	**0.21 (0.31)**	**0**	**0**	**0**	**114**	**0**	**11.9 (10.2)**
Elk River	RG_ER_HN_01_20180425	medium	627997	5447625	25-Apr-18	26-Apr-18	9:15	10:08	24.9	0.5	1.0	1.04	0	0	0	0	0	0	0	0	0	4	0	3.86
	RG_ER_HN_02_20180425	medium	628268	5448201	25-Apr-18	26-Apr-18	9:50	9:35	23.8	0.1	0.7	0.990	0	0	0	0	0	0	0	0	0	37	0	37.4
	RG_ER_HN_03_20180426	medium	628268	5448201	26-Apr-18	27-Apr-18	9:45	11:25	25.7	0.5	1.0	0.990	0	0	0	0	0	0	0	0	0	38	0	35.5
	RG_ER_HN_04_20180426	medium	627997	5447625	26-Apr-18	27-Apr-18	10:12	10:15	24.0	0.1	0.7	1.07	0	0	0	1	0	0.935	0	0	0	2	0	1.87
	RG_ER_HN_05_20180427	medium	628268	5448201	27-Apr-18	28-Apr-18	10:30	12:05	25.6	0.5	1.0	1.07	0	0	0	0	0	0	0	0	0	2	0	1.88
	RG_ER_HN_06_20180427	medium	627997	5447625	27-Apr-18	28-Apr-18	11:40	9:15	21.6	0.1	0.7	0.899	0	0	0	0	0	0	0	0	0	16	0	17.8
	RG_ER_HN_07_20180428	medium	627997	5447625	28-Apr-18	29-Apr-18	10:00	9:03	23.1	0.1	0.7	0.960	1	0	1.04	0	0	0	0	0	0	2	0	2.08
	RG_ER_HN_08_20180428	medium	628268	5448201	28-Apr-18	29-Apr-18	12:25	9:40	21.3	0.5	1.0	0.885	0	0	0	0	0	0	1	0	1.13	17	0	19.2
	RG_ER_HN_09_20180429	medium	628268	5448201	29-Apr-18	29-Apr-18	9:45	13:15	3.5	0.5	1.0	0.146	0	0	0	0	0	0	0	0	0	1	0	6.86
								Total	**193.3**	**-**	**-**	**8.04**	**1**	**0**	**0.12 (0.27)**	**1**	**0**	**0.12 (0.24)**	**1**	**0**	**0.12 (0.29)**	**119**	**0**	**14.8 (11.0)**
Gold Creek	RG_GC_HN_01_20180424	medium	630804	5436413	24-Apr-18	25-Apr-18	12:45	9:45	21.0	1.0	1.0	0.875	0	0	0	1	0	1.14	0	0	0	11	0	13
	RG_GC_HN_02_20180424	medium	630920	5436384	24-Apr-18	25-Apr-18	13:18	11:48	22.5	1.4	1.6	0.938	0	0	0	0	0	0	1	0	1.07	1	0	1.07
								Total	**43.5**	**-**	**-**	**1.81**	**0**	**0**	**0**	**1**	**0**	**0.552**	**1**	**0**	**0.552**	**12**	**0**	**6.62**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the hoop net sets in one area. 95% confidence intervals calculated where a sufficient sampling number of events occurred.

Table G.1: Hoop Net Records for Fish Caught in Koocanusa Reservoir, April 2018

Area	Station	Size	Location (11U, NAD83)		Set Date	Removal Date	Set Time	Removal Time	Fishing Hours (hrs)	Depth Range (m)		Effort (Fishing days)	Northern Pikeminnow			Peamouth Chub			Redside Shiner			Westslope Cutthroat Trout			Yellow Perch		
			Easting	Northing									Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Sand Creek	RG_SC_HN_01_20180424	medium	623775	5461216	24-Apr-18	25-Apr-18	12:23	9:30	21.1	1.3	1.5	0.880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_HN_02_20180424	medium	625743	5458191	24-Apr-18	25-Apr-18	13:45	10:45	21.0	1.5	2.0	0.875	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_HN_03_20180425	medium	625706	5457684	25-Apr-18	26-Apr-18	10:30	9:30	23.0	1.0	1.5	0.958	2	1	2.09	1	1	1.04	0	0	0	0	0	0	0	0	0
	RG_SC_HN_04_20180425	medium	625628	5457337	25-Apr-18	26-Apr-18	11:20	9:50	22.5	1.3	1.8	0.938	4	0	4.27	3	3	3.20	0	0	0	0	0	0	0	0	0
	RG_SC_HN_05_20180426	medium	625706	5457684	26-Apr-18	27-Apr-18	9:43	9:25	23.7	1.2	1.7	0.987	2	0	2.03	0	0	0	1	1	0.042	0	0	0	1	0	1
	RG_SC_HN_06_20180426	medium	625628	5457337	26-Apr-18	27-Apr-18	10:00	10:46	24.8	1.2	1.7	1.03	9	0	8.72	12	12	11.6	0	0	0	0	0	0	0	0	0
	RG_SC_HN_07_20180427	medium	625476	5458232	27-Apr-18	28-Apr-18	10:30	9:15	22.7	1.0	1.5	0.948	0	0	0	7	7	7.38	0	0	0	0	0	0	0	0	0
	RG_SC_HN_08_20180427	medium	625621	5457346	27-Apr-18	28-Apr-18	11:10	10:30	23.3	1.0	1.3	0.972	4	0	4.11	4	4	4.11	0	0	0	0	0	0	0	0	0
	RG_SC_HN_09_20180428	medium	625666	5458230	28-Apr-18	29-Apr-18	9:35	9:30	23.9	0.0	1.5	1.00	5	0	5.02	1	1	1.00	0	0	0	0	0	0	0	0	0
	RG_SC_HN_10_20180428	medium	625621	5457346	28-Apr-18	29-Apr-18	10:00	9:00	23.0	1.0	1.5	0.958	4	0	4.17	3	3	3.13	0	0	0	0	0	0	0	0	0
								Total	**208**	**-**	**-**	**9.55**	**30**	**1**	**3.1 (2.0)**	**31**	**31**	**3.2 (2.7)**	**1**	**1**	**0.10 (0.01)**	**0**	**0**	**0**	**1**	**0**	**0.10 (0.23)**
Elk River	RG_ER_HN_01_20180425	medium	627997	5447625	25-Apr-18	26-Apr-18	9:15	10:08	24.9	0.5	1.0	1.04	0	0	0	25	25	24.1	2	2	1.93	0	0	0	0	0	0
	RG_ER_HN_02_20180425	medium	628268	5448201	25-Apr-18	26-Apr-18	9:50	9:35	23.8	0.1	0.7	0.990	1	0	1.01	21	21	21.2	1	1	1.01	0	0	0	0	0	0
	RG_ER_HN_03_20180426	medium	628268	5448201	26-Apr-18	27-Apr-18	9:45	11:25	25.7	0.5	1.0	0.990	1	0	0.935	5	2	4.68	0	0	0	0	0	0	0	0	0
	RG_ER_HN_04_20180426	medium	627997	5447625	26-Apr-18	27-Apr-18	10:12	10:15	24.0	0.1	0.7	1.07	1	0	0.935	3	1	2.81	0	0	0	0	0	0	0	0	0
	RG_ER_HN_05_20180427	medium	628268	5448201	27-Apr-18	28-Apr-18	10:30	12:05	25.6	0.5	1.0	1.07	1	0	0.938	19	9	17.8	0	0	0	0	0	0	0	0	0
	RG_ER_HN_06_20180427	medium	627997	5447625	27-Apr-18	28-Apr-18	11:40	9:15	21.6	0.1	0.7	0.899	1	0	1.11	14	9	15.6	7	7	7.78	0	0	0	0	0	0
	RG_ER_HN_07_20180428	medium	627997	5447625	28-Apr-18	29-Apr-18	10:00	9:03	23.1	0.1	0.7	0.960	0	0	0	0	0	0	2	2	2.08	0	0	0	0	0	0
	RG_ER_HN_08_20180428	medium	628268	5448201	28-Apr-18	29-Apr-18	12:25	9:40	21.3	0.5	1.0	0.885	7	0	7.91	16	16	18.1	2	2	2.26	0	0	0	0	0	0
	RG_ER_HN_09_20180429	medium	628268	5448201	29-Apr-18	29-Apr-18	9:45	13:15	3.5	0.5	1.0	0.146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								Total	**193.3**	**-**	**-**	**8.04**	**12**	**0**	**1.5 (1.9)**	**103**	**83**	**12.8 (7.4)**	**14**	**14**	**1.7 (1.9)**	**0**	**0**	**0**	**0**	**0**	**0**
Gold Creek	RG_GC_HN_01_20180424	medium	630804	5436413	24-Apr-18	25-Apr-18	12:45	9:45	21.0	1.0	1.0	0.875	2	0	2.29	0	0	0	0	0	0	6	0	6.86	1	0	1.14
	RG_GC_HN_02_20180424	medium	630920	5436384	24-Apr-18	25-Apr-18	13:18	11:48	22.5	1.4	1.6	0.938	4	0	4.27	0	0	0	0	0	0	0	0	0	8	8	8.53
								Total	**43.5**	**-**	**-**	**1.81**	**6**	**0**	**3.31**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**3.31**	**9**	**8**	**4.97**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the hoop net sets in one area. 95% confidence intervals calculated where a sufficient sampling number of events occurred.

Table G.2: Gill Netting Catch Record and Catch-Per-Unit-Effort (CPUE) Data for Fish Sampling Conducted in April 2018

Area	Station ID	Location (11U, NAD83)		Length (m)	Mesh (inches)	Depth Range (m)		Set Date	Removal Date	Set Time	Removal Time	Time (hours)	Effort (m*hours/ 100 m)	Bull Trout			Kokanee			Largescale Sucker			Mountain Whitefish			Northern Pikeminnow			Peamouth Chub			Rainbow Trout			Redside Shiner		
		Easting	Northing											Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Sand Creek	RG_SC_GN_01_20180424	625656	5458178	15.2	2	1.5	2.0	24-Apr-18	24-Apr-18	14:20	14:35	0.250	0.0381	0	0	0	0	0	0	0	0	0	0	0	0	2	0	52.5	7	6	184	0	0	0	0	0	0
	RG_SC_GN_02_20180424	625656	5458178	15.2	2	1.5	2.0	24-Apr-18	24-Apr-18	14:45	15:00	0.250	0.0381	0	0	0	0	0	0	1	0	26.2	0	0	0	2	0	52.5	4	4	105	0	0	0	0	0	0
	RG_SC_GN_03_20180424	625682	5458216	22.9	1	0.5	1.0	24-Apr-18	24-Apr-18	15:40	15:55	0.250	0.0571	0	0	0	0	0	0	1	0	17.5	0	0	0	2	0	35.0	0	0	0	0	0	0	10	10	175
	RG_SC_GN_04_20180424	625685	5458175	15.2	2	0.5	1.5	24-Apr-18	24-Apr-18	15:45	16:00	0.250	0.0381	0	0	0	0	0	0	1	0	26.2	0	0	0	0	0	0	5	5	131	0	0	0	0	0	0
	RG_SC_GN_05_20180424	625696	5458147	15.2	2	1.0	2.0	24-Apr-18	24-Apr-18	16:15	16:30	0.250	0.0381	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	105	0	0	0	0	0	0
	RG_SC_GN_06_20180424	625708	5458166	22.9	1	1.5	2.0	24-Apr-18	24-Apr-18	16:20	16:35	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_07_20180425	625678	5458207	15.2	1	0.8	1.0	25-Apr-18	25-Apr-18	11:35	11:50	0.250	0.0381	0	0	0	0	0	0	1	0	26.2	0	0	0	3	0	78.7	0	0	0	0	0	0	0	0	0
	RG_SC_GN_08_20180425	625690	5458173	22.9	2	1.0	1.5	25-Apr-18	25-Apr-18	11:40	11:55	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	35.0	0	0	0	0	0	0
	RG_SC_GN_09_20180425	625642	5457311	15.2	2	1.3	2.0	25-Apr-18	25-Apr-18	12:30	12:45	0.250	0.0381	0	0	0	0	0	0	2	0	52.5	0	0	0	0	0	0	18	18	472	0	0	0	0	0	0
	RG_SC_GN_10_20180425	625642	5457311	22.9	1	1.0	1.2	25-Apr-18	25-Apr-18	12:40	12:55	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_11_20180425	625642	5457311	15.2	2	1.0	1.4	25-Apr-18	25-Apr-18	12:55	13:10	0.250	0.0381	2	0	52.5	2	0	52.5	2	0	52.5	0	0	0	1	0	26.2	4	2	105	2	0	52.5	0	0	0
	RG_SC_GN_12_20180425	625640	5457309	22.9	1	1.0	1.2	25-Apr-18	25-Apr-18	13:00	13:20	0.333	0.0762	1	0	13	0	0	0	0	0	0	0	0	0	2	0	26.2	0	0	0	0	0	0	0	0	0
	RG_SC_GN_13_20180425	625642	5457302	15.2	2	1.2	1.8	25-Apr-18	25-Apr-18	13:40	14:00	0.333	0.0508	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	98.4	0	0	0	0	0	0
	RG_SC_GN_14_20180425	625649	5457301	15.2	2	1.0	1.4	25-Apr-18	25-Apr-18	14:00	14:15	0.250	0.0381	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_15_20180425	625618	5457343	15.2	2	1.5	2.0	25-Apr-18	25-Apr-18	14:15	14:35	0.333	0.0508	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_16_20180425	625618	5457343	15.2	2	1.5	2.0	25-Apr-18	25-Apr-18	14:35	14:55	0.333	0.0508	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_17_20180426	625642	5457302	15.2	2	0.5	1.5	26-Apr-18	26-Apr-18	10:10	10:25	0.250	0.0381	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	52.5	0	0	0	0	0	0
	RG_SC_GN_18_20180426	625498	5457218	22.9	1	0.5	0.8	26-Apr-18	26-Apr-18	10:15	10:30	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	4	0	70.0	1	1	17.5	0	0	0	0	0	0
	RG_SC_GN_19_20180426	625255	5457944	22.9	1	0.5	1.0	26-Apr-18	26-Apr-18	11:15	11:30	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	17.5	0	0	0	2	2	35.0
	RG_SC_GN_20_20180426	625553	5458050	15.2	2	1.2	1.7	26-Apr-18	26-Apr-18	11:25	11:40	0.250	0.0381	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	26.2	0	0	0	1	1	26.2
	RG_SC_GN_21_20180426	625255	5457944	22.9	1	0.5	1.0	26-Apr-18	26-Apr-18	12:00	12:20	0.333	0.0762	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_22_20180426	625553	5458050	15.2	2	1.2	1.7	26-Apr-18	26-Apr-18	11:45	12:00	0.250	0.0381	0	0	0	0	0	0	0	0	0	0	0	0	1	0	26.2	0	0	0	0	0	0	1	1	26.2
	RG_SC_GN_23_20180426	625263	5457898	22.9	1	0.5	1.2	26-Apr-18	26-Apr-18	12:40	12:55	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	17.5
	RG_SC_GN_24_20180426	625366	5458018	15.2	2	0.5	1.0	26-Apr-18	26-Apr-18	12:55	13:10	0.250	0.0381	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	26.2	0	0	0	0	0	0
	RG_SC_GN_25_20180426	625341	5458030	22.9	1	0.5	1.0	26-Apr-18	26-Apr-18	13:00	13:15	0.250	0.0571	0	0	0	0	0	0	1	0	17.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_26_20180426	625646	5457319	22.9	1	1.0	1.2	26-Apr-18	26-Apr-18	13:30	13:45	0.250	0.0571	1	0	17.5	2	0	35.0	1	0	17.5	0	0	0	0	0	0	1	1	17.5	0	0	0	0	0	0
	RG_SC_GN_27_20180427	625619	5457347	15.2	2	1.5	1.7	27-Apr-18	27-Apr-18	11:15	11:30	0.250	0.0381	0	0	0	0	0	0	1	0	26.2	0	0	0	0	0	0	0	0	0	2	2	52.5	0	0	0
	RG_SC_GN_28_20180427	625475	5458205	15.2	2	0.5	1.0	27-Apr-18	27-Apr-18	11:50	12:05	0.250	0.0381	0	0	0	0	0	0	5	0	131	1	1	26	6	0	157	7	7	184	0	0	0	0	0	0
	RG_SC_GN_29_20180427	625476	5458197	22.9	1	0.5	0.8	27-Apr-18	27-Apr-18	11:55	12:15	0.333	0.0762	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_30_20180427	625706	5457684	22.9	1	0.5	1.2	27-Apr-18	27-Apr-18	15:00	15:15	0.250	0.0571	0	0	0	0	0	0	3	0	52.5	0	0	0	0	0	0	2	0	35.0	0	0	0	2	2	35.0
	RG_SC_GN_31_20180427	625649	5457351	22.9	1	0.5	1.5	27-Apr-18	27-Apr-18	15:40	15:55	0.250	0.0571	0	0	0	0	0	0	3	0	52.5	0	0	0	1	0	17.5	1	0	17.5	0	0	0	3	3	52.5
	RG_SC_GN_32_20180428	625464	5458223	22.9	1	1.2	1.5	28-Apr-18	28-Apr-18	9:30	9:45	0.250	0.0571	0	0	0	0	0	0	1	0	17.5	0	0	0	0	0	0	1	0	17.5	0	0	0	1	1	17.5
	RG_SC_GN_33_20180428	625487	5458198	22.9	1	1.0	1.5	28-Apr-18	28-Apr-18	9:35	9:50	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	17.5
	RG_SC_GN_34_20180428	625686	5458247	22.9	1	0.0	1.0	28-Apr-18	28-Apr-18	10:05	10:20	0.250	0.0571	0	0	0	0	0	0	2	0	35.0	0	0	0	3	0	52.5	1	1	17.5	0	0	0	7	7	122
	RG_SC_GN_35_20180428	625686	5458247	22.9	1	0.0	1.0	28-Apr-18	28-Apr-18	10:10	10:25	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	2	0	35.0	0	0	0	0	0	0	3	3	52.5
	RG_SC_GN_36_20180428	625686	5458247	22.9	1	0.0	1.0	28-Apr-18	28-Apr-18	10:15	10:30	0.250	0.0571	0	0	0	0	0	0	2	0	35.0	0	0	0	2	0	35.0	3	0	52.5	0	0	0	5	5	87.5
	RG_SC_GN_37_20180428	625680	5458260	22.9	1	0.5	1.2	28-Apr-18	28-Apr-18	12:00	12:22	0.367	0.0838	0	0	0	0	0	0	10	0	119	0	0	0	8	0	95.4	4	3	47.7	0	0	0	9	9	107
	RG_SC_GN_38_20180428	625279	5457941	22.9	1	1.0	1.2	28-Apr-18	28-Apr-18	13:30	13:50	0.333	0.0762	0	0	0	0	0	0	6	0	78.7	0	0	0	3	0	39.4	4	0	52.5	0	0	0	11	11	144
	RG_SC_GN_39_20180428	625302	5457948	45.7	1	1.0	1.4	28-Apr-18	28-Apr-18	14:20	14:40	0.333	0.152	1	0	6.56	0	0	0	1	0	6.56	0	0	0	0	0	0	1	0	6.56	0	0	0	3	3	19.7
	RG_SC_GN_40_20180429	625668	5458208	68.6	1	0.5	1.2	29-Apr-18	29-Apr-18	9:40	10:00	0.333	0.229	0	0	0	0	0	0	8	0	35.0	0	0	0	11	0	48.1	5	5	21.9	0	0	0	15	15	65.6
	RG_SC_GN_41_20180429	625667	5458214	15.2	2	1.2	1.5	29-Apr-18	29-Apr-18	9:50	10:05	0.250	0.0381	0	0	0	0	0	0	2	0	52.5	0	0	0	0	0	0	6	6	157	0	0	0	0	0	0
	RG_SC_GN_42_20180429	625667	5458214	15.2	2	1.0	1.5	29-Apr-18	29-Apr-18	10:15	10:30	0.250	0.0381	0	0	0	0	0	0	3	3	78.7	0	0	0	2	0	52.5	1	1	26.2	0	0	0	0	0	0
	RG_SC_GN_43_20180429	625662	5458246	68.6	1	1.0	1.5	29-Apr-18	29-Apr-18	11:10	11:30	0.333	0.229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_44_20180429	625663	5458244	15.2	2	1.5	2.0	29-Apr-18	29-Apr-18	11:15	11:30	0.250	0.0381	0	0	0	0	0	0	14	0	367	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_45_20180429	625302	5457948	68.6	1	1.0	1.2	29-Apr-18	29-Apr-18	13:00	13:20	0.333	0.229	0	0	0	0	0	0	2	0	8.75	0	0	0	0	0	0	4	3	17.5	0	0	0	7	7	30.6
	RG_SC_GN_46_20180429	625548	5458144	15.2	2	1.5	2.0	29-Apr-18	29-Apr-18	13:05	13:25	0.333	0.0508	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_47_20180429	625292	5457949	68.6	1	1.0	1.5	29-Apr-18	29-Apr-18	14:00	14:20	0.333	0.229	0	0	0	0	0	0	2	0	8.75	0	0	0	1	0	4.37	1	1	4.37	0	0	0	2	2	8.75
	RG_SC_GN_48_20180429	625295	5457951	15.2	2	1.5	2.0	29-Apr-18	29-Apr-18	14:05	14:25	0.333	0.0508	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_GN_49_20180429	625657	5457346	68.6	1	0.5	1.2	29-Apr-18	29-Apr-18	15:00	15:30	0.500	0.343	0	0	0	0	0	0	4	0	11.7	0	0	0	6	0	17.5	2	2	5.83	0	0	0	15	15	43.7
	RG_SC_GN_50_20180429	625658	5457344	15.2	2	1.0	1.5	29-Apr-18	29-Apr-18	15:05	15:35	0.500	0.0762	0	0	0	0	0	0	0	0	0	0	0	0	4	0	52.5	1	1	13.1	0	0	0	0	0	0
	RG_SC_GN_51_20180430	625646	5457350	30.5	2	1.5	2.0	30-Apr-18	30-Apr-18	9:30	9:52	0.367	0.112	0	0	0	0	0	0	5	0	45	0	0	0	3	0	27	6	6	54	0	0	0	0	0	0
	RG_SC_GN_52_20180430	625646	5457350	30.5	2	1.5	2.0	30-Apr-18	30-Apr-18	10:15	10:35	0.333	0.102	1	0	9.84	0	0	0	0	0	0	0	0	0	2	0	19.7	5	5	49.2	0	0	0	0	0	0
											Total	**15.0**	**3.90**	**6**	**0**	**1.5 (2.2)**	**4**	**0**	**1.0 (2.4)**	**84**	**3**	**21.5 (15.8)**	**1**	**1**	**0.26 (1.01)**	**71**	**0**	**18.2 (8.7)**	**111**	**94**	**28.4 (21.6)**	**4**	**2**	**1.0 (2.8)**	**99**	**99**	**25.4 (11.1)**

Table G.2: Gill Netting Catch Record and Catch-Per-Unit-Effort (CPUE) Data for Fish Sampling Conducted in April 2018

Area	Station ID	Location (11U, NAD83)		Length (m)	Mesh (inches)	Depth Range (m)		Set Date	Removal Date	Set Time	Removal Time	Time (hours)	Effort (m*hours/ 100 m)	Bull Trout			Kokanee			Largescale Sucker			Mountain Whitefish			Northern Pikeminnow			Peamouth Chub			Rainbow Trout			Redside Shiner		
		Easting	Northing											Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Elk River	RG_ER_GN_01_20180425	628097	5447705	22.9	2	0.5	2.3	25-Apr-18	25-Apr-18	10:15	10:30	0.250	0.0571	0	0	0	0	0	0	5	0	87.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_02_20180425	628002	5447599	22.9	1	0.2	1.0	25-Apr-18	25-Apr-18	10:27	10:45	0.300	0.0686	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	14.6
	RG_ER_GN_03a_20180425	628092	5447738	22.9	2	0.5	2.2	25-Apr-18	25-Apr-18	10:37	11:10	0.550	0.126	0	0	0	0	0	0	2	0	15.9	0	0	0	0	0	0	2	2	15.9	0	0	0	0	0	0
	RG_ER_GN_03b_20180425			22.9				25-Apr-18	25-Apr-18	11:15	11:35	0.333	0.0762	0	0	0	0	0	0	1	0	13.1	0	0	0	2	0	26.2	4	4	52.5	0	0	0	0	0	0
	RG_ER_GN_03c_20180425			22.9				25-Apr-18	25-Apr-18	11:35	12:00	0.417	0.0952	0	0	0	0	0	0	1	0	10.5	1	0	10.5	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_04a_20180425	627994	5447591	22.9	1	0.2	0.9	25-Apr-18	25-Apr-18	10:52	11:15	0.383	0.0876	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	57.1
	RG_ER_GN_04b_20180425			22.9				25-Apr-18	25-Apr-18	11:24	11:55	0.517	0.118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	50.8	0	0	0	2	2	16.9
	RG_ER_GN_05_20180425	628325	5448260	22.9	2	1.2	0.8	25-Apr-18	25-Apr-18	13:18	13:35	0.283	0.0648	0	0	0	0	0	0	1	0	15.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_06a_20180425	628231	5448177	22.9	1	0.5	1.2	25-Apr-18	25-Apr-18	13:23	13:35	0.200	0.0457	0	0	0	0	0	0	1	0	21.9	1	0	21.9	0	0	0	0	0	0	0	0	0	5	5	109
	RG_ER_GN_06b_20180425			22.9				25-Apr-18	25-Apr-18	13:52	14:13	0.350	0.0800	0	0	0	0	0	0	0	0	0	0	0	0	1	0	12.5	0	0	0	0	0	0	0	0	0
	RG_ER_GN_06c_20180425			22.9				25-Apr-18	25-Apr-18	14:19	16:45	2.43	0.556	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.80
	RG_ER_GN_07_20180425	628314	5448248	22.9	2	0.5	0.5	25-Apr-18	25-Apr-18	13:40	13:55	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_08_20180425	628636	5448484	22.9	2	0.9	1.5	25-Apr-18	25-Apr-18	14:10	14:30	0.333	0.0762	0	0	0	0	0	0	2	0	26.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_09_20180425	627996	5447709	22.9	1	1.1	1.6	25-Apr-18	25-Apr-18	14:45	15:00	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	52.5	0	0	0	9	9	157
	RG_ER_GN_10_20180425	628121	5447376	22.9	2	0.8	2.0	25-Apr-18	25-Apr-18	14:55	15:10	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_11_20180426	627914	5447150	22.9	1	0.4	0.6	26-Apr-18	26-Apr-18	10:45	11:00	0.250	0.0572	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	87.5	0	0	0	4	4	70.0
	RG_ER_GN_12_20180426	627997	5447625	22.9	1	0.6	0.8	26-Apr-18	26-Apr-18	11:13	11:35	0.367	0.0838	0	0	0	0	0	0	0	0	0	1	0	11.9	0	0	0	0	0	0	0	0	0	1	1	11.9
	RG_ER_GN_13_20180426	627905	5447460	22.9	1	0.4	0.6	26-Apr-18	26-Apr-18	11:40	11:58	0.300	0.0686	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	58.3
	RG_ER_GN_14_20180426	627975	5447566	22.9	1	0.2	1.0	26-Apr-18	26-Apr-18	12:03	12:23	0.333	0.0762	0	0	0	0	0	0	1	0	13.1	0	0	0	1	0	13.1	2	0	26.2	0	0	0	2	2	26.2
	RG_ER_GN_15_20180426	627975	5447566	22.9	1	0.2	1.0	26-Apr-18	26-Apr-18	12:28	12:48	0.333	0.0762	0	0	0	0	0	0	0	0	0	0	0	0	1	0	13.1	3	3	39.4	0	0	0	2	2	26.2
	RG_ER_GN_16_20180426	627975	5447566	22.9	1	0.2	1.0	26-Apr-18	26-Apr-18	12:56	13:10	0.233	0.0533	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	75.0	0	0	0	3	3	56.2
	RG_ER_GN_17_20180426	627975	5447566	22.9	1	0.2	1.0	26-Apr-18	26-Apr-18	13:15	13:30	0.250	0.0571	0	0	0	0	0	0	1	0	17.5	0	0	0	0	0	0	1	0	17.5	0	0	0	0	0	0
	RG_ER_GN_18_20180427	628299	5448226	22.9	1	1.0	1.0	27-Apr-18	27-Apr-18	11:45	12:00	0.250	0.0571	0	0	0	0	0	0	2	0	35.0	0	0	0	0	0	0	3	2	52.5	0	0	0	0	0	0
	RG_ER_GN_19_20180427	628299	5448226	22.9	1	1.0	1.0	27-Apr-18	27-Apr-18	12:15	12:45	0.500	0.114	0	0	0	0	0	0	1	0	8.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_20_20180427	628299	5448226	22.9	1	1.0	1.0	27-Apr-18	27-Apr-18	12:55	13:10	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_21_20180427	627989	5447672	22.9	1	0.5	1.5	27-Apr-18	27-Apr-18	14:20	14:40	0.333	0.0762	0	0	0	0	0	0	1	0	13.1	0	0	0	0	0	0	0	0	0	0	0	0	5	5	65.6
	RG_ER_GN_22_20180427	627950	5447580	22.9	1	0.8	1.0	27-Apr-18	27-Apr-18	15:30	15:48	0.300	0.0686	0	0	0	0	0	0	3	0	43.7	0	0	0	1	0	14.6	3	0	43.7	0	0	0	3	3	43.7
	RG_ER_GN_23_20180427	627950	5447580	22.9	1	1.0	1.0	27-Apr-18	27-Apr-18	15:55	16:25	0.500	0.114	0	0	0	0	0	0	4	0	35.0	0	0	0	0	0	0	6	0	52.5	0	0	0	1	1	8.75
	RG_ER_GN_24_20180428	628291	5448202	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	9:05	9:23	0.300	0.0686	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	14.6	0	0	0	0	0	0
	RG_ER_GN_25_20180428	628291	5448702	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	9:25	9:45	0.333	0.0762	0	0	0	1	0	13.1	1	0	13.1	1	0	13.1	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_26_20180428	628271	5448196	22.9	1	1.0	1.0	28-Apr-18	28-Apr-18	9:30	10:00	0.500	0.114	0	0	0	0	0	0	2	0	17.5	0	0	0	0	0	0	1	0	8.75	0	0	0	1	1	8.75
	RG_ER_GN_27_20180428	628291	5448702	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	10:10	10:35	0.417	0.0952	0	0	0	0	0	0	2	0	21.0	0	0	0	0	0	0	1	1	10.5	0	0	0	0	0	0
	RG_ER_GN_28_20180428	628246	5448175	22.9	1	1.0	1.0	28-Apr-18	28-Apr-18	10:20	10:45	0.417	0.0952	0	0	0	0	0	0	2	0	21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_29_20180428	628291	5448702	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	10:40	11:05	0.417	0.0952	0	0	0	0	0	0	1	0	10.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_30_20180428	628246	5448175	22.9	1	1.0	1.0	28-Apr-18	28-Apr-18	10:55	11:20	0.417	0.0952	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_31_20180428	627947	5447561	22.9	1	1.0	1.0	28-Apr-18	28-Apr-18	12:00	12:25	0.417	0.0952	0	0	0	0	0	0	2	0	21.0	0	0	0	0	0	0	2	1	21.0	0	0	0	14	14	147
	RG_ER_GN_32_20180428	627947	5447561	22.9	1	1.0	1.0	28-Apr-18	28-Apr-18	12:35	13:00	0.417	0.0952	0	0	0	0	0	0	1	0	10.5	0	0	0	1	0	10.5	1	0	10.5	0	0	0	3	3	31.5
	RG_ER_GN_33_20180428	627978	5447571	22.9	2	1.0	1.5	28-Apr-18	28-Apr-18	12:45	13:05	0.333	0.0762	0	0	0	0	0	0	1	0	13.1	1	0	13.1	0	0	0	1	1	13.1	0	0	0	0	0	0
	RG_ER_GN_34_20180428	627947	5447561	22.9	1	1.0	1.5	28-Apr-18	28-Apr-18	13:15	13:40	0.417	0.0952	0	0	0	0	0	0	2	0	21.0	0	0	0	0	0	0	1	0	10.5	0	0	0	2	2	21.0
	RG_ER_GN_35_20180428	627978	5447571	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	13:20	13:43	0.383	0.0876	0	0	0	0	0	0	8	0	91.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_36_20180428	627947	5447561	22.9	1	1.0	1.5	28-Apr-18	28-Apr-18	13:45	14:10	0.417	0.0953	0	0	0	0	0	0	2	0	21.0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	31.5
	RG_ER_GN_37_20180428	627978	5447571	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	14:06	14:30	0.400	0.0914	0	0	0	0	0	0	2	0	21.9	0	0	0	0	0	0	1	1	10.9	0	0	0	0	0	0
	RG_ER_GN_38_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	9:55	10:10	0.250	0.0571	0	0	0	1	0	17.5	0	0	0	0	0	0	1	0	17.5	1	0	17.5	0	0	0	6	6	105
	RG_ER_GN_39_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	10:00	10:30	0.500	0.114	1	0	8.75	0	0	0	27	0	236	0	0	0	1	0	8.75	3	3	26.2	0	0	0	0	0	0
	RG_ER_GN_40_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	10:30	11:00	0.500	0.114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	61.2
	RG_ER_GN_41_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	11:10	11:45	0.583	0.133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_42_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	11:40	12:15	0.583	0.133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	7.50	0	0	0	4	4	30.0
	RG_ER_GN_43_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	11:45	12:20	0.583	0.133	0	0	0	0	0	0	4	0	30.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_44_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	12:40	13:00	0.333	0.0762	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	26.2	0	0	0	0	0	0
	RG_ER_GN_45_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	12:45	13:05	0.333	0.0762	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	13.1	0	0	0	0	0	0
	RG_ER_GN_46_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	13:05	13:45	0.667	0.152	0	0	0	0	0	0	3	0	19.7	1	0	6.56	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_47_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	13:10	13:40	0.500	0.114	0	0	0	0	0	0	2	0	17.5	0	0	0	0	0	0	3	3	26.2	0	0	0	4	4	35.0
	RG_ER_GN_48_20180429	627945	5447545	22.9	1	1.0	1.0	29-Apr-18	29-Apr-18	13:25	14:00	0.583	0.133	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7.50	0	0	0	0	0	0	2	2	15.0
	RG_ER_GN_49_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	13:45	14:05	0.333	0.0762	0	0	0	0	0	0	2	0	26.2	0	0	0	0	0	0	2	2	26.2	0	0	0	0	0	0
	RG_ER_GN_50_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	13:40	14:05	0.417	0.0952	0	0	0	0	0	0	2	0	21.0	0	0	0	0	0	0	1	1	10.5	0	0	0	1	1	10.5
	RG_ER_GN_51_20180429	627945	5447545	22.9	1	1.0	1.0	29-Apr-18	29-Apr-18	14:00	14:30	0.500	0.114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	17.5	0	0	0	1	1	8.75

Table G.2: Gill Netting Catch Record and Catch-Per-Unit-Effort (CPUE) Data for Fish Sampling Conducted in April 2018

Area	Station ID	Location (11U, NAD83)		Length (m)	Mesh (inches)	Depth Range (m)		Set Date	Removal Date	Set Time	Removal Time	Time (hours)	Effort (m*hours/ 100 m)	Bull Trout			Kokanee			Largescale Sucker			Mountain Whitefish			Northern Pikeminnow			Peamouth Chub			Rainbow Trout			Redside Shiner		
		Easting	Northing											Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Elk River	RG_ER_GN_52_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	14:05	14:40	0.583	0.133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	15.0	0	0	0	0	0	0
	RG_ER_GN_53_20180430	627945	5447569	22.9	1	1.2	1.2	30-Apr-18	30-Apr-18	14:05	14:45	0.667	0.152	0	0	0	0	0	0	2	0	13.1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6.56
	RG_ER_GN_54_20180430	627941	5447551	15.2	2	1.0	1.0	30-Apr-18	30-Apr-18	10:30	11:00	0.500	0.0762	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_55_20180430	627951	5447557	22.9	2	1.0	1.0	30-Apr-18	30-Apr-18	10:35	11:05	0.500	0.114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_56_20180430	627941	5447551	15.2	2	1.0	1.0	30-Apr-18	30-Apr-18	11:05	11:45	0.667	0.101	0	0	0	0	0	0	2	0	19.7	0	0	0	0	0	0	1	1	9.9	0	0	0	0	0	0
	RG_ER_GN_57_20180430	627951	5447557	22.9	2	1.0	1.0	30-Apr-18	30-Apr-18	11:10	11:50	0.667	0.152	0	0	0	0	0	0	2	0	13.1	0	0	0	0	0	0	2	2	13.1	0	0	0	0	0	0
	RG_ER_GN_58_20180430	627941	5447551	15.2	2	1.0	1.0	30-Apr-18	30-Apr-18	11:55	12:35	0.667	0.101	0	0	0	0	0	0	1	0	9.87	0	0	0	0	0	0	2	2	19.7	0	0	0	0	0	0
	RG_ER_GN_59_20180430	627951	5447557	22.9	2	1.0	1.0	30-Apr-18	30-Apr-18	12:10	12:45	0.583	0.133	0	0	0	0	0	0	2	0	15.0	0	0	0	0	0	0	1	1	7.50	0	0	0	0	0	0
	RG_ER_GN_60_20180430	627941	5447551	15.2	2	1.0	1.0	30-Apr-18	30-Apr-18	13:15	13:55	0.667	0.101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_GN_61_20180430	627951	5447557	22.9	2	1.0	1.0	30-Apr-18	30-Apr-18	13:25	14:05	0.667	0.152	0	0	0	0	0	0	2	0	13.1	0	0	0	0	0	0	4	4	26.2	0	0	0	0	0	0
											Total	**29.7**	**6.60**	**1**	**0**	**0.15 (0.26)**	**2**	**0**	**0.30 (0.66)**	**103**	**0**	**15.6 (8.0)**	**6**	**0**	**0.91 (0.98)**	**10**	**0**	**1.5 (1.3)**	**79**	**43**	**12.0 (4.8)**	**0**	**0**	**0**	**97**	**95**	**14.7 (8.5)**
Gold Creek	RG_GC_GN_01_20180424	630930	5436332	22.9	1	1.8	2.0	24-Apr-18	24-Apr-18	13:39	13:50	0.183	0.0419	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	23.9	0	0	0	1	1	23.9
	RG_GC_GN_02_20180424	630392	5436392	22.9	1	1.4	2.3	24-Apr-18	24-Apr-18	14:05	14:29	0.400	0.0914	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	10.9
	RG_GC_GN_03_20180424	630820	5436416	22.9	1	1.0	1.0	24-Apr-18	24-Apr-18	14:38	15:02	0.400	0.0914	0	0	0	0	0	0	2	0	21.9	0	0	0	0	0	0	0	0	0	0	0	0	2	2	21.9
	RG_GC_GN_04_20180425	630816	5436404	22.9	1	1.0	1.0	25-Apr-18	25-Apr-18	12:16	12:39	0.383	0.0876	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC_GN_05_20180425	630841	5436362	15.2	2	1.0	1.0	25-Apr-18	25-Apr-18	12:22	13:01	0.650	0.0991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	30.3	0	0	0	0	0	0
	RG_GC_GN_06_20180425	630828	5436368	22.9	1	1.0	1.0	25-Apr-18	25-Apr-18	12:41	13:16	0.583	0.133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	15.0
	RG_GC_GN_07_20180425	630838	5436402	15.2	2	1.0	1.0	25-Apr-18	25-Apr-18	13:05	13:24	0.317	0.0483	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC_GN_08_20180425	630844	5436312	22.9	1	1.0	1.0	25-Apr-18	25-Apr-18	13:21	13:48	0.450	0.103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC_GN_09_20180425	630839	5436403	22.9	1	1.0	1.0	25-Apr-18	25-Apr-18	14:05	14:20	0.250	0.0571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	17.5
	RG_GC_GN_10_20180425	630908	5436382	15.2	2	1.0	1.0	25-Apr-18	25-Apr-18	14:08	14:30	0.367	0.0559	0	0	0	0	0	0	0	0	0	0	0	0	2	0	35.8	5	5	89.5	0	0	0	0	0	0
	RG_GC_GN_11_20180426	630970	5436354	22.9	1	1.0	2.8	26-Apr-18	26-Apr-18	9:02	9:20	0.300	0.0686	0	0	0	0	0	0	0	0	0	0	0	0	1	0	14.6	0	0	0	0	0	0	0	0	0
	RG_GC_GN_12_20180426	630822	5436416	15.2	2	0.7	0.9	26-Apr-18	26-Apr-18	9:06	9:30	0.400	0.0610	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC_GN_13a_20180426	630865	5436351	61.0	2	0.8	1.4	26-Apr-18	26-Apr-18	10:24	10:40	0.267	0.163	0	0	0	0	0	0	3	0	18.5	0	0	0	0	0	0	2	2	12.3	0	0	0	0	0	0
	RG_GC_GN_13b_20180426			61.0				26-Apr-18	26-Apr-18	10:50	11:05	0.250	0.152	0	0	0	0	0	0	3	0	19.7	0	0	0	0	0	0	19	19	125	0	0	0	0	0	0
	RG_GC_GN_13c_20180426			61.0				26-Apr-18	26-Apr-18	11:40	12:05	0.417	0.254	0	0	0	0	0	0	8	0	31.5	0	0	0	8	0	31.5	57	57	224	0	0	0	0	0	0
	RG_GC_GN_14_20180426	630867	5436467	22.6	1	0.9	1.2	26-Apr-18	26-Apr-18	10:36	11:00	0.400	0.0902	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	22.2	0	0	0	3	3	33.2
	RG_GC_GN_15_20180426	630810	5436325	22.9	1	0.5	0.8	26-Apr-18	26-Apr-18	11:30	11:55	0.417	0.0953	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	10.5	0	0	0	0	0	0
	RG_GC_GN_16a_20180426	630864	5436345	22.9	1	1.1	1.2	26-Apr-18	26-Apr-18	13:08	13:25	0.283	0.0648	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	30.9
	RG_GC_GN_16b_20180426			22.9				26-Apr-18	26-Apr-18	13:34	13:50	0.267	0.0610	0	0	0	0	0	0	2	0	32.8	0	0	0	0	0	0	0	0	0	0	0	0	1	1	16.4
	RG_GC_GN_17_20180426	630846	5436426	15.2	1	0.3	1.1	26-Apr-18	26-Apr-18	13:18	13:45	0.450	0.0686	0	0	0	0	0	0	0	0	0	2	0	29.2	0	0	0	7	0	102	0	0	0	3	3	43.7
	RG_GC_GN_18_20180427	630940	5436318	61.0	2	1.6	1.9	27-Apr-18	27-Apr-18	10:30	10:50	0.333	0.203	0	0	0	1	0	4.92	6	0	29.5	0	0	0	10	0	49.2	59	59	290	0	0	0	0	0	0
	RG_GC_GN_19_20180427	631168	5436072	22.9	1	2.3	2.0	27-Apr-18	27-Apr-18	10:35	10:55	0.333	0.0762	0	0	0	0	0	0	1	0	13.1	1	0	13.1	1	0	13.1	3	0	39.4	0	0	0	10	10	131
	RG_GC_GN_20_20180427	631193	5436049	15.2	1	2.3	2.3	27-Apr-18	27-Apr-18	10:40	11:05	0.417	0.0635	1	0	15.7	0	0	0	0	0	0	0	0	0	0	0	0	2	0	31.5	0	0	0	12	12	189
	RG_GC_GN_21_20180428	631166	5436079	15.2	1	0.8	2.2	28-Apr-18	28-Apr-18	9:30	10:00	0.500	0.0762	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	13.1
	RG_GC_GN_22_20180428	631212	5436344	22.9	1	1.0	0.9	28-Apr-18	28-Apr-18	9:35	10:05	0.500	0.114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC_GN_23_20180428	631240	5436005	22.9	1	1.1	1.3	28-Apr-18	28-Apr-18	10:20	10:40	0.333	0.0762	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC_GN_24a_20180428	631262	5435969	15.2	1	1.1	1.2	28-Apr-18	28-Apr-18	10:25	10:45	0.333	0.0508	1	0	19.7	0	0	0	1	0	19.7	0	0	0	0	0	0	0	0	0	0	0	0	15	15	295
	RG_GC_GN_24b_20180428			15.2				28-Apr-18	28-Apr-18	11:35	12:00	0.417	0.0635	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16	252
	RG_GC_GN_24c_20180428			15.2				28-Apr-18	28-Apr-18	12:40	13:05	0.417	0.0635	0	0	0	0	0	0	1	0	15.7	0	0	0	0	0	0	1	0	15.7	0	0	0	11	11	173
	RG_GC_GN_25a_20180428	631279	5435946	15.2	1	1.2	1.5	28-Apr-18	28-Apr-18	11:40	12:10	0.500	0.0762	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	22	289
	RG_GC_GN_25b_20180428			15.2				28-Apr-18	28-Apr-18	12:35	13:09	0.567	0.0864	0	0	0	0	0	0	1	0	11.6	0	0	0	2	0	23.2	1	0	11.6	0	0	0	7	7	81.1
	RG_GC_GN_25c_20180428			15.2				28-Apr-18	28-Apr-18	13:25	14:10	0.750	0.114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	8.75	0	0	0	2	2	17.5
	RG_GC_GN_26_20180428	631305	5435916	22.9	1	1.7	2.3	28-Apr-18	28-Apr-18	13:15	13:50	0.583	0.133	0	0	0	0	0	0	0	0	0	1	0	7.50	0	0	0	0	0	0	0	0	0	0	0	0
											Total	**13.4**	**3.08**	**2**	**0**	**0.65 (1.53)**	**1**	**0**	**0.32 (0.30)**	**28**	**0**	**9.1 (3.8)**	**4**	**0**	**1.3 (2.0)**	**24**	**0**	**7.8 (4.3)**	**164**	**146**	**53.2 (23.6)**	**0**	**0**	**0**	**112**	**112**	**36.3 (31.2)**

[a] CPUE denotes catch per unit effort (#fish/100 m hour). 95% confidence intervals presented in brackets.

Table G.2: Gill Netting Catch Record and Catch-Per-Unit-Effort (CPUE) Data for Fish Sampling Conducted in April 2018

Area	Station ID	Location (11U, NAD83)		Length (m)	Mesh (inches)	Depth Range (m)		Set Date	Removal Date	Set Time	Removal Time	Time (hours)	Effort (m*hours/ 100 m)	Westslope Cutthroat Trout			Yellow Perch		
		Easting	Northing											Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Sand Creek	RG_SC_GN_01_20180424	625656	5458178	15.2	2	1.5	2.0	24-Apr-18	24-Apr-18	14:20	14:35	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_02_20180424	625656	5458178	15.2	2	1.5	2.0	24-Apr-18	24-Apr-18	14:45	15:00	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_03_20180424	625682	5458216	22.9	1	0.5	1.0	24-Apr-18	24-Apr-18	15:40	15:55	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_04_20180424	625685	5458175	15.2	2	0.5	1.5	24-Apr-18	24-Apr-18	15:45	16:00	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_05_20180424	625696	5458147	15.2	2	1.0	2.0	24-Apr-18	24-Apr-18	16:15	16:30	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_06_20180424	625708	5458166	22.9	1	1.5	2.0	24-Apr-18	24-Apr-18	16:20	16:35	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_07_20180425	625678	5458207	15.2	1	0.8	1.0	25-Apr-18	25-Apr-18	11:35	11:50	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_08_20180425	625690	5458173	22.9	2	1.0	1.5	25-Apr-18	25-Apr-18	11:40	11:55	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_09_20180425	625642	5457311	15.2	2	1.3	2.0	25-Apr-18	25-Apr-18	12:30	12:45	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_10_20180425	625642	5457311	22.9	1	1.0	1.2	25-Apr-18	25-Apr-18	12:40	12:55	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_11_20180425	625642	5457311	15.2	2	1.0	1.4	25-Apr-18	25-Apr-18	12:55	13:10	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_12_20180425	625640	5457309	22.9	1	1.0	1.2	25-Apr-18	25-Apr-18	13:00	13:20	0.333	0.0762	0	0	0	0	0	0
	RG_SC_GN_13_20180425	625642	5457302	15.2	2	1.2	1.8	25-Apr-18	25-Apr-18	13:40	14:00	0.333	0.0508	0	0	0	0	0	0
	RG_SC_GN_14_20180425	625649	5457301	15.2	2	1.0	1.4	25-Apr-18	25-Apr-18	14:00	14:15	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_15_20180425	625618	5457343	15.2	2	1.5	2.0	25-Apr-18	25-Apr-18	14:15	14:35	0.333	0.0508	0	0	0	0	0	0
	RG_SC_GN_16_20180425	625618	5457343	15.2	2	1.5	2.0	25-Apr-18	25-Apr-18	14:35	14:55	0.333	0.0508	0	0	0	0	0	0
	RG_SC_GN_17_20180426	625642	5457302	15.2	2	0.5	1.5	26-Apr-18	26-Apr-18	10:10	10:25	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_18_20180426	625498	5457218	22.9	1	0.5	0.8	26-Apr-18	26-Apr-18	10:15	10:30	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_19_20180426	625255	5457944	22.9	1	0.5	1.0	26-Apr-18	26-Apr-18	11:15	11:30	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_20_20180426	625553	5458050	15.2	2	1.2	1.7	26-Apr-18	26-Apr-18	11:25	11:40	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_21_20180426	625255	5457944	22.9	1	0.5	1.0	26-Apr-18	26-Apr-18	12:00	12:20	0.333	0.0762	0	0	0	0	0	0
	RG_SC_GN_22_20180426	625553	5458050	15.2	2	1.2	1.7	26-Apr-18	26-Apr-18	11:45	12:00	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_23_20180426	625263	5457898	22.9	1	0.5	1.2	26-Apr-18	26-Apr-18	12:40	12:55	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_24_20180426	625366	5458018	15.2	2	0.5	1.0	26-Apr-18	26-Apr-18	12:55	13:10	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_25_20180426	625341	5458030	22.9	1	0.5	1.0	26-Apr-18	26-Apr-18	13:00	13:15	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_26_20180426	625646	5457319	22.9	1	1.0	1.2	26-Apr-18	26-Apr-18	13:30	13:45	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_27_20180427	625619	5457347	15.2	2	1.5	1.7	27-Apr-18	27-Apr-18	11:15	11:30	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_28_20180427	625475	5458205	15.2	2	0.5	1.0	27-Apr-18	27-Apr-18	11:50	12:05	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_29_20180427	625476	5458197	22.9	1	0.5	0.8	27-Apr-18	27-Apr-18	11:55	12:15	0.333	0.0762	0	0	0	0	0	0
	RG_SC_GN_30_20180427	625706	5457684	22.9	1	0.5	1.2	27-Apr-18	27-Apr-18	15:00	15:15	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_31_20180427	625649	5457351	22.9	1	0.5	1.5	27-Apr-18	27-Apr-18	15:40	15:55	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_32_20180428	625464	5458223	22.9	1	1.2	1.5	28-Apr-18	28-Apr-18	9:30	9:45	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_33_20180428	625487	5458198	22.9	1	1.0	1.5	28-Apr-18	28-Apr-18	9:35	9:50	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_34_20180428	625686	5458247	22.9	1	0.0	1.0	28-Apr-18	28-Apr-18	10:05	10:20	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_35_20180428	625686	5458247	22.9	1	0.0	1.0	28-Apr-18	28-Apr-18	10:10	10:25	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_36_20180428	625686	5458247	22.9	1	0.0	1.0	28-Apr-18	28-Apr-18	10:15	10:30	0.250	0.0571	0	0	0	0	0	0
	RG_SC_GN_37_20180428	625680	5458260	22.9	1	0.5	1.2	28-Apr-18	28-Apr-18	12:00	12:22	0.367	0.0838	0	0	0	0	0	0
	RG_SC_GN_38_20180428	625279	5457941	22.9	1	1.0	1.2	28-Apr-18	28-Apr-18	13:30	13:50	0.333	0.0762	0	0	0	0	0	0
	RG_SC_GN_39_20180428	625302	5457948	45.7	1	1.0	1.4	28-Apr-18	28-Apr-18	14:20	14:40	0.333	0.152	0	0	0	0	0	0
	RG_SC_GN_40_20180429	625668	5458208	68.6	1	0.5	1.2	29-Apr-18	29-Apr-18	9:40	10:00	0.333	0.229	0	0	0	0	0	0
	RG_SC_GN_41_20180429	625667	5458214	15.2	2	1.2	1.5	29-Apr-18	29-Apr-18	9:50	10:05	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_42_20180429	625667	5458214	15.2	2	1.0	1.5	29-Apr-18	29-Apr-18	10:15	10:30	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_43_20180429	625662	5458246	68.6	1	1.0	1.5	29-Apr-18	29-Apr-18	11:10	11:30	0.333	0.229	0	0	0	0	0	0
	RG_SC_GN_44_20180429	625663	5458244	15.2	2	1.5	2.0	29-Apr-18	29-Apr-18	11:15	11:30	0.250	0.0381	0	0	0	0	0	0
	RG_SC_GN_45_20180429	625302	5457948	68.6	1	1.0	1.2	29-Apr-18	29-Apr-18	13:00	13:20	0.333	0.229	0	0	0	0	0	0
	RG_SC_GN_46_20180429	625548	5458144	15.2	2	1.5	2.0	29-Apr-18	29-Apr-18	13:05	13:25	0.333	0.0508	0	0	0	0	0	0
	RG_SC_GN_47_20180429	625292	5457949	68.6	1	1.0	1.5	29-Apr-18	29-Apr-18	14:00	14:20	0.333	0.229	0	0	0	0	0	0
	RG_SC_GN_48_20180429	625295	5457951	15.2	2	1.5	2.0	29-Apr-18	29-Apr-18	14:05	14:25	0.333	0.0508	0	0	0	0	0	0
	RG_SC_GN_49_20180429	625657	5457346	68.6	1	0.5	1.2	29-Apr-18	29-Apr-18	15:00	15:30	0.500	0.343	0	0	0	0	0	0
	RG_SC_GN_50_20180429	625658	5457344	15.2	2	1.0	1.5	29-Apr-18	29-Apr-18	15:05	15:35	0.500	0.0762	0	0	0	0	0	0
	RG_SC_GN_51_20180430	625646	5457350	30.5	2	1.5	2.0	30-Apr-18	30-Apr-18	9:30	9:52	0.367	0.112	0	0	0	1	1	9
	RG_SC_GN_52_20180430	625646	5457350	30.5	2	1.5	2.0	30-Apr-18	30-Apr-18	10:15	10:35	0.333	0.102	0	0	0	0	0	0
											Total	**15.0**	**3.90**	**0**	**0**	**0**	**1**	**1**	**0.26 (0.35)**

Table G.2: Gill Netting Catch Record and Catch-Per-Unit-Effort (CPUE) Data for Fish Sampling Conducted in April 2018

Area	Station ID	Location (11U, NAD83)		Length (m)	Mesh (inches)	Depth Range (m)		Set Date	Removal Date	Set Time	Removal Time	Time (hours)	Effort (m*hours/ 100 m)	Westslope Cutthroat Trout			Yellow Perch		
		Easting	Northing											Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Elk River	RG_ER_GN_01_20180425	628097	5447705	22.9	2	0.5	2.3	25-Apr-18	25-Apr-18	10:15	10:30	0.250	0.0571	0	0	0	0	0	0
	RG_ER_GN_02_20180425	628002	5447599	22.9	1	0.2	1.0	25-Apr-18	25-Apr-18	10:27	10:45	0.300	0.0686	0	0	0	0	0	0
	RG_ER_GN_03a_20180425	628092	5447738	22.9	2	0.5	2.2	25-Apr-18	25-Apr-18	10:37	11:10	0.550	0.126	1	0	7.95	0	0	0
	RG_ER_GN_03b_20180425			22.9				25-Apr-18	25-Apr-18	11:15	11:35	0.333	0.0762	0	0	0	0	0	0
	RG_ER_GN_03c_20180425			22.9				25-Apr-18	25-Apr-18	11:35	12:00	0.417	0.0952	0	0	0	0	0	0
	RG_ER_GN_04a_20180425	627994	5447591	22.9	1	0.2	0.9	25-Apr-18	25-Apr-18	10:52	11:15	0.383	0.0876	0	0	0	0	0	0
	RG_ER_GN_04b_20180425			22.9				25-Apr-18	25-Apr-18	11:24	11:55	0.517	0.118	0	0	0	0	0	0
	RG_ER_GN_05_20180425	628325	5448260	22.9	2	1.2	0.8	25-Apr-18	25-Apr-18	13:18	13:35	0.283	0.0648	0	0	0	0	0	0
	RG_ER_GN_06a_20180425	628231	5448177	22.9	1	0.5	1.2	25-Apr-18	25-Apr-18	13:23	13:35	0.200	0.0457	0	0	0	0	0	0
	RG_ER_GN_06b_20180425			22.9				25-Apr-18	25-Apr-18	13:52	14:13	0.350	0.0800	0	0	0	0	0	0
	RG_ER_GN_06c_20180425			22.9				25-Apr-18	25-Apr-18	14:19	16:45	2.43	0.556	0	0	0	0	0	0
	RG_ER_GN_07_20180425	628314	5448248	22.9	2	0.5	0.5	25-Apr-18	25-Apr-18	13:40	13:55	0.250	0.0571	0	0	0	0	0	0
	RG_ER_GN_08_20180425	628636	5448484	22.9	2	0.9	1.5	25-Apr-18	25-Apr-18	14:10	14:30	0.333	0.0762	0	0	0	0	0	0
	RG_ER_GN_09_20180425	627996	5447709	22.9	1	1.1	1.6	25-Apr-18	25-Apr-18	14:45	15:00	0.250	0.0571	0	0	0	0	0	0
	RG_ER_GN_10_20180425	628121	5447376	22.9	2	0.8	2.0	25-Apr-18	25-Apr-18	14:55	15:10	0.250	0.0571	0	0	0	0	0	0
	RG_ER_GN_11_20180426	627914	5447150	22.9	1	0.4	0.6	26-Apr-18	26-Apr-18	10:45	11:00	0.250	0.0572	0	0	0	0	0	0
	RG_ER_GN_12_20180426	627997	5447625	22.9	1	0.6	0.8	26-Apr-18	26-Apr-18	11:13	11:35	0.367	0.0838	0	0	0	0	0	0
	RG_ER_GN_13_20180426	627905	5447460	22.9	1	0.4	0.6	26-Apr-18	26-Apr-18	11:40	11:58	0.300	0.0686	0	0	0	0	0	0
	RG_ER_GN_14_20180426	627975	5447566	22.9	1	0.2	1.0	26-Apr-18	26-Apr-18	12:03	12:23	0.333	0.0762	0	0	0	0	0	0
	RG_ER_GN_15_20180426	627975	5447566	22.9	1	0.2	1.0	26-Apr-18	26-Apr-18	12:28	12:48	0.333	0.0762	0	0	0	0	0	0
	RG_ER_GN_16_20180426	627975	5447566	22.9	1	0.2	1.0	26-Apr-18	26-Apr-18	12:56	13:10	0.233	0.0533	0	0	0	0	0	0
	RG_ER_GN_17_20180426	627975	5447566	22.9	1	0.2	1.0	26-Apr-18	26-Apr-18	13:15	13:30	0.250	0.0571	0	0	0	0	0	0
	RG_ER_GN_18_20180427	628299	5448226	22.9	1	1.0	1.0	27-Apr-18	27-Apr-18	11:45	12:00	0.250	0.0571	0	0	0	0	0	0
	RG_ER_GN_19_20180427	628299	5448226	22.9	1	1.0	1.0	27-Apr-18	27-Apr-18	12:15	12:45	0.500	0.114	0	0	0	0	0	0
	RG_ER_GN_20_20180427	628299	5448226	22.9	1	1.0	1.0	27-Apr-18	27-Apr-18	12:55	13:10	0.250	0.0571	0	0	0	0	0	0
	RG_ER_GN_21_20180427	627989	5447672	22.9	1	0.5	1.5	27-Apr-18	27-Apr-18	14:20	14:40	0.333	0.0762	0	0	0	0	0	0
	RG_ER_GN_22_20180427	627950	5447580	22.9	1	0.8	1.0	27-Apr-18	27-Apr-18	15:30	15:48	0.300	0.0686	0	0	0	0	0	0
	RG_ER_GN_23_20180427	627950	5447580	22.9	1	1.0	1.0	27-Apr-18	27-Apr-18	15:55	16:25	0.500	0.114	0	0	0	0	0	0
	RG_ER_GN_24_20180428	628291	5448202	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	9:05	9:23	0.300	0.0686	0	0	0	0	0	0
	RG_ER_GN_25_20180428	628291	5448702	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	9:25	9:45	0.333	0.0762	0	0	0	0	0	0
	RG_ER_GN_26_20180428	628271	5448196	22.9	1	1.0	1.0	28-Apr-18	28-Apr-18	9:30	10:00	0.500	0.114	0	0	0	0	0	0
	RG_ER_GN_27_20180428	628291	5448702	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	10:10	10:35	0.417	0.0952	0	0	0	0	0	0
	RG_ER_GN_28_20180428	628246	5448175	22.9	1	1.0	1.0	28-Apr-18	28-Apr-18	10:20	10:45	0.417	0.0952	0	0	0	0	0	0
	RG_ER_GN_29_20180428	628291	5448702	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	10:40	11:05	0.417	0.0952	0	0	0	0	0	0
	RG_ER_GN_30_20180428	628246	5448175	22.9	1	1.0	1.0	28-Apr-18	28-Apr-18	10:55	11:20	0.417	0.0952	0	0	0	0	0	0
	RG_ER_GN_31_20180428	627947	5447561	22.9	1	1.0	1.0	28-Apr-18	28-Apr-18	12:00	12:25	0.417	0.0952	0	0	0	0	0	0
	RG_ER_GN_32_20180428	627947	5447561	22.9	1	1.0	1.0	28-Apr-18	28-Apr-18	12:35	13:00	0.417	0.0952	0	0	0	0	0	0
	RG_ER_GN_33_20180428	627978	5447571	22.9	2	1.0	1.5	28-Apr-18	28-Apr-18	12:45	13:05	0.333	0.0762	0	0	0	0	0	0
	RG_ER_GN_34_20180428	627947	5447561	22.9	1	1.0	1.5	28-Apr-18	28-Apr-18	13:15	13:40	0.417	0.0952	0	0	0	0	0	0
	RG_ER_GN_35_20180428	627978	5447571	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	13:20	13:43	0.383	0.0876	0	0	0	0	0	0
	RG_ER_GN_36_20180428	627947	5447561	22.9	1	1.0	1.5	28-Apr-18	28-Apr-18	13:45	14:10	0.417	0.0953	0	0	0	0	0	0
	RG_ER_GN_37_20180428	627978	5447571	22.9	2	1.0	1.0	28-Apr-18	28-Apr-18	14:06	14:30	0.400	0.0914	0	0	0	0	0	0
	RG_ER_GN_38_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	9:55	10:10	0.250	0.0571	0	0	0	0	0	0
	RG_ER_GN_39_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	10:00	10:30	0.500	0.114	0	0	0	0	0	0
	RG_ER_GN_40_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	10:30	11:00	0.500	0.114	0	0	0	0	0	0
	RG_ER_GN_41_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	11:10	11:45	0.583	0.133	0	0	0	0	0	0
	RG_ER_GN_42_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	11:40	12:15	0.583	0.133	0	0	0	0	0	0
	RG_ER_GN_43_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	11:45	12:20	0.583	0.133	0	0	0	0	0	0
	RG_ER_GN_44_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	12:40	13:00	0.333	0.0762	0	0	0	0	0	0
	RG_ER_GN_45_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	12:45	13:05	0.333	0.0762	0	0	0	0	0	0
	RG_ER_GN_46_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	13:05	13:45	0.667	0.152	0	0	0	0	0	0
	RG_ER_GN_47_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	13:10	13:40	0.500	0.114	0	0	0	0	0	0
	RG_ER_GN_48_20180429	627945	5447545	22.9	1	1.0	1.0	29-Apr-18	29-Apr-18	13:25	14:00	0.583	0.133	0	0	0	0	0	0
	RG_ER_GN_49_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	13:45	14:05	0.333	0.0762	0	0	0	0	0	0
	RG_ER_GN_50_20180429	627945	5447569	22.9	1	1.2	1.2	29-Apr-18	29-Apr-18	13:40	14:05	0.417	0.0952	0	0	0	0	0	0
	RG_ER_GN_51_20180429	627945	5447545	22.9	1	1.0	1.0	29-Apr-18	29-Apr-18	14:00	14:30	0.500	0.114	0	0	0	0	0	0

Table G.2: Gill Netting Catch Record and Catch-Per-Unit-Effort (CPUE) Data for Fish Sampling Conducted in April 2018

Area	Station ID	Location (11U, NAD83)		Length (m)	Mesh (inches)	Depth Range (m)		Set Date	Removal Date	Set Time	Removal Time	Time (hours)	Effort (m*hours/ 100 m)	Westslope Cutthroat Trout			Yellow Perch		
		Easting	Northing											Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Elk River	RG_ER_GN_52_20180429	627949	5447559	22.9	2	1.0	1.0	29-Apr-18	29-Apr-18	14:05	14:40	0.583	0.133	0	0	0	0	0	0
	RG_ER_GN_53_20180430	627945	5447569	22.9	1	1.2	1.2	30-Apr-18	30-Apr-18	14:05	14:45	0.667	0.152	0	0	0	0	0	0
	RG_ER_GN_54_20180430	627941	5447551	15.2	2	1.0	1.0	30-Apr-18	30-Apr-18	10:30	11:00	0.500	0.0762	0	0	0	0	0	0
	RG_ER_GN_55_20180430	627951	5447557	22.9	2	1.0	1.0	30-Apr-18	30-Apr-18	10:35	11:05	0.500	0.114	0	0	0	0	0	0
	RG_ER_GN_56_20180430	627941	5447551	15.2	2	1.0	1.0	30-Apr-18	30-Apr-18	11:05	11:45	0.667	0.101	0	0	0	0	0	0
	RG_ER_GN_57_20180430	627951	5447557	22.9	2	1.0	1.0	30-Apr-18	30-Apr-18	11:10	11:50	0.667	0.152	0	0	0	0	0	0
	RG_ER_GN_58_20180430	627941	5447551	15.2	2	1.0	1.0	30-Apr-18	30-Apr-18	11:55	12:35	0.667	0.101	0	0	0	0	0	0
	RG_ER_GN_59_20180430	627951	5447557	22.9	2	1.0	1.0	30-Apr-18	30-Apr-18	12:10	12:45	0.583	0.133	1	0	7.50	0	0	0
	RG_ER_GN_60_20180430	627941	5447551	15.2	2	1.0	1.0	30-Apr-18	30-Apr-18	13:15	13:55	0.667	0.101	0	0	0	0	0	0
	RG_ER_GN_61_20180430	627951	5447557	22.9	2	1.0	1.0	30-Apr-18	30-Apr-18	13:25	14:05	0.667	0.152	0	0	0	0	0	0
											Total	**29.7**	**6.60**	**2**	**0**	**0.30 (0.33)**	**0**	**0**	**0**
Gold Creek	RG_GC_GN_01_20180424	630930	5436332	22.9	1	1.8	2.0	24-Apr-18	24-Apr-18	13:39	13:50	0.183	0.0419	0	0	0	0	0	0
	RG_GC_GN_02_20180424	630392	5436392	22.9	1	1.4	2.3	24-Apr-18	24-Apr-18	14:05	14:29	0.400	0.0914	0	0	0	0	0	0
	RG_GC_GN_03_20180424	630820	5436416	22.9	1	1.0	1.0	24-Apr-18	24-Apr-18	14:38	15:02	0.400	0.0914	0	0	0	0	0	0
	RG_GC_GN_04_20180425	630816	5436404	22.9	1	1.0	1.0	25-Apr-18	25-Apr-18	12:16	12:39	0.383	0.0876	0	0	0	0	0	0
	RG_GC_GN_05_20180425	630841	5436362	15.2	2	1.0	1.0	25-Apr-18	25-Apr-18	12:22	13:01	0.650	0.0991	1	0	10.1	0	0	0
	RG_GC_GN_06_20180425	630828	5436368	22.9	1	1.0	1.0	25-Apr-18	25-Apr-18	12:41	13:16	0.583	0.133	0	0	0	0	0	0
	RG_GC_GN_07_20180425	630838	5436402	15.2	2	1.0	1.0	25-Apr-18	25-Apr-18	13:05	13:24	0.317	0.0483	0	0	0	0	0	0
	RG_GC_GN_08_20180425	630844	5436312	22.9	1	1.0	1.0	25-Apr-18	25-Apr-18	13:21	13:48	0.450	0.103	0	0	0	0	0	0
	RG_GC_GN_09_20180425	630839	5436403	22.9	1	1.0	1.0	25-Apr-18	25-Apr-18	14:05	14:20	0.250	0.0571	0	0	0	0	0	0
	RG_GC_GN_10_20180425	630908	5436382	15.2	2	1.0	1.0	25-Apr-18	25-Apr-18	14:08	14:30	0.367	0.0559	1	0	17.9	0	0	0
	RG_GC_GN_11_20180426	630970	5436354	22.9	1	1.0	2.8	26-Apr-18	26-Apr-18	9:02	9:20	0.300	0.0686	0	0	0	1	0	14.6
	RG_GC_GN_12_20180426	630822	5436416	15.2	2	0.7	0.9	26-Apr-18	26-Apr-18	9:06	9:30	0.400	0.0610	0	0	0	0	0	0
	RG_GC_GN_13a_20180426	630865	5436351	61.0	2	0.8	1.4	26-Apr-18	26-Apr-18	10:24	10:40	0.267	0.163	0	0	0	0	0	0
	RG_GC_GN_13b_20180426			61.0				26-Apr-18	26-Apr-18	10:50	11:05	0.250	0.152	0	0	0	0	0	0
	RG_GC_GN_13c_20180426			61.0				26-Apr-18	26-Apr-18	11:40	12:05	0.417	0.254	2	0	7.87	0	0	0
	RG_GC_GN_14_20180426	630867	5436467	22.6	1	0.9	1.2	26-Apr-18	26-Apr-18	10:36	11:00	0.400	0.0902	0	0	0	1	0	11.1
	RG_GC_GN_15_20180426	630810	5436325	22.9	1	0.5	0.8	26-Apr-18	26-Apr-18	11:30	11:55	0.417	0.0953	0	0	0	0	0	0
	RG_GC_GN_16a_20180426	630864	5436345	22.9	1	1.1	1.2	26-Apr-18	26-Apr-18	13:08	13:25	0.283	0.0648	0	0	0	0	0	0
	RG_GC_GN_16b_20180426			22.9				26-Apr-18	26-Apr-18	13:34	13:50	0.267	0.0610	0	0	0	0	0	0
	RG_GC_GN_17_20180426	630846	5436426	15.2	1	0.3	1.1	26-Apr-18	26-Apr-18	13:18	13:45	0.450	0.0686	0	0	0	0	0	0
	RG_GC_GN_18_20180427	630940	5436318	61.0	2	1.6	1.9	27-Apr-18	27-Apr-18	10:30	10:50	0.333	0.203	1	0	4.92	0	0	0
	RG_GC_GN_19_20180427	631168	5436072	22.9	1	2.3	2.0	27-Apr-18	27-Apr-18	10:35	10:55	0.333	0.0762	0	0	0	0	0	0
	RG_GC_GN_20_20180427	631193	5436049	15.2	1	2.3	2.3	27-Apr-18	27-Apr-18	10:40	11:05	0.417	0.0635	0	0	0	0	0	0
	RG_GC_GN_21_20180428	631166	5436079	15.2	1	0.8	2.2	28-Apr-18	28-Apr-18	9:30	10:00	0.500	0.0762	0	0	0	0	0	0
	RG_GC_GN_22_20180428	631212	5436344	22.9	1	1.0	0.9	28-Apr-18	28-Apr-18	9:35	10:05	0.500	0.114	0	0	0	0	0	0
	RG_GC_GN_23_20180428	631240	5436005	22.9	1	1.1	1.3	28-Apr-18	28-Apr-18	10:20	10:40	0.333	0.0762	0	0	0	0	0	0
	RG_GC_GN_24a_20180428	631262	5435969	15.2	1	1.1	1.2	28-Apr-18	28-Apr-18	10:25	10:45	0.333	0.0508	0	0	0	0	0	0
	RG_GC_GN_24b_20180428			15.2				28-Apr-18	28-Apr-18	11:35	12:00	0.417	0.0635	0	0	0	0	0	0
	RG_GC_GN_24c_20180428			15.2				28-Apr-18	28-Apr-18	12:40	13:05	0.417	0.0635	0	0	0	0	0	0
	RG_GC_GN_25a_20180428	631279	5435946	15.2	1	1.2	1.5	28-Apr-18	28-Apr-18	11:40	12:10	0.500	0.0762	0	0	0	0	0	0
	RG_GC_GN_25b_20180428			15.2				28-Apr-18	28-Apr-18	12:35	13:09	0.567	0.0864	0	0	0	0	0	0
	RG_GC_GN_25c_20180428			15.2				28-Apr-18	28-Apr-18	13:25	14:10	0.750	0.114	0	0	0	0	0	0
	RG_GC_GN_26_20180428	631305	5435916	22.9	1	1.7	2.3	28-Apr-18	28-Apr-18	13:15	13:50	0.583	0.133	0	0	0	0	0	0
											Total	**13.4**	**3.08**	**5**	**0**	**1.6 (1.3)**	**2**	**0**	**0.65 (1.11)**

[a] CPUE denotes catch per unit effort (#fish/100 m hour). 95% confidence intervals presented in brackets.

Table G.3: Angling Records for Fish Caught in Koocanusa Reservoir, April 2018

Area	Station ID	Location (11U, NAD83)		Set Date	Date of Removal	Set Time	Removal Time	Angling Hours (hours)	Depth Range (m)		# of Lines	Effort (angling lines*days)	Bull Trout			Kokanee			Rainbow Trout			Westslope Cutthroat Trout			Yellow Perch		
		Easting	Northing										Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Sand Creek	RG_SC_AN_01_20180424	625553	5458223	24-Apr-18	24-Apr-18	12:30	12:45	0.250	1.5	2.0	2	0.0208	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_AN_02_20180424	625440	5458201	24-Apr-18	24-Apr-18	14:35	14:55	0.333	0.8	2.5	2	0.0278	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							Total	**0.583**	**-**	**-**	**-**	**0.0486**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Gold Creek	RG_GC_AN_01_20180424	630840	5436312	24-Apr-18	24-Apr-18	14:12	14:25	0.217	1.0	-	2	0.0181	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC_AN_02_20180424	630823	5436415	24-Apr-18	24-Apr-18	14:40	14:55	0.250	1.0	-	2	0.0208	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC_AN_03_20180424	630693	5436448	24-Apr-18	24-Apr-18	15:20	15:26	0.100	1.0	-	2	0.0083	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							Total	**0.57**	**-**	**-**	**-**	**0.05**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total angling effort in one area.

Table G.4: **Angling Records for Fish Caught in the Koocanusa Reservoir, June 2018**

Area	Station ID	UTM (NAD83, 11U)		Set Date	Removal Date	Start Time	End Time	Angling Hours (hours)	Depth Range (m)		# of Lines	Effort (angling lines*days)	Largescale Sucker			Northern Pikeminnow			Peamouth Chub			Westslope Cutthroat Trout		
		Easting	Northing										Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Sand Creek	RG_SC_AN_01_20180605	625691	5457986	5-Jun-18	5-Jun-18	11:30	13:30	2.00	3.0	5.2	2	0.167	1	0	6.00	13	12	78.0	5	0	30.0	0	0	0
	RG_SC_AN_02_20180605	625691	5457986	5-Jun-18	5-Jun-18	14:35	16:40	2.08	3.2	5.5	2	0.174	0	0	0	9	9	51.8	3	0	17.3	0	0	0
	RG_SC_AN_03_20180610	625691	5457986	10-Jun-18	10-Jun-18	15:00	17:30	2.50	5.4	6.0	2	0.208	0	0	0	11	6	52.8	4	0	19.2	0	0	0
							Total	**6.6**	**-**	**-**	**-**	**0.549**	**1**	**0**	**1.82**	**33**	**27**	**60.2**	**12**	**0**	**21.9**	**0**	**0**	**0**
Elk River	RG_ER_AN_01_20180606	627989	5447721	6-Jun-18	6-Jun-18	13:00	15:00	2.00	7.4	9.6	2	0.167	0	0	0	4	4	24.0	2	0	12.0	0	0	0
	RG_ER_AN_02_20180606	628669	5447426	6-Jun-18	6-Jun-18	15:05	16:20	1.25	1.8	5.5	2	0.104	0	0	0	9	9	86.4	1	0	9.60	0	0	0
	RG_ER_AN_03_20180607	628624	5447338	7-Jun-18	7-Jun-18	9:30	12:30	3.00	0.5	5.8	2	0.250	0	0	0	11	6	44.0	9	0	36.0	1	0	4.00
							Total	**6.3**	**-**	**-**	**-**	**0.521**	**0**	**0**	**0**	**24**	**19**	**46.1**	**12**	**0**	**23.0**	**1**	**0**	**1.92**
Gold Creek	RG_GC_AN_01_20180606	630351	5436952	6-Jun-18	6-Jun-18	9:30	9:50	0.33	1.2	1.8	2	0.0278	0	0	0	1	0	36.0	0	0	0	0	0	0
	RG_GC_AN_02_20180606	628977	5436935	6-Jun-18	6-Jun-18	9:55	12:30	2.58	1.5	4.5	2	0.215	0	0	0	9	9	41.8	5	0	23.2	0	0	0
	RG_GC_AN_03_20180607	632685	5434375	7-Jun-18	7-Jun-18	13:00	17:30	4.50	3.5	9.2	2	0.375	0	0	0	9	5	24.0	6	0	16.0	0	0	0
							Total	**7.4**	**-**	**-**	**-**	**0.618**	**0**	**0**	**0**	**19**	**14**	**30.7**	**11**	**0**	**17.8**	**0**	**0**	**0**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total angling effort in one area. Confidence intervals not calculated due to limited sampling events.

Table G.5: Angling Records for Fish Caught in the Koocanusa Reservoir, August 2018

Area	Station ID	UTM (NAD83, 11U)		Set Date	Removal Date	Start Time	End Time	Angling Hours (hours)	Depth Range (m)		# of Lines	Effort (angling lines*days)	Kokanee			Largescale Sucker			Northern Pikeminnow			Peamouth Chub			Westslope Cutthroat Trout			Rainbow Trout		
		Start Easting	Start Northing										Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Sand Creek	RG_SC_AN_01_20180901	626492	5458292	1-Sep-18	1-Sep-18	10:10	11:00	0.833	2.0	10	2	0.0694	0	0	0	0	0	0	1	0	14.4	0	0	0	0	0	0	0	0	0
	RG_SC_AN_02_20180901	623648	5463055	1-Sep-18	1-Sep-18	11:20	12:30	1.17	1.0	2.0	2	0.0972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC_AN_03_20180901	626380	5455295	1-Sep-18	1-Sep-18	13:15	14:00	0.750	-	-	2	0.0625	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							Total	**2.75**	**-**	**-**	**-**	**0.229**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**4.36**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Elk River	RG_ER_AN_01_20180901	632162	5447353	1-Sep-18	1-Sep-18	9:45	11:00	1.25	3.5	-	2	0.104	0	0	0	0	0	0	1	0	9.6	0	0	0	0	0	0	0	0	0
	RG_ER_AN_02_20180901	627921	5446733	1-Sep-18	1-Sep-18	11:00	12:55	1.9167	20	-	2	0.1597	4	4	25.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_AN_03_20180901	627084	5446722	1-Sep-18	1-Sep-18	12:05	12:30	0.417	22	-	2	0.0347	1	0	28.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_AN_04_20180901	626902	5446710	1-Sep-18	1-Sep-18	12:45	13:15	0.500	8.3	-	2	0.0417	0	0	0	0	0	0	1	0	24.0	0	0	0	0	0	0	0	0	0
	RG_ER_AN_05_20180901	626772	5445605	1-Sep-18	1-Sep-18	13:30	14:00	0.500	15	-	2	0.0417	1	0	24.0	0	0	0	1	0	24.0	0	0	0	0	0	0	1	0	24
	RG_ER_AN_06_20180901	629084	5442539	1-Sep-18	1-Sep-18	14:25	15:00	0.583	20	-	2	0.0486	1	0	20.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER_AN_07_20180901	628571	5447340	1-Sep-18	1-Sep-18	14:30	15:30	1.00	-	-	2	0.0833	0	0	0	0	0	0	3	0	36.0	0	0	0	0	0	0	0	0	0
							Total	**6.17**	**-**	**-**	**-**	**0.514**	**7**	**4**	**13.6 (12.4)**	**0**	**0**	**0**	**6**	**0**	**11.7 (13.6)**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1.9 (8.4)**
Gold Creek	RG_GC_AN_01_20180901	630498	5436738	1-Sep-18	1-Sep-18	15:20	16:45	1.42	15	-	2	0.118	1	1	8.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC_AN_02_20180901	630612	5437886	1-Sep-18	1-Sep-18	15:45	16:25	0.667	-	-	2	0.0556	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							Total	**2.08**	**-**	**-**	**-**	**0.174**	**1**	**1**	**5.76**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total angling effort in one area. 95% confidence intervals presented in brackets where calculated where sufficient sampling events occurred.

Table G.6: Seine Catch Records for Fish Caught in Koocanusa Reservoir, August 2018 [a]

Area	Station ID	Location (NAD 83, Zone 11U)		Date	Time	Length (m)	Distance (m)	# of Hauls	Effort [Area Seined (m^2)]	Largemouth Bass (juvenile)			Largescale Sucker (juvenile)			Redside Shiner (juvenile)			Yellow Perch (juvenile)		
		Easting	Northing							Catch	Mortalities/ Sacrificed	CPUE [b]	Catch	Mortalities/ Sacrificed	CPUE [b]	Catch	Mortalities/ Sacrificed	CPUE [b]	Catch	Mortalities/ Sacrificed	CPUE [b]
Sand Creek	RG_SC_SN_01_20180829	625982	5457457	29-Aug-18	9:30	15	25	1	375	0	0	0	18	0	0.05	380	170	1.01	0	0	0
Elk River	RG_ER_SN_01_20180828	632704	5447704	28-Aug-18	13:09	15	20	1	300	0	0	0	336	0	1.12	40	4	0.133	1	0	0
	RG_ER_SN_02_20180828	632754	5447700	28-Aug-18	15:15	15	25	1	375	0	0	0	156	0	0.42	271	123	0.723	4	0	0.01
					Total	**-**	**-**	**2**	**675**	**0**	**0**	**0**	**492**	**0**	**0.73**	**311**	**127**	**0.461**	**5**	**0**	**0.01**
Gold Creek	RG_GC_SN_01_20180828	628388	5436933	28-Aug-18	9:30	15	40	1	600	1	0	0	43	0	0.07	293	5	0.49	2	0	0.00

[a] Fish collected were all juveniles.

[b] Total catch-per-unit-effort (CPUE; number of fish / m^2) calculated as the number of fish caught over the area seined. Confidence intervals not calculated due to small number of sampling events.

Table G.7: Summary Statistics for Bull Trout Meristic Data Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Tissue Collected
						D	E	L	T		
Sand Creek	25-Apr-18	RG_SC_BT_01_20180425	33.0	31.0	280	M	A	A	A	missing top third of caudal fin	muscle plug
	25-Apr-18	RG_SC_BT_02_20180425	26.4	25.2	150	A	A	A	A	no muscle plug taken, as fish was small and stressed	-
	25-Apr-18	RG_SC_BT_03_20180425	55.9	52.8	1,480	A	A	A	A	-	muscle plug
	27-Apr-18	RG_SC_BT_04_20180427	28.3	26.7	185	A	A	A	A	muscle plug includes hard orange structure	muscle plug
	28-Apr-18	RG_SC_BT_05_20180428	47.2	44.2	750	A	A	A	A	-	muscle plug
	28-Apr-18	RG_SC_BT_06_20180428	68.9	65.5	2,700	A	M	A	A	-	muscle plug
	total sample size		**6**	**6**	**6**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**43.3**	**40.9**	**924**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**40.1**	**37.6**	**515**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**17.0**	**16.1**	**1,005**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**6.94**	**6.59**	**410**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**26.4**	**25.2**	**150**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**68.9**	**65.5**	**2,700**	**-**	**-**	**-**	**-**	**-**	**-**
Elk River	27-Apr-18	RG_ER_BT_01_20180427	70.2	67.1	3,280	A	A	A	A	-	muscle plug
	29-Apr-18	RG_ER_BT_02_20180429	27.9	26.3	159	A	M	A	A	minor erosion	muscle plug
	total sample size		**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**49.1**	**46.7**	**1,720**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**49.1**	**46.7**	**1,720**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**29.9**	**28.8**	**2,207**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**21.2**	**20.4**	**1,561**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**27.9**	**26.3**	**159**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**70.2**	**67.1**	**3,280**	**-**	**-**	**-**	**-**	**-**	**-**
Gold Creek	25-Apr-18	RG_GC_BT_01_20180425	71.7	70.2	3,300	A	A	M	A	minor lesions	muscle plug
	27-Apr-18	RG_GC_BT_02_20180427	77.9	75.0	3,550	A	A	A	A	worm in left pectoral, clipped adipose	muscle plug
	28-Apr-18	RG_GC_BT_03_20180428	67.4	64.5	2,450	A	A	A	A	fishing line in throat	muscle plug
	total sample size		**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**72.3**	**69.9**	**3,100**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**71.7**	**70.2**	**3,300**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**5.28**	**5.26**	**577**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**3.05**	**3.03**	**333**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**67.4**	**64.5**	**2,450**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**77.9**	**75.0**	**3,550**	**-**	**-**	**-**	**-**	**-**	**-**

Note: "-" indicates no data available

Table G.8: Summary Statistics for Kokanee Meristic Data Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Tissue Collected
						D	E	L	T		
Sand Creek	25-Apr-18	RG_SC_KO_01_20180425	26.1	23.9	138	A	A	A	A	-	muscle
	25-Apr-18	RG_SC_KO_02_20180425	26.8	24.3	143	A	A	A	A	-	muscle
	26-Apr-18	RG_SC_KO_03_20180426	28.5	25.9	152	A	A	A	A	-	muscle
	26-Apr-18	RG_SC_KO_04_20180426	28.6	26.0	150	A	A	A	A	-	muscle
		total sample size	**4**	**4**	**4**	-	-	-	-	-	-
		average	**27.5**	**25.0**	**146**	-	-	-	-	-	-
		median	**27.7**	**25.1**	**147**	-	-	-	-	-	-
		standard deviation	**1.25**	**1.08**	**6.45**	-	-	-	-	-	-
		standard error	**0.623**	**0.541**	**3.22**	-	-	-	-	-	-
		minimum	**26.1**	**23.9**	**138**	-	-	-	-	-	-
		maximum	**28.6**	**26.0**	**152**	-	-	-	-	-	-
Elk River	28-Apr-18	RG_ER_KO_01_20180428	27.7	25.4	280	A	A	A	A	-	muscle plug
	29-Apr-18	RG_ER_KO_02_20180429	26.8	24.3	126	A	M	A	A	-	muscle plug
	01-Sep-18	RG_ER_KO_01_20180901	29.4	26.7	220	A	A	A	A	-	muscle plug
	01-Sep-18	RG_ER_KO_02_20180901	28.4	26.4	205	A	A	A	A	-	muscle plug
	01-Sep-18	RG_ER_KO_03_20180901	28.2	25.5	180	A	A	A	A	-	muscle plug
	01-Sep-18	RG_ER_KO_04_20180901	23.6	21.3	130	A	A	A	A	-	muscle plug
	01-Sep-18	RG_ER_KO_05_20180901	28.1	25.8	185	A	A	A	A	-	muscle plug
	01-Sep-18	RG_ER_KO_06_20180901	29.6	27.1	235	A	A	A	A	-	muscle plug
	01-Sep-18	RG_ER_KO_07_20180901	27.3	25.0	190	A	A	A	A	-	muscle plug
	01-Sep-18	RG_ER_KO_08_20180901	28.0	25.5	208	A	A	A	A	-	muscle plug
		total sample size	**10**	**10**	**10**	-	-	-	-	-	-
		average	**27.7**	**25.3**	**196**	-	-	-	-	-	-
		median	**28.1**	**25.5**	**198**	-	-	-	-	-	-
		standard deviation	**1.68**	**1.63**	**46.0**	-	-	-	-	-	-
		standard error	**0.530**	**0.515**	**14.5**	-	-	-	-	-	-
		minimum	**23.6**	**21.3**	**126**	-	-	-	-	-	-
		maximum	**29.6**	**27.1**	**280**	-	-	-	-	-	-
Gold Creek	27-Apr-18	RG_GC_KO_01_20180427	25.8	23.0	188	A	A	A	A	-	muscle plug
	01-Sep-18	RG_GC_KO_01_20180901	24.3	21.9	122	A	A	A	A	-	muscle plug
		total sample size	**2**	**2**	**2**	-	-	-	-	-	-
		average	**25.1**	**22.5**	**155**	-	-	-	-	-	-
		median	**25.1**	**22.5**	**155**	-	-	-	-	-	-
		standard deviation	**1.06**	**0.778**	**46.7**	-	-	-	-	-	-
		standard error	**0.750**	**0.550**	**33.0**	-	-	-	-	-	-
		minimum	**24.3**	**21.9**	**122**	-	-	-	-	-	-
		maximum	**25.8**	**23.0**	**188**	-	-	-	-	-	-

Note: "-" indicates no data available

Table G.9: Summary Statistics for Mountain Whitefish Meristic Data Collected near Sand Creek and Elk River in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Tissue Collected
						D	E	L	T		
Sand Creek	27-Apr-18	RG_SC_MW_01_20180427	23.0	21.0	95.0	A	A	A	A	-	muscle
	total sample size		**1**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**23.0**	**21.0**	**95.0**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**23.0**	**21.0**	**95.0**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**23.0**	**21.0**	**95.0**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**23.0**	**21.0**	**95.0**	**-**	**-**	**-**	**-**	**-**	**-**
Elk River	25-Apr-18	RG_ER_MW_01_20180425	25.1	22.9	160	A	A	A	A	-	muscle plug
	28-Apr-18	RG_ER_MW_02_20180428	24.7	22.2	120	A	A	A	A	-	muscle plug
	29-Apr-18	RG_ER_MW_03_20180429	27.1	25.0	174	A	A	A	A	-	muscle plug
	total sample size		**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**25.6**	**23.4**	**151**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**25.1**	**22.9**	**160**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**1.29**	**1.46**	**28.3**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**0.742**	**0.841**	**16.3**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**24.7**	**22.2**	**120**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**27.1**	**25.0**	**174**	**-**	**-**	**-**	**-**	**-**	**-**

Note: "-" indicates no data available

Table G.10: **Summary Statistics for Northern Pikeminnow Meristic Data Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018**

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structures Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Sand Creek	05-Jun-18	RG_SC_NSC_01_20180605	44.3	40.4	685	oto	12	F	5.85	10.5	669	0.015	0.009	A	A	A	A	-	-	muscle, ovaries
	05-Jun-18	RG_SC_NSC_02_20180605	48.8	44.8	1,140	oto	13	F	52.1	24.0	1,064	0.021	0.046	A	A	A	A	-	-	muscle, ovaries
	05-Jun-18	RG_SC_NSC_03_20180605	34.5	31.2	330	oto	10	F	4.87	2.93	322	0.009	0.015	A	A	A	A	crayfish in gut	-	muscle, ovaries
	05-Jun-18	RG_SC_NSC_04_20180605	35.6	32.4	340	oto	9	F	7.24	3.65	329	0.011	0.021	A	A	A	A	-	-	muscle, ovaries
	05-Jun-18	RG_SC_NSC_05_20180605	34.0	31.0	280	oto	8	F	2.80	2.76	274	0.010	0.010	A	A	A	A	-	-	muscle, ovaries
	10-Jun-18	RG_SC_NSC_06_20180610	41.6	37.7	530	oto	11	F	6.82	4.65	519	0.009	0.013	A	A	A	A	-	-	muscle, ovaries
	10-Jun-18	RG_SC_NSC_07_20180610	58.9	53.9	1,690	oto	17	F	96.2	29.2	1,565	0.017	0.057	A	A	A	A	-	-	muscle, ovaries
		total sample size	**7**	**7**	**7**	**-**	**7**	**-**	**7**	**7**	**7**	**7**	**7**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		average	**42.5**	**38.8**	**714**	**-**	**11.4**	**-**	**25.1**	**11.1**	**677**	**0.013**	**0.024**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		median	**41.6**	**37.7**	**530**	**-**	**11.0**	**-**	**6.82**	**4.65**	**519**	**0.011**	**0.015**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		standard deviation	**9.10**	**8.44**	**524**	**-**	**2.99**	**-**	**35.9**	**11.0**	**478**	**0.005**	**0.019**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		standard error	**3.44**	**3.19**	**198**	**-**	**1.13**	**-**	**13.6**	**4.16**	**181**	**0.002**	**0.007**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		minimum	**34.0**	**31.0**	**280**	**-**	**8**	**-**	**2.80**	**2.76**	**274**	**0.009**	**0.009**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		maximum	**58.9**	**53.9**	**1,690**	**-**	**17**	**-**	**96.2**	**29.2**	**1,565**	**0.021**	**0.057**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Table G.10: **Summary Statistics for Northern Pikeminnow Meristic Data Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018**

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structures Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
Elk River	06-Jun-18	RG_ER_NSC_01_20180606	41.4	37.0	545	oto	10	F	3.56	6.42	535	0.012	0.007	A	A	A	A	-	-	muscle, ovaries
	06-Jun-18	RG_ER_NSC_02_20180606	35.5	31.8	315	oto	9	F	1.92	2.70	310	0.009	0.006	A	A	A	A	scar on right side	-	muscle, ovaries
	07-Jun-18	RG_ER_NSC_03_20180607	33.9	30.2	275	oto	10	F	1.63	2.06	271	0.008	0.006	A	A	A	A	-	-	muscle, ovaries
	07-Jun-18	RG_ER_NSC_04_20180607	44.0	39.8	755	oto	12	F	26.4	4.40	724	0.006	0.035	A	A	A	A	-	-	muscle, ovaries
	07-Jun-18	RG_ER_NSC_05_20180607	39.9	35.7	445	oto	11	F	2.69	5.16	437	0.012	0.006	A	A	A	A	-	-	muscle, ovaries
	07-Jun-18	RG_ER_NSC_06_20180607	30.9	27.7	205	oto	6	F	1.05	2.93	201	0.014	0.005	A	A	A	A	intestinal worm	0.213	muscle, ovaries
	01-Sep-18	RG_ER_NSC_01_20180901	53.5	48.4	1,220	-	-	-	-	-	-	-	-	A	A	A	A	-	-	muscle plug
	01-Sep-18	RG_ER_NSC_02_20180901	44.7	40.4	650	-	-	-	-	-	-	-	-	A	A	A	A	-	-	muscle plug
	01-Sep-18	RG_ER_NSC_03_20180901	36.8	33.2	360	-	-	-	-	-	-	-	-	A	A	A	A	-	-	muscle plug
	01-Sep-18	RG_ER_NSC_04_20180901	36.4	32.8	350	-	-	-	-	-	-	-	-	A	A	A	A	-	-	muscle plug
	total sample size		**10**	**10**	**10**	**-**	**6**	**-**	**6**	**6**	**6**	**6**	**6**	**-**	**-**	**-**	**-**	**-**	**1**	**-**
	average		**39.7**	**35.7**	**512**	**-**	**9.67**	**-**	**6.21**	**3.94**	**413**	**0.010**	**0.011**	**-**	**-**	**-**	**-**	**-**	**0.213**	**-**
	median		**38.4**	**34.5**	**403**	**-**	**10.0**	**-**	**2.30**	**3.66**	**374**	**0.010**	**0.006**	**-**	**-**	**-**	**-**	**-**	**0.213**	**-**
	standard deviation		**6.54**	**6.02**	**302**	**-**	**2.07**	**-**	**9.95**	**1.67**	**194**	**0.003**	**0.012**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**2.07**	**1.90**	**95.7**	**-**	**0.843**	**-**	**4.06**	**0.681**	**79.1**	**0.001**	**0.005**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**30.9**	**27.7**	**205**	**-**	**6**	**-**	**1.05**	**2.06**	**201**	**0.006**	**0.005**	**-**	**-**	**-**	**-**	**-**	**0.213**	**-**
	maximum		**53.5**	**48.4**	**1,220.0**	**-**	**12**	**-**	**26.4**	**6.42**	**724**	**0.014**	**0.035**	**-**	**-**	**-**	**-**	**-**	**0.213**	**-**
Gold Creek	07-Jun-18	RG_GC_NSC_01_20180607	38.5	34.7	475	oto	9	F	6.12	8.25	461	0.017	0.013	A	A	A	A	-	-	muscle, ovaries
	07-Jun-18	RG_GC_NSC_02_20180607	37.1	33.5	350	oto	9	F	1.91	4.32	344	0.012	0.005	A	A	A	A	-	-	muscle, ovaries
	07-Jun-18	RG_GC_NSC_03_20180607	54.5	50.1	1,800	oto	15	F	192	47.8	1,561	0.027	0.106	A	A	A	A	gonad sub-sampled for tissue sample	-	muscle, ovaries
	total sample size		**3**	**3**	**3**	**-**	**3**	**-**	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**43.4**	**39.4**	**875**	**-**	**11.0**	**-**	**66.6**	**20.1**	**788**	**0.019**	**0.042**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**38.5**	**34.7**	**475**	**-**	**9.00**	**-**	**6.12**	**8.25**	**461**	**0.017**	**0.013**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**9.67**	**9.26**	**804**	**-**	**3.46**	**-**	**108**	**24.1**	**671**	**0.007**	**0.056**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**5.58**	**5.34**	**464**	**-**	**2.00**	**-**	**62.6**	**13.9**	**388**	**0.004**	**0.033**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**37.1**	**33.5**	**350**	**-**	**9**	**-**	**1.91**	**4.32**	**344**	**0.012**	**0.005**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**54.5**	**50.1**	**1,800**	**-**	**15**	**-**	**192**	**47.8**	**1,561**	**0.027**	**0.106**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Note: "-" indicates no data available

[a] Age structures collected: oto - otoliths

[b] Adjusted body weight represents whole body weight less the liver weight and gonad weight and used for statistical analyses.

Table G.11: **Summary Statistics for Peamouth Chub Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018**

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structures Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Sand Creek	24-Apr-18	RG_SC_PCC_01_20180424	27.3	24.4	156	oto	12	F	10.6	2.92	142	0.019	0.068	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_PCC_02_20180424	25.9	23.3	147	oto	11	F	10.2	2.48	134	0.017	0.069	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_PCC_03_20180424	28.0	25.5	178	oto	11	F	15.5	3.12	159	0.018	0.087	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_PCC_04_20180424	24.8	22.4	91.5	oto	9	M	1.17	1.44	88.9	0.016	0.013	A	A	A	A	-	-	-
	24-Apr-18	RG_SC_PCC_05_20180424	23.5	20.9	92.0	oto	5	M	3.72	1.31	87.0	0.014	0.040	A	A	A	A	-	-	-
	24-Apr-18	RG_SC_PCC_06_20180424	25.6	23.1	136	oto	8	F	7.53	2.39	126	0.018	0.055	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_PCC_07_20180424	23.4	20.8	108	oto	6	F	4.26	1.63	102	0.015	0.039	A	A	A	A	worms	4.41	muscle, ovaries
	24-Apr-18	RG_SC_PCC_08_20180424	24.4	21.9	118	oto	14	F	7.93	1.72	108	0.015	0.067	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_PCC_09_20180424	22.5	20.3	89.5	oto	5	M	2.96	1.59	85.0	0.018	0.033	A	A	A	A	-	-	-
	24-Apr-18	RG_SC_PCC_10_20180424	24.7	22.4	130	oto	6	F	8.00	1.87	120	0.014	0.062	A	A	M	A	small cut	-	muscle, ovaries
	24-Apr-18	RG_SC_PCC_11_20180424	25.9	23.4	147	oto	7	F	9.24	2.71	135	0.018	0.063	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_PCC_12_20180424	23.3	20.8	103	oto	6	M	3.40	1.63	98.0	0.016	0.033	A	A	A	A	-	-	-
	24-Apr-18	RG_SC_PCC_13_20180424	25.0	22.5	135	oto	7	F	12.4	2.28	120	0.017	0.092	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_PCC_14_20180424	23.2	20.9	113	oto	5	F	7.83	2.20	103	0.019	0.069	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_PCC_15_20180424	22.4	20.1	99.5	-	-	U	-	1.56	-	0.016	-	A	A	A	A	worms	15.6	-
	24-Apr-18	RG_SC_PCC_16_20180424	22.7	20.5	89.5	oto	5	M	3.89	0.98	84.6	0.011	0.043	A	A	A	A	-	-	-
	24-Apr-18	RG_SC_PCC_17_20180424	24.4	21.9	125	oto	6	F	10.3	2.00	113	0.016	0.082	A	A	A	A	-	-	-
	24-Apr-18	RG_SC_PCC_18_20180424	24.8	22.6	144	oto	7	F	9.86	1.49	133	0.010	0.068	A	A	A	A	worms	13.5	-
	24-Apr-18	RG_SC_PCC_19_20180424	23.1	20.5	90.2	oto	5	F	3.27	1.67	85.3	0.019	0.036	A	A	A	A	worms	2.96	-
	25-Apr-18	RG_SC_PCC_20_20180425	26.7	24.4	144	oto	10	F	6.08	1.78	136	0.012	0.042	A	A	A	A	worms	3.05	-
	25-Apr-18	RG_SC_PCC_21_20180425	29.3	26.5	217	oto	18	F	14.2	3.56	199	0.016	0.065	A	A	A	A	-	-	-
	25-Apr-18	RG_SC_PCC_22_20180425	27.6	25.2	164	oto	15	F	12.4	3.19	148	0.019	0.076	A	A	A	A	-	-	-
	25-Apr-18	RG_SC_PCC_23_20180425	24.9	22.4	122	oto	5	M	0.616	1.75	120	0.014	0.0050	A	A	A	A	worms	6.94	-
	25-Apr-18	RG_SC_PCC_24_20180425	24.4	21.9	115	oto	6	M	1.42	1.48	112	0.013	0.012	A	A	A	A	worms	12.0	-
	25-Apr-18	RG_SC_PCC_25_20180425	26.3	24.1	139	oto	9	F	10.5	1.85	127	0.013	0.076	A	A	A	A	-	-	-
	25-Apr-18	RG_SC_PCC_26_20180425	24.5	22.2	115	oto	7	M	1.21	1.60	112	0.014	0.011	A	A	A	A	1x oto, worms	12.0	-
	25-Apr-18	RG_SC_PCC_27_20180425	25.9	23.5	150	oto	5	F	4.96	2.26	143	0.015	0.033	A	A	A	A	worms	25.2	-
	25-Apr-18	RG_SC_PCC_28_20180425	26.1	23.6	124	oto	11	F	6.81	1.70	115	0.014	0.055	A	A	A	A	-	-	-
	25-Apr-18	RG_SC_PCC_29_20180425	24.0	21.4	115	oto	7	F	7.96	2.18	105	0.019	0.069	A	A	A	A	-	-	-
	25-Apr-18	RG_SC_PCC_30_20180425	22.9	20.7	104	oto	4	F	7.95	1.80	94.3	0.017	0.076	A	A	A	A	-	-	-
	25-Apr-18	RG_SC_PCC_31_20180425	25.2	22.8	151	oto	6	F	3.14	2.26	146	0.015	0.021	A	A	A	A	worms	22.0	-

Table G.11: **Summary Statistics for Peamouth Chub Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018**

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structures Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Sand Creek	25-Apr-18	RG_SC_PCC_32_20180425	22.0	19.8	89.0	-	-	U	-	1.17	-	0.013	-	A	A	A	A	1x oto, worms	14.4	-
	25-Apr-18	RG_SC_PCC_33_20180425	24.0	21.5	122	oto	5	M	0.987	1.63	119	0.013	0.008	A	A	A	A	worms	22.9	-
	25-Apr-18	RG_SC_PCC_34_20180425	22.4	20.0	98.0	oto	5	M	0.496	1.19	96.3	0.012	0.005	A	A	A	A	worms	15.7	-
	25-Apr-18	RG_SC_PCC_35_20180425	23.2	20.9	105	oto	5	M	0.979	1.71	102	0.016	0.009	A	A	A	A	1x oto, worms	16.5	-
	25-Apr-18	RG_SC_PCC_36_20180425	22.5	20.3	98.0	oto	5	M	0.440	1.17	96.4	0.012	0.004	A	A	A	A	worms	16.4	-
	25-Apr-18	RG_SC_PCC_37_20180425	25.0	22.5	130	oto	7	M	1.09	2.15	127	0.017	0.008	A	A	A	A	worms	8.90	-
	25-Apr-18	RG_SC_PCC_38_20180425	24.6	22.0	120	oto	5	F	1.23	1.10	118	0.009	0.010	A	M	A	A	worms	20.4	-
	26-Apr-18	RG_SC_PCC_39_20180426	25.7	23.5	145	oto	6	M	1.38	1.30	142	0.009	0.010	A	A	A	A	worms	20.9	-
	26-Apr-18	RG_SC_PCC_40_20180426	24.6	22.1	133	oto	5	F	1.02	0.96	131	0.007	0.008	A	A	A	A	worms	17.1	-
	26-Apr-18	RG_SC_PCC_41_20180426	20.2	19.1	70.0	oto	4	M	3.09	0.63	66.3	0.009	0.044	A	A	A	A	-	-	-
	26-Apr-18	RG_SC_PCC_42_20180426	22.5	20.2	95.0	oto	5	M	0.296	0.93	93.8	0.010	0.003	A	M	A	A	worms	11.5	-
	26-Apr-18	RG_SC_PCC_43_20180426	19.3	17.5	53.4	oto	5	M	1.76	0.91	50.7	0.017	0.033	A	A	A	A	-	-	-
	27-Apr-18	RG_SC_PCC_44_20180427	24.7	22.3	130	oto	11	M	5.36	1.76	123	0.014	0.041	A	A	A	A	-	-	-
	27-Apr-18	RG_SC_PCC_45_20180427	24.1	21.5	111	oto	7	M	1.41	1.40	108	0.013	0.013	A	A	A	A	worms	10.3	-
	27-Apr-18	RG_SC_PCC_46_20180427	24.5	22.0	125	oto	6	M	6.32	1.53	117	0.012	0.051	A	A	A	A	-	-	-
	27-Apr-18	RG_SC_PCC_47_20180427	22.0	19.5	77.5	oto	7	M	2.97	0.92	73.6	0.012	0.038	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_PCC_48_20180428	21.2	19.0	77.0	oto	5	M	2.84	1.00	73.2	0.013	0.037	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_PCC_49_20180428	24.3	21.7	125	oto	6	M	5.71	0.86	118	0.007	0.046	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_PCC_50_20180428	22.4	20.0	82.5	oto	6	M	0.682	0.88	80.9	0.011	0.008	A	A	A	A	worms	6.19	-
	28-Apr-18	RG_SC_PCC_51_20180428	23.2	20.5	98.5	oto	5	F	0.833	1.31	96.4	0.013	0.008	A	A	A	A	worms	0.257	-
	28-Apr-18	RG_SC_PCC_52_20180428	21.5	19.3	73.5	oto	6	M	2.32	0.77	70.4	0.011	0.032	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_PCC_53_20180428	19.7	17.5	51.5	oto	4	M	0.198	0.90	50.4	0.017	0.004	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_PCC_54_20180428	19.8	17.7	53.0	oto	5	M	0.434	0.95	51.6	0.018	0.008	A	M	A	A	-	-	-
	28-Apr-18	RG_SC_PCC_55_20180428	23.4	20.9	115	oto	5	M	0.533	1.15	113	0.010	0.005	A	A	A	A	1x oto, worms	21.8	-
	29-Apr-18	RG_SC_PCC_56_20180429	21.2	19.0	71.0	oto	5	M	2.29	0.83	67.9	0.012	0.032	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_PCC_57_20180429	20.3	18.0	60.0	oto	-	M	2.13	0.64	57.2	0.011	0.035	A	A	A	A	-	-	-
	30-Apr-18	RG_SC_PCC_58_20180430	24.1	21.9	102	oto	6	M	5.30	1.55	95.2	0.015	0.052	A	A	A	A	-	-	-
	30-Apr-18	RG_SC_PCC_59_20180430	24.4	21.9	102	oto	11	M	4.21	1.16	96.6	0.011	0.041	A	A	A	A	-	-	-
	30-Apr-18	RG_SC_PCC_60_20180430	23.4	20.9	105	oto	6	M	0.741	1.59	103	0.015	0.007	A	A	A	A	worms	20.7	-
	total sample size		**60**	**60**	**60**	**-**	**57**	**-**	**58**	**60**	**58**	**60**	**58**	-	-	-	-	**-**	**25**	**-**
	average		**23.9**	**21.5**	**113**	**-**	**6.95**	**-**	**4.59**	**1.61**	**107**	**0.014**	**0.037**	-	-	-	-	**-**	**13.7**	**-**
	median		**24.1**	**21.6**	**114**	**-**	**6.00**	**-**	**3.20**	**1.58**	**108**	**0.014**	**0.037**	-	-	-	-	**-**	**14.4**	**-**
	standard deviation		**2.05**	**1.92**	**31.5**	**-**	**2.92**	**-**	**4.01**	**0.65**	**28.8**	**0.003**	**0.026**	-	-	-	-	**-**	**6.99**	**-**
	standard error		**0.264**	**0.247**	**4.07**	**-**	**0.387**	**-**	**0.527**	**0.08**	**3.78**	**0.000**	**0.003**	-	-	-	-	**-**	**1.40**	**-**
	minimum		**19.3**	**17.5**	**51.5**	**-**	**4**	**-**	**0.198**	**0.63**	**50.4**	**0.007**	**0.003**	-	-	-	-	**-**	**0.257**	**-**
	maximum		**29.3**	**26.5**	**217**	**-**	**18**	**-**	**15.5**	**3.56**	**199**	**0.019**	**0.092**	-	-	-	-	**-**	**25.2**	**-**

Table G.11: Summary Statistics for Peamouth Chub Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structures Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Elk River	25-Apr-18	RG_ER_PCC_01_20180425	26.6	23.9	155	oto	12	F	10.6	2.89	142	0.019	0.068	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_ER_PCC_02_20180425	25.1	23.0	151	oto	5	F	3.40	2.40	145	0.016	0.022	A	A	A	A	worms	22.1	muscle, ovaries
	25-Apr-18	RG_ER_PCC_03_20180425	24.4	22.1	119	oto	7	F	8.62	1.83	109	0.015	0.072	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_ER_PCC_04_20180425	23.7	21.4	128	oto	5	M	0.109	1.14	127	0.009	0.001	A	A	A	A	worms	27.3	-
	25-Apr-18	RG_ER_PCC_05_20180425	23.5	20.9	105	oto	5	M	0.680	1.22	103	0.012	0.006	A	A	A	A	worms	5.13	-
	25-Apr-18	RG_ER_PCC_06_20180425	22.3	21.1	92.0	oto	5	F	4.55	1.22	86.2	0.013	0.049	A	A	A	A	worms	0.0390	muscle, ovaries
	26-Apr-18	RG_ER_PCC_07_20180426	25.6	22.8	136	oto	7	M	6.44	1.51	128	0.011	0.047	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_08_20180426	26.0	23.1	145	oto	6	F	2.85	1.86	140	0.013	0.020	A	A	A	A	worms	32.2	muscle, ovaries
	26-Apr-18	RG_ER_PCC_09_20180426	26.6	24.2	142	oto	11	F	9.07	2.46	130	0.017	0.064	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_ER_PCC_10_20180426	20.2	17.9	52.0	oto	-	U	-	0.44	-	0.009	-	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_11_20180426	26.0	23.4	137	oto	11	F	8.84	1.96	126	0.014	0.065	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_ER_PCC_12_20180426	27.2	24.5	138	oto	13	F	6.16	1.40	130	0.010	0.045	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_ER_PCC_13_20180426	20.6	18.4	58.0	oto	4	M	0.675	0.82	56.5	0.014	0.012	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_14_20180426	20.9	18.7	66.0	oto	5	M	1.34	0.53	64.1	0.008	0.020	A	M	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_15_20180426	21.8	19.5	78.0	oto	5	M	2.17	0.77	75.1	0.010	0.028	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_16_20180426	29.4	26.5	172	oto	15	F	10.3	3.06	159	0.018	0.060	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_ER_PCC_17_20180426	24.7	22.2	117	oto	5	F	3.90	1.61	111	0.014	0.033	A	A	A	A	worms	6.24	muscle, ovaries
	26-Apr-18	RG_ER_PCC_18_20180426	22.9	20.4	84.5	oto	7	M	2.53	0.40	81.6	0.005	0.030	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_19_20180426	21.8	19.5	60.5	oto	4	F	0.634	0.76	59.1	0.012	0.010	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_20_20180426	21.5	19.2	75.0	oto	6	F	4.79	1.04	69.2	0.014	0.064	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_21_20180426	21.5	19.4	82.0	oto	4	M	3.26	0.99	77.8	0.012	0.040	A	A	A	A	-		-
	26-Apr-18	RG_ER_PCC_22_20180426	20.9	18.8	58.5	oto	6	M	1.07	0.54	56.9	0.009	0.018	A	A	A	A	-		-
	26-Apr-18	RG_ER_PCC_23_20180426	23.4	21.1	105	oto	6	M	1.08	1.46	102	0.014	0.010	A	A	A	A	worms	16.7	-
	26-Apr-18	RG_ER_PCC_24_20180426	21.7	19.5	65.0	oto	5	M	2.49	0.63	61.9	0.010	0.038	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_25_20180426	21.3	19.0	71.0	oto	5	F	3.77	1.57	65.7	0.022	0.053	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_25_20180426	23.5	21.2	88.5	oto	5	M	0.356	1.29	86.9	0.015	0.004	A	A	A	A	worms	11.1	-
	26-Apr-18	RG_ER_PCC_27_20180426	27.7	25.4	150	oto	15	F	7.57	2.28	140	0.015	0.050	M	A	A	A		-	-
	26-Apr-18	RG_ER_PCC_28_20180426	21.4	19.1	64.5	oto	5	F	0.665	1.09	62.7	0.017	0.010	A	A	A	A	worms	5.29	-
	26-Apr-18	RG_ER_PCC_29_20180426	21.5	19.1	71.0	oto	5	F	4.47	1.38	65.2	0.019	0.063	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_PCC_30_20180426	24.1	21.8	97.0	oto	12	F	4.83	1.34	90.8	0.014	0.050	A	A	A	A	-	-	-
	27-Apr-18	RG_ER_PCC_31_20180427	24.2	21.6	115	oto	5	M	0.622	1.99	112	0.017	0.005	A	A	A	A	worms	21.7	-
	27-Apr-18	RG_ER_PCC_32_20180427	27.3	24.6	154	oto	14	F	9.19	2.85	142	0.018	0.060	A	A	A	A	-	-	-

Table G.11: **Summary Statistics for Peamouth Chub Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018**

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structures Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Elk River	27-Apr-18	RG_ER_PCC_33_20180427	26.6	23.7	165	oto	6	F	6.60	2.40	156	0.015	0.040	A	A	A	A	worms	19.0	-
	27-Apr-18	RG_ER_PCC_34_20180427	27.2	24.1	129	oto	15	F	6.27	1.28	121	0.010	0.049	A	A	A	A	-	-	-
	27-Apr-18	RG_ER_PCC_35_20180427	20.7	18.5	60.0	oto	5	M	1.87	0.71	57.4	0.012	0.031	A	A	A	A	-	-	-
	27-Apr-18	RG_ER_PCC_36_20180427	29.2	26.3	178	oto	14	F	9.70	3.53	165	0.020	0.054	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_PCC_37_20180428	22.0	19.7	83.0	oto	6	M	4.80	1.05	77.2	0.013	0.058	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_PCC_38_20180428	24.7	22.0	112	oto	5	M	5.32	0.86	106	0.008	0.048	M	A	A	A	-	-	-
	28-Apr-18	RG_ER_PCC_39_20180428	25.5	22.9	146	oto	7	M	1.12	1.08	144	0.007	0.008	A	A	A	A	worms	25.9	-
	28-Apr-18	RG_ER_PCC_40_20180428	24.4	22.0	118	oto	6	M	4.67	0.21	113	0.002	0.040	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_PCC_41_20180428	24.2	21.7	101	oto	5	F	0.542	1.04	99.4	0.010	0.005	A	A	A	A	-	17.9	-
	28-Apr-18	RG_ER_PCC_42_20180428	20.0	18.0	58.0	oto	6	M	0.691	0.75	56.6	0.013	0.012	A	M	A	A	minor erosion		-
	28-Apr-18	RG_ER_PCC_43_20180428	23.3	20.9	110	oto	5	M	0.743	1.34	108	0.012	0.007	A	A	A	A	worms	20.3	-
	28-Apr-18	RG_ER_PCC_44_20180428	20.9	18.7	68.0	oto	4	M	0.311	1.06	66.6	0.016	0.005	A	A	A	A	worms	3.08	-
	28-Apr-18	RG_ER_PCC_45_20180428	20.6	18.5	65.0	oto	4	M	1.26	0.71	63.0	0.011	0.019	A	A	A	A	worms	0.133	-
	28-Apr-18	RG_ER_PCC_46_20180428	20.7	18.4	63.0	oto	4	M	0.334	0.80	61.9	0.013	0.005	A	A	A	A	worms	4.60	-
	29-Apr-18	RG_ER_PCC_47_20180429	24.3	21.8	124	oto	6	M	1.15	2.09	121	0.017	0.009	A	A	A	A	worms	16.4	-
	29-Apr-18	RG_ER_PCC_48_20180429	24.0	21.5	118	oto	5	M	0.458	1.60	116	0.014	0.004	A	A	A	A	worms	20.0	-
	29-Apr-18	RG_ER_PCC_49_20180429	21.0	18.7	68.5	oto	4	M	1.40	0.91	66.2	0.013	0.020	A	M	A	A	-	-	-
	29-Apr-18	RG_ER_PCC_50_20180429	19.1	16.8	42.5	oto	4	M	0.192	0.35	42.0	0.008	0.005	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_PCC_51_20180429	20.5	18.3	57.0	oto	5	M	0.419	0.74	55.8	0.013	0.007	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_PCC_52_20180429	20.4	18.0	62.0	oto	5	M	1.71	0.69	59.6	0.011	0.028	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_PCC_53_20180429	21.0	18.8	73.0	oto	5	M	3.76	1.32	67.9	0.018	0.051	A	A	A	A	-	-	-
	30-Apr-18	RG_ER_PCC_54_20180430	23.7	21.4	113	oto	5	M	1.52	1.35	110	0.012	0.013	A	A	A	A	worms	9.84	-
	30-Apr-18	RG_ER_PCC_55_20180430	24.1	21.8	119	oto	5	M	1.50	1.75	116	0.015	0.013	A	M	A	A	worms	12.8	-
	30-Apr-18	RG_ER_PCC_56_20180430	23.0	20.8	105	oto	5	M	0.541	0.95	103	0.009	0.005	A	A	A	A	worms	20.5	-
	30-Apr-18	RG_ER_PCC_57_20180430	22.4	20.1	92.0	oto	5	M	0.786	1.46	89.8	0.016	0.009	A	A	A	A	worms	10.1	-
	30-Apr-18	RG_ER_PCC_58_20180430	23.4	20.9	103	oto	5	M	0.933	1.32	101	0.013	0.009	A	A	A	A	worms	16.4	-
	total sample size		**58**	**58**	**58**	**-**	**57**	**-**	**57**	**58**	**57**	**58**	**57**	-	-	-	-	**-**	**24**	**-**
	average		**23.4**	**21.0**	**101**	**-**	**6.60**	**-**	**3.26**	**1.35**	**97.4**	**0.013**	**0.029**	-	-	-	-	**-**	**14.4**	**-**
	median		**23.4**	**21.0**	**102**	**-**	**5.00**	**-**	**1.87**	**1.25**	**101**	**0.013**	**0.022**	-	-	-	-	**-**	**16.4**	**-**
	standard deviation		**2.47**	**2.29**	**35.4**	**-**	**3.23**	**-**	**3.06**	**0.72**	**32.6**	**0.0038**	**0.022**	-	-	-	-	**-**	**8.85**	**-**
	standard error		**0.324**	**0.300**	**4.64**	**-**	**0.428**	**-**	**0.406**	**0.09**	**4.31**	**0.0005**	**0.0029**	-	-	-	-	**-**	**1.81**	**-**
	minimum		**19.1**	**16.8**	**42.5**	**-**	**4**	**-**	**0.109**	**0.21**	**42.0**	**0.0018**	**0.0009**	-	-	-	-	**-**	**0.0390**	**-**
	maximum		**29.4**	**26.5**	**178**	**-**	**15**	**-**	**10.6**	**3.53**	**165**	**0.022**	**0.072**	-	-	-	-		**32.2**	**-**

Table G.11: Summary Statistics for Peamouth Chub Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structures Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Gold Creek	25-Apr-18	RG_GC_PCC_01_20180425	23.9	21.4	108	oto	8	F	10.64	2.04	95.3	0.019	0.099	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_GC_PCC_02_20180425	25.0	22.8	128	oto	6	F	2.38	1.53	124	0.012	0.019	A	A	A	A	worms	20.6	muscle, ovaries
	25-Apr-18	RG_GC_PCC_03_20180425	22.4	19.9	96.0	oto	6	M	0.72	1.84	93.4	0.019	0.0075	A	A	A	A	worms	3.85	-
	25-Apr-18	RG_GC_PCC_04_20180425	21.9	19.8	87.0	oto	7	F	4.75	2.57	79.7	0.030	0.055	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_GC_PCC_05_20180425	23.4	20.9	96.0	oto	7	M	0.61	1.07	94.3	0.011	0.0064	A	A	A	A	worms	12.0	-
	25-Apr-18	RG_GC_PCC_06_20180425	23.2	20.9	98.0	oto	4	M	1.09	1.48	95.4	0.015	0.011	A	A	A	A	worms	6.24	-
	25-Apr-18	RG_GC_PCC_07_20180425	23.1	20.5	99.0	oto	4	M	0.40	1.33	97.3	0.013	0.0041	A	A	A	A	worms	15.3	-
	25-Apr-18	RG_GC_PCC_08_20180425	24.2	22.0	118	oto	5	F	8.67	2.13	107	0.018	0.073	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_GC_PCC_09_20180426	26.4	23.7	134	oto	9	F	8.90	2.51	123	0.019	0.066	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_GC_PCC_10_20180426	24.2	22.1	123	oto	5	M	0.45	1.56	121	0.013	0.0037	A	A	A	A	worms	20.3	-
	26-Apr-18	RG_GC_PCC_11_20180426	23.4	20.7	105	oto	6	F	7.66	3.48	93.9	0.033	0.073	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_GC_PCC_12_20180426	22.8	20.3	92.0	oto	5	M	0.93	1.55	89.5	0.017	0.010	A	A	A	A	worms	10.5	-
	26-Apr-18	RG_GC_PCC_13_20180426	25.1	22.5	121	oto	8	M	0.39	1.89	119	0.016	0.0032	A	A	A	A	worms	20.6	-
	26-Apr-18	RG_GC_PCC_14_20180426	27.1	24.6	154	oto	11	F	12.30	3.04	139	0.020	0.080	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_GC_PCC_15_20180426	26.5	23.8	148	oto	7	F	12.67	2.77	133	0.019	0.086	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_GC_PCC_16_20180426	22.3	19.8	81.0	oto	7	M	2.88	1.39	76.7	0.017	0.036	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_17_20180426	22.1	19.9	74.5	oto	5	F	4.22	1.13	69.2	0.015	0.057	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_GC_PCC_18_20180426	26.6	24.3	154	oto	7	F	16.01	3.90	134	0.025	0.10	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_GC_PCC_19_20180426	22.7	20.5	104	oto	5	M	0.36	1.43	102	0.014	0.0035	A	A	A	A	worms	10.9	-
	26-Apr-18	RG_GC_PCC_20_20180426	26.4	23.7	160	oto	6	F	12.66	2.91	144	0.018	0.079	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_21_20180426	23.2	20.9	90.0	oto	6	F	5.92	2.21	81.9	0.025	0.066	A	A	A	A	worms	3.06	-
	26-Apr-18	RG_GC_PCC_22_20180426	23.2	20.9	102	oto	7	F	4.46	1.39	96.2	0.014	0.044	A	A	A	A	worms	9.49	-
	26-Apr-18	RG_GC_PCC_23_20180426	22.4	19.8	81.5	oto	5	M	0.39	1.09	80.0	0.013	0.0048	A	A	A	A	worms	19.5	-
	26-Apr-18	RG_GC_PCC_24_20180426	24.0	21.3	119	oto	7	M	3.76	2.23	113	0.019	0.032	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_25_20180426	26.9	24.5	153	oto	11	F	10.23	3.06	140	0.020	0.067	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_26_20180426	22.1	19.7	73.5	oto	5	F	2.35	1.08	70.1	0.015	0.032	A	A	A	A	worms	5.44	-
	26-Apr-18	RG_GC_PCC_27_20180426	26.0	23.5	148	oto	7	F	6.25	2.62	139	0.018	0.042	A	A	A	A	worms	16.4	-
	26-Apr-18	RG_GC_PCC_28_20180426	23.9	21.5	111	oto	7	F	9.76	2.00	99.2	0.018	0.088	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_29_20180426	24.9	22.4	127	oto	5	F	11.01	2.64	113	0.021	0.087	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_30_20180426	25.9	23.4	138	oto	11	F	9.40	1.80	127	0.013	0.068	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_31_20180426	23.5	21.1	80.0	oto	7	F	3.77	1.03	75.2	0.013	0.047	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_32_20180426	22.9	21.6	99.0	oto	5	F	7.49	2.02	89.5	0.020	0.076	A	A	A	A	-	-	-

Table G.11: Summary Statistics for Peamouth Chub Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structures Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S]/ Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Gold Creek	26-Apr-18	RG_GC_PCC_33_20180426	23.9	21.5	115	oto	6	F	1.38	1.69	112	0.015	0.012	A	A	A	A	worms	19.3	-
	26-Apr-18	RG_GC_PCC_34_20180426	25.4	22.5	130	oto	6	F	1.61	0.99	127	0.008	0.012	A	A	A	A	worms	23.8	-
	26-Apr-18	RG_GC_PCC_35_20180426	24.2	21.8	118	oto	7	F	1.33	1.48	115	0.013	0.011	A	A	A	A	worms	22.3	-
	26-Apr-18	RG_GC_PCC_36_20180426	21.5	19.3	70.5	oto	5	M	2.09	1.06	67.3	0.015	0.030	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_37_20180426	21.3	19.1	82.0	oto	4	M	0.30	1.31	80.4	0.016	0.004	A	A	A	A	worms	9.46	-
	26-Apr-18	RG_GC_PCC_38_20180426	23.1	20.5	86.5	oto	6	M	2.97	1.37	82.2	0.016	0.034	A	A	A	A	fatty liver	-	-
	26-Apr-18	RG_GC_PCC_39_20180426	23.1	20.8	84.5	oto	6	M	3.03	1.53	79.9	0.018	0.036	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_40_20180426	21.9	19.5	94.0	oto	6	M	0.20	1.27	92.5	0.013	0.002	A	A	A	A	worms	23.1	-
	26-Apr-18	RG_GC_PCC_41_20180426	22.1	20.0	83.0	oto	6	M	0.53	1.29	81.2	0.016	0.006	A	A	A	A	worms	10.9	-
	26-Apr-18	RG_GC_PCC_42_20180426	22.8	20.2	99.0	oto	7	M	1.14	1.28	96.6	0.013	0.011	A	A	A	A	worms	9.99	-
	26-Apr-18	RG_GC_PCC_43_20180426	20.9	18.5	69.0	oto	4	M	2.22	0.85	65.9	0.012	0.032	A	A	A	A	-	-	-
	26-Apr-18	RG_GC_PCC_44_20180426	22.4	20.2	90.5	oto	5	M	1.78	1.52	87.2	0.017	0.020	A	A	A	A	worms	0.238	-
	26-Apr-18	RG_GC_PCC_45_20180426	22.1	19.6	98.0	oto	5	M	0.63	1.30	96.1	0.013	0.006	A	A	A	A	worms	24.6	-
	26-Apr-18	RG_GC_PCC_46_20180426	22.7	19.5	79.0	oto	4	M	0.51	1.17	77.3	0.015	0.006	A	A	A	A	worms	5.24	-
	26-Apr-18	RG_GC_PCC_47_20180426	24.9	22.5	119	oto	11	M	0.80	1.28	117	0.011	0.007	A	A	A	A	worms	7.27	-
	27-Apr-18	RG_GC_PCC_48_20180427	24.6	22.0	123	oto	9	M	1.37	1.79	120	0.015	0.011	A	A	A	A	worms	13.2	-
	27-Apr-18	RG_GC_PCC_49_20180427	22.7	20.5	95.0	oto	5	M	1.89	1.44	91.7	0.015	0.020	A	A	A	A	worms	11.6	-
	27-Apr-18	RG_GC_PCC_50_20180427	21.5	19.4	78.0	oto	5	M	0.36	0.77	76.9	0.010	0.005	A	A	A	A	worms	12.0	-
	27-Apr-18	RG_GC_PCC_51_20180427	25.1	22.5	130	oto	4	M	2.38	1.06	127	0.008	0.018	A	A	A	A	-	-	-
	27-Apr-18	RG_GC_PCC_52_20180427	23.6	21.1	125	oto	8	M	5.22	2.20	118	0.018	0.042	A	A	A	A	-	-	-
	27-Apr-18	RG_GC_PCC_53_20180427	22.3	19.8	78.0	oto	5	M	0.59	0.86	76.6	0.011	0.008	A	A	A	A	worms	11.2	-
	27-Apr-18	RG_GC_PCC_54_20180427	23.1	21.2	112	oto	6	M	0.25	1.03	111	0.009	0.002	A	A	A	A	worms	12.9	-
	27-Apr-18	RG_GC_PCC_55_20180427	23.5	21.2	109	oto	6	M	0.68	1.27	107	0.012	0.006	A	A	A	A	worms	19.4	-
	27-Apr-18	RG_GC_PCC_56_20180427	24.6	22.3	112	oto	10	M	5.03	1.34	106	0.012	0.045	A	A	A	A	-	-	-
	27-Apr-18	RG_GC_PCC_57_20180427	25.0	22.4	132	oto	6	F	1.67	1.27	129	0.010	0.013	A	A	A	A	worms	23.0	
	27-Apr-18	RG_GC_PCC_58_20180427	24.0	21.1	91.0	oto	6	M	1.37	0.72	88.9	0.008	0.015	A	A	A	A	-	-	-
	27-Apr-18	RG_GC_PCC_59_20180427	23.8	21.5	123	oto	5	M	0.56	1.12	121	0.009	0.005	A	A	A	A	worms	26.7	-
	27-Apr-18	RG_GC_PCC_60_20180427	23.9	21.8	112	oto	8	M	6.09	1.87	104	0.017	0.054	A	A	A	A	-	-	-
	27-Apr-18	RG_GC_PCC_61_20180427	22.9	20.7	104	oto	5	M	0.50	1.20	102	0.012	0.005	A	A	A	A	worms	16.8	-
	total sample size		**61**	**61**	**61**	**-**	**61**	**-**	**61**	**61**	**61**	**61**	**61**	-	-	-	-	**-**	**34**	**-**
	average		**23.7**	**21.3**	**107**	**-**	**6.34**	**-**	**3.80**	**1.67**	**102**	**0.015**	**0.033**	-	-	-	-	**-**	**14.0**	**-**
	median		**23.4**	**21.1**	**104**	**-**	**6.00**	**-**	**2.09**	**1.44**	**97.3**	**0.015**	**0.020**	-	-	-	-	**-**	**12.4**	**-**
	standard deviation		**1.50**	**1.45**	**23.4**	**-**	**1.81**	**-**	**4.02**	**0.69**	**20.9**	**0.005**	**0.030**	-	-	-	-	**-**	**6.99**	**-**
	standard error		**0.19**	**0.19**	**3.00**	**-**	**0.23**	**-**	**0.52**	**0.09**	**2.68**	**0.001**	**0.004**	-	-	-	-	**-**	**1.20**	**-**
	minimum		**20.9**	**18.5**	**69.0**	**-**	**4**	**-**	**0.20**	**0.72**	**65.9**	**0.008**	**0.002**	-	-	-	-	**-**	**0.24**	**-**
	maximum		**27.1**	**24.6**	**160**	**-**	**11**	**-**	**16.0**	**3.90**	**144**	**0.033**	**0.104**	-	-	-	-	**-**	**26.7**	**-**

Note: "-" indicates no data available

[a] Age structures collected: oto - otoliths.

[b] Adjusted body weight represents whole body weight less the liver weight and gonad weight and used for statistical analyses.

Table G.12: Summary Statistics for Redside Shiner Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S] /Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Sand Creek	24-Apr-18	RG_SC_RSC_01_20180424	10.0	8.90	7.67	oto	-	U	-	0.066	-	0.009	-	A	A	A	A	-	-	-
	24-Apr-18	RG_SC_RSC_02_20180424	10.8	9.40	9.80	oto	4	F	0.334	0.168	9.30	0.017	0.034	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_RSC_03_20180424	10.1	8.70	7.71	oto	-	U	-	0.104	-	0.013	-	A	A	A	A	-	-	-
	24-Apr-18	RG_SC_RSC_04_20180424	9.10	7.90	6.78	oto	2	F	0.188	0.182	6.41	0.027	0.028	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_RSC_05_20180424	10.7	9.20	8.54	oto	3	F	0.251	0.082	8.20	0.010	0.029	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_RSC_06_20180424	9.60	8.40	6.78	oto	3	F	0.228	0.025	6.52	0.004	0.034	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_RSC_07_20180424	10.2	8.80	7.96	oto	-	U	-	0.105	-	0.013	-	A	A	A	A	-	-	-
	24-Apr-18	RG_SC_RSC_08_20180424	11.5	10.0	13.1	oto	4	M	0.153	0.123	12.9	0.009	0.012	A	A	A	A	-	-	-
	24-Apr-18	RG_SC_RSC_09_20180424	9.20	8.00	6.04	oto	3	F	0.092	0.103	5.85	0.017	0.015	A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_SC_RSC_10_20180424	10.0	8.60	7.28	oto	2	F	0.261	0.037	6.98	0.005	0.036	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_SC_RSC_11_20180426	10.5	9.10	9.59	oto	3	F	0.499	0.183	8.91	0.019	0.052	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_SC_RSC_12_20180426	10.2	8.90	8.14	oto	3	M	0.029	0.062	8.05	0.008	0.004	A	M	A	A	-	-	-
	26-Apr-18	RG_SC_RSC_13_20180426	12.3	10.7	15.8	oto	3	F	0.627	0.192	15.0	0.012	0.040	A	A	A	A	-	-	muscle, ovaries
	26-Apr-18	RG_SC_RSC_14_20180426	10.5	9.00	8.65	oto	3	M	0.092	0.052	8.51	0.006	0.011	A	A	A	A	-	-	-
	26-Apr-18	RG_SC_RSC_15_20180426	9.60	8.10	7.22	oto	3	M	0.065	0.096	7.06	0.013	0.009	A	A	A	A	worms	0.704	-
	27-Apr-18	RG_SC_RSC_16_20180427	10.1	8.60	7.60	oto	2	M	0.045	0.190	7.37	0.025	0.006	A	A	A	A	-	-	-
	27-Apr-18	RG_SC_RSC_17_20180427	11.2	9.30	10.1	oto	3	F	0.379	0.153	9.58	0.015	0.037	A	A	A	A	worms	0.136	muscle, ovaries
	27-Apr-18	RG_SC_RSC_18_20180427	12.6	11.0	20.3	oto	4	F	0.561	0.285	19.4	0.014	0.028	A	M	A	A	worms	2.72	muscle, ovaries
	27-Apr-18	RG_SC_RSC_19_20180427	10.7	9.60	11.8	oto	3	M	0.434	0.144	11.3	0.012	0.037	A	M	A	A	-	-	-
	27-Apr-18	RG_SC_RSC_20_20180427	11.9	10.5	12.9	oto	4	F	0.597	0.130	12.1	0.010	0.046	A	A	A	A	-	-	-
	27-Apr-18	RG_SC_RSC_21_20180427	11.3	9.60	10.9	oto	3	M	0.202	0.040	10.7	0.004	0.019	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_22_20180428	11.0	9.40	10.4	oto	3	M	0.137	0.207	10.1	0.020	0.013	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_23_20180428	9.80	8.50	7.33	oto	3	M	0.079	0.082	7.16	0.011	0.011	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_24_20180428	10.3	9.00	9.32	oto	4	F	0.358	0.099	8.86	0.011	0.038	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_25_20180428	11.3	10.0	11.8	oto	3	M	0.072	0.123	11.6	0.010	0.006	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_26_20180428	10.0	8.90	8.62	oto	3	F	0.296	0.199	8.13	0.023	0.034	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_27_20180428	10.9	9.50	10.3	oto	3	M	0.082	0.159	10.1	0.015	0.008	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_28_20180428	10.3	9.00	8.69	oto	3	M	0.063	0.084	8.55	0.010	0.007	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_29_20180428	10.7	9.30	10.6	oto	4	F	0.574	0.258	9.77	0.024	0.054	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_30_20180428	11.6	10.0	10.9	oto	5	M	0.098	0.031	10.7	0.003	0.009	A	A	A	A	worms	0.0390	-

Table G.12: **Summary Statistics for Redside Shiner Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018**

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S] /Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Sand Creek	28-Apr-18	RG_SC_RSC_31_20180428	11.7	10.2	13.7	oto	4	F	0.611	0.203	12.9	0.015	0.045	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_32_20180428	11.5	10.2	13.1	oto	3	F	0.687	0.348	12.1	0.027	0.052	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_33_20180428	12.4	10.6	16.6	oto	3	F	0.524	0.349	15.7	0.021	0.032	A	A	A	A	worms	0.196	-
	28-Apr-18	RG_SC_RSC_34_20180428	11.0	9.50	11.6	oto	4	F	0.715	0.190	10.7	0.016	0.062	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_35_20180428	10.0	8.90	8.70	oto	3	M	0.047	0.086	8.56	0.010	0.005	A	A	A	A	worms	0.453	-
	28-Apr-18	RG_SC_RSC_36_20180428	11.1	9.40	9.67	oto	3	M	0.214	0.144	9.31	0.015	0.022	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_37_20180428	11.2	9.80	10.9	oto	3	M	0.019	0.102	10.8	0.009	0.002	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_38_20180428	10.3	9.00	9.23	oto	3	M	0.117	0.053	9.06	0.006	0.013	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_39_20180428	11.4	9.90	11.8	oto	4	M	0.118	0.330	11.3	0.028	0.010	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_40_20180428	12.3	10.7	15.2	oto	5	F	0.688	0.176	14.3	0.012	0.045	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_41_20180428	11.4	9.90	12.2	oto	3	F	0.487	0.084	11.6	0.007	0.040	A	A	A	A	worms	0.720	-
	28-Apr-18	RG_SC_RSC_42_20180428	11.6	10.2	12.3	oto	4	F	0.667	0.155	11.5	0.013	0.054	A	M	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_43_20180428	11.9	10.3	12.5	oto	5	M	0.147	0.260	12.1	0.021	0.012	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_44_20180428	9.50	8.30	6.75	oto	3	M	0.070	0.014	6.67	0.002	0.010	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_45_20180428	12.1	10.5	15.1	oto	6	F	0.330	0.154	14.6	0.010	0.022	A	A	A	A	worms	1.46	-
	28-Apr-18	RG_SC_RSC_46_20180428	12.3	10.9	16.6	oto	4	F	0.795	0.370	15.5	0.022	0.048	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_47_20180428	12.1	10.7	14.1	oto	5	F	0.710	0.159	13.3	0.011	0.050	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_48_20180428	10.0	8.70	8.58	oto	[c]	M	0.057	0.168	8.36	0.020	0.007	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_49_20180428	11.6	9.90	11.8	oto	4	M	0.123	0.166	11.5	0.014	0.010	A	M	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_50_20180428	10.0	8.90	8.27	oto	3	F	0.295	0.090	7.89	0.011	0.036	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_51_20180428	8.70	7.50	4.82	oto	3	F	0.177	0.093	4.55	0.019	0.037	A	M	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_52_20180428	11.5	7.10	12.6	oto	4	M	0.179	0.169	12.2	0.013	0.014	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_53_20180428	11.0	9.50	11.4	oto	3	M	0.163	0.111	11.2	0.010	0.014	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_54_20180428	11.1	8.50	11.5	oto	3	M	0.158	0.117	11.2	0.010	0.014	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_55_20180428	11.1	9.50	10.6	oto	3	M	0.111	0.159	10.3	0.015	0.011	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_56_20180428	10.0	8.60	8.46	oto	2	F	0.066	0.071	8.32	0.008	0.008	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_57_20180428	10.5	9.10	9.14	oto	4	F	0.400	0.126	8.61	0.014	0.044	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_58_20180428	9.70	8.60	7.14	oto	4	M	0.035	0.083	7.03	0.012	0.005	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_59_20180428	10.6	9.10	9.16	oto	3	M	0.044	0.076	9.04	0.008	0.005	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_60_20180428	10.1	8.90	9.18	oto	3	F	0.078	0.164	8.94	0.018	0.008	A	M	A	A	worms	0.948	-
	28-Apr-18	RG_SC_RSC_61_20180428	11.1	9.60	11.5	oto	5	F	0.102	0.203	11.2	0.018	0.009	A	A	A	A	worms	0.298	-
	29-Apr-18	RG_SC_RSC_62_20180429	13.3	11.6	19.2	oto	6	F	1.257	0.293	17.7	0.015	0.065	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_63_20180429	10.2	8.90	9.14	oto	2	M	0.040	0.119	8.98	0.013	0.004	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_64_20180429	11.4	9.70	11.3	oto	3	M	0.198	0.133	11.0	0.012	0.017	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_65_20180428	11.7	10.1	12.1	oto	3	F	0.582	0.213	11.3	0.018	0.048	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_66_20180429	13.5	11.8	20.3	oto	5	F	0.808	0.473	19.0	0.023	0.040	A	A	A	A	worms	0.237	-
	29-Apr-18	RG_SC_RSC_67_20180429	9.90	8.60	8.42	oto	3	M	0.085	0.158	8.18	0.019	0.010	A	M	A	A	-	-	-

Table G.12: Summary Statistics for Redside Shiner Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S] /Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Sand Creek	29-Apr-18	RG_SC_RSC_68_20180429	11.0	9.50	11.2	oto	4	M	0.120	0.180	10.9	0.016	0.011	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_69_20180428	10.5	9.10	9.07	oto	3	F	0.389	0.052	8.63	0.006	0.043	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_70_20180429	9.70	8.40	7.45	oto	3	M	0.131	0.110	7.21	0.015	0.018	A	A	A	A	-	-	-
	28-Apr-18	RG_SC_RSC_71_20180428	11.5	10.0	12.2	oto	4	F	0.577	0.172	11.5	0.014	0.047	A	M	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_72_20180429	12.9	11.3	17.4	oto	5	M	0.180	0.211	17.0	0.012	0.010	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_73_20180429	10.4	9.00	8.98	oto	3	M	0.093	0.052	8.84	0.006	0.010	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_74_20180429	10.5	9.00	9.11	oto	2	M	0.137	0.126	8.85	0.014	0.015	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_75_20180429	11.6	10.1	12.6	oto	4	F	0.179	0.220	12.2	0.017	0.014	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_76_20180429	11.8	10.2	14.0	oto	3	M	0.179	0.220	13.6	0.016	0.013	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_77_20180429	10.5	9.40	9.22	oto	3	M	0.061	0.117	9.04	0.013	0.007	A	M	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_78_20180429	10.9	9.50	9.68	oto	3	M	0.062	0.147	9.47	0.015	0.006	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_79_20180429	11.8	10.3	12.4	oto	4	M	0.154	0.114	12.1	0.009	0.012	A	M	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_80_20180429	11.2	9.50	10.8	oto	3	M	0.108	0.099	10.6	0.009	0.010	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_81_20180429	11.7	10.3	14.2	oto	4	M	0.295	0.220	13.6	0.016	0.021	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_82_20180429	11.1	9.50	10.7	oto	5	M	0.126	0.107	10.5	0.010	0.012	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_83_20180429	10.2	8.80	8.49	oto	3	M	0.140	0.145	8.21	0.017	0.016	A	A	A	A	worms	0.0200	-
	29-Apr-18	RG_SC_RSC_84_20180429	10.7	9.30	9.96	oto	3	M	0.152	0.138	9.67	0.014	0.015	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_85_20180429	9.90	8.50	8.22	oto	3	M	0.077	0.091	8.05	0.011	0.009	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_86_20180429	10.7	9.50	9.89	oto	3	M	0.119	0.119	9.65	0.012	0.012	A	A	A	A	-	-	-
	29-Apr-18	RG_SC_RSC_87_20180429	11.1	9.70	11.2	oto	4	M	0.168	0.233	10.8	0.021	0.015	A	A	A	A	-	-	-
	total sample size		**87**	**87**	**87**	**-**	**83**	**-**	**84**	**87**	**84**	**87**	**84**	**-**	**-**	**-**	**-**	**-**	**12**	**-**
	average		**10.9**	**9.43**	**10.7**	**-**	**3.45**	**-**	**0.264**	**0.149**	**10.4**	**0.0**	**0.0**	**-**	**-**	**-**	**-**	**-**	**0.661**	**-**
	median		**10.9**	**9.40**	**10.3**	**-**	**3.00**	**-**	**0.161**	**0.138**	**10.1**	**0.0**	**0.0**	**-**	**-**	**-**	**-**	**-**	**0.376**	**-**
	standard deviation		**0.937**	**0.870**	**3.08**	**-**	**0.859**	**-**	**0.242**	**0.082**	**2.87**	**0.01**	**0.02**	**-**	**-**	**-**	**-**	**-**	**0.776**	**-**
	standard error		**0.100**	**0.0933**	**0.330**	**-**	**0.0943**	**-**	**0.026**	**0.009**	**0.313**	**0.001**	**0.002**	**-**	**-**	**-**	**-**	**-**	**0.224**	**-**
	minimum		**8.70**	**7.10**	**4.82**	**-**	**2.00**	**-**	**0.019**	**0.014**	**4.55**	**0.00**	**0.00**	**-**	**-**	**-**	**-**	**-**	**0.0200**	**-**
	maximum		**13.5**	**11.8**	**20.3**	**-**	**6.00**	**-**	**1.26**	**0.473**	**19.4**	**0.0**	**0.1**	**-**	**-**	**-**	**-**	**-**	**2.72**	**-**
Elk River	25-Apr-18	RG_ER_RSC_01_20180425	11.2	10.1	13.3	oto	4	F	0.735	0.265	12.3	0.020	0.055	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_ER_RSC_02_20180425	10.6	9.20	9.96	oto	3	M	0.066	0.154	9.74	0.015	0.007	A	A	A	A	-	-	-
	25-Apr-18	RG_ER_RSC_03_20180425	10.5	9.10	8.32	oto	-	U	-	0.090	-	0.011	-	A	A	A	A	worms	0.797	-
	25-Apr-18	RG_ER_RSC_04_20180425	9.80	8.70	6.91	oto	3	M	0.042	0.041	6.83	0.006	0.006	A	A	A	A	-	-	-
	25-Apr-18	RG_ER_RSC_05_20180425	10.8	9.50	11.1	oto	3	M	2.888	0.155	8.04	0.014	0.261	A	A	A	A	-	-	-
	25-Apr-18	RG_ER_RSC_06_20180425	10.9	9.50	10.3	oto	3	M	0.112	0.147	10.0	0.014	0.011	A	A	A	A	-	-	-
	25-Apr-18	RG_ER_RSC_07_20180425	10.9	9.40	10.3	oto	4	F	0.459	0.103	9.78	0.010	0.044	A	A	A	A	-	-	muscle, ovaries

Table G.12: Summary Statistics for Redside Shiner Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S] /Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Elk River	25-Apr-18	RG_ER_RSC_08_20180425	12.1	10.5	13.4	oto	5	F	0.584	0.343	12.5	0.026	0.044	A	A	A	A	worms	0.0960	muscle, ovaries
	25-Apr-18	RG_ER_RSC_09_20180425	10.1	8.90	7.90	oto	3	F	0.271	0.197	7.43	0.025	0.034	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_ER_RSC_10_20180425	10.6	9.30	8.77	oto	3	F	0.039	0.140	8.59	0.016	0.004	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_ER_RSC_11_20180425	10.7	9.50	10.7	oto	3	F	0.478	0.173	10.1	0.016	0.045	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_ER_RSC_12_20180425	10.5	9.30	9.03	oto	4	F	0.263	0.202	8.56	0.022	0.029	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_ER_RSC_13_20180425	9.80	8.50	8.03	oto	3	M	0.061	0.176	7.80	0.022	0.008	A	A	A	A	-	-	-
	25-Apr-18	RG_ER_RSC_14_20180425	9.90	8.60	7.40	oto	3	F	0.238	0.150	7.01	0.020	0.032	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_ER_RSC_15_20180425	9.70	8.60	7.27	oto	3	F	0.213	0.135	6.92	0.019	0.029	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_ER_RSC_16_20180425	9.70	8.50	8.24	oto	3	F	0.086	0.192	7.96	0.023	0.010	A	A	A	A	worms	1.40	muscle, ovaries
	25-Apr-18	RG_ER_RSC_17_20180425	10.6	9.20	8.52	oto	3	M	0.143	0.063	8.31	0.007	0.017	A	A	A	A	-	-	-
	25-Apr-18	RG_ER_RSC_18_20180425	10.0	8.70	8.73	oto	-	U	0.025	0.065	8.64	0.007	0.003	A	A	A	A	worms	1.07	-
	25-Apr-18	RG_ER_RSC_19_20180425	10.5	9.30	9.03	oto	3	F	0.347	0.148	8.54	0.016	0.038	A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_ER_RSC_20_20180425	9.40	8.50	6.77	oto	-	U	0.024	0.123	6.62	0.018	0.004	A	A	A	A	worms	0.476	-
	25-Apr-18	RG_ER_RSC_21_20180425	10.0	8.60	7.82	oto	3	F	0.198	0.083	7.54	0.011	0.025	A	A	A	A	-	-	-
	25-Apr-18	RG_ER_RSC_22_20180425	10.8	9.30	9.65	oto	3	F	0.290	0.243	9.12	0.025	0.030	A	M	A	A	-	-	-
	25-Apr-18	RG_ER_RSC_23_20180425	10.3	8.90	9.32	oto	3	M	0.090	0.128	9.10	0.014	0.010	A	A	A	A	cut tail fin	-	-
	26-Apr-18	RG_ER_RSC_24_20180426	12.1	10.4	15.2	oto	4	M	0.144	0.234	14.8	0.015	0.010	A	M	A	A	worms	0.0930	-
	26-Apr-18	RG_ER_RSC_25_20180426	12.1	10.5	14.6	oto	5	F	0.692	0.169	13.7	0.012	0.048	A	A	A	A	missing half of caudal fin	-	-
	26-Apr-18	RG_ER_RSC_26_20180426	12.2	10.3	13.8	oto	4	F	0.353	0.336	13.1	0.024	0.026	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_RSC_27_20180426	10.5	9.20	9.12	oto	3	F	0.155	0.167	8.80	0.018	0.017	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_RSC_28_20180426	11.9	10.5	13.9	oto	3	F	0.417	0.096	13.4	0.007	0.030	M	A	A	A	worms, broken operculum	0.200	-
	26-Apr-18	RG_ER_RSC_29_20180426	11.0	9.11	11.8	oto	3	F	0.681	0.188	10.9	0.016	0.058	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_RSC_30_20180426	11.2	9.80	10.9	oto	3	M	0.083	0.160	10.6	0.015	0.008	A	A	A	A	worms	0.00600	-
	26-Apr-18	RG_ER_RSC_31_20180426	11.0	9.70	10.3	oto	3	M	0.124	0.029	10.2	0.003	0.012	A	M	A	A	worms, missing half of caudal fin	0.309	-
	26-Apr-18	RG_ER_RSC_32_20180426	10.1	8.90	8.26	oto	3	F	0.137	0.140	7.99	0.017	0.017	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_RSC_33_20180426	10.2	8.90	7.96	oto	3	M	0.084	0.149	7.73	0.019	0.011	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_RSC_34_20180426	11.8	10.5	13.3	oto	4	M	0.071	0.119	13.2	0.009	0.005	A	A	A	A	-	-	-

Table G.12: Summary Statistics for Redside Shiner Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S] /Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Elk River	26-Apr-18	RG_ER_RSC_35_20180426	11.9	10.5	14.6	oto	4	F	0.566	0.248	13.8	0.017	0.039	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_RSC_36_20180426	11.5	9.90	11.7	oto	4	M	0.088	0.195	11.4	0.017	0.008	A	A	A	A	worms	0.711	-
	26-Apr-18	RG_ER_RSC_37_20180426	10.0	8.50	7.63	oto	4	M	0.064	0.175	7.39	0.023	0.008	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_RSC_38_20180426	9.80	8.40	7.53	oto	2	M	0.017	0.146	7.37	0.019	0.002	A	A	A	A	worms	0.0400	-
	26-Apr-18	RG_ER_RSC_39_20180426	10.0	8.60	8.08	oto	3	M	0.032	0.110	7.94	0.014	0.004	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_RSC_40_20180426	10.5	9.10	8.61	oto	3	M	0.083	0.113	8.41	0.013	0.010	A	A	A	A	-	-	-
	26-Apr-18	RG_ER_RSC_41_20180426	10.0	8.60	7.87	oto	3	M	0.096	0.075	7.70	0.010	0.012	A	A	A	A	-	-	-
	27-Apr-18	RG_ER_RSC_42_20180427	11.6	10.5	15.2	oto	3	M	0.181	0.156	14.9	0.010	0.012	A	A	A	A	worms	1.11	-
	27-Apr-18	RG_ER_RSC_43_20180427	11.7	10.3	12.9	oto	3	M	0.093	0.115	12.7	0.009	0.007	A	M	A	A	missing half of caudal fin	-	-
	27-Apr-18	RG_ER_RSC_44_20180427	10.4	9.00	7.85	oto	3	F	0.296	0.103	7.45	0.013	0.038	A	A	A	A	-	-	-
	27-Apr-18	RG_ER_RSC_45_20180427	11.1	9.70	10.0	oto	5	M	0.051	0.101	9.86	0.010	0.005	A	A	A	A	-	-	-
	27-Apr-18	RG_ER_RSC_46_20180427	9.90	8.50	8.94	oto	3	F	0.496	0.192	8.25	0.021	0.055	A	A	A	A	-	-	-
	27-Apr-18	RG_ER_RSC_47_20180427	10.5	9.30	9.12	oto	2	M	0.122	0.211	8.79	0.023	0.013	A	A	A	A	-	-	-
	27-Apr-18	RG_ER_RSC_48_20180427	12.0	10.4	13.7	oto	5	F	0.444	0.218	13.0	0.016	0.032	A	A	A	A	worms	0.282	-
	27-Apr-18	RG_ER_RSC_49_20180427	11.4	10.5	11.3	oto	4	M	0.077	0.280	11.0	0.025	0.007	A	A	A	A	-	-	-
	27-Apr-18	RG_ER_RSC_50_20180427	10.4	8.90	9.31	oto	3	M	0.061	0.077	9.17	0.008	0.007	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_51_20180428	12.5	10.8	17.5	oto	4	M	0.560	0.364	16.5	0.021	0.032	A	A	A	A	worms	0.561	-
	28-Apr-18	RG_ER_RSC_52_20180428	10.8	9.30	10.0	oto	4	F	0.420	0.214	9.40	0.021	0.042	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_53_20180428	12.3	10.6	14.2	oto	4	M	0.247	0.244	13.7	0.017	0.017	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_54_20180428	11.2	9.70	11.3	oto	3	F	0.940	0.198	10.2	0.017	0.083	A	A	A	A	worms	0.0390	-
	28-Apr-18	RG_ER_RSC_55_20180428	10.1	8.50	8.45	oto	4	M	0.044	0.157	8.25	0.019	0.005	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_56_20180428	12.6	11.1	16.5	oto	4	F	0.802	0.276	15.5	0.017	0.049	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_57_20180428	12.2	10.6	14.7	oto	8	M	0.074	0.322	14.3	0.022	0.005	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_58_20180428	10.4	9.10	9.17	oto	-	M	0.109	0.174	8.89	0.019	0.012	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_59_20180428	12.9	11.3	18.6	oto	4	F	0.880	0.272	17.5	0.015	0.047	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_60_20180428	13.3	11.7	18.6	oto	5	F	0.978	0.321	17.3	0.017	0.053	A	A	A	A	worms	2.78	-
	28-Apr-18	RG_ER_RSC_61_20180428	13.1	11.5	17.5	oto	5	F	0.906	0.272	16.3	0.016	0.052	A	M	A	A	worms	0.936	-
	28-Apr-18	RG_ER_RSC_62_20180428	13.0	11.5	20.9	oto	5	F	0.314	0.367	20.2	0.018	0.015	A	A	A	A	worms	1.39	-
	28-Apr-18	RG_ER_RSC_63_20180428	12.3	10.7	16.2	oto	5	M	0.079	0.263	15.9	0.016	0.005	A	A	A	A	worms	1.45	-
	28-Apr-18	RG_ER_RSC_64_20180428	11.5	9.70	12.2	oto	4	F	0.096	0.116	12.0	0.009	0.008	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_65_20180428	11.8	10.4	14.3	oto	-	U	-	0.215	-	0.015	-	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_66_20180428	13.5	11.7	20.8	oto	5	F	1.361	0.375	19.1	0.018	0.065	A	A	A	A	worms	0.288	-
	28-Apr-18	RG_ER_RSC_67_20180428	11.5	10.2	13.8	oto	4	M	0.170	0.123	13.5	0.009	0.012	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_68_20180428	12.2	10.5	14.4	oto	4	F	0.583	0.195	13.6	0.014	0.040	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_69_20180428	11.2	9.70	10.7	oto	3	F	0.487	0.130	10.1	0.012	0.046	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_70_20180428	12.5	10.8	17.1	oto	3	M	0.194	0.169	16.7	0.010	0.011	A	A	A	A	-	-	-

Table G.12: Summary Statistics for Redside Shiner Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S] /Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Elk River	28-Apr-18	RG_ER_RSC_71_20180428	11.7	10.4	13.2	oto	4	F	0.321	0.347	12.6	0.026	0.024	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_72_20180428	10.2	8.90	8.36	oto	3	F	0.272	0.173	7.92	0.021	0.033	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_73_20180428	10.5	9.00	9.75	oto	3	M	0.052	0.122	9.57	0.013	0.005	A	A	A	A	-	-	-
	28-Apr-18	RG_ER_RSC_74_20180428	11.1	9.60	11.6	oto	3	M	0.102	0.081	11.5	0.007	0.009	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_75_20180429	11.4	10.0	12.9	oto	4	M	0.115	0.187	12.6	0.014	0.009	A	M	A	A	caudal fin erosion	-	-
	29-Apr-18	RG_ER_RSC_76_20180429	12.5	10.8	16.1	oto	7	M	0.295	0.253	15.5	0.016	0.018	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_77_20180429	10.6	9.10	9.78	oto	4	F	0.356	0.190	9.23	0.019	0.036	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_78_20180429	11.9	10.4	13.0	oto	4	M	0.118	0.169	12.8	0.013	0.009	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_79_20180429	11.3	9.90	11.3	oto	4	M	0.105	0.196	11.0	0.017	0.009	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_80_20180429	12.0	10.6	14.6	oto	6	M	0.167	0.221	14.2	0.015	0.011	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_81_20180429	11.2	10.0	11.6	oto	4	M	0.128	0.126	11.4	0.011	0.011	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_82_20180429	10.7	9.50	10.6	oto	4	M	0.147	0.145	10.3	0.014	0.014	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_83_20180429	11.2	10.0	13.0	oto	4	M	0.114	0.346	12.5	0.027	0.009	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_84_20180429	11.4	10.0	11.4	oto	3	M	0.062	0.174	11.2	0.015	0.005	A	A	A	A	worms	0.0890	-
	29-Apr-18	RG_ER_RSC_85_20180429	11.2	9.60	10.5	oto	3	M	0.040	0.208	10.2	0.020	0.004	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_86_20180429	10.5	9.20	8.68	oto	3	M	0.088	0.260	8.34	0.030	0.010	A	A	A	A	-	-	-
	29-Apr-18	RG_ER_RSC_87_20180429	10.7	9.20	9.38	oto	3	M	0.105	0.074	9.20	0.008	0.011	A	A	A	A	-	-	-
	total sample size		**87**	**87**	**87**	**-**	**82**	**-**	**85**	**87**	**85**	**87**	**85**	**-**	**-**	**-**	**-**	**-**	**21**	**-**
	average		**11.1**	**9.70**	**11.5**	**-**	**3.67**	**-**	**0.296**	**0.182**	**11.0**	**0.0**	**0.0**	**-**	**-**	**-**	**-**	**-**	**0.673**	**-**
	median		**11.0**	**9.60**	**10.7**	**-**	**3.00**	**-**	**0.144**	**0.173**	**10.2**	**0.0**	**0.0**	**-**	**-**	**-**	**-**	**-**	**0.476**	**-**
	standard deviation		**0.950**	**0.854**	**3.31**	**-**	**0.982**	**-**	**0.391**	**0.080**	**3.13**	**0.01**	**0.03**	**-**	**-**	**-**	**-**	**-**	**0.689**	**-**
	standard error		**0.102**	**0.0915**	**0.355**	**-**	**0.108**	**-**	**0.042**	**0.009**	**0.340**	**0.001**	**0.003**	**-**	**-**	**-**	**-**	**-**	**0.150**	**-**
	minimum		**9.40**	**8.40**	**6.77**	**-**	**2.00**	**-**	**0.017**	**0.029**	**6.62**	**0.00**	**0.00**	**-**	**-**	**-**	**-**	**-**	**0.00600**	**-**
	maximum		**13.5**	**11.7**	**20.9**	**-**	**8.00**	**-**	**2.89**	**0.375**	**20.2**	**0.0**	**0.3**	**-**	**-**	**-**	**-**	**-**	**2.78**	**-**
Gold Creek	24-Apr-18	RG_GC_RSC_01_20180424	10.5	9.10	8.73	oto	3	M	0.056	0.067	8.61			A	A	A	A	-	-	-
	24-Apr-18	RG_GC_RSC_02_20180424	10.4	9.30	9.25	oto	3	F	0.421	0.072	8.76			A	A	A	A	-	-	muscle, ovaries
	24-Apr-18	RG_GC_RSC_03_20180424	10.0	8.60	7.91	oto	-	U	0.048	0.137	7.72			A	A	A	A	worms	0.249	-
	24-Apr-18	RG_GC_RSC_04_20180424	9.80	8.40	7.19	oto	3	F	0.061	0.117	7.01			A	A	A	A	-	-	muscle, ovaries
	25-Apr-18	RG_GC_RSC_05_20180425	11.1	9.80	10.3	oto	3	M	0.038	0.182	10.1			A	A	A	A	-	-	-
	25-Apr-18	RG_GC_RSC_06_20180425	10.4	8.90	8.73	oto	2	M	0.099	0.131	8.50			A	A	A	A	-	-	-
	25-Apr-18	RG_GC_RSC_07_20180425	10.3	8.90	8.00	oto	3	M	0.047	0.085	7.87			A	A	A	A	-	-	-
	26-Apr-18	RG_GC_RSC_08_20180426	9.70	8.40	7.02	oto	3	M	0.045	0.107	6.87			A	A	A	A	-	-	-
	26-Apr-18	RG_GC_RSC_09_20180426	11.9	10.4	14.6	oto	4	F	0.388	0.196	14.0			A	A	A	A	worms	1.04	muscle, ovaries
	26-Apr-18	RG_GC_RSC_10_20180426	9.90	8.50	7.82	oto	3	M	0.043	0.182	7.59			A	A	A	A	-	-	-

Table G.12: Summary Statistics for Redside Shiner Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S] /Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Gold Creek	26-Apr-18	RG_GC_RSC_11_20180426	9.70	8.40	8.27	oto	-	U	0.024	0.150	8.10			A	A	A	A	worms	0.0120	-
	26-Apr-18	RG_GC_RSC_12_20180426	9.90	8.50	8.31	oto	3	M	0.083	0.179	8.05			A	A	A	A	-	-	-
	26-Apr-18	RG_GC_RSC_13_20180426	9.80	8.50	7.54	oto	2	M	0.077	0.098	7.36			A	A	A	A	worms	0.0520	-
	26-Apr-18	RG_GC_RSC_14_20180426	9.20	8.10	6.86	oto	3	M	0.118	0.152	6.59			A	A	A	A	-	-	-
	26-Apr-18	RG_GC_RSC_15_20180426	10.1	8.90	8.44	oto	4	M	0.068	0.050	8.32			A	A	A	A	worms	0.0170	-
	26-Apr-18	RG_GC_RSC_16_20180426	9.90	8.80	8.88	oto	3	F	0.373	0.105	8.40			A	A	A	A	-	-	muscle, ovaries
	27-Apr-18	RG_GC_RSC_17_20180427	12.5	10.7	15.5	oto	5	F	0.494	0.103	14.9			A	A	A	A	worms	0.452	muscle, ovaries
	27-Apr-18	RG_GC_RSC_18_20180427	10.1	9.30	9.66	oto	3	F	0.385	0.190	9.08			A	A	A	A	-	-	muscle, ovaries
	27-Apr-18	RG_GC_RSC_19_20180427	12.5	11.4	15.7	oto	4	F	0.660	0.359	14.7			A	A	A	A	-	-	muscle, ovaries
	27-Apr-18	RG_GC_RSC_20_20180427	12.8	11.2	16.0	oto	3	F	0.700	0.222	15.1			A	M	A	A	worms	0.229	muscle, ovaries
	27-Apr-18	RG_GC_RSC_21_20180427	11.5	10.3	14.6	oto	4	F	0.715	0.274	13.6			A	A	A	A	-	-	muscle, ovaries
	27-Apr-18	RG_GC_RSC_22_20180427	10.6	9.20	9.17	oto	3	M	0.108	0.061	9.00			A	A	A	A	worms	0.668	-
	27-Apr-18	RG_GC_RSC_23_20180427	10.4	8.90	7.97	oto	3	F	0.322	0.125	7.52			A	A	A	A	worms	0.0490	-
	27-Apr-18	RG_GC_RSC_24_20180427	10.6	9.20	9.63	oto	3	F	0.380	0.215	9.04			A	A	A	A	-	-	muscle, ovaries
	27-Apr-18	RG_GC_RSC_25_20180427	12.2	10.6	15.1	oto	4	F	0.418	0.273	14.4			-	-	-	-	worms	0.554	-
	27-Apr-18	RG_GC_RSC_26_20180427	10.2	8.80	8.17	oto	2	F	0.217	0.081	7.87			A	A	A	A	worms	0.00900	-
	27-Apr-18	RG_GC_RSC_27_20180427	10.4	9.00	9.71	oto	3	M	0.049	0.143	9.52			A	M	A	A	-	-	-
	27-Apr-18	RG_GC_RSC_28_20180427	10.9	9.40	8.61	oto	3	F	0.063	0.108	8.44			A	A	A	A	worms	1.37	-
	27-Apr-18	RG_GC_RSC_29_20180427	10.9	8.60	11.4	oto	3	M	0.075	0.113	11.2			A	A	A	A	-	-	-
	27-Apr-18	RG_GC_RSC_30_20180427	10.9	9.50	11.8	oto	3	F	0.527	0.160	11.1			A	A	A	A	-	-	-
	27-Apr-18	RG_GC_RSC_31_20180427	11.1	10.5	10.1	oto	3	M	0.062	0.291	9.75			A	A	A	A	worms	0.004	-
	27-Apr-18	RG_GC_RSC_32_20180427	9.60	8.50	8.31	oto	3	F	0.380	0.098	7.83			A	A	A	A	-	-	-
	27-Apr-18	RG_GC_RSC_33_20180427	10.4	9.10	8.92	oto	3	M	0.080	0.156	8.69			A	A	A	A	-	-	-
	27-Apr-18	RG_GC_RSC_34_20180427	9.70	8.60	8.60	oto	3	M	0.041	0.054	8.50			A	A	A	A	worms, upturned snout	0.581	-
	27-Apr-18	RG_GC_RSC_35_20180427	9.70	8.50	7.62	oto	2	M	0.029	0.133	7.46			A	A	A	A	-	-	-
	27-Apr-18	RG_GC_RSC_36_20180427	11.6	10.2	13.2	oto	3	F	0.620	0.136	12.5			A	A	A	A	worms	0.660	-
	27-Apr-18	RG_GC_RSC_37_20180427	12.5	10.9	15.6	oto	4	M	0.533	0.237	14.9			A	A	A	A	-	-	-
	27-Apr-18	RG_GC_RSC_38_20180427	9.70	8.50	7.90	oto	2	M	0.048	0.130	7.72			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_39_20180428	12.3	10.6	14.8	oto	3	F	0.414	0.225	14.2			A	A	A	A	worms	0.435	-
	28-Apr-18	RG_GC_RSC_40_20180428	12.2	10.5	15.5	oto	3	F	0.579	0.340	14.6			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_41_20180428	11.6	10.2	14.6	oto	3	M	0.290	0.154	14.1			A	M	A	A	worms	1.01	-

Table G.12: Summary Statistics for Redside Shiner Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S] /Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Gold Creek	28-Apr-18	RG_GC_RSC_42_20180428	10.5	8.90	9.44	oto	3	F	0.318	0.184	8.94			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_43_20180428	10.4	9.10	8.17	oto	3	M	0.071	0.121	7.98			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_44_20180428	11.5	10.1	12.5	oto	4	F	0.585	0.160	11.7			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_45_20180428	10.4	9.10	8.71	oto	3	F	0.362	0.125	8.22			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_46_20180428	11.1	9.50	10.8	oto	3	F	0.683	0.147	9.95			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_47_20180428	12.8	10.9	15.9	oto	4	F	0.813	0.406	14.7			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_48_20180428	10.2	8.90	10.9	oto	-	U	0.026	0.169	10.7			A	M	A	A	worms	2.49	-
	28-Apr-18	RG_GC_RSC_49_20180428	10.2	8.60	8.00	oto	3	M	0.130	0.104	7.77			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_50_20180428	11.4	9.90	11.3	oto	3	F	0.556	0.162	10.6			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_51_20180428	11.2	9.50	13.1	oto	3	M	0.106	0.125	12.8			A	A	A	A	worms	1.79	-
	28-Apr-18	RG_GC_RSC_52_20180428	12.6	11.0	16.9	oto	4	F	0.323	0.230	16.3			A	A	A	A	worms	0.392	-
	28-Apr-18	RG_GC_RSC_53_20180428	11.9	10.4	13.8	oto	3	F	0.257	0.255	13.3			A	A	A	A	worms	0.0170	-
	28-Apr-18	RG_GC_RSC_54_20180428	10.0	8.70	8.22	oto	3	M	0.093	0.064	8.06			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_55_20180428	10.4	9.10	8.74	oto	3	M	0.038	0.026	8.68			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_56_20180428	10.6	9.20	9.50	oto	3	M	0.038	0.220	9.24			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_57_20180428	10.8	9.40	9.49	oto	3	M	0.103	0.155	9.23			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_58_20180428	10.4	9.10	8.34	oto	3	M	0.096	0.155	8.09			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_59_20180428	10.2	9.00	8.99	oto	3	M	0.130	0.204	8.66			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_60_20180428	11.2	9.70	9.37	oto	4	F	0.406	0.120	8.85			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_61_20180428	10.4	9.10	9.09	oto	-	U	0.037	0.070	8.98			A	A	A	A	worms	0.622	-
	28-Apr-18	RG_GC_RSC_62_20180428	10.9	9.50	10.3	oto	3	M	0.180	0.166	9.92			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_63_20180428	10.4	9.10	9.08	oto	3	F	0.286	0.238	8.55			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_64_20180428	11.3	9.70	10.8	oto	3	M	0.092	0.248	10.5			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_65_20180428	12.3	10.6	14.8	oto	4	F	0.683	0.227	13.9			A	A	A	A	worms	0.0180	-
	28-Apr-18	RG_GC_RSC_66_20180428	11.9	10.5	14.1	oto	4	M	0.174	0.239	13.7			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_67_20180428	10.7	9.30	9.00	oto	3	M	0.155	0.083	8.77			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_68_20180428	11.0	9.60	10.4	oto	4	M	0.144	0.098	10.2			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_69_20180428	10.6	9.10	10.7	oto	3	M	0.122	0.233	10.3			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_70_20180428	10.3	9.00	9.16	oto	4	M	0.099	0.220	8.84			A	A	A	A	worms	0.0680	-
	28-Apr-18	RG_GC_RSC_71_20180428	10.1	8.60	8.29	oto	-	U	0.004	0.053	8.23			A	A	A	A	worms	0.0230	-
	28-Apr-18	RG_GC_RSC_72_20180428	11.6	10.2	13.2	oto	4	F	0.634	0.161	12.4			A	A	A	A	worms	0.299	-
	28-Apr-18	RG_GC_RSC_73_20180428	10.0	8.70	8.28	oto	3	M	0.050	0.272	7.96			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_74_20180428	10.1	8.90	8.82	oto	3	M	0.029	0.112	8.68			A	A	A	A	worms	1.37	-
	28-Apr-18	RG_GC_RSC_75_20180428	12.5	11.0	17.9	oto	4	F	0.344	0.218	17.3			A	A	A	A	worms	2.79	-
	28-Apr-18	RG_GC_RSC_76_20180428	10.5	9.00	8.95	oto	3	M	0.126	0.141	8.68			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_77_20180428	11.3	9.90	11.4	oto	5	M	0.079	0.167	11.1			A	A	A	A	worms	0.0330	-
	28-Apr-18	RG_GC_RSC_78_20180428	10.7	9.00	8.79	oto	4	M	0.120	0.139	8.53			A	A	A	A	-	-	-

Table G.12: Summary Statistics for Redside Shiner Meristic Data Used for the Fish Health Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age (years)	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S] /Minor[M]/ Absent[A])				Comment	Worm Weight (g)	Tissue Collected
														D	E	L	T			
Gold Creek	28-Apr-18	RG_GC_RSC_79_20180428	10.4	8.90	8.09	oto	2	M	0.125	0.122	7.84			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_80_20180428	10.4	9.10	9.17	oto	3	F	0.292	0.209	8.66			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_81_20180428	7.50	9.00	8.69	oto	3	M	0.027	0.207	8.46			A	A	A	A	worms	0.0290	-
	28-Apr-18	RG_GC_RSC_82_20180428	12.1	10.6	14.8	oto	4	F	0.547	0.227	14.0			A	A	A	A	worms	0.133	-
	28-Apr-18	RG_GC_RSC_83_20180428	11.6	10.0	12.0	oto	4	F	0.602	0.162	11.2			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_84_20180428	10.4	9.20	9.37	oto	3	F	0.226	0.209	8.93			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_85_20180428	11.0	10.0	9.09	oto	3	F	0.527	0.198	8.36			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_86_20180428	9.90	8.70	7.91	oto	3	M	0.069	0.126	7.72			A	A	A	A	worm	-	-
	28-Apr-18	RG_GC_RSC_87_20180428	12.4	11.0	15.3	oto	3	M	0.251	0.164	14.9			A	A	A	A	-	-	-
	28-Apr-18	RG_GC_RSC_88_20180428	10.5	9.20	7.78	oto	3	M	0.086	0.136	7.55			A	M	A	A	-	-	-
	total sample size		**88**	**88**	**88**	**-**	**83**	**-**	**88**	**88**	**88**			**-**	**-**	**-**	**-**	**-**	**31**	**-**
	average		**10.8**	**9.44**	**10.5**	**-**	**3.20**	**-**	**0.243**	**0.163**	**10.1**			**-**	**-**	**-**	**-**	**-**	**0.563**	**-**
	median		**10.5**	**9.15**	**9.21**	**-**	**3.00**	**-**	**0.128**	**0.155**	**8.89**			**-**	**-**	**-**	**-**	**-**	**0.299**	**-**
	standard deviation		**0.953**	**0.804**	**2.81**	**-**	**0.600**	**-**	**0.219**	**0.0711**	**2.63**			**-**	**-**	**-**	**-**	**-**	**0.727**	**-**
	standard error		**0.102**	**0.0857**	**0.300**	**-**	**0.0659**	**-**	**0.0234**	**0.00758**	**0.280**			**-**	**-**	**-**	**-**	**-**	**0.131**	**-**
	minimum		**7.50**	**8.10**	**6.86**	**-**	**2.00**	**-**	**0.00400**	**0.0260**	**6.59**			**-**	**-**	**-**	**-**	**-**	**0.004**	**-**
	maximum		**12.8**	**11.4**	**17.9**	**-**	**5.00**	**-**	**0.813**	**0.406**	**17.3**			**-**	**-**	**-**	**-**	**-**	**2.79**	**-**

Note: "-" indicates no data available

[a] Age structures collected: oto - otoliths.

[b] Adjusted body weight represents whole body weight less the liver weight and gonad weight and used for statistical analyses.

[c] Otoliths were crystalized.

Table G.13: Summary Statistics for Juvenile Redside Shiner Meristic Data Used for the Recruitment Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (mm)	Fork Length (mm)	Body Weight (g)	Age Structure Collected	Age	DELT (Severe[S]/Minor[M]/Absent[A])				Comment	Tissue Collected
								D	E	L	T		
Sand Creek	29-Aug-18	RG_SC_RSC_01_20180829	22.0	20.4	0.075	whole body	0	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_02_20180829	22.9	21.1	0.115	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_03_20180829	26.3	23.7	0.130	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_04_20180829	32.6	30.5	0.263	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_05_20180829	28.6	25.6	0.172	whole body	0	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_06_20180829	32.6	29.0	0.262	whole body	0	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_07_20180829	34.3	32.2	0.311	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_08_20180829	25.2	22.7	0.125	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_09_20180829	27.5	24.4	0.155	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_10_20180829	20.4	18.1	0.083	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_11_20180829	23.9	22.2	0.121	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_12_20180829	25.5	24.0	0.153	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_13_20180829	24.0	22.9	0.135	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_14_20180829	23.8	22.2	0.132	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_15_20180829	23.0	21.2	0.103	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_16_20180829	29.4	27.0	0.188	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_17_20180829	30.0	27.7	0.238	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_18_20180829	26.3	24.1	0.151	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_19_20180829	28.0	26.1	0.185	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_20_20180829	21.9	20.1	0.106	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_21_20180829	23.2	20.6	0.117	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_22_20180829	28.8	25.8	0.203	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_23_20180829	24.5	22.3	0.129	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_24_20180829	23.5	21.4	0.139	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_25_20180829	31.1	28.4	0.220	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_26_20180829	39.5	37.0	0.488	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_27_20180829	31.1	28.2	0.209	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_28_20180829	22.8	21.1	0.094	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_29_20180829	36.7	33.2	0.377	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_30_20180829	37.8	34.2	0.351	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_31_20180829	30.1	26.8	0.201	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_32_20180829	33.0	29.8	0.304	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_33_20180829	23.6	21.5	0.116	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_34_20180829	33.6	31.0	0.338	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_35_20180829	25.1	23.2	0.135	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_36_20180829	33.7	29.7	0.313	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_37_20180829	30.6	27.5	0.232	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_38_20180829	34.4	32.7	0.345	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_39_20180829	24.1	22.5	0.131	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_40_20180829	25.7	23.0	0.150	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_41_20180829	29.6	26.2	0.171	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_42_20180829	34.2	30.7	0.304	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_43_20180829	38.1	33.9	0.388	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_44_20180829	42.1	37.4	0.502	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_45_20180829	29.9	26.7	0.207	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_46_20180829	34.1	31.5	0.296	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_47_20180829	34.2	30.4	0.275	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_48_20180829	24.7	22.7	0.124	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_49_20180829	36.2	32.9	0.395	whole body	0	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_50_20180829	30.8	27.6	0.121	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_51_20180829	31.9	29.5	0.223	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_52_20180829	24.1	22.0	0.263	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_53_20180829	23.5	21.5	0.091	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_54_20180829	25.0	22.5	0.114	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_55_20180829	28.3	25.5	0.161	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_56_20180829	30.8	28.3	0.221	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_57_20180829	24.8	22.9	0.126	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_58_20180829	25.3	22.4	0.115	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_59_20180829	21.7	19.0	0.073	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_60_20180829	30.4	27.5	0.227	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_61_20180829	31.9	27.1	0.210	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_62_20180829	28.5	25.5	0.148	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_63_20180829	29.7	26.1	0.157	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_64_20180829	31.3	28.9	0.214	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_65_20180829	31.5	28.6	0.207	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_66_20180829	33.5	29.6	0.253	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_67_20180829	26.0	24.1	0.120	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_68_20180829	22.9	21.6	0.091	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_69_20180829	23.0	21.2	0.090	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_70_20180829	22.6	20.5	0.073	-	-	A	A	A	A	-	-

Table G.13: Summary Statistics for Juvenile Redside Shiner Meristic Data Used for the Recruitment Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (mm)	Fork Length (mm)	Body Weight (g)	Age Structure Collected	Age	DELT (Severe[S]/Minor[M]/Absent[A])				Comment	Tissue Collected
								D	E	L	T		
Sand Creek	29-Aug-18	RG_SC_RSC_71_20180829	26.5	24.7	0.138	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_72_20180829	22.9	20.5	0.089	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_73_20180829	22.5	20.5	0.083	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_74_20180829	23.2	21.5	0.104	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_75_20180829	22.6	20.5	0.091	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_76_20180829	28.3	25.8	0.164	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_77_20180829	35.1	31.7	0.317	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_78_20180829	38.6	34.5	0.394	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_79_20180829	34.5	31.4	0.276	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_80_20180829	30.7	27.8	0.212	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_81_20180829	25.2	22.2	0.122	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_82_20180829	35.7	32.2	0.288	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_83_20180829	46.9	41.9	0.726	whole body	1	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_84_20180829	35.6	33.4	0.299	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_85_20180829	38.9	36.2	0.409	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_86_20180829	30.7	28.0	0.227	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_87_20180829	33.6	31.3	0.240	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_88_20180829	32.4	30.2	0.260	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_89_20180829	32.2	29.6	0.242	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_90_20180829	37.2	34.1	0.395	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_91_20180829	27.4	25.3	0.172	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_92_20180829	37.4	34.0	0.352	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_93_20180829	27.9	24.7	0.158	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_94_20180829	29.0	26.6	0.156	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_95_20180829	23.8	22.2	0.103	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_96_20180829	23.4	21.6	0.093	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_97_20180829	21.5	18.9	0.059	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_98_20180829	26.6	23.3	0.291	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_99_20180829	32.4	29.8	0.287	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_100_20180829	36.1	33.3	0.387	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_101_20180829	34.2	31.2	0.279	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_102_20180829	27.4	24.6	0.141	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_103_20180829	21.7	19.8	0.080	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_104_20180829	26.2	23.4	0.112	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_105_20180829	24.6	21.8	0.098	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_106_20180829	26.6	23.9	0.137	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_107_20180829	33.3	30.3	0.259	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_108_20180829	30.4	26.7	0.222	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_109_20180829	33.9	29.6	0.308	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_110_20180829	26.9	24.8	0.159	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_111_20180829	33.2	29.5	0.315	-	-	A	A	A	A	-	-
	29-Aug-18	RG_SC_RSC_112_20180829	33.0	29.6	0.281	-	-	A	A	A	A	-	-
	total sample size		**112**	**112**	**112**	**-**	**5**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**29.2**	**26.5**	**0.208**	**-**	**0.200**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**28.9**	**26.1**	**0.179**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**5.30**	**4.80**	**0.111**	**-**	**0.447**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**0.501**	**0.454**	**0.0105**	**-**	**0.200**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**20.4**	**18.1**	**0.0590**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**46.9**	**41.9**	**0.726**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**
Elk River	28-Aug-18	RG_ER_RSC_01_20180828	38.9	34.4	0.402	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_02_20180828	36.9	33.6	0.390	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_03_20180828	30.1	28.2	0.230	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_04_20180828	37.0	32.9	0.362	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_05_20180828	31.5	28.6	0.223	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_06_20180828	34.2	32.1	0.294	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_07_20180828	39.0	35.1	0.444	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_08_20180828	29.2	27.1	0.212	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_09_20180828	31.4	29.2	0.237	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_10_20180828	34.0	30.8	0.275	whole body	0	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_11_20180828	30.1	27.7	0.206	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_12_20180828	32.8	30.6	0.249	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_13_20180828	33.2	29.8	0.262	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_14_20180828	36.6	34.1	0.372	whole body	0	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_15_20180828	38.3	34.5	0.430	whole body	0	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_16_20180828	31.0	28.0	0.210	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_17_20180828	22.0	18.9	0.074	whole body	0	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_18_20180828	49.0	45.2	0.869	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_19_20180828	27.2	25.4	0.143	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_20_20180828	41.8	37.5	0.606	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_21_20180828	41.6	35.5	0.572	-	-	A	A	A	A	-	-

Table G.13: Summary Statistics for Juvenile Redside Shiner Meristic Data Used for the Recruitment Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (mm)	Fork Length (mm)	Body Weight (g)	Age Structure Collected	Age	DELT (Severe[S]/Minor[M]/Absent[A])				Comment	Tissue Collected
								D	E	L	T		
Elk River	28-Aug-18	RG_ER_RSC_22_20180828	30.7	29.4	0.231	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_23_20180828	32.4	30.4	0.277	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_24_20180828	39.9	36.1	0.487	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_25_20180828	30.5	28.6	0.248	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_26_20180828	27.4	25.0	0.168	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_27_20180828	33.4	30.3	0.259	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_28_20180828	28.3	26.1	0.178	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_29_20180828	31.5	26.5	0.238	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_30_20180828	30.1	27.8	0.212	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_31_20180828	37.0	33.3	0.381	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_32_20180828	31.5	28.8	0.235	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_33_20180828	43.4	39.9	0.622	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_34_20180828	34.9	31.4	0.299	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_35_20180828	38.2	34.1	0.368	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_36_20180828	34.6	31.8	0.271	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_37_20180828	32.3	29.0	0.218	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_38_20180828	37.0	33.5	0.363	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_39_20180828	41.3	36.9	0.569	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_40_20180828	31.4	28.5	0.233	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_41_20180828	29.1	27.6	0.195	whole body	0	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_42_20180828	33.0	29.6	0.264	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_43_20180828	31.4	29.4	0.241	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_44_20180828	30.0	27.6	0.173	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_45_20180828	31.6	28.8	0.223	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_46_20180828	33.4	30.2	0.264	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_47_20180828	33.5	31.6	0.255	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_48_20180828	34.6	32.8	0.315	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_49_20180828	26.3	25.2	0.130	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_50_20180828	30.7	28.1	0.202	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_51_20180828	26.5	25.4	0.181	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_52_20180828	35.0	32.7	0.337	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_53_20180828	31.6	29.0	0.231	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_54_20180828	33.2	29.3	0.287	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_55_20180828	26.9	25.1	0.156	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_56_20180828	33.1	29.5	0.269	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_57_20180828	31.0	28.0	0.209	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_58_20180828	31.0	28.4	0.221	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_59_20180828	30.0	27.6	0.206	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_60_20180828	32.3	29.7	0.235	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_61_20180828	29.4	28.0	0.227	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_62_20180828	33.5	30.5	0.272	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_63_20180828	32.0	29.0	0.234	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_64_20180828	26.2	24.7	0.148	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_65_20180828	30.2	27.9	0.225	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_66_20180828	32.9	29.8	0.288	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_67_20180828	29.4	26.6	0.173	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_68_20180828	28.5	25.8	0.183	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_69_20180828	34.8	31.3	0.337	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_70_20180828	37.6	33.1	0.424	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_71_20180828	30.3	28.1	0.205	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_72_20180828	31.8	29.2	0.275	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_73_20180828	30.0	27.5	0.217	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_74_20180828	31.9	28.9	0.285	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_75_20180828	28.5	26.0	0.169	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_76_20180828	29.9	26.8	0.192	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_77_20180828	29.3	27.3	0.188	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_78_20180828	28.8	27.4	0.199	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_79_20180828	27.4	26.1	0.149	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_80_20180828	27.4	26.7	0.210	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_81_20180828	28.4	27.1	0.158	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_82_20180828	26.3	24.2	0.149	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_83_20180828	31.3	28.8	0.248	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_84_20180828	31.1	27.5	0.202	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_85_20180828	28.2	25.6	0.165	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_86_20180828	32.1	29.0	0.264	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_87_20180828	30.6	28.3	0.237	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_88_20180828	25.4	24.0	0.131	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_89_20180828	36.8	34.2	0.372	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_90_20180828	35.0	31.4	0.285	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_91_20180828	30.6	27.7	0.224	-	-	A	A	A	A	-	-

Table G.13: Summary Statistics for Juvenile Redside Shiner Meristic Data Used for the Recruitment Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (mm)	Fork Length (mm)	Body Weight (g)	Age Structure Collected	Age	DELT (Severe[S]/Minor[M]/Absent[A])				Comment	Tissue Collected
								D	E	L	T		
Elk River	28-Aug-18	RG_ER_RSC_92_20180828	26.9	24.0	0.157	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_93_20180828	25.4	23.0	0.128	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_94_20180828	30.3	27.9	0.190	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_95_20180828	25.4	23.4	0.120	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_96_20180828	28.3	25.4	0.151	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_97_20180828	29.7	26.2	0.166	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_98_20180828	30.2	27.5	0.192	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_99_20180828	28.6	25.8	0.159	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_100_20180828	27.7	24.9	0.164	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_101_20180828	26.9	24.3	0.139	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_102_20180828	36.8	27.4	0.193	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_103_20180828	28.3	25.2	0.169	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_104_20180828	27.4	25.5	0.151	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_105_20180828	28.8	25.8	0.172	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_106_20180828	28.2	25.6	0.129	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_107_20180828	28.9	26.5	0.197	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_108_20180828	27.1	23.6	0.135	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_109_20180828	32.8	29.9	0.237	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_110_20180828	28.7	26.9	0.156	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_111_20180828	33.6	31.4	0.277	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_112_20180828	24.4	22.4	0.118	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_113_20180828	23.0	21.6	0.075	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_114_20180828	32.1	29.7	0.281	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_115_20180828	30.7	28.1	0.197	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_116_20180828	30.3	26.7	0.183	-	-	A	A	A	A	-	-
	28-Aug-18	RG_ER_RSC_117_20180828	32.0	29.3	0.219	-	-	A	A	A	A	-	-
	total sample size		**117**	**117**	**117**	**-**	**5**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**31.6**	**28.8**	**0.248**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**31.0**	**28.2**	**0.223**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**4.32**	**3.79**	**0.117**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**0.400**	**0.351**	**0.0108**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**22.0**	**18.9**	**0.0740**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**49.0**	**45.2**	**0.869**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
Gold Creek	28-Aug-18	RG_GC_RSC_01_20180828	40.2	35.2	0.491	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_02_20180828	24.4	22.7	0.148	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_03_20180828	25.7	23.7	0.146	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_04_20180828	29.6	27.6	0.194	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_05_20180828	24.0	22.1	0.115	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_06_20180828	31.1	29.3	0.227	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_07_20180828	24.4	22.7	0.124	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_08_20180828	29.0	26.1	0.168	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_09_20180828	28.8	25.8	0.158	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_10_20180828	34.7	32.0	0.294	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_11_20180828	31.5	29.1	0.193	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_12_20180828	28.4	26.8	0.149	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_13_20180828	26.6	24.7	0.143	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_14_20180828	34.1	31.5	0.293	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_15_20180828	34.4	31.9	0.305	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_16_20180828	27.6	25.6	0.145	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_17_20180828	29.4	27.4	0.161	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_18_20180828	32.4	28.9	0.239	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_19_20180828	27.5	25.5	0.144	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_20_20180828	42.4	38.8	0.550	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_21_20180828	35.1	32.9	0.325	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_22_20180828	27.4	24.7	0.133	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_23_20180828	35.7	33.3	0.340	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_24_20180828	33.8	30.7	0.281	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_25_20180828	36.6	32.9	0.327	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_26_20180828	27.9	26.2	0.146	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_27_20180828	42.7	39.3	0.583	whole body	0	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_28_20180828	26.8	25.0	0.142	whole body	0	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_29_20180828	32.5	29.9	0.220	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_30_20180828	30.5	28.7	0.206	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_31_20180828	29.6	27.7	0.217	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_32_20180828	33.8	31.0	0.322	whole body	0	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_33_20180828	30.2	28.2	0.208	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_34_20180828	32.6	29.7	0.262	whole body	0	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_35_20180828	41.7	37.4	0.521	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_36_20180828	34.0	31.6	0.296	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_37_20180828	29.9	28.5	0.184	-	-	A	A	A	A	-	-

Table G.13: Summary Statistics for Juvenile Redside Shiner Meristic Data Used for the Recruitment Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (mm)	Fork Length (mm)	Body Weight (g)	Age Structure Collected	Age	DELT (Severe[S]/Minor[M]/Absent[A])				Comment	Tissue Collected
								D	E	L	T		
Gold Creek	28-Aug-18	RG_GC_RSC_38_20180828	27.6	26.2	0.171	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_39_20180828	37.5	33.9	0.397	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_40_20180828	26.5	23.0	0.138	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_41_20180828	40.7	38.3	0.480	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_42_20180828	38.7	35.7	0.387	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_43_20180828	27.4	24.7	0.115	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_44_20180828	29.9	27.6	0.195	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_45_20180828	31.2	27.8	0.202	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_46_20180828	32.8	31.5	0.301	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_47_20180828	35.5	34.3	0.438	whole body	0	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_48_20180828	28.6	25.3	0.152	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_49_20180828	27.0	25.5	0.147	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_50_20180828	32.8	30.1	0.296	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_51_20180828	27.5	26.8	0.172	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_52_20180828	26.9	25.5	0.200	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_53_20180828	30.9	29.1	0.237	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_54_20180828	27.8	26.3	0.166	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_55_20180828	28.5	26.1	0.147	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_56_20180828	36.8	34.0	0.375	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_57_20180828	29.6	26.8	0.196	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_58_20180828	29.9	26.7	0.184	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_59_20180828	36.4	32.4	0.349	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_60_20180828	29.5	27.3	0.211	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_61_20180828	36.0	32.0	0.347	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_62_20180828	30.0	27.2	0.196	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_63_20180828	27.3	25.0	0.159	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_64_20180828	33.3	30.4	0.299	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_65_20180828	32.3	29.1	0.240	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_66_20180828	35.8	33.4	0.355	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_67_20180828	33.4	30.6	0.293	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_68_20180828	37.3	34.2	0.407	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_69_20180828	33.6	31.6	0.314	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_70_20180828	34.8	32.3	0.389	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_71_20180828	34.6	30.8	0.253	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_72_20180828	32.7	30.7	0.268	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_73_20180828	34.5	32.5	0.347	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_74_20180828	36.8	34.0	0.359	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_75_20180828	37.9	34.2	0.408	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_76_20180828	41.1	38.0	0.513	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_77_20180828	37.5	34.8	0.408	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_78_20180828	30.2	28.4	0.199	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_79_20180828	46.4	42.9	0.706	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_80_20180828	32.4	31.0	0.268	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_81_20180828	36.0	34.0	0.303	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_82_20180828	37.8	35.5	0.427	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_83_20180828	36.5	34.0	0.331	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_84_20180828	41.1	37.2	0.442	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_85_20180828	27.4	24.1	0.123	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_86_20180828	40.0	37.1	0.526	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_87_20180828	38.1	34.7	0.368	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_88_20180828	25.5	24.0	0.135	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_89_20180828	39.2	35.3	0.399	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_90_20180828	33.9	31.7	0.275	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_91_20180828	42.1	37.2	0.538	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_92_20180828	39.2	36.5	0.442	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_93_20180828	37.0	34.5	0.363	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_94_20180828	38.0	34.0	0.405	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_95_20180828	28.9	26.8	0.138	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_96_20180828	39.3	34.5	0.433	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_97_20180828	31.9	29.8	0.271	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_98_20180828	31.9	29.1	0.257	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_99_20180828	34.9	31.6	0.275	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_100_20180828	34.2	31.0	0.286	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_101_20180828	34.6	33.3	0.353	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_102_20180828	32.7	31.4	0.278	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_103_20180828	34.4	33.3	0.304	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_104_20180828	42.1	38.6	0.582	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_105_20180828	33.2	29.7	0.246	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_106_20180828	29.0	27.3	0.182	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_107_20180828	25.6	23.6	0.109	-	-	A	A	A	A	-	-

Table G.13: Summary Statistics for Juvenile Redside Shiner Meristic Data Used for the Recruitment Assessment and Collected near Sand Creek, Elk River, and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (mm)	Fork Length (mm)	Body Weight (g)	Age Structure Collected	Age	DELT (Severe[S]/Minor[M]/Absent[A])				Comment	Tissue Collected
								D	E	L	T		
Gold Creek	28-Aug-18	RG_GC_RSC_108_20180828	22.6	20.3	0.081	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_109_20180828	31.9	29.6	0.229	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_110_20180828	35.7	30.9	0.281	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_111_20180828	40.1	35.4	0.478	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_112_20180828	41.9	38.7	0.542	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_113_20180828	33.9	31.0	0.281	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_114_20180828	35.4	32.4	0.298	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_115_20180828	34.4	32.5	0.281	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_116_20180828	35.9	33.0	0.326	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_130_20180828	34.9	32.0	0.293	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_117_20180828	32.7	29.0	0.234	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_118_20180828	34.0	31.1	0.274	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_119_20180828	34.0	31.2	0.248	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_120_20180828	35.1	32.2	0.287	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_121_20180828	36.6	24.6	0.116	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_122_20180828	36.9	33.4	0.331	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_123_20180828	27.3	24.7	0.137	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_124_20180828	27.4	24.7	0.126	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_125_20180828	30.1	27.5	0.188	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_126_20180828	33.2	31.0	0.227	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_127_20180828	33.2	29.3	0.225	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_128_20180828	35.5	33.1	0.287	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_129_20180828	35.1	32.6	0.290	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_131_20180828	38.2	35.0	0.405	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_132_20180828	37.6	33.6	0.385	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_133_20180828	36.1	32.4	0.323	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_134_20180828	34.1	31.1	0.306	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_135_20180828	35.7	31.5	0.322	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_136_20180828	35.1	31.7	0.296	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_137_20180828	28.9	26.8	0.174	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_138_20180828	34.4	29.9	0.291	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_139_20180828	34.9	30.8	0.267	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_140_20180828	35.4	30.0	0.269	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_141_20180828	34.2	31.2	0.297	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_142_20180828	23.7	21.2	0.092	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_143_20180828	37.1	33.9	0.346	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_144_20180828	33.2	31.1	0.241	-	-	A	A	A	A	-	-
	28-Aug-18	RG_GC_RSC_145_20180828	25.4	23.0	0.109	-	-	A	A	A	A	-	-
	total sample size		**145**	**145**	**145**	**-**	**5**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**33.2**	**30.4**	**0.279**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**33.8**	**31.0**	**0.275**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**4.68**	**4.25**	**0.119**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**0.388**	**0.353**	**0.00991**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**22.6**	**20.3**	**0.0810**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**46.4**	**42.9**	**0.706**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**

Note: "-" indicates no data available.

Table G.14: Summary Statistics for Rainbow Trout Meristic Data Collected near Sand Creek and Elk River in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structures Collected [a]	Age	Sex	DELT (Severe[S]/Minor[M]/ Absent[A])				Comment	Tissue Collected
									D	E	L	T		
Sand Creek	27-Apr-18	RG_SC_RT_01_20180427	21.1	19.0	65	-	-	-	A	A	A	A	-	muscle
	27-Apr-18	RG_SC_RT_02_20180427	27.7	25.8	174	oto	3	U	A	A	A	A	-	muscle
	total sample size		**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**24.4**	**22.4**	**120**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**24.4**	**22.4**	**120**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**4.67**	**4.81**	**77.1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**3.30**	**3.40**	**54.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**21.1**	**19.0**	**65.0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**27.7**	**25.8**	**174**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Elk River	01-Sep-18	RG_ER_RT_01_20180901	32.2	29.8	270	-	-	-	A	A	A	A	-	muscle plug
	total sample size		**1**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**32.2**	**29.8**	**270**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**32.2**	**29.8**	**270**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**32.2**	**29.8**	**270**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**32.2**	**29.8**	**270**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Note: "-" indicates no data available

[a] Age structures collected: oto - otoliths

Table G.15: Summary Statistics for Westslope Cutthroat Trout Meristic Data Collected near Elk River and Gold Creek in Koocanusa Reservoir, 2018

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Sex	DELT (Severe[S]/Minor[M]/Absent[A])				Comments	Tissue Collected
							D	E	L	T		
Elk River	25-Apr-18	RG_ER_WCT_01_20180425	24.2	23.1	140	-	A	A	A	A	-	muscle plug
	30-Apr-18	RG_ER_WCT_02_20180430	24.3	23.5	100	-	A	M	A	A	-	muscle plug
	07-Jun-18	RG_ER_WCT_01_20180607	39.5	37.8	535	F	A	A	A	A	-	muscle plug
	total sample size		**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**29.3**	**28.1**	**258**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**24.3**	**23.5**	**140**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**8.80**	**8.37**	**240**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**5.08**	**4.83**	**139**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**24.2**	**23.1**	**100**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**39.5**	**37.8**	**535**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Gold Creek	25-Apr-18	RG_GC_WCT_01_20180425	38.9	37.0	600	-	A	A	A	A	-	muscle plug
	25-Apr-18	RG_GC_WCT_02_20180425	25.2	23.8	134	-	A	A	M	A	-	muscle plug
	25-Apr-18	RG_GC_WCT_03_20180425	34.8	32.9	410	-	A	A	A	A	-	muscle plug
	25-Apr-18	RG_GC_WCT_04_20180425	38.8	36.2	560	-	A	A	A	A	-	muscle plug
	25-Apr-18	RG_GC_WCT_05_20180425	36.9	35.2	455	-	A	A	A	A	-	muscle plug
	25-Apr-18	RG_GC_WCT_06_20180425	32.6	30.3	320	-	A	A	M	A	-	muscle plug
	25-Apr-18	RG_GC_WCT_07_20180425	25.4	23.9	144	-	A	A	A	A	-	muscle plug
	25-Apr-18	RG_GC_WCT_08_20180425	29.7	28.9	250	-	A	A	M	A	minor lesion	muscle plug
	total sample size		**8**	**8**	**8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**32.8**	**31.0**	**359**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**33.7**	**31.6**	**365**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**5.56**	**5.23**	**178**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**1.96**	**1.85**	**62.8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**25.2**	**23.8**	**134**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**38.9**	**37.0**	**600**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Note: "-" indicates no data available.

Table G.16: **Summary Statistics for Yellow Perch Meristic Data Collected near Sand Creek and Gold Creek in Koocanusa Reservoir, 2018**

Area	Processing Date	Fish ID	Sex	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Hepato-somatic Index	Gonado-somatic Index	DELT (Severe[S]/Minor[M]/Absent[A])				Comments	Tissue Collected
														D	E	L	T		
Sand Creek	27-Apr-18	RG_SC_YP_01_20180427	F	27.2	25.9	305	oto	5	82.4	4.05	219	0.013	0.270	A	A	A	A	-	muscle, ovaries
	30-Apr-18	RG_SC_YP_02_20180430	M	17.8	17.1	65.0	oto	3	0.77	0.70	63.5	0.011	0.012	A	A	A	A	-	-
	total sample size		**-**	**2**	**2**	**2**	**-**	**2**	**2**	**2**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**
	average		**-**	**22.5**	**21.5**	**185**	**-**	**4.00**	**41.6**	**2.37**	**141**	**0.0120**	**0.141**	**-**	**-**	**-**	**-**	**-**	**-**
	median		**-**	**22.5**	**21.5**	**185**	**-**	**4.00**	**41.6**	**2.37**	**141**	**0.0120**	**0.141**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation		**-**	**6.65**	**6.22**	**170**	**-**	**1.41**	**57.7**	**2.37**	**110**	**0.00175**	**0.183**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error		**-**	**4.70**	**4.40**	**120**	**-**	**1.00**	**40.8**	**1.67**	**77.5**	**0.00124**	**0.129**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum		**-**	**17.8**	**17.1**	**65.0**	**-**	**3.00**	**0.768**	**0.701**	**63.5**	**0.0108**	**0.0118**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum		**-**	**27.2**	**25.9**	**305**	**-**	**5.00**	**82.4**	**4.05**	**219**	**0.0133**	**0.270**	**-**	**-**	**-**	**-**	**-**	**-**
Gold Creek	25-Apr-18	RG_GC_YP_01_20180425	F	22.5	21.6	151	oto, ds	6	39.3	2.16	110	0.10	1.8	A	A	A	A	-	muscle, ovaries
	25-Apr-18	RG_GC_YP_02_20180425	F	19.5	18.5	99.0	oto, ds	6	25.7	1.64	71.7	0.089	1.4	A	A	A	A	-	muscle, ovaries
	25-Apr-18	RG_GC_YP_03_20180425	F	18.2	17.3	74.0	oto, ds	4	18.7	0.99	54.3	0.057	1.1	A	A	A	A	-	muscle, ovaries
	25-Apr-18	RG_GC_YP_04_20180425	F	18.1	17.2	77.0	oto, ds	3	18.5	0.70	57.8	0.041	1.1	A	A	A	A	-	muscle, ovaries
	25-Apr-18	RG_GC_YP_05_20180425	F	22.5	21.7	155	oto, ds	3	39.9	1.72	113	0.079	1.8	A	A	A	A	-	muscle, ovaries
	25-Apr-18	RG_GC_YP_06_20180425	M	18.7	17.8	70.0	oto, ds	5	3.34	1.28	65.4	0.072	0.19	A	A	A	A	some milt loss	muscle
	25-Apr-18	RG_GC_YP_07_20180425	M	18.6	17.7	78.0	oto, ds	5	3.32	0.68	74.0	0.038	0.19	A	A	A	A	-	muscle
	25-Apr-18	RG_GC_YP_08_20180425	M	18.8	17.9	74.0	oto, ds	3	2.74	0.78	70.5	0.043	0.15	A	A	A	A	some milt loss	muscle
	25-Apr-18	RG_GC_YP_09_20180425	M	20.3	19.4	96.0	oto, ds	4	4.74	0.94	90.3	0.048	0.24	A	A	A	A	some milt loss	muscle
	total sample size			**9**	**9**	**9**	**-**	**9**	**9**	**9**	**9**	**9**	**9**	**-**	**-**	**-**	**-**	**-**	**-**
	average			**19.7**	**18.8**	**97.1**	**-**	**4.33**	**17.4**	**1.21**	**78.5**	**0.0631**	**0.886**	**-**	**-**	**-**	**-**	**-**	**-**
	median			**18.8**	**17.9**	**78.0**	**-**	**4.00**	**18.5**	**0.993**	**71.7**	**0.0574**	**1.08**	**-**	**-**	**-**	**-**	**-**	**-**
	standard deviation			**1.73**	**1.75**	**33.2**	**-**	**1.22**	**15.1**	**0.524**	**21.3**	**0.0226**	**0.710**	**-**	**-**	**-**	**-**	**-**	**-**
	standard error			**0.576**	**0.584**	**11.1**	**-**	**0.408**	**5.04**	**0.175**	**7.10**	**0.00754**	**0.237**	**-**	**-**	**-**	**-**	**-**	**-**
	minimum			**18.1**	**17.2**	**70.0**	**-**	**3.00**	**2.74**	**0.680**	**54.3**	**0.0384**	**0.153**	**-**	**-**	**-**	**-**	**-**	**-**
	maximum			**22.5**	**21.7**	**155**	**-**	**6.00**	**39.9**	**2.16**	**113**	**0.10**	**1.8**	**-**	**-**	**-**	**-**	**-**	**-**

Note: "-" indicates no data available

[a] Age structures collected: oto - otoliths, ds- dorsal spines

[b] Adjusted body weight represents whole body weight less the liver weight and gonad weight and used for statistical analyses.

Table G.17: Summary of Externally and Internally Observed Fish Anomalies at Sand Creek, Elk River, and Gold Creek Study Areas in Koocanusa Reservoir, 2018

Fish Species	Study Area	External				Total Proportion of Fish with Internal Anomalies	Internal			Total Proportion of Fish with External Anomalies
		Sample Size	Deformities	Erosion	Lesions		Sample Size	Parasites[a]	Irregular Size or Discolouration of Liver or Gonads	
Bull Trout (April)	Sand Creek	6	17%	17%	0%	33%	-	-	-	-
	Elk River	2	0%	50%	0%	50%	-	-	-	-
	Gold Creek	3	0%	0.0%	33%	33%	-	-	-	-
Kokanee (April)	Sand Creek	4	0%	0%	0%	0%	-	-	-	-
	Elk River	10	0%	10%	0%	10%	-	-	-	-
	Gold Creek	2	0%	0%	0%	0%	-	-	-	-
Peamouth Chub (April)	Sand Creek	60	0%	0%	0%	0%	60	42%	0%	42%
	Elk River	58	3.4%	6.9%	0%	10%	58	41%	0%	41%
	Gold Creek	61	0%	0%	0%	0%	61	56%	1.6%	57%
Redside Shiner (April)	Sand Creek	87	0%	11%	0%	11%	87	14%	0%	14%
	Elk River	87	1.1%	6.9%	0%	8%	87	24%	0%	24%
	Gold Creek	88	0%	5.7%	0%	6%	88	35%	0%	35%
Westslope Cutthroat Trout (April)	Sand Creek	-	-	-	-	-	-	-	-	-
	Elk River	2	0%	50%	0%	50%	-	-	-	-
	Gold Creek	8	0%	0%	38%	38%	-	-	-	-
Northern Pikeminnow (June)	Sand Creek	7	0%	0%	0%	0%	7	0%	0%	0%
	Elk River	6	0%	0%	0%	0%	6	17%	0%	17%
	Gold Creek	3	0%	0%	0%	0%	3	0%	0%	0%

Note: "-" indicates no data available.

[a] Parasites found were exclusively tapeworms; almost all tapeworms were found in body cavity.

Table G.18: Gill Net Records for Fish Caught in Sand Creek, Koocanusa Reservoir, April 2019

Area	Station ID	UTM (NAD83, 11U)		Set Date	Lift Date	Set Time	Lift Time	Effort (Fishing Hours)	Depth Range (m)		Set		Bull Trout			Kokanee			Northern Pikeminnow			Peamouth Chub			Redside Shiner			Westslope Cutthroat Trout		
		Easting	Northing								Length (ft)	Mesh (inches)	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]
Sand Creek	RG_SC-GN-01	625605	5459678	24-Apr-19	24-Apr-19	10:30	10:45	0.25	0	6.0	75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC-GN-02	625470	5459765	24-Apr-19	24-Apr-19	10:40	10:55	0.25	0	2.5	50	2	0	0	0	3	0	12	1	0	4.0	14	14	56	0	0	0	1	0	4.0
	RG_SC-GN-03	625497	5459781	24-Apr-19	24-Apr-19	10:50	11:30	0.67	0	3.0	75	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.5	0	0	0
	RG_SC-GN-04	625470	5459765	24-Apr-19	24-Apr-19	11:30	11:45	0.25	0	2.5	50	2	0	0	0	2	0	8.0	0	0	0	1	1	4	0	0	0	1	0	4.0
	RG_SC-GN-05	625449	5459709	24-Apr-19	24-Apr-19	11:40	12:10	0.50	0	3.0	50	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2.0	0	0	0
	RG_SC-GN-06	625451	5459610	24-Apr-19	24-Apr-19	13:15	13:40	0.42	0	2.0	75	1	0	0	0	0	0	0	0	0	0	2	1	4.8	12	12	29	0	0	0
	RG_SC-GN-07	625455	5459698	24-Apr-19	24-Apr-19	13:35	13:50	0.25	0	2.0	75	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2	8.0	0	0	0
	RG_SC-GN-08	625451	5459610	24-Apr-19	24-Apr-19	13:45	13:55	0.17	0	2.0	75	1	0	0	0	0	0	0	0	0	0	2	0	12	3	3	18	0	0	0
	RG_SC-GN-09	625455	5459698	24-Apr-19	24-Apr-19	13:50	14:05	0.25	0	2.0	75	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4.0	0	0	0
	RG_SC-GN-10	625451	5459610	24-Apr-19	24-Apr-19	14:00	14:10	0.17	0	2.0	75	1	0	0	0	0	0	0	0	0	0	1	0	6	1	1	6.0	0	0	0
	RG_SC-GN-11	625455	5459698	24-Apr-19	24-Apr-19	14:05	14:15	0.17	0	2.0	75	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6.0	0	0	0
	RG_SC-GN-12	625469	5459764	24-Apr-19	24-Apr-19	14:15	14:30	0.25	0	3.0	75	1	0	0	0	0	0	0	0	0	0	2	0	8	4	4	16	0	0	0
	RG_SC-GN-13	625462	5459733	24-Apr-19	24-Apr-19	14:25	14:35	0.17	0	3.0	75	1	1	0	6.0	0	0	0	0	0	0	0	0	0	2	2	12	0	0	0
	RG_SC-GN-14	625469	5459764	24-Apr-19	24-Apr-19	14:30	14:40	0.17	0	3.0	75	1	1	0	6.0	0	0	0	0	0	0	2	2	12	2	2	12	0	0	0
	RG_SC-GN-15	625462	5459733	24-Apr-19	24-Apr-19	14:35	14:50	0.25	0	3.0	75	1	0	0	0	0	0	0	0	0	0	2	0	8.0	0	0	0	0	0	0
							Total	**4.17**					**2**	**0**	**0.48 (1.17)**	**5**	**0**	**1.20 (1.99)**	**1**	**0**	**0.24 (0.57)**	**26**	**18**	**6.24 (7.84)**	**30**	**30**	**7.20 (4.64)**	**2**	**0**	**0.48 (0.78)**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the gill net sets in one area with 95% confidence intervals in brackets.

Table G.19: Gill Net Records for Fish Caught in Elk River, Koocanusa Reservoir, April 2019

Area	Station ID	UTM (NAD83, 11U)		Set Date	Lift Date	Set Time	Lift Time	Effort (Fishing Hours)	Depth Range (m)		Set		Kokanee			Longnose Sucker			Northern Pikeminnow		
		Easting	Northing								Length (ft)	Mesh (inches)	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]
Elk River	RG_ER-GN-01	626862	5446634	23-Apr-19	23-Apr-19	13:39	13:54	0.25	3.1	5.8	75	2	0	0	0	0	0	0	2	0	8.0
	RG_ER-GN-02	626953	5446742	23-Apr-19	23-Apr-19	15:01	15:16	0.25	2.5	5.5	50	1	0	0	0	0	0	0	3	0	12
	RG_ER-GN-03	626880	5446619	23-Apr-19	23-Apr-19	14:50	15:05	0.25	0	5.8	75	2	0	0	0	0	0	0	2	0	8.0
	RG_ER-GN-04	626953	5446789	23-Apr-19	23-Apr-19	16:04	16:19	0.25	1.3	2.3	50	1	0	0	0	0	0	0	1	0	4.0
	RG_ER-GN-05	626985	5446840	24-Apr-19	24-Apr-19	9:59	10:25	0.43	2.5	2.5	50	1	0	0	0	0	0	0	1	0	2.3
	RG_ER-GN-06	626872	5446642	24-Apr-19	24-Apr-19	12:10	12:25	0.25	4.5	5.9	75	2	2	0	8.0	0	0	0	13	12	52
	RG_ER-GN-07	626953	5446742	24-Apr-19	24-Apr-19	12:15	13:23	1.13	1.5	2.5	50	1	0	0	0	0	0	0	1	0	0.88
	RG_ER-GN-08	628399	5447014	26-Apr-19	26-Apr-19	10:32	10:48	0.27	3.8	4.5	75	2	0	0	0	0	0	0	6	0	23
	RG_ER-GN-09	628399	5447014	26-Apr-19	26-Apr-19	11:10	11:25	0.25	3.8	4.5	75	2	3	0	12	3	0	12	8	0	32
	RG_ER-GN-10	628523	5447167	26-Apr-19	26-Apr-19	12:06	12:23	0.28	3.0	3.0	75	2	0	0	0	0	0	0	2	0	7.1
	RG_ER-GN-11	628523	5447167	26-Apr-19	26-Apr-19	12:35	12:55	0.33	3.0	3.0	75	2	1	0	3.0	0	0	0	6	0	18
	RG_ER-GN-12	626964	5446728	26-Apr-19	26-Apr-19	13:22	13:40	0.30	2.0	3.0	75	2	0	0	0	2	0	6.7	3	0	10
	RG_ER-GN-13	628302	5446669	26-Apr-19	26-Apr-19	14:00	14:20	0.33	4.0	5.0	75	2	0	0	0	0	0	0	3	0	9.0
	RG_ER-GN-14	628477	5447102	26-Apr-19	26-Apr-19	14:30	14:45	0.25	6.0	6.0	75	2	0	0	0	1	0	4.0	1	0	4.0
							Total	**4.8**					**6**	**0**	**1.24 (2.14)**	**6**	**0**	**1.24 (2.07)**	**52**	**0**	**10.76 (8.05)**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the gill net sets in one area with 95% confidence intervals in brackets.

Table G.19: Gill Net Records for Fish Caught in Elk River, Koocanusa Reservoir, April 2019

Area	Station ID	Peamouth Chub			Largescale Sucker			Redside Shiner			Yellow Perch			Mountain Whitefish		
		Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]
Elk River	RG_ER-GN-01	5	5	20	1	0	4.0	0	0	0	0	0	0	0	0	0
	RG_ER-GN-02	4	4	16	1	0	4.0	2	2	8.0	0	0	0	0	0	0
	RG_ER-GN-03	54	5	216	1	0	4.0	0	0	0	0	0	0	0	0	0
	RG_ER-GN-04	12	12	48	0	0	0	11	11	44	0	0	0	0	0	0
	RG_ER-GN-05	23	1	53	0	0	0	2	2	4.6	0	0	0	0	0	0
	RG_ER-GN-06	11	0	44	1	0	4.0	0	0	0	0	0	0	0	0	0
	RG_ER-GN-07	30	0	26	0	0	0	36	21	32	1	1	0.88	4	0	3.5
	RG_ER-GN-08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER-GN-09	5	0	20	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER-GN-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER-GN-11	5	0	15	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER-GN-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER-GN-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_ER-GN-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		149	**0**	**30.83 (32.30)**	**4**	**0**	**0.83 (1.08)**	**51**	**36**	**10.55 (7.96)**	**1**	**1**	**0.21 (0.14)**	**4**	**0**	**0.83 (0.54)**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the gill net sets in one area with 95% confidence intervals in brackets.

Table G.20: Gill Net Records for Fish Caught in Gold Creek, Koocanusa Reservoir, April 2019

Area	Station ID	UTM (NAD83, 11U)		Set Date	Lift Date	Set Time	Lift Time	Effort (Fishing Hours)	Depth Range (m)		Set		Bull Trout			Largescale Sucker			Longnose Sucker			Mountain Whitefish		
		Easting	Northing								Length (ft)	Mesh (inches)	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Gold Creek	RG_GC-GN-01	629656	5437400	25-Apr-19	25-Apr-19	12:35	12:50	0.25	0	3	75	2	0	0	0	1	0	4.0	0	0	0	0	0	0
	RG_GC-GN-02	629741	5437353	25-Apr-19	25-Apr-19	12:40	13:00	0.33	0	3	50	1	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-03	629656	5437400	25-Apr-19	25-Apr-19	12:55	13:05	0.17	0	3	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-04	629741	5437353	25-Apr-19	25-Apr-19	13:05	13:20	0.25	0	3	50	1	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-05	629656	5437400	25-Apr-19	25-Apr-19	13:20	13:35	0.25	0	3	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-06	629741	5437353	25-Apr-19	25-Apr-19	13:25	13:45	0.33	0	3	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-07	629656	5437400	25-Apr-19	25-Apr-19	13:40	13:55	0.25	0	3	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-08	629741	5437353	25-Apr-19	25-Apr-19	13:45	14:05	0.33	0	3	50	1	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-09	629741	5437353	25-Apr-19	25-Apr-19	14:05	14:20	0.25	0	3	50	1	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-10	629614	5437400	26-Apr-19	26-Apr-19	10:20	10:35	0.25	0	3	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-11	629735	5437351	26-Apr-19	26-Apr-19	10:30	10:45	0.25	0	3	75	2	0	0	0	2	0	8.0	0	0	0	1	0	4.0
	RG_GC-GN-12	629614	5437400	26-Apr-19	26-Apr-19	10:40	11:00	0.33	0	3	75	2	0	0	0	0	0	0	1	0	3.0	0	0	0
	RG_GC-GN-13	629735	5437351	26-Apr-19	26-Apr-19	10:55	11:10	0.25	0	3	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-14	629614	5437400	26-Apr-19	26-Apr-19	11:10	11:27	0.28	0	3	75	2	1	0	3.5	0	0	0	0	0	0	0	0	0
	RG_GC-GN-15	629735	5437351	26-Apr-19	26-Apr-19	11:25	11:35	0.17	0	3	75	2	0	0	0	1	0	6.0	0	0	0	1	0	6.0
	RG_GC-GN-16	629753	5457343	26-Apr-19	26-Apr-19	12:00	12:10	0.17	0	3	75	2	0	0	0	0	0	0	0	0	0	1	0	6.0
	RG_GC-GN-17	630082	5437447	26-Apr-19	26-Apr-19	12:05	12:25	0.33	0	6	75	2	1	0	3.0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-18	629753	5457343	26-Apr-19	26-Apr-19	12:20	12:35	0.25	0	3	75	2	0	0	0	0	0	0	0	0	0	1	0	4.0
	RG_GC-GN-19	629856	5437380	26-Apr-19	26-Apr-19	12:35	12:50	0.25	0	2	75	2	0	0	0	2	0	8.0	0	0	0	1	0	4.0
	RG_GC-GN-20	629753	5457343	26-Apr-19	26-Apr-19	12:55	13:05	0.17	0	3	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-21	629856	5437380	26-Apr-19	26-Apr-19	13:05	13:20	0.25	0	2	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-22	629753	5457343	26-Apr-19	26-Apr-19	13:15	13:30	0.25	0	3	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-23	629856	5437380	26-Apr-19	26-Apr-19	13:20	13:30	0.17	0	2	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-24	630040	5436821	26-Apr-19	26-Apr-19	13:45	14:05	0.33	0	4	75	2	1	0	3.0	0	0	0	0	0	0	1	0	3.0
	RG_GC-GN-25	630204	5436861	26-Apr-19	26-Apr-19	13:50	14:05	0.25	0	4	75	2	0	0	0	1	0	4.0	0	0	0	0	0	0
	RG_GC-GN-26	630040	5436821	26-Apr-19	26-Apr-19	14:05	14:20	0.25	0	4	75	2	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-27	630204	5436861	26-Apr-19	26-Apr-19	14:20	14:40	0.33	0	4	75	2	0	0	0	1	0	3.0	0	0	0	0	0	0
							Total	**6.9**					**3**	**0**	**0.43 (0.40)**	**8**	**0**	**1.15 (1.00)**	**1**	**0**	**0.14 (0.23)**	**6**	**0**	**0.86 (0.78)**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the gill net sets in one area with 95% confidence intervals in brackets.

Table G.20: Gill Net Records for Fish Caught in Gold Creek, Koocanusa Reservoir, April 2019

Area	Station ID	Northern Pikeminnow			Peamouth Chub			Rainbow Trout			Redside Shiner			Westslope Cutthroat Trout			Yellow Perch		
		Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]	Catch	Mortalities/ Sacrificed	CPUE [a]
Gold Creek	RG_GC-GN-01	0	0	0	5	5	20	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-02	0	0	0	0	0	0	0	0	0	1	1	3.0	0	0	0	0	0	0
	RG_GC-GN-03	0	0	0	5	5	30	0	0	0	0	0	0	1	0	6.0	0	0	0
	RG_GC-GN-04	0	0	0	1	0	4.0	0	0	0	3	3	12	0	0	0	0	0	0
	RG_GC-GN-05	0	0	0	9	9	36	1	0	4.0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-06	0	0	0	3	0	9.0	0	0	0	7	7	21	0	0	0	0	0	0
	RG_GC-GN-07	0	0	0	4	4	16	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-08	0	0	0	7	0	21	0	0	0	7	7	21	0	0	0	0	0	0
	RG_GC-GN-09	0	0	0	0	0	0	0	0	0	4	4	16	0	0	0	0	0	0
	RG_GC-GN-10	1	0	4.0	6	1	24	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-11	0	0	0	8	2	32	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-12	0	0	0	7	0	21	0	0	0	0	0	0	1	0	3.0	0	0	0
	RG_GC-GN-13	0	0	0	7	0	28	1	0	4.0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-14	0	0	0	2	0	7.1	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-15	0	0	0	2	0	12	0	0	0	0	0	0	0	0	0	1	1	6.0
	RG_GC-GN-16	0	0	0	5	1	30	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-17	0	0	0	17	0	51	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-18	1	0	4.0	3	0	12	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-19	2	0	8.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-20	0	0	0	1	1	6.0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-22	0	0	0	2	0	8.0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-24	0	0	0	2	0	6.0	0	0	0	0	0	0	1	0	3.0	0	0	0
	RG_GC-GN-25	6	0	24	13	0	52	0	0	0	0	0	0	1	0	4.0	0	0	0
	RG_GC-GN-26	1	0	0	3	0	12	0	0	0	0	0	0	0	0	0	0	0	0
	RG_GC-GN-27	1	0	3.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	**0**	**1.73 (1.92)**	**112**	**28**	**16.12 (5.99)**	**2**	**0**	**0.29 (0.42)**	**22**	**22**	**3.17 (2.57)**	**4**	**0**	**0.58 (0.60)**	**1**	**1**	**0.14 (0.46)**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the gill net sets in one area with 95% confidence intervals in brackets.

Table G.21: Hoop Net Records for Fish Caught in Sand Creek, Koocanusa Reservoir, April 2019

Area	Station ID	Net Size (inches)	UTM (NAD83, 11U)		Set Date	Lift Date	Set Time	Removal Time	Fishing Hours (hrs)	Depth Range (m)		Set Configuration	Effort (Fishing days)	Bull Trout			Eastern Brook Trout			Largescale Sucker			Longnose Sucker		
			Easting	Northing										Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]
Sand Creek	RG_SC-HN-01	2.5	625434	5459613	23-Apr-19	24-Apr-19	14:15	9:00	18.8	0	2.8	Central Lead	0.8	0	0	0	0	0	0	1	0	1.3	4	0	5.1
	RG_SC-HN-02	2.5	625600	5459973	23-Apr-19	24-Apr-19	15:00	9:20	18.3	0	6.0	Central Lead	0.8	0	0	0	0	0	0	0	0	0	0	0	0
	RG_SC-HN-03	2.5	625434	5459613	24-Apr-19	25-Apr-19	9:15	9:00	23.8	0	4.0	Central Lead	1.0	0	0	0	1	0	1.0	1	0	1.0	2	0	2.0
	RG_SC-HN-04	2.5	625574	5460474	24-Apr-19	25-Apr-19	9:45	9:15	23.5	0	2.0	Central Lead	1.0	1	0	1.0	0	0	0	0	0	0	3	0	3.1
												Total	**3.5**	**1**	**0**	**0.28**	**1**	**0**	**0.28**	**2**	**0**	**0.57**	**9**	**0**	**2.6**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the hoop net sets in one area. Confidence intervals not calculated due to small number of sampling events.

Table G.21: Hoop Net Records for Fish Caught in Sand Creek, Koocanusa Reservoir, April 2019

Area	Station ID	Mountain Whitefish			Northern Pikeminnow			Peamouth Chub			Yellow Perch		
		Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]
Sand Creek	RG_SC-HN-01	0	0	0	6	0	7.7	0	0	0	1	1	1.3
	RG_SC-HN-02	0	0	0	2	0	2.6	0	0	0	0	0	0
	RG_SC-HN-03	0	0	0	0	0	0	3	0	3.0	0	0	0
	RG_SC-HN-04	1	1	1.0	2	0	2.0	2	0	2.0	1	1	1.0
	Total	**1**	**1**	**0.28**	**10**	**0**	**2.8**	**5**	**0**	**1.4**	**2**	**2**	**0.57**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the hoop net sets in one area. Confidence intervals not calculated due to small number of sampling events.

Table G.22: Hoop Net Records for Fish Caught in Elk River, Koocanusa Reservoir, April 2019

Area	Station ID	Net Size (inches)	UTM (NAD83, 11U)		Set Date	Lift Date	Set Time	Removal Time	Fishing Hours (hrs)	Depth Range (m)		Set Configuration	Effort (Fishing days)	Burbot			Largescale Sucker			Longnose Sucker			Northern Pikeminnow			Yellow Perch		
			Easting	Northing										Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]
Elk River	RG_ER-HN-01	2.5	627530	5447151	23-Apr-19	24-Apr-19	11:30	10:25	22.9	0	5	Central Lead	1.0	0	0	0	1	0	1.0	0	0	0	3	0	3.1	6	6	6.3
	RG_ER-HN-02	2.5	627842	5447469	23-Apr-19	24-Apr-19	12:30	11:20	22.8	0	5	Central Lead	1.0	1	0	1.1	2	0	2.1	1	0	1.1	3	0	3.2	5	5	5.3
												Total	**1.9**	**1**	**0**	**0.52**	**3**	**0**	**1.6**	**1**	**0**	**0.52**	**6**	**0**	**3.1**	**11**	**11**	**5.8**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the hoop net sets in one area. Confidence intervals not calculated due to small number of sampling events.

Table G.23: Hoop Net Records for Fish Caught in Gold Creek, Koocanusa Reservoir, April 2019

Area	Station ID	Net Size (Inches)	UTM (NAD83, 11U)		Set Date	Lift Date	Set Time	Removal Time	Fishing Hours (hrs)	Depth Range (m)		Set Configuration	Effort (Fishing days)	Largescale Sucker			Mountain Whitefish			Peamouth Chub			Westslope Cutthroat Trout			Yellow Perch		
			Easting	Northing										Catch	Mortalities / Sacrificed	CPUE[a]	Catch	Mortalities / Sacrificed	CPUE[a]	Catch	Mortalities / Sacrificed	CPUE[a]	Catch	Mortalities / Sacrificed	CPUE[a]	Catch	Mortalities / Sacrificed	CPUE[a]
Gold Creek	RG_GC-HN-01	2.5	629420	5437065	25-Apr-19	26-Apr-19	11:45	9:30	21.8	0	1.5	Central Lead	0.91	4	0	4.4	2	0	2.2	1	0	1.1	1	0	1.1	0	0	0
	RG_GC-HN-02	2.5	629595	5437398	25-Apr-19	26-Apr-19	12:00	9:20	21.3	0	4.0	Central Lead	0.89	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1.1
												Total	**1.8**	**4**	**0**	**2.2**	**2**	**0**	**1.1**	**1**	**0**	**0.56**	**1**	**0**	**0.56**	**1**	**0**	**0.56**

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the hoop net sets in one area. Confidence intervals not calculated due to small number of sampling events.

Table G.24: Seine Net Records for Fish Caught in Koocanusa Reservoir, August 2019

Area	Station ID	UTM (NAD83, 11U)		Date	Time	Net Length (m)	Haul Distance (m)	# of Hauls	Effort [Area Seined (m^2)]	Depth Range (m)		Set		Redside Shiner			Largescale Sucker			Longnose Dace			Northern Pikeminnow		
		Easting	Northing									Height (m)	Mesh (mm)	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]	Catch	Mortalities/ Sacrificed	CPUE[a]
Sand Creek	RG_SC_SN-01	625631	5459712	20-Aug-19	12:20	25	20	1	500	0	1.0	1.0	5.0	30	3	0.060	6	0	0	0	0	0	0	0	0
	RG_SC-SN-02	625631	5459712	20-Aug-19	13:40	25	30	1	750	0	1.0	1.0	5.0	1,100	10	1.5	50	0	0.067	7	0	0.009	0	0	0
								Total	**1,250**					**1,130**	**13**	**0.90**	**56**	**0**	**0**	**7**	**0**	**0.006**	**0**	**0**	0
Elk River	RG_ER_SN-01	627913	5448146	22-Aug-19	14:00	25	50	1	**1,250**	0.5	1.5	1.0	5.0	**200**	**0**	**0.16**	**200**	**0**	**0.16**	**11**	**0**	**0.009**	**0**	**0**	**0**
Gold Creek	RG_GC_SN-01	629115	5436441	21-Aug-19	13:50	25	20	1	500	0.1	1.5	1.5	5.0	29	0	0.06	11	0	0	0	0	0	17	0	0
	RG_GC_SN-02	629115	5436441	21-Aug-19	14:20	25	30	1	750	0.1	1.5	1.5	5.0	250	10	0.33	80	0	0.11	0	0	0	80	0	0.11
								Total	**1,250**					**279**	**10**	**0.22**	**91**	**0**	**0.073**	**0**	**0**	**0**	**97**	**0**	0.078

[a] Total catch-per-unit-effort (CPUE) calculated as the total catch of a single species over the total effort for all the seine net sets in one area. Confidence intervals not calculated due to small number of sampling attempts.

Table G.25: Angling Records for Fish Caught in the Koocanusa Reservoir, August 2019

Area	Station ID	UTM (NAD83, 11U)		Set Date	Removal Date	# of Lines	Kokanee	
		Easting	Northing				Catch	Mortalities/ Sacrificed
Sand Creek	SC_AN_01	625624	5457296	26-Aug-19	26-Aug-19	2	3	0
Elk River	ER_AN_01	627959	5447572	26-Aug-19	26-Aug-19	2	1	0
Gold Creek	GC_AN_01	630926	5436344	26-Aug-19	26-Aug-19	2	0	0

Table G.26: Fish Meristics Data for Peamouth Chub, Koocanusa Reservoir, April 2019

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Fulton's Condition Factor (K)	Gonado-somatic Index	Hepato-somatic Index	DELT (Severe[S]/Minor[M]/Absent[A])				Worm Weight (g)	Tissue Collected	Comment
														D	E	L	T			
Sand Creek	24-Apr-19	RG_SC_PCC-01	24.1	22.9	101	6	F	7.135	2.291	92	0.84	0.071	0.023	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_PCC-02	25.4	22.7	140	6	F	3.999	2.334	134	1.20	0.029	0.017	A	A	A	A	13.656	Muscle, Ovary	Worms Present
	24-Apr-19	RG_SC_PCC-03	24.9	22.2	119	6	F	9.907	2.998	106	1.09	0.083	0.025	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_PCC-04	22.5	20.3	100	6	F	7.048	2.818	90	1.20	0.070	0.028	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_PCC-05	24.2	21.9	118	5	F	12.732	2.054	103	1.12	0.108	0.017	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_PCC-06	24.2	21.8	109	7	F	3.471	1.522	104	1.05	0.032	0.014	A	A	A	A	7.540	Muscle, Ovary	Worms Present
	24-Apr-19	RG_SC_PCC-07	26.4	23.9	153	6	F	5.272	2.417	145	1.12	0.034	0.016	A	A	A	A	17.543	Muscle, Ovary	Worms Present
	24-Apr-19	RG_SC_PCC-08	27.2	24.6	138	6	F	7.906	2.556	128	0.93	0.057	0.019	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_PCC-09	27.4	24.8	178	6	F	8.325	2.463	167	1.17	0.047	0.014	A	A	A	A	15.684	Muscle, Ovary	Worms Present
	24-Apr-19	RG_SC_PCC-10	24.3	21.0	100	5	F	5.783	2.152	92	1.08	0.058	0.022	A	A	A	A	-	Muscle, Ovary	-
total sample size			**10**	**10**	**10**	**10**	**-**	**10**	**10**	**10**	**10**	**10**	**10**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
average			**25.1**	**22.6**	**125.6**	**5.9**	**-**	**7.158**	**2.361**	**116.1**	**1.08**	**0.059**	**0.019**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
median			**24.6**	**22.5**	**118.5**	**6**	**-**	**7.092**	**2.376**	**105.1**	**1.10**	**0.058**	**0.018**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
standard deviation			**1.546**	**1.482**	**26.141**	**0.57**	**-**	**2.781**	**0.410**	**26.185**	**0.115**	**0.025**	**0.005**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
standard error			**0.489**	**0.469**	**8.267**	**0.18**	**-**	**0.879**	**0.130**	**8.280**	**0.036**	**0.008**	**0.002**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
minimum			**22.5**	**20.3**	**100**	**5**	**-**	**3.471**	**1.522**	**90**	**0.84**	**0.029**	**0.014**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
maximum			**27.4**	**24.8**	**178**	**7**	**-**	**12.732**	**2.998**	**167**	**1.20**	**0.108**	**0.028**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Elk River	23-Apr-19	RG_ER_PCC-01	26.5	24	149	6	F	10.739	3.135	135	1.08	0.072	0.021	A	A	A	A	-	Muscle, Ovary	-
	23-Apr-19	RG_ER_PCC-02	26.9	23.6	137	6	F	13.119	0.369	124	1.04	0.096	0.003	A	A	A	A	-	Muscle, Ovary	-
	23-Apr-19	RG_ER_PCC-03	26.2	23.4	149	7	F	14.321	3.215	131	1.16	0.096	0.022	A	A	A	A	-	Muscle, Ovary	-
	23-Apr-19	RG_ER_PCC-04	23.5	21.2	117	6	F	10.72	3.4	103	1.23	0.092	0.029	A	A	A	A	-	Muscle, Ovary	-
	23-Apr-19	RG_ER_PCC-05	24.1	22.2	120	6	F	8.019	2.221	110	1.10	0.067	0.019	A	A	A	A	-	Muscle, Ovary	-
	23-Apr-19	RG_ER_PCC-06	23.6	21.1	108	6	F	8.222	3.776	96	1.15	0.076	0.035	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_ER_PCC-07	24.3	21.2	120	6	F	9.428	2.697	108	1.26	0.079	0.022	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_ER_PCC-08	25.8	23.2	152	6	F	17.426	4.478	130	1.22	0.115	0.029	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_ER_PCC-09	26.3	23.6	159	7	F	9.339	4.082	146	1.21	0.059	0.026	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_ER_PCC-10	26.5	24	172	6	F	9.902	3.126	159	1.24	0.058	0.018	A	A	A	A	16.596	Muscle, Ovary	Worms Present
total sample size			**10**	**10**	**10**	**10**	**-**	**10**	**10**	**10**	**10**	**10**	**10**	-	-	-	-	-	-	-
average			**25.4**	**22.8**	**138.3**	**6.2**	**-**	**11.124**	**3.050**	**124.1**	**1.17**	**0.081**	**0.022**	-	-	-	-	-	-	-
median			**26.0**	**23.3**	**143**	**6**	**-**	**10.311**	**3.175**	**126.8**	**1.19**	**0.077**	**0.022**	-	-	-	-	-	-	-
standard deviation			**1.334**	**1.203**	**21.145**	**0.42**	**-**	**2.979**	**1.145**	**19.995**	**0.075**	**0.018**	**0.009**	-	-	-	-	-	-	-
standard error			**0.422**	**0.380**	**6.687**	**0.13**	**-**	**0.942**	**0.362**	**6.323**	**0.024**	**0.006**	**0.003**	-	-	-	-	-	-	-
minimum			**23.5**	**21.1**	**108**	**6**	**-**	**8.019**	**0.369**	**96**	**1.04**	**0.058**	**0.003**	-	-	-	-	-	-	-
maximum			**26.9**	**24**	**172**	**7**	**-**	**17.426**	**4.478**	**159**	**1.26**	**0.115**	**0.035**	-	-	-	-	-	-	-
Gold Creek	25-Apr-19	RG_GC_PCC-01	23	20.7	102	8	F	3.482	1.432	97	1.15	0.034	0.014	A	A	A	A	10.534	Muscle, Ovary	Worms Present
	25-Apr-19	RG_GC_PCC-02	29.9	27	215	15	F	18.018	5.434	192	1.09	0.084	0.025	A	A	A	A	-	Muscle, Ovary	-
	25-Apr-19	RG_GC_PCC-03	27.9	24.9	164	6	F	12.507	3.306	148	1.06	0.076	0.020	A	A	A	A	-	Muscle, Ovary	-
	25-Apr-19	RG_GC_PCC-04	27.4	25.8	169	7	F	4.959	2.798	161	0.98	0.029	0.017	A	A	A	A	28.102	Muscle, Ovary	Worms Present
	25-Apr-19	RG_GC_PCC-05	25	23.5	122	6	F	4.594	2.127	115	0.94	0.038	0.017	M	A	A	A	12.355	Muscle, Ovary	Worms Present, Operculum Damaged
	25-Apr-19	RG_GC_PCC-06	25.6	23	135	6	F	6.628	3.013	125	1.11	0.049	0.022	A	A	A	A	14.031	Muscle, Ovary	Worms Present
	25-Apr-19	RG_GC_PCC-07	25.1	22.7	120	6	F	1.446	2.014	117	1.03	0.012	0.017	A	A	A	A	13.624	Muscle, Ovary	Worms Present
	25-Apr-19	RG_GC_PCC-08	26	23.2	145	6	F	5.395	2.256	137	1.16	0.037	0.016	A	A	A	A	10.131	Muscle, Ovary	Worms Present
	25-Apr-19	RG_GC_PCC-09	24	21.2	99	5	F	1.625	1.575	96	1.04	0.016	0.016	A	A	A	A	3.968	Muscle, Ovary	Worms Present
	25-Apr-19	RG_GC_PCC-10	24.9	22.2	106	6	F	1.862	1.44	103	0.97	0.018	0.014	A	A	A	A	6.157	Muscle, Ovary	Worms Present
total sample size			**10**	**10**	**10**	**10**	**-**	**10**	**10**	**10**	**10**	**10**	**10**	-	-	-	-	-	-	-
average			**25.9**	**23.4**	**137.7**	**7.1**	**-**	**6.052**	**2.540**	**129.1**	**1.05**	**0.039**	**0.018**	-	-	-	-	-	-	-
median			**25.4**	**23.1**	**128.5**	**6**	**-**	**4.777**	**2.192**	**120.9**	**1.05**	**0.036**	**0.017**	-	-	-	-	-	-	-
standard deviation			**2.023**	**1.979**	**36.582**	**2.88**	**-**	**5.312**	**1.209**	**30.838**	**0.076**	**0.024**	**0.004**	-	-	-	-	-	-	-
standard error			**0.640**	**0.626**	**11.568**	**0.91**	**-**	**1.680**	**0.382**	**9.752**	**0.024**	**0.008**	**0.001**	-	-	-	-	-	-	-
minimum			**23**	**20.7**	**99**	**5**	**-**	**1.446**	**1.432**	**96**	**0.94**	**0.012**	**0.014**	-	-	-	-	-	-	-
maximum			**29.9**	**27**	**215**	**15**	**-**	**18.018**	**5.434**	**192**	**1.16**	**0.084**	**0.025**	-	-	-	-	-	-	-

Notes: D - deformities, E - erosion, L - lesions, T - tumors, "-" indicates no data

[a] Age structures collected: sc - scales, oto - otoliths

[b] Adjusted Body Weight = Body Weight - Liver Weight - Gonad Weight

Table G.27: Fish Meristics Data for Redside Shiners, Koocanusa Reservoir, April 2019

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age	Sex	Gonad Weight (g)	Liver Weight (g)	Adjusted Body Weight (g) [b]	Fulton's Condition Factor (K)	Gonado-somatic Index	Hepato-somatic Index	DELT (Severe[S]/Minor[M]/Absent[A])				Worm Weight (g)	Tissue Collected	Comment
															D	E	L	T			
Sand Creek	24-Apr-19	RG_SC_RSC-01	11.5	10	13.5	oto	2	F	0.635	0.286	12.6	1.35	0.047	0.021	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_RSC-02	11.1	9.9	13.0	oto	3	F	0.683	0.285	12.0	1.34	0.053	0.022	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_RSC-03	10.5	9.9	9.9	oto	2	F	0.366	0.173	9.4	1.02	0.037	0.017	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_RSC-04	10.7	9.4	10.0	oto	3	F	0.449	0.168	9.4	1.20	0.045	0.017	A	A	A	A	0.028	Muscle, Ovary	Worms Present
	24-Apr-19	RG_SC_RSC-05	10.3	9.0	9.1	oto	3	F	0.258	0.136	8.7	1.25	0.028	0.015	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_RSC-06	11.5	9.6	12.0	oto	3	F	0.553	0.284	11.2	1.36	0.046	0.024	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_RSC-07	10.4	9.2	9.9	oto	3	F	0.477	0.236	9.2	1.27	0.048	0.024	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_RSC-08	11.4	9.9	11.5	oto	2	F	0.46	0.196	10.8	1.19	0.040	0.017	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_RSC-09	9.5	8.5	8.2	oto	2	F	0.615	0.228	7.4	1.34	0.075	0.028	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_SC_RSC-10	9.8	8.6	8.5	oto	2	F	0.344	0.117	8.0	1.34	0.040	0.014	A	A	A	A	-	Muscle, Ovary	-
total sample size			**10**	**10**	**10**	**-**	**10**	**-**	**10**	**10**	**10**	**10**	**10**	**10**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
average			**10.7**	**9.4**	**10.56**	**-**	**2.5**	**-**	**0.484**	**0.211**	**9.9**	**1.26**	**0.046**	**0.020**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
median			**10.6**	**9.5**	**9.95**	**-**	**2.5**	**-**	**0.469**	**0.212**	**9.4**	**1.30**	**0.045**	**0.019**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
standard deviation			**0.704**	**0.558**	**1.846**	**-**	**0.53**	**-**	**0.138**	**0.063**	**1.720**	**0.106**	**0.012**	**0.005**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
standard error			**0.223**	**0.176**	**0.584**	**-**	**0.17**	**-**	**0.044**	**0.020**	**0.544**	**0.034**	**0.004**	**0.001**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
minimum			**9.5**	**8.5**	**8.2**	**-**	**2**	**-**	**0.258**	**0.117**	**7**	**1.02**	**0.028**	**0.014**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
maximum			**11.5**	**10**	**13.5**	**-**	**3**	**-**	**0.683**	**0.286**	**13**	**1.36**	**0.075**	**0.028**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Elk River	23-Apr-19	RG_ER_RSC-01	9.9	8.6	7.9	oto	3	F	0.348	0.173	7.38	1.24	0.0441	0.0219	A	A	A	A	-	Muscle, Ovary	-
	23-Apr-19	RG_ER_RSC-02	10.5	9.2	8.5	oto	2	F	0.237	0.078	8.19	1.09	0.0279	0.0092	A	A	A	A	-	Muscle, Ovary	-
	23-Apr-19	RG_ER_RSC-03	10.1	9.4	9.3	oto	2	F	0.327	0.083	8.84	1.11	0.0354	0.0090	A	A	A	A	-	Muscle, Ovary	-
	23-Apr-19	RG_ER_RSC-04	11.1	9.9	11.0	oto	2	F	0.385	0.154	10.51	1.14	0.0349	0.0139	A	A	A	A	0.019	Muscle, Ovary	Worms Present
	23-Apr-19	RG_ER_RSC-05	10.8	9.5	10.0	oto	2	F	0.288	0.168	9.54	1.17	0.0288	0.0168	A	A	A	A	0.438	Muscle, Ovary	Worms Present
	23-Apr-19	RG_ER_RSC-06	12.0	10.3	13.3	oto	3	F	0.572	0.205	12.47	1.21	0.0432	0.0155	A	A	A	A	-	Muscle, Ovary	-
	23-Apr-19	RG_ER_RSC-07	10.7	9.6	10.0	oto	2	F	0.444	0.112	9.44	1.13	0.0444	0.0112	A	A	A	A	-	Muscle, Ovary	-
	23-Apr-19	RG_ER_RSC-08	9.5	8.4	6.8	oto	2	F	0.304	0.08	6.37	1.14	0.0450	0.0119	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_ER_RSC-09	13.2	11.3	16.0	oto	3	F	0.763	0.461	14.78	1.11	0.0477	0.0288	A	A	A	A	-	Muscle, Ovary	-
	24-Apr-19	RG_ER_RSC-10	10.3	9.3	9.5	oto	2	F	0.336	0.062	9.10	1.18	0.0354	0.0065	A	A	A	A	-	Muscle, Ovary	-
total sample size			**10**	**10**	**10**	**-**	**10**	**-**	**10**	**10**	**10**	**10**	**10**	**10**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
average			**10.8**	**9.6**	**10.2**	**-**	**2.3**	**-**	**0.400**	**0.158**	**9.7**	**1.15**	**0.039**	**0.014**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
median			**10.6**	**9.5**	**9.75**	**-**	**2**	**-**	**0.342**	**0.133**	**9.3**	**1.14**	**0.039**	**0.013**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
standard deviation			**1.087**	**0.829**	**2.692**	**-**	**0.48**	**-**	**0.158**	**0.117**	**2.451**	**0.048**	**0.007**	**0.007**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
standard error			**0.344**	**0.262**	**0.851**	**-**	**0.15**	**-**	**0.050**	**0.037**	**0.775**	**0.015**	**0.002**	**0.002**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
minimum			**9.5**	**8.4**	**6.75**	**-**	**2**	**-**	**0.237**	**0.062**	**6.37**	**1.09**	**0.028**	**0.007**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
maximum			**13.2**	**11.3**	**16**	**-**	**3**	**-**	**0.763**	**0.461**	**14.78**	**1.24**	**0.048**	**0.029**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Gold Creek	25-Apr-19	RG_GC_RSC-01	11.2	9.8	10.2	oto	3	F	0.567	0.137	9.50	1.08	0.0556	0.0134	A	A	A	A	-	Muscle, Ovary	-
	25-Apr-19	RG_GC_RSC-02	12.0	10.5	13.0	oto	3	F	0.543	0.109	12.35	1.12	0.0418	0.0084	A	A	A	A	-	Muscle, Ovary	-
	25-Apr-19	RG_GC_RSC-03	11.9	10.3	13.5	oto	3	F	0.53	0.215	12.76	1.24	0.0393	0.0159	A	A	A	A	0.704	Muscle, Ovary	Worms Present
	25-Apr-19	RG_GC_RSC-04	11.4	9.9	10.5	oto	3	F	0.416	0.141	9.94	1.08	0.0396	0.0134	A	A	A	A	-	Muscle, Ovary	-
	25-Apr-19	RG_GC_RSC-05	11.2	9.7	10.0	oto	3	F	0.279	0.136	9.59	1.10	0.0279	0.0136	A	A	A	A	-	Muscle, Ovary	-
	25-Apr-19	RG_GC_RSC-06	11.8	10.4	13.2	oto	3	F	0.787	0.191	12.22	1.17	0.0596	0.0145	A	A	A	A	-	Muscle, Ovary	-
	25-Apr-19	RG_GC_RSC-07	10.9	9.1	8.5	oto	3	F	0.45	0.104	7.95	1.13	0.0529	0.0122	A	A	A	A	-	Muscle, Ovary	-
	25-Apr-19	RG_GC_RSC-08	10.6	9.5	8.5	oto	2	F	0.422	0.115	7.96	0.99	0.0496	0.0135	A	A	A	A	-	Muscle, Ovary	-
	25-Apr-19	RG_GC_RSC-09	11.2	9.8	10.8	oto	3	F	0.56	0.106	10.13	1.15	0.0519	0.0098	A	A	A	A	-	Muscle, Ovary	-
	25-Apr-19	RG_GC_RSC-10	10.4	8.5	8.5	oto	2	F	0.305	0.096	8.10	1.38	0.0359	0.0113	A	A	A	A	-	Muscle, Ovary	-
total sample size			**10**	**10**	**10**	**-**	**10**	**-**	**10**	**10**	**10**	**10**	**10**	**10**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
average			**11.3**	**9.8**	**10.7**	**-**	**2.8**	**-**	**0.486**	**0.135**	**10.0**	**1.14**	**0.045**	**0.013**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
median			**11.2**	**9.8**	**10.35**	**-**	**3**	**-**	**0.490**	**0.126**	**9.8**	**1.13**	**0.046**	**0.013**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
standard deviation			**0.536**	**0.611**	**1.963**	**-**	**0.42**	**-**	**0.147**	**0.039**	**1.839**	**0.106**	**0.010**	**0.002**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
standard error			**0.169**	**0.193**	**0.621**	**-**	**0.13**	**-**	**0.046**	**0.012**	**0.582**	**0.033**	**0.003**	**0.001**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
minimum			**10.4**	**8.5**	**8.5**	**-**	**2**	**-**	**0.279**	**0.096**	**7.95**	**0.99**	**0.028**	**0.008**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
maximum			**12.0**	**10.5**	**13.5**	**-**	**3**	**-**	**0.787**	**0.215**	**12.76**	**1.38**	**0.060**	**0.016**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Notes: D - deformities, E - erosion, L - lesions, T - tumors, "-" indicates no data

[a] Age structures collected: sc - scales, oto - otoliths

[b] Adjusted Body Weight = Body Weight - Liver Weight - Gonad Weight

Table G.28: Sport Fish Meristics Data for the Koocanusa Reservoir, April 2019

Area	Processing Date	Fish Species	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	DELT (Severe[S]/Minor[M]/ Absent[A])				Tissue Collected
							D	E	L	T	
Sand Creek	24-Apr-19	BT	RG_SC_BT-01	71.0	68.0	3,000	A	A	A	A	Muscle
	25-Apr-19	BT	RG_SC_BT-02	61.0	57.9	2,100	A	A	A	A	Muscle
	24-Apr-19	KO	RG_SC_KO-01	27.6	25.5	175	A	A	A	A	Muscle
	24-Apr-19	KO	RG_SC_KO-02	24.5	22.9	115	A	A	A	A	Muscle
	24-Apr-19	KO	RG_SC_KO-03	25.2	23.0	125	A	A	A	A	Muscle
	24-Apr-19	KO	RG_SC_KO-04	26.4	24.3	130	A	A	A	A	Muscle
	24-Apr-19	KO	RG_SC_KO-05	29.8	26.9	192	A	A	A	A	Muscle
	24-Apr-19	WCT	RG_SC_WCT-01	25.1	23.5	135	A	A	A	A	Muscle
Elk River	24-Apr-19	KO	RG_ER_KO-01	24.9	22.6	112	A	A	A	A	Muscle
	24-Apr-19	KO	RG_ER_KO-02	25.4	23.2	125	A	A	A	A	Muscle
	26-Apr-19	KO	RG_ER_KO-03	25.0	23.0	135	A	A	A	A	Muscle
	26-Apr-19	KO	RG_ER_KO-04	23.2	20.8	95	A	A	A	A	Muscle
	26-Apr-19	KO	RG_ER_KO-05	26.5	23.9	140	A	A	A	A	Muscle
	26-Apr-19	KO	RG_ER_KO-06	25.1	22.7	125	A	A	A	A	Muscle
Gold Creek	26-Apr-19	BT	RG_GC_BT-01	56.8	54.3	1,450	A	A	A	A	Muscle
	26-Apr-19	BT	RG_GC_BT-02	55.2	51.0	1,450	A	A	A	A	Muscle
	26-Apr-19	BT	RG_GC_BT-03	61.8	59.0	2,220	A	A	A	A	Muscle
	26-Apr-19	MWF	RG_GC_MWF-01	28.4	25.9	170	A	A	A	A	Muscle
	26-Apr-19	MWF	RG_GC_MWF-02	35.9	32.9	350	A	A	A	A	Muscle
	26-Apr-19	MWF	RG_GC_MWF-03	27.2	24.9	142	A	A	A	A	Muscle
	26-Apr-19	MWF	RG_GC_MWF-04	26.2	23.9	142	A	A	A	A	Muscle
	26-Apr-19	MWF	RG_GC_MWF-05	31.2	28.6	259	A	A	A	A	Muscle
	26-Apr-19	MWF	RG_GC_MWF-06	27.1	24.8	180	A	A	A	A	Muscle
	26-Apr-19	MWF	RG_GC_MWF-07	24.6	22.4	120	A	A	A	A	Muscle
	25-Apr-19	RBT	RG_GC_RBT-01	28.5	26.6	-	A	A	A	A	Muscle
	26-Apr-19	RBT	RG_GC_RBT-02	37.3	34.8	400	A	A	A	A	Muscle
	25-Apr-19	WCT	RG_GC_WCT-01	29.9	27.8	249	A	A	A	A	Muscle
	26-Apr-19	WCT	RG_GC_WCT-02	33.5	30.6	320	A	A	A	A	Muscle
	26-Apr-19	WCT	RG_GC_WCT-03	27.1	25.4	182	A	A	A	A	Muscle
	26-Apr-19	WCT	RG_GC_WCT-04	27.6	25.5	-	A	A	A	A	Muscle
	26-Apr-19	WCT	RG_GC_WCT-05	23.2	21.8	112	A	A	A	A	Muscle

Notes: D - deformities, E - erosion, L - lesions, T - tumors, "-" indicates no data.

Table G.29: Redside Shiner Recruitment Data for Sand Creek, Koocanusa Reservoir, August 2019

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age	Fulton's Condition Factor (K)	DELT (Severe[S]/Minor[M]/Absent[A])				Tissue Collected	Comment
								D	E	L	T		
20-Aug-19	RG_SC_RSC-01	1.6	1.5	0.024	-	-	0.711	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-02	2.6	2.4	0.134	oto	1	0.969	A	A	A	A	WB	-
20-Aug-19	RG_SC_RSC-03	2.3	2.2	0.053	-	-	0.498	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-04	2.0	1.9	0.060	-	-	0.875	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-05	1.9	1.8	0.027	-	-	0.463	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-06	2.1	1.9	0.067	-	-	0.977	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-07	1.6	1.5	0.031	-	-	0.919	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-08	1.8	1.7	0.043	-	-	0.875	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-09	1.9	1.8	0.062	-	-	1.063	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-10	1.7	1.6	0.026	-	-	0.635	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-11	1.9	1.8	0.062	-	-	1.063	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-12	2.3	2.2	0.067	-	-	0.629	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-13	2.2	2.0	0.080	-	-	1.000	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-14	1.5	1.4	0.021	-	-	0.765	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-15	1.9	1.8	0.031	-	-	0.532	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-16	1.9	1.8	0.037	-	-	0.634	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-17	2.0	1.9	0.043	-	-	0.627	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-18	1.6	1.5	0.029	-	-	0.859	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-19	2.1	2.0	0.058	-	-	0.725	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-20	1.6	1.5	0.030	-	-	0.889	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-21	1.9	1.8	0.058	-	-	0.995	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-22	2.0	1.9	0.063	-	-	0.919	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-23	1.7	1.6	0.057	-	-	1.392	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-24	2.1	1.9	0.041	-	-	0.598	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-25	1.7	1.6	0.033	-	-	0.806	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-26	1.9	1.8	0.046	-	-	0.789	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-27	1.7	1.6	0.037	-	-	0.903	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-28	2.0	1.9	0.039	-	-	0.569	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-29	1.6	1.5	0.032	-	-	0.948	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-30	1.5	1.4	0.028	-	-	1.020	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-31	3.3	3.0	0.286	oto	0	1.059	A	A	A	A	WB	-
20-Aug-19	RG_SC_RSC-32	3.4	3.1	0.271	oto	0	0.910	A	A	A	A	WB	-
20-Aug-19	RG_SC_RSC-33	4.0	3.7	0.515	-	-	1.017	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-34	2.7	2.4	0.103	-	-	0.745	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-35	2.8	2.5	0.097	-	-	0.621	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-36	2.6	2.4	0.101	-	-	0.731	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-37	2.8	2.6	0.134	-	-	0.762	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-38	2.1	1.9	0.065	-	-	0.948	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-39	3.0	2.8	0.219	-	-	0.998	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-40	2.9	2.7	0.163	-	-	0.828	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-41	6.0	5.3	1.674	oto	2	1.124	A	A	A	A	WB	-
20-Aug-19	RG_SC_RSC-42	2.2	2.0	0.053	-	-	0.663	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-43	2.7	2.5	0.143	-	-	0.915	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-44	2.6	2.4	0.117	-	-	0.846	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-45	2.9	2.7	0.200	-	-	1.016	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-46	4.5	4.1	0.665	-	-	0.965	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-47	4.7	4.2	0.755	oto	1	1.019	A	A	A	A	WB	-
20-Aug-19	RG_SC_RSC-48	3.3	3.0	0.251	-	-	0.930	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-49	4.7	4.4	0.722	oto	0	0.848	A	A	A	A	WB	-
20-Aug-19	RG_SC_RSC-50	2.8	2.6	0.097	-	-	0.552	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-51	3.4	3.1	0.301	-	-	1.010	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-52	5.2	4.8	0.939	oto	1	0.849	A	A	A	A	WB	-
20-Aug-19	RG_SC_RSC-53	4.0	3.6	0.497	oto	0	1.065	A	A	A	A	WB	-
20-Aug-19	RG_SC_RSC-54	4.9	4.5	0.940	oto	1	1.032	A	A	A	A	WB	-
20-Aug-19	RG_SC_RSC-55	5.4	4.9	1.370	oto	1	1.164	A	A	A	A	WB	-
20-Aug-19	RG_SC_RSC-56	2.4	2.2	1.017	-	-	9.551	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-57	3.0	2.7	0.179	-	-	0.909	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-58	2.7	2.5	0.129	-	-	0.826	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-59	2.9	2.6	0.157	-	-	0.893	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-60	2.7	2.4	0.161	-	-	1.165	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-61	2.5	2.3	0.121	-	-	0.994	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-62	2.7	2.4	0.133	-	-	0.962	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-63	2.9	2.7	0.206	-	-	1.047	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-64	5.4	5.0	1.368	-	-	1.094	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-65	4.0	3.7	0.537	-	-	1.060	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-66	3.1	2.9	0.224	-	-	0.918	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-67	1.7	1.5	0.041	-	-	1.215	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-68	3.2	2.9	0.269	-	-	1.103	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-69	2.4	2.3	0.103	-	-	0.847	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-70	2.9	2.7	0.180	-	-	0.914	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-71	3.1	2.7	0.187	-	-	0.950	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-72	2.8	2.6	0.184	-	-	1.047	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-73	3.1	2.8	0.194	-	-	0.884	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-74	2.3	2.1	0.123	-	-	1.328	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-75	5.6	4.2	0.702	-	-	0.948	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-76	2.7	2.4	0.177	-	-	1.280	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-77	2.7	2.5	0.198	-	-	1.267	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-78	2.9	2.7	0.203	-	-	1.031	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-79	3.7	3.4	0.402	-	-	1.023	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-80	2.7	2.5	0.142	-	-	0.909	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-81	2.7	2.5	0.138	-	-	0.883	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-82	2.1	1.9	0.091	-	-	1.327	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-83	2.4	2.2	0.145	-	-	1.362	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-84	3.6	3.4	0.477	-	-	1.214	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-85	2.6	2.4	0.131	-	-	0.948	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-86	3.0	2.7	0.227	-	-	1.153	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-87	2.9	2.6	0.215	-	-	1.223	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-88	3.2	2.9	0.256	-	-	1.050	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-89	3.0	2.8	0.268	-	-	1.221	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-90	2.6	2.4	0.134	-	-	0.969	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-91	3.4	3.1	0.291	-	-	0.977	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-92	2.8	2.6	0.173	-	-	0.984	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-93	3.2	2.9	0.226	-	-	0.927	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-94	2.5	2.3	0.149	-	-	1.225	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-95	3.0	2.7	0.251	-	-	1.275	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-96	3.9	3.5	0.433	-	-	1.010	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-97	3.7	3.3	0.365	-	-	1.016	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-98	2.3	2.1	0.100	-	-	1.080	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-99	3.5	3.1	0.335	-	-	1.125	A	A	A	A	-	-
20-Aug-19	RG_SC_RSC-100	2.8	2.6	0.162	-	-	0.922	A	A	A	A	-	-
total sample size		**100**	**100**	**100**	**-**	**10**	**100**	**-**	**-**	**-**	**-**	**-**	**-**
average		**2.8**	**2.6**	**0.240**	**-**	**0.7**	**1.033**	**-**	**-**	**-**	**-**	**-**	**-**
median		**2.7**	**2.5**	**0.143**	**-**	**1**	**0.956**	**-**	**-**	**-**	**-**	**-**	**-**
standard deviation		**1.0**	**0.8**	**0.302**	**-**	**0.67**	**0.882**	**-**	**-**	**-**	**-**	**-**	**-**
standard error		**0.1**	**0.1**	**0.030**	**-**	**0.21**	**0.088**	**-**	**-**	**-**	**-**	**-**	**-**
minimum		**1.5**	**1.4**	**0.021**	**-**	**0**	**0.463**	**-**	**-**	**-**	**-**	**-**	**-**
maximum		**6.0**	**5.3**	**1.674**	**-**	**2**	**9.551**	**-**	**-**	**-**	**-**	**-**	**-**

Notes: D - deformity, E - erosion, L - lesion, T - tumor, "-" indicates no data.

[a] Age structures collected: oto = otolith extracted from whole body (WB)

Table G.30: Redside Shiner Recruitment Data for Elk River, Koocanusa Reservoir, August 2019

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age	Fulton's Condition Factor (K)	DELT (Severe[S]/Minor[M]/Absent[A])				Tissue Collected
								D	E	L	T	
22-Aug-19	RG_ER_RSC-01	2.6	2.4	0.097	-	-	0.702	A	A	A	A	-
22-Aug-19	RG_ER_RSC-02	2.9	2.6	0.138	oto	0	0.785	A	A	A	A	WB
22-Aug-19	RG_ER_RSC-03	1.7	1.6	0.034	-	-	0.830	A	A	A	A	-
22-Aug-19	RG_ER_RSC-04	2.5	2.4	0.143	-	-	1.034	A	A	A	A	-
22-Aug-19	RG_ER_RSC-05	2.7	2.6	0.123	-	-	0.700	A	A	A	A	-
22-Aug-19	RG_ER_RSC-06	2.6	2.5	0.124	-	-	0.794	A	A	A	A	-
22-Aug-19	RG_ER_RSC-07	2.7	2.5	0.199	-	-	1.274	A	A	A	A	-
22-Aug-19	RG_ER_RSC-08	3.2	2.9	0.278	oto	0	1.140	A	A	A	A	WB
22-Aug-19	RG_ER_RSC-09	2.5	2.4	0.129	-	-	0.933	A	A	A	A	-
22-Aug-19	RG_ER_RSC-10	2.7	2.5	0.172	oto	0	1.101	A	A	A	A	WB
22-Aug-19	RG_ER_RSC-11	2.1	2.0	0.102	-	-	1.275	A	A	A	A	-
22-Aug-19	RG_ER_RSC-12	2.1	2.0	0.100	-	-	1.250	A	A	A	A	-
22-Aug-19	RG_ER_RSC-13	2.6	2.4	0.169	oto	0	1.223	A	A	A	A	WB
22-Aug-19	RG_ER_RSC-14	3.5	3.2	0.317	oto	0	0.967	A	A	A	A	WB
22-Aug-19	RG_ER_RSC-15	2.6	2.4	0.128	oto	0	0.926	A	A	A	A	WB
22-Aug-19	RG_ER_RSC-16	2.4	2.2	0.115	oto	0	1.080	A	A	A	A	WB
22-Aug-19	RG_ER_RSC-17	2.2	2.0	0.094	oto	0	1.175	A	A	A	A	WB
22-Aug-19	RG_ER_RSC-18	2.6	2.4	0.157	oto	0	1.136	A	A	A	A	WB
22-Aug-19	RG_ER_RSC-19	2.9	2.7	0.191	-	-	0.970	A	A	A	A	-
22-Aug-19	RG_ER_RSC-20	2.5	2.3	0.129	-	-	1.060	A	A	A	A	-
22-Aug-19	RG_ER_RSC-21	2.6	2.5	0.182	-	-	1.165	A	A	A	A	-
22-Aug-19	RG_ER_RSC-22	2.9	2.8	0.079	-	-	0.360	A	A	A	A	-
22-Aug-19	RG_ER_RSC-23	2.9	2.7	0.077	-	-	0.391	A	A	A	A	-
22-Aug-19	RG_ER_RSC-24	3.1	2.8	0.256	-	-	1.166	A	A	A	A	-
22-Aug-19	RG_ER_RSC-25	2.2	2.0	0.104	-	-	1.300	A	A	A	A	-
22-Aug-19	RG_ER_RSC-26	2.0	1.9	0.073	-	-	1.064	A	A	A	A	-
22-Aug-19	RG_ER_RSC-27	2.6	2.4	0.171	-	-	1.237	A	A	A	A	-
22-Aug-19	RG_ER_RSC-28	2.5	2.3	0.159	-	-	1.307	A	A	A	A	-
22-Aug-19	RG_ER_RSC-29	1.9	1.7	0.074	-	-	1.506	A	A	A	A	-
22-Aug-19	RG_ER_RSC-30	2.2	2.1	0.097	-	-	1.047	A	A	A	A	-
22-Aug-19	RG_ER_RSC-31	1.7	1.6	0.063	-	-	1.538	A	A	A	A	-
22-Aug-19	RG_ER_RSC-32	2.5	2.3	0.143	-	-	1.175	A	A	A	A	-
22-Aug-19	RG_ER_RSC-33	2.1	2.0	0.093	-	-	1.163	A	A	A	A	-
22-Aug-19	RG_ER_RSC-34	2.0	1.9	0.067	-	-	0.977	A	A	A	A	-
22-Aug-19	RG_ER_RSC-35	2.6	2.5	0.139	-	-	0.890	A	A	A	A	-
22-Aug-19	RG_ER_RSC-36	2.7	2.5	0.163	-	-	1.043	A	A	A	A	-
22-Aug-19	RG_ER_RSC-37	2.2	2.1	0.119	-	-	1.285	A	A	A	A	-
22-Aug-19	RG_ER_RSC-38	2.1	2.0	0.097	-	-	1.213	A	A	A	A	-
22-Aug-19	RG_ER_RSC-39	2.3	2.2	0.113	-	-	1.061	A	A	A	A	-
22-Aug-19	RG_ER_RSC-40	2.8	2.6	0.209	-	-	1.189	A	A	A	A	-
22-Aug-19	RG_ER_RSC-41	3.0	2.8	0.126	-	-	0.574	A	A	A	A	-
22-Aug-19	RG_ER_RSC-42	2.7	2.5	0.179	-	-	1.146	A	A	A	A	-
22-Aug-19	RG_ER_RSC-43	2.2	2.0	0.121	-	-	1.513	A	A	A	A	-
22-Aug-19	RG_ER_RSC-44	2.4	2.3	0.127	-	-	1.044	A	A	A	A	-
22-Aug-19	RG_ER_RSC-45	1.8	1.7	0.086	-	-	1.750	A	A	A	A	-
22-Aug-19	RG_ER_RSC-46	2.8	2.6	0.178	-	-	1.013	A	A	A	A	-
22-Aug-19	RG_ER_RSC-47	2.2	2.0	0.085	-	-	1.063	A	A	A	A	-
22-Aug-19	RG_ER_RSC-48	2.4	2.5	0.144	-	-	0.922	A	A	A	A	-
22-Aug-19	RG_ER_RSC-49	2.0	1.9	0.079	-	-	1.152	A	A	A	A	-
22-Aug-19	RG_ER_RSC-50	2.0	1.9	0.073	-	-	1.064	A	A	A	A	-
22-Aug-19	RG_ER_RSC-51	2.2	2.0	0.093	-	-	1.163	A	A	A	A	-
22-Aug-19	RG_ER_RSC-52	2.9	2.7	0.157	-	-	0.798	A	A	A	A	-
22-Aug-19	RG_ER_RSC-53	2.6	2.4	0.122	-	-	0.883	A	A	A	A	-
22-Aug-19	RG_ER_RSC-54	2.8	2.6	0.142	-	-	0.808	A	A	A	A	-
22-Aug-19	RG_ER_RSC-55	2.6	2.4	0.156	-	-	1.128	A	A	A	A	-
22-Aug-19	RG_ER_RSC-56	2.8	2.6	0.100	-	-	0.569	A	A	A	A	-
22-Aug-19	RG_ER_RSC-57	2.0	1.9	0.072	-	-	1.050	A	A	A	A	-
22-Aug-19	RG_ER_RSC-58	2.8	2.6	0.159	-	-	0.905	A	A	A	A	-
22-Aug-19	RG_ER_RSC-59	2.1	2.0	0.068	-	-	0.850	A	A	A	A	-
22-Aug-19	RG_ER_RSC-60	3.4	3.0	0.297	-	-	1.100	A	A	A	A	-
22-Aug-19	RG_ER_RSC-61	1.8	1.6	0.067	-	-	1.636	A	A	A	A	-
22-Aug-19	RG_ER_RSC-62	2.1	1.9	0.074	-	-	1.079	A	A	A	A	-
22-Aug-19	RG_ER_RSC-63	2.6	2.4	0.105	-	-	0.760	A	A	A	A	-
22-Aug-19	RG_ER_RSC-64	2.8	2.6	0.152	-	-	0.865	A	A	A	A	-
22-Aug-19	RG_ER_RSC-65	3.3	2.9	0.266	-	-	1.091	A	A	A	A	-
22-Aug-19	RG_ER_RSC-66	3.0	2.7	0.231	-	-	1.174	A	A	A	A	-
22-Aug-19	RG_ER_RSC-67	2.2	2.0	0.072	-	-	0.900	A	A	A	A	-
22-Aug-19	RG_ER_RSC-68	2.3	2.1	0.080	-	-	0.864	A	A	A	A	-
22-Aug-19	RG_ER_RSC-69	2.9	2.6	0.187	-	-	1.064	A	A	A	A	-
22-Aug-19	RG_ER_RSC-70	3.0	2.7	0.238	-	-	1.209	A	A	A	A	-
22-Aug-19	RG_ER_RSC-71	2.2	2.1	0.088	-	-	0.950	A	A	A	A	-
22-Aug-19	RG_ER_RSC-72	4.0	3.5	0.513	oto	0	1.197	A	A	A	A	WB
22-Aug-19	RG_ER_RSC-73	3.0	2.8	0.248	-	-	1.130	A	A	A	A	-
22-Aug-19	RG_ER_RSC-74	2.5	2.3	0.126	-	-	1.036	A	A	A	A	-
22-Aug-19	RG_ER_RSC-75	2.7	2.5	0.171	-	-	1.094	A	A	A	A	-
22-Aug-19	RG_ER_RSC-76	2.3	2.1	0.074	-	-	0.799	A	A	A	A	-
22-Aug-19	RG_ER_RSC-77	2.5	2.2	0.111	-	-	1.042	A	A	A	A	-
22-Aug-19	RG_ER_RSC-78	1.9	1.7	0.066	-	-	1.343	A	A	A	A	-
22-Aug-19	RG_ER_RSC-79	1.6	1.5	0.033	-	-	0.978	A	A	A	A	-
22-Aug-19	RG_ER_RSC-80	2.4	2.3	0.135	-	-	1.110	A	A	A	A	-
22-Aug-19	RG_ER_RSC-81	3.4	3.1	0.281	-	-	0.943	A	A	A	A	-
22-Aug-19	RG_ER_RSC-82	1.9	1.8	0.057	-	-	0.977	A	A	A	A	-
22-Aug-19	RG_ER_RSC-83	3.0	2.6	0.227	-	-	1.292	A	A	A	A	-
22-Aug-19	RG_ER_RSC-84	2.4	2.2	0.076	-	-	0.714	A	A	A	A	-
22-Aug-19	RG_ER_RSC-85	2.7	2.5	0.126	-	-	0.806	A	A	A	A	-
22-Aug-19	RG_ER_RSC-86	2.1	1.9	0.097	-	-	1.414	A	A	A	A	-
22-Aug-19	RG_ER_RSC-87	2.6	2.4	0.171	-	-	1.237	A	A	A	A	-
22-Aug-19	RG_ER_RSC-88	2.1	2.0	0.098	-	-	1.225	A	A	A	A	-
22-Aug-19	RG_ER_RSC-89	2.3	2.1	0.107	-	-	1.155	A	A	A	A	-
22-Aug-19	RG_ER_RSC-90	3.0	2.7	0.192	-	-	0.975	A	A	A	A	-
22-Aug-19	RG_ER_RSC-91	2.5	2.3	0.114	-	-	0.937	A	A	A	A	-
22-Aug-19	RG_ER_RSC-92	1.7	1.6	0.038	-	-	0.928	A	A	A	A	-
22-Aug-19	RG_ER_RSC-93	3.2	3.0	0.250	-	-	0.926	A	A	A	A	-
22-Aug-19	RG_ER_RSC-94	2.6	2.4	0.121	-	-	0.875	A	A	A	A	-
22-Aug-19	RG_ER_RSC-95	2.4	2.2	0.119	-	-	1.118	A	A	A	A	-
22-Aug-19	RG_ER_RSC-96	2.9	2.7	0.174	-	-	0.884	A	A	A	A	-
22-Aug-19	RG_ER_RSC-97	2.5	2.3	0.125	-	-	1.027	A	A	A	A	-
22-Aug-19	RG_ER_RSC-98	2.7	2.5	0.136	-	-	0.870	A	A	A	A	-
22-Aug-19	RG_ER_RSC-99	3.1	2.7	0.226	-	-	1.148	A	A	A	A	-
22-Aug-19	RG_ER_RSC-100	2.8	2.6	0.196	-	-	1.115	A	A	A	A	-
total sample size		**100**	**100**	**100**	**-**	**10**	**100**	**-**	**-**	**-**	**-**	**-**
average		**2.5**	**2.3**	**0.139**	**-**	**0**	**1.048**	**-**	**-**	**-**	**-**	**-**
median		**2.6**	**2.4**	**0.126**	**-**	**0**	**1.062**	**-**	**-**	**-**	**-**	**-**
standard deviation		**0.4**	**0.4**	**0.072**	**-**	**0.00**	**0.229**	**-**	**-**	**-**	**-**	**-**
standard error		**0.0**	**0.0**	**0.007**	**-**	**0.00**	**0.023**	**-**	**-**	**-**	**-**	**-**
minimum		**1.6**	**1.5**	**0.033**	**-**	**0**	**0.360**	**-**	**-**	**-**	**-**	**-**
maximum		**4.0**	**3.5**	**0.513**	**-**	**0**	**1.750**	**-**	**-**	**-**	**-**	**-**

Notes: D - deformity, E - erosion, L - lesion, T - tumor, "-" indicates no data.

[a] Age structures collected: oto = otolith extracted from whole body (WB)

Table G.31: Redside Shiner Recruitment Data for Gold Creek, Koocanusa Reservoir, August 2019

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected [a]	Age	Fulton's Condition Factor (K)	DELT (Severe[S]/Minor[M]/Absent[A])				Tissue Collected
								D	E	L	T	
21-Aug-19	RG_GC_RSC-01	3.2	3.0	0.286	oto	0	1.059	A	A	A	A	WB
21-Aug-19	RG_GC_RSC-02	2.5	2.2	0.077	-	-	0.723	A	A	A	A	-
21-Aug-19	RG_GC_RSC-03	3.5	3.2	0.172	-	-	0.525	A	A	A	A	-
21-Aug-19	RG_GC_RSC-04	4.4	4.0	0.624	oto	1	0.975	A	A	A	A	WB
21-Aug-19	RG_GC_RSC-05	3.2	3.0	0.271	-	-	1.004	A	A	A	A	-
21-Aug-19	RG_GC_RSC-06	3.8	3.5	0.520	oto	0	1.213	A	A	A	A	WB
21-Aug-19	RG_GC_RSC-07	2.8	2.6	0.166	-	-	0.944	A	A	A	A	-
21-Aug-19	RG_GC_RSC-08	4.3	3.9	0.664	oto	0	1.119	A	A	A	A	WB
21-Aug-19	RG_GC_RSC-09	3.1	2.8	0.286	-	-	1.303	A	A	A	A	-
21-Aug-19	RG_GC_RSC-10	3.5	3.1	0.397	oto	0	1.333	A	A	A	A	WB
21-Aug-19	RG_GC_RSC-11	3.1	2.8	0.236	-	-	1.075	A	A	A	A	-
21-Aug-19	RG_GC_RSC-12	4.0	3.7	0.552	oto	0	1.090	A	A	A	A	WB
21-Aug-19	RG_GC_RSC-13	3.8	3.5	0.381	-	-	0.889	A	A	A	A	-
21-Aug-19	RG_GC_RSC-14	3.7	3.5	0.381	-	-	0.889	A	A	A	A	-
21-Aug-19	RG_GC_RSC-15	4.0	3.7	0.552	oto	0	1.090	A	A	A	A	WB
21-Aug-19	RG_GC_RSC-16	4.1	3.7	0.549	oto	0	1.084	A	A	A	A	WB
21-Aug-19	RG_GC_RSC-17	3.2	3.0	0.241	-	-	0.893	A	A	A	A	-
21-Aug-19	RG_GC_RSC-18	2.7	2.6	0.132	-	-	0.751	A	A	A	A	-
21-Aug-19	RG_GC_RSC-19	3.0	2.8	0.213	-	-	0.970	A	A	A	A	-
21-Aug-19	RG_GC_RSC-20	3.5	3.1	0.297	-	-	0.997	A	A	A	A	-
21-Aug-19	RG_GC_RSC-21	3.2	3.0	0.268	-	-	0.993	A	A	A	A	-
21-Aug-19	RG_GC_RSC-22	2.5	2.5	0.077	-	-	0.493	A	A	A	A	-
21-Aug-19	RG_GC_RSC-23	3.5	3.2	0.172	oto	0	0.525	A	A	A	A	WB
21-Aug-19	RG_GC_RSC-24	4.4	4.0	0.624	-	-	0.975	A	A	A	A	-
21-Aug-19	RG_GC_RSC-25	3.2	3.0	0.271	-	-	1.004	A	A	A	A	-
21-Aug-19	RG_GC_RSC-26	3.8	3.5	0.520	-	-	1.213	A	A	A	A	-
21-Aug-19	RG_GC_RSC-27	2.8	2.6	0.166	-	-	0.944	A	A	A	A	-
21-Aug-19	RG_GC_RSC-28	4.3	3.9	0.664	-	-	1.119	A	A	A	A	-
21-Aug-19	RG_GC_RSC-29	3.1	2.8	0.286	-	-	1.303	A	A	A	A	-
21-Aug-19	RG_GC_RSC-30	3.5	3.1	0.397	-	-	1.333	A	A	A	A	-
21-Aug-19	RG_GC_RSC-31	3.1	2.8	0.236	-	-	1.075	A	A	A	A	-
21-Aug-19	RG_GC_RSC-32	4.0	3.7	0.544	-	-	1.074	A	A	A	A	-
21-Aug-19	RG_GC_RSC-33	3.8	3.5	0.447	-	-	1.043	A	A	A	A	-
21-Aug-19	RG_GC_RSC-34	3.7	3.5	0.381	-	-	0.889	A	A	A	A	-
21-Aug-19	RG_GC_RSC-35	4.0	3.7	0.552	-	-	1.090	A	A	A	A	-
21-Aug-19	RG_GC_RSC-36	4.1	3.7	0.549	-	-	1.084	A	A	A	A	-
21-Aug-19	RG_GC_RSC-37	3.2	3.0	0.241	-	-	0.893	A	A	A	A	-
21-Aug-19	RG_GC_RSC-38	2.7	2.6	0.132	-	-	0.751	A	A	A	A	-
21-Aug-19	RG_GC_RSC-39	3.0	2.8	0.213	-	-	0.970	A	A	A	A	-
21-Aug-19	RG_GC_RSC-40	3.5	3.1	0.297	-	-	0.997	A	A	A	A	-
21-Aug-19	RG_GC_RSC-41	3.7	3.5	0.371	-	-	0.865	A	A	A	A	-
21-Aug-19	RG_GC_RSC-42	4.2	3.8	0.531	oto	0	0.968	A	A	A	A	WB
21-Aug-19	RG_GC_RSC-43	3.1	2.8	0.226	-	-	1.030	A	A	A	A	-
21-Aug-19	RG_GC_RSC-44	2.5	2.3	0.126	-	-	1.036	A	A	A	A	-
21-Aug-19	RG_GC_RSC-45	3.1	2.7	0.271	-	-	1.377	A	A	A	A	-
21-Aug-19	RG_GC_RSC-46	2.9	2.6	0.172	-	-	0.979	A	A	A	A	-
21-Aug-19	RG_GC_RSC-47	2.9	2.7	0.274	-	-	1.392	A	A	A	A	-
21-Aug-19	RG_GC_RSC-48	3.9	3.7	0.417	-	-	0.823	A	A	A	A	-
21-Aug-19	RG_GC_RSC-49	2.3	2.2	0.087	-	-	0.817	A	A	A	A	-
21-Aug-19	RG_GC_RSC-50	3.5	3.2	0.303	-	-	0.925	A	A	A	A	-
21-Aug-19	RG_GC_RSC-51	2.8	2.7	0.159	-	-	0.808	A	A	A	A	-
21-Aug-19	RG_GC_RSC-52	2.7	2.5	0.157	-	-	1.005	A	A	A	A	-
21-Aug-19	RG_GC_RSC-53	3.1	2.8	0.288	-	-	1.312	A	A	A	A	-
21-Aug-19	RG_GC_RSC-54	3.0	2.7	0.194	-	-	0.986	A	A	A	A	-
21-Aug-19	RG_GC_RSC-55	2.7	2.5	0.119	-	-	0.762	A	A	A	A	-
21-Aug-19	RG_GC_RSC-56	2.8	2.6	0.145	-	-	0.825	A	A	A	A	-
21-Aug-19	RG_GC_RSC-57	2.5	2.3	0.123	-	-	1.011	A	A	A	A	-
21-Aug-19	RG_GC_RSC-58	3.1	2.7	0.212	-	-	1.077	A	A	A	A	-
21-Aug-19	RG_GC_RSC-59	3.8	3.5	0.449	-	-	1.047	A	A	A	A	-
21-Aug-19	RG_GC_RSC-60	2.7	2.5	0.186	-	-	1.190	A	A	A	A	-
21-Aug-19	RG_GC_RSC-61	2.6	2.4	0.134	-	-	0.969	A	A	A	A	-
21-Aug-19	RG_GC_RSC-62	2.5	2.3	0.152	-	-	1.249	A	A	A	A	-
21-Aug-19	RG_GC_RSC-63	3.1	3.0	0.226	-	-	0.837	A	A	A	A	-
21-Aug-19	RG_GC_RSC-64	2.4	2.3	0.122	-	-	1.003	A	A	A	A	-
21-Aug-19	RG_GC_RSC-65	2.7	2.5	0.184	-	-	1.178	A	A	A	A	-
21-Aug-19	RG_GC_RSC-66	2.2	2.0	0.070	-	-	0.875	A	A	A	A	-
21-Aug-19	RG_GC_RSC-67	2.4	2.3	0.097	-	-	0.797	A	A	A	A	-
21-Aug-19	RG_GC_RSC-68	3.9	3.5	0.486	-	-	1.134	A	A	A	A	-
21-Aug-19	RG_GC_RSC-69	2.7	2.5	0.158	-	-	1.011	A	A	A	A	-
21-Aug-19	RG_GC_RSC-70	3.1	2.9	0.198	-	-	0.812	A	A	A	A	-
21-Aug-19	RG_GC_RSC-71	2.8	2.6	0.155	-	-	0.882	A	A	A	A	-
21-Aug-19	RG_GC_RSC-72	3.0	2.8	0.205	-	-	0.934	A	A	A	A	-
21-Aug-19	RG_GC_RSC-73	2.8	2.6	0.170	-	-	0.967	A	A	A	A	-
21-Aug-19	RG_GC_RSC-74	2.9	2.7	0.161	-	-	0.818	A	A	A	A	-
21-Aug-19	RG_GC_RSC-75	2.8	2.6	0.147	-	-	0.836	A	A	A	A	-
21-Aug-19	RG_GC_RSC-76	2.6	2.5	0.126	-	-	0.806	A	A	A	A	-
21-Aug-19	RG_GC_RSC-77	2.5	2.3	0.116	-	-	0.953	A	A	A	A	-
21-Aug-19	RG_GC_RSC-78	2.9	2.6	0.189	-	-	1.075	A	A	A	A	-
21-Aug-19	RG_GC_RSC-79	2.9	2.8	0.143	-	-	0.651	A	A	A	A	-
21-Aug-19	RG_GC_RSC-80	2.5	2.3	0.124	-	-	1.019	A	A	A	A	-
21-Aug-19	RG_GC_RSC-81	2.3	2.2	0.081	-	-	0.761	A	A	A	A	-
21-Aug-19	RG_GC_RSC-82	2.3	2.1	0.063	-	-	0.680	A	A	A	A	-
21-Aug-19	RG_GC_RSC-83	2.7	2.5	0.158	-	-	1.011	A	A	A	A	-
21-Aug-19	RG_GC_RSC-84	2.5	2.4	0.117	-	-	0.846	A	A	A	A	-
21-Aug-19	RG_GC_RSC-85	4.1	3.8	0.502	-	-	0.915	A	A	A	A	-
21-Aug-19	RG_GC_RSC-86	4.2	3.9	0.537	-	-	0.905	A	A	A	A	-
21-Aug-19	RG_GC_RSC-87	3.1	2.8	0.220	-	-	1.002	A	A	A	A	-
21-Aug-19	RG_GC_RSC-88	3.0	2.7	0.257	-	-	1.306	A	A	A	A	-
21-Aug-19	RG_GC_RSC-89	2.7	2.5	0.181	-	-	1.158	A	A	A	A	-
21-Aug-19	RG_GC_RSC-90	3.2	3.0	0.264	-	-	0.978	A	A	A	A	-
21-Aug-19	RG_GC_RSC-91	2.2	2.0	0.083	-	-	1.038	A	A	A	A	-
21-Aug-19	RG_GC_RSC-92	2.2	2.0	0.078	-	-	0.975	A	A	A	A	-
21-Aug-19	RG_GC_RSC-93	2.9	2.6	0.161	-	-	0.916	A	A	A	A	-
21-Aug-19	RG_GC_RSC-94	3.9	3.5	0.459	-	-	1.071	A	A	A	A	-
21-Aug-19	RG_GC_RSC-95	3.1	2.9	0.221	-	-	0.906	A	A	A	A	-
21-Aug-19	RG_GC_RSC-96	2.6	2.5	0.154	-	-	0.986	A	A	A	A	-
21-Aug-19	RG_GC_RSC-97	3.8	3.4	0.413	-	-	1.051	A	A	A	A	-
21-Aug-19	RG_GC_RSC-98	2.9	2.6	0.186	-	-	1.058	A	A	A	A	-
21-Aug-19	RG_GC_RSC-99	3.2	2.9	0.271	-	-	1.111	A	A	A	A	-
21-Aug-19	RG_GC_RSC-100	3.9	3.5	0.448	-	-	1.045	A	A	A	A	-
total sample size		**100**	**100**	**100**	**-**	**10**	**100**	**-**	**-**	**-**	**-**	**-**
average		**3.2**	**2.9**	**0.271**	**-**	**0.1**	**0.984**	**-**	**-**	**-**	**-**	**-**
median		**3.1**	**2.8**	**0.221**	**-**	**0**	**0.989**	**-**	**-**	**-**	**-**	**-**
standard deviation		**0.6**	**0.5**	**0.159**	**-**	**0.32**	**0.175**	**-**	**-**	**-**	**-**	**-**
standard error		**0.1**	**0.1**	**0.016**	**-**	**0.10**	**0.018**	**-**	**-**	**-**	**-**	**-**
minimum		**2.2**	**2.0**	**0.063**	**-**	**0**	**0.493**	**-**	**-**	**-**	**-**	**-**
maximum		**4.4**	**4.0**	**0.664**	**-**	**1**	**1.392**	**-**	**-**	**-**	**-**	**-**

Notes: D - deformity, E - erosion, L - lesion, T - tumor, "-" indicates no data.

[a] Age structures collected: oto = otolith extracted from whole body (WB)

Table G.32: Sport Fish Meristics Data for the Koocanusa Reservoir, August 2019

Area	Processing Date	Fish Species	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Sex	DELT (Severe[S]/Minor[M]/Absent[A])				Tissue Collected
								D	E	L	T	
Sand Creek	26-Aug-19	KO	RG_SC_KO-01	24.2	22.2	110	U	A	A	A	A	Muscle
	26-Aug-19	KO	RG_SC_KO-02	25.9	23.6	155	U	A	A	A	A	Muscle
	26-Aug-19	KO	RG_SC_KO-03	25.9	23.4	140	U	A	A	A	A	Muscle
Elk River	26-Aug-19	KO	RG_ER_KO-01	26.4	24.5	145	U	A	A	A	A	Muscle

Notes: D - deformity, E - erosion, L - lesion, T - tumor, "-" indicates no data.

Table G.33: Summary of Externally and Internally Observed Fish Anomalies at Sand Creek, Elk River, and Gold Creek Study Areas in Koocanusa Reservoir, 2019

Fish Species	Study Area	External				Total Proportion of Fish with Internal Anomalies	Internal			Total Proportion of Fish with External Anomalies
		Sample Size	Deformities	Erosion	Lesions		Sample Size	Parasites[a]	Irregular Size or Discolouration of Liver or Gonads	
Peamouth Chub (April)	Sand Creek	10	0%	0%	0%	0%	10	40%	-	40%
	Elk River	10	0%	0%	0%	0%	10	10%	-	10%
	Gold Creek	10	10%	0%	0%	10%	10	80%	-	80%
Redside Shiner (April)	Sand Creek	10	0%	0%	0%	0%	10	10%	-	10%
	Elk River	10	0%	0%	0%	0%	10	20%	-	20%
	Gold Creek	10	0%	0%	0%	0%	10	10%	-	10%

Note: No sport fish were observed with anomalies. "-" indicates no data available

[a] Parasites found were exclusively tapeworms; almost all tapeworms were found in body cavity

Table G.34: Summary of Pair-Wise Statistical Comparisons Among Koocanusa Reservoir Study Areas for Peamouth Chub Health Endpoints, 2014 to 2018

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-way ANCOVA (Parallel Slope Model) P-values			Year	Covariate Value	Measures of Central Tendency			Magnitude of Difference ([Exposed-Reference]/Reference*100%)		
				Term (s)	P-value	Area	Year	Area x Year			Sand Creek	Elk River	Gold Creek	Sand Creek vs. Elk River	Sand Creek vs. Gold Creek	Gold Creek vs. Elk River
F	Age (yrs)	-	rank	-	-	<0.001	<0.001	0.009	2014	-	10.0	13.0	9.00	30	-10	44
									2015		12.0	13.0	12.0	8.3	0	8.3
									2016		10.0	8.00	6.00	-20	-40	33
									2018		8.00	8.00	7.00	0	-12	14
	Fork Length (cm)	-	log_{10}	-	-	<0.001	<0.001	<0.001	2014	-	23.2	25.5	23.5	10	1.4	8.5
									2015		24.5	24.9	24.3	1.4	-0.86	2.3
									2016		23.3	22.2	20.2	-4.6	-13	9.6
									2018		22.8	22.5	22.1	-1.1	-2.7	1.7
	Adjusted Body Weight (g)	-	rank	-	-	<0.001	<0.001	0.003	2014	-	136	162	139	19	2.2	16
									2015		150	153	144	2.0	-4.0	6.2
									2016		139	131	108	-5.8	-22	21
									2018		136	130	122	-4.4	-10	6.6
		Age (yrs)	log_{10}	Cov x Area x Year	<0.001	0.010	0.008	0.001	2014	8	122	141	132	-		
										9.5	132	150	140	14	5.7	7.4
										11	142	159	147	-		
									2015	8	126	125	123	-		
										9.5	137	135	130	-1.2	-5.0	3.9
										11	147	145	136	-		
									2016	8	128	126	113	-	-12	12
										9.5	137	138	132	1.2	-	-
										11	145	150	151	-	4.8	-0.91
									2018	8	136	116	126	-		
										9.5	143	126	137	-12	-4.5	-7.9
										11	150	135	146	-		
	Fork Length (cm)	Age (yrs)	log_{10}	Cov x Area x Year	<0.001	0.079	<0.001	0.005	2014	8	22.4	23.7	23.2	-		
										9.5	23.1	24.2	23.9	4.8	3.3	1.5
										11	23.8	24.7	24.4	-		
									2015	8	23.1	23.1	22.9	-		
										9.5	23.7	23.8	23.4	0.33	-1.0	1.4
										11	24.2	24.3	23.9	-		
									2016	8	22.7	22.3	21.9	-	-3.6	1.8
										9.5	23.3	23.0	23.1	-1.3	-	-
										11	23.8	23.6	24.2	-	1.7	-2.5
									2018	8	22.9	22.5	22.7	-		
										9.5	23.5	23.2	23.4	-1.2	-0.43	-0.74
										11	23.9	23.8	23.9	-		

P-value < 0.05

Tukey's Honestly Significant Difference (HSD) P-Value < 0.1 and Exp > Ref

Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organism; "M" indicates male organism; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the

Table G.34: Summary of Pair-Wise Statistical Comparisons Among Koocanusa Reservoir Study Areas for Peamouth Chub Health Endpoints, 2014 to 2018

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-way ANCOVA (Parallel Slope Model) P-values			Year	Covariate Value	Measures of Central Tendency			Magnitude of Difference ([Exposed-Reference]/Reference*100%)		
				Term (s)	P-value	Area	Year	Area x Year			Sand Creek	Elk River	Gold Creek	Sand Creek vs. Elk River	Sand Creek vs. Gold Creek	Gold Creek vs. Elk River
F	Gonad Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov x Area	0.029	0.210	<0.001	0.242	2014	108	3.37	4.79	4.40	42	-	-
										134	5.70	6.78	6.72	-	18	0.85
										160	8.78	9.01	9.51	2.7	-	-
									2015	108	3.51	5.00	4.60	42	-	-
										134	5.95	7.08	7.02	-	18	0.85
										160	9.17	9.41	9.93	2.7	-	-
									2016	108	5.38	7.65	7.04	42	-	-
										134	9.10	10.8	10.7	-	18	0.85
										160	14.0	14.4	15.2	2.7	-	-
									2018	108	3.42	4.86	4.47	42	-	-
										134	5.78	6.88	6.82	-	18	0.85
										160	8.91	9.15	9.65	2.7	-	-
	Liver Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	0.002	<0.001	0.002	2014	108	1.71	1.82	2.00		-	
										134	2.16	2.30	2.53	6.4	17	-9.0
										160	2.62	2.79	3.07		-	
									2015	108	1.90	1.64	1.60		-	
										134	2.40	2.07	2.03	-14	-16	2.2
										160	2.91	2.52	2.46		-	
									2016	108	1.82	2.21	2.47		-	
										134	2.30	2.80	3.13	22	36	-10
										160	2.80	3.40	3.80		-	
									2018	108	1.59	1.60	1.82		-	
										134	2.02	2.03	2.31	0.70	14	-12
										160	2.45	2.46	2.80		-	
	Adjusted Body Weight (g)	Fork Length (cm)	log_{10}	Cov	<0.001	0.335	<0.001	<0.001	2014	22.5	122	123	124		-	
										23.55	140	140	142	0.31	1.4	-1.1
										24.6	159	159	161		-	
									2015	22.5	119	115	114		-	
										23.55	136	131	130	-3.7	-4.3	0.57
										24.6	155	149	148		-	
									2016	22.5	124	128	123		-	
										23.55	142	146	140	3.5	-0.94	4.5
										24.6	161	166	159		-	
									2018	22.5	129	116	122		-	
										23.55	147	133	140	-10	-5.0	-5.3
										24.6	167	151	159		-	
M	Age (yrs)	-	rank	-	-	0.220	<0.001	0.006	2014	-	6.00	7.00	6.00	17	0	17
									2015		7.00	7.00	6.00	0	-14	17
									2016		6.00	6.00	5.00	0	-17	20
									2018		6.00	5.00	6.00	-17	0	-17
	Fork Length (cm)	-	untrans	-	-	0.324	<0.001	<0.001	2014	-	19.6	22.2	21.8	13	11	1.9
									2015		21.6	20.6	21.1	-4.7	-2.2	-2.5
									2016		19.9	20.5	17.8	2.8	-11	16
									2018		20.6	20.1	20.6	-2.6	0.20	-2.8
	Adjusted Body Weight (g)	-	untrans	-	-	0.402	<0.001	<0.001	2014	-	83.5	107	111	28	33	-3.6
									2015		107	93.6	97.6	-13	-8.9	-4.1
									2016		91.5	99.0	59.8	8.1	-35	65
									2018		96.8	89.4	98.8	-7.7	2.1	-9.5

P-value < 0.05

Tukey's Honestly Significant Difference (HSD) P-Value < 0.1 and Exp > Ref

Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organism; "M" indicates male organism; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the

Table G.34: Summary of Pair-Wise Statistical Comparisons Among Koocanusa Reservoir Study Areas for Peamouth Chub Health Endpoints, 2014 to 2018

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-way ANCOVA (Parallel Slope Model) P-values			Year	Covariate Value	Measures of Central Tendency			Magnitude of Difference ([Exposed-Reference]/Reference*100%)		
				Term (s)	P-value	Area	Year	Area x Year			Sand Creek	Elk River	Gold Creek	Sand Creek vs. Elk River	Sand Creek vs. Gold Creek	Gold Creek vs. Elk River
M	Adjusted Body Weight (g)	Age (yrs)	log_{10}	Cov x Area	0.042	0.981	<0.001	<0.001	2014	4	66.8	71.9	96.3	-	-	-25
										5	75.1	82.1	103	9.2	37	-
										6	82.7	91.4	108	-	-	-16
									2015	4	74.6	61.1	82.0	-	-	-26
										5	83.9	69.7	87.5	-17	4.3	-
										6	92.3	77.7	92.2	-	-	-16
									2016	4	70.2	73.7	55.5	-	-	33
										5	79.0	84.1	59.2	6.5	-25	-
										6	86.9	93.7	62.5	-	-	50
									2018	4	78.0	74.1	87.7	-	-	-16
										5	87.8	84.5	93.6	-3.7	6.6	-
										6	96.6	94.2	98.7	-	-	-4.6
	Fork Length (cm)	Age (yrs)	log_{10}	Cov x Area	0.019	0.674	<0.001	<0.001	2014	4	18.1	19.4	20.7	-	14	-6.4
										5	18.9	20.3	21.2	7.0	-	-
										6	19.6	21.1	21.6	-	10	-2.8
									2015	4	19.0	18.0	19.9	-	4.6	-9.6
										5	19.8	18.8	20.4	-5.1	-	-
										6	20.6	19.5	20.8	-	1.2	-6.1
									2016	4	18.3	18.7	17.4	-	-4.7	7.7
										5	19.1	19.6	17.9	2.9	-	-
										6	19.8	20.4	18.2	-	-7.8	12
									2018	4	19.2	19.0	19.8	-	3.1	-3.8
										5	20.1	19.9	20.3	-0.55	-	-
										6	20.8	20.7	20.7	-	-0.22	-0.11
	Gonad Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	0.272	<0.001	0.411	2014	75	1.41	1.41	1.41	ns	ns	ns
										98	1.70	1.70	1.70			
									2015	75	2.47	2.47	2.47			
										98	2.98	2.98	2.98			
									2016	75	1.88	1.88	1.88			
										98	2.27	2.27	2.27			
									2018	75	1.02	1.02	1.02			
										98	1.23	1.23	1.23			
	Liver Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	0.015	0.016	0.126	2014	86.5	1.22	1.15	1.31	-6.2	6.8	-12
									2015	86.5	1.17	1.10	1.25			
									2016	86.5	1.26	1.18	1.35			
									2018	86.5	1.10	1.03	1.18			
	Adjusted Body Weight (g)	Fork Length (cm)	log_{10}	Cov	<0.001	0.603	<0.001	0.237	2014	19.1	73.4	73.4	73.4	ns	ns	ns
										20.4	89.9	89.9	89.9			
									2015	19.1	71.5	71.5	71.5			
										20.4	87.6	87.6	87.6			
									2016	19.1	76.8	76.8	76.8			
										20.4	94.0	94.0	94.0			
									2018	19.1	75.4	75.4	75.4			
										20.4	92.4	92.4	92.4			

P-value < 0.05
Tukey's Honestly Significant Difference (HSD) P-Value < 0.1 and Exp > Ref
Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organism; "M" indicates male organism; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the

Table G.35: Among-Year Statistical Comparisons of Peamouth Chub Health Endpoints at Koocanusa Reservoir Study Areas, 2014 to 2018

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-Way ANCOVA (Parallel Slope Model) P- values			Year Contrasts		Covariate Value	Magnitude of Difference ([Contrast-Baseline]/Baseline*100%)		
				Term (s)	P-value	Area	Year	Area x Year	Baseline Year	Contrast Year		Sand Creek	Elk River	Gold Creek
F	Age (yrs)	-	rank	-	-	<0.001	<0.001	0.009	2014	2015	-	20	0	33
										2016		0	-38	-33
										2018		-20	-38	-22
									2015	2016	-	-17	-38	-50
										2018		-33	-38	-42
									2016	2018	-	-20	0	17
	Fork Length (cm)	-	log_{10}	-	-	<0.001	<0.001	<0.001	2014	2015	-	5.7	-2.5	3.4
										2016		0.52	-13	-14
										2018		-1.8	-12	-5.8
									2015	2016	-	-4.9	-11	-17
										2018		-7.1	-9.5	-8.9
									2016	2018	-	-2.3	1.3	9.3
	Adjusted Body Weight (g)	-	rank	-	-	<0.001	<0.001	0.003	2014	2015	-	10	-5.6	3.6
										2016		2.2	-19	-22
										2018		0	-20	-12
									2015	2016	-	-7.3	-14	-25
										2018		-9.3	-15	-15
									2016	2018	-	-2.2	-0.76	13
	Adjusted Body Weight (g)	Age (yrs)	log_{10}	Cov x Area x Year	<0.001	0.010	0.008	0.001	2014	2015	9.5	3.5	-10.0	-7.0
										2016	8	-	-	-14
											9.5	3.3	-8.0	-
											11	-	-	2.7
										2018	9.5	8.0	-16	-2.4
									2015	2016	8	-	-	-8.6
											9.5	-0.18	2.2	-
											11	-	-	11
										2018	9.5	4.4	-7.0	4.9
									2016	2018	8	-	-	12
											9.5	4.6	-9.1	-
											11	-	-	-3.5
	Fork Length (cm)	Age (yrs)	log_{10}	Cov x Area x Year	<0.001	0.079	<0.001	0.005	2014	2015	9.5	2.4	-2.0	-1.9
										2016	8	-	-	-5.6
											9.5	0.69	-5.2	-
											11	-	-	-1.1
										2018	9.5	1.5	-4.3	-2.1
									2015	2016	8	-	-	-4.6
											9.5	-1.7	-3.3	-
											11	-	-	1.4
										2018	9.5	-0.89	-2.4	-0.30
									2016	2018	8	-	-	3.8
											9.5	0.79	0.92	-
											11	-	-	-1.1
	Gonad Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov x Area	0.029	0.210	<0.001	0.242	2014	2015	134	4.4		
										2016	134	60		
										2018	134	1.5		
									2015	2016	134	53		
										2018	134	-2.8		
									2016	2018	134	-36		

P-value < 0.05

Tukey's Honestly Significant Difference (HSD) P-Value < 0.1 and Exp > Ref

Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organism; "M" indicates male organism; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not

Table G.35: Among-Year Statistical Comparisons of Peamouth Chub Health Endpoints at Koocanusa Reservoir Study Areas, 2014 to 2018

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-Way ANCOVA (Parallel Slope Model) P- values			Year Contrasts		Covariate Value	Magnitude of Difference ([Contrast-Baseline]/Baseline*100%)		
				Term (s)	P-value	Area	Year	Area x Year	Baseline Year	Contrast Year		Sand Creek	Elk River	Gold Creek
F	Liver Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	0.002	<0.001	0.002	2014	2015	134	11	-9.9	-20
										2016	134	6.5	22	24
										2018	134	-6.7	-12	-8.6
									2015	2016	134	-4.1	35	54
										2018	134	-16	-2.0	14
									2016	2018	134	-12	-28	-26
	Adjusted Body Weight (g)	Fork Length (cm)	log_{10}	Cov	<0.001	0.335	<0.001	<0.001	2014	2015	23.55	-2.6	-6.5	-8.0
										2016	23.55	1.3	4.5	-1.0
										2018	23.55	5.4	-5.5	-1.2
									2015	2016	23.55	3.9	12	7.6
										2018	23.55	8.2	1.1	7.3
									2016	2018	23.55	4.1	-9.5	-0.22
M	Age (yrs)	-	rank	-	-	0.220	<0.001	0.006	2014	2015	-	17	0	0
										2016	-	0	-14	-17
										2018	-	0	-29	0
									2015	2016	-	-14	-14	-17
										2018	-	-14	-29	0
									2016	2018	-	0	-17	20
	Fork Length (cm)	-	untrans	-	-	0.324	<0.001	<0.001	2014	2015	-	10	-7.1	-3.0
										2016	-	1.9	-7.5	-18
										2018	-	5.3	-9.5	-5.1
									2015	2016	-	-7.7	-0.44	-16
										2018	-	-4.6	-2.6	-2.2
									2016	2018	-	3.3	-2.2	16
	Adjusted Body Weight (g)	-	untrans	-	-	0.402	<0.001	<0.001	2014	2015	-	28	-12	-12
										2016	-	9.7	-7.5	-46
										2018	-	16	-16	-11
									2015	2016	-	-14	5.7	-39
										2018	-	-9.6	-4.5	1.2
									2016	2018	-	5.8	-9.7	65
		Age (yrs)	log_{10}	Cov x Area	0.042	0.981	<0.001	<0.001	2014	2015	5	12	-15	-15
										2016	5	5.1	2.5	-42
										2018	5	17	3.0	-8.9
									2015	2016	5	-5.8	21	-32
										2018	5	4.7	21	7.0
									2016	2018	5	11	0.46	58
	Fork Length (cm)	Age (yrs)	log_{10}	Cov x Area	0.019	0.674	<0.001	<0.001	2014	2015	5	4.7	-7.1	-3.9
										2016	5	0.71	-3.2	-16
										2018	5	5.8	-1.6	-4.3
									2015	2016	5	-3.8	4.3	-12
										2018	5	1.0	5.9	-0.39
									2016	2018	5	5.1	1.6	14

P-value < 0.05

Tukey's Honestly Significant Difference (HSD) P-Value < 0.1 and Exp > Ref

Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organism; "M" indicates male organism; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not

Table G.35: Among-Year Statistical Comparisons of Peamouth Chub Health Endpoints at Koocanusa Reservoir Study Areas, 2014 to 2018

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-Way ANCOVA (Parallel Slope Model) P- values			Year Contrasts		Covariate Value	Magnitude of Difference ([Contrast-Baseline]/Baseline*100%)		
				Term (s)	P-value	Area	Year	Area x Year	Baseline Year	Contrast Year		Sand Creek	Elk River	Gold Creek
M	Gonad Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	0.272	<0.001	0.411	2014	2015	75	75		
											86.5			
											98			
										2016	75	34		
											86.5			
											98			
										2018	75	-28		
											86.5			
											98			
									2015	2016	75	-24		
											86.5			
											98			
										2018	75	-59		
											86.5			
											98			
									2016	2018	75	-46		
											86.5			
											98			
	Liver Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	0.015	0.016	0.126	2014	2015	86.5	-4.5		
										2016	86.5	2.8		
										2018	86.5	-10		
									2015	2016	86.5	7.7		
										2018	86.5	-5.9		
									2016	2018	86.5	-13		
	Adjusted Body Weight (g)	Fork Length (cm)	log_{10}	Cov	<0.001	0.603	<0.001	0.237	2014	2015	19.1	-2.6		
											19.75			
											20.4			
										2016	19.1	4.6		
											19.75			
											20.4			
										2018	19.1	2.8		
											19.75			
											20.4			
									2015	2016	19.1	7.3		
											19.75			
											20.4			
										2018	19.1	5.5		
											19.75			
											20.4			
									2016	2018	19.1	-1.7		
											19.75			
											20.4			

P-value < 0.05

Tukey's Honestly Significant Difference (HSD) P-Value < 0.1 and Exp > Ref

Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organism; "M" indicates male organism; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not

Table G.36: Summary of Pair-Wise Statistical Comparisons Between Koocanusa Reservoir Study Areas for Redside Shiner Health Endpoints, 2015 to 2018

Sex	Response	Covariate	Transformation	Significant Covariate P- Values[a]		Two-way ANOVA or Two-Way ANCOVA (Parallel Slope Model) P- values			Year	Covariate Value	Measures of Central Tendancy			Magnitude of Difference ([Exposed-Reference]/Reference*100%)		
				Term (S)	P-value	Area	Year	Area x Year			Sand Creek	Elk River	Gold Creek	Sand Creek vs. Elk River	Sand Creek vs. Gold Creek	Gold Creek vs. Elk River
F	Age (yrs)	-	rank	-	-	0.161	<0.001	0.260	2015	-	3.00	4.00	3.00	ns		
											3.00	3.00	3.00			
											3.00	4.00	3.00			
	Fork Length (cm)	-	untrans	-	-	0.081	<0.001	0.006	2015	-	9.48	11.2	11.2	18	18	-0.089
											9.87	9.71	10.0	-1.6	1.5	-3.1
											9.67	9.81	9.87	1.5	2.1	-0.65
	Adjusted Body Weight (g)	-	log_{10}	-	-	0.091	<0.001	0.029	2015	-	11.1	17.4	18.6	57	68	-6.4
									2016	-	12.3	12.2	13.4	-1.0	8.9	-9.1
									2018	-	11.0	11.4	11.6	3.3	4.8	-1.4
	Adjusted Body Weight (g)	Age (yrs)	log_{10}	Cov	<0.001	0.003	<0.001	0.253	2015	3.5	14.9	15.3	16.8	2.8	13	-9
									2016		13.5	13.9	15.3			
									2018		10.8	11.1	12.2			
	Fork Length (cm)	Age (yrs)	log_{10}	Cov x Year	0.001	0.002	<0.001	0.165	2015	3.5	10.5	10.5	10.9	0.36	3.9	-3.4
									2016		9.86	9.90	10.2			
									2018		9.61	9.65	9.99			
	Gonad Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	0.633	0.036	0.194	2015	11.14	0.448	0.326	0.212	ns	ns	ns
										12.24	0.505	0.368	0.239			
										13.34	0.564	0.411	0.267			
									2016	11.14	0.370	0.519	0.420			
										12.24	0.418	0.586	0.474			
										13.34	0.467	0.654	0.530			
									2018	11.14	0.377	0.359	0.380			
										12.24	0.425	0.406	0.429			
										13.34	0.475	0.453	0.479			
	Liver Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	<0.001	0.003	0.027	2015	11.14	0.157	0.121	0.123	-	-	-
										12.24	0.173	0.134	0.136	-23	-21	-1.8
										13.34	0.190	0.147	0.150	-	-	-
									2016	11.14	0.139	0.228	0.207	-	-	-
										12.24	0.154	0.252	0.229	64	49	10
										13.34	0.169	0.277	0.251	-	-	-
									2018	11.14	0.153	0.188	0.169	-	-	-
										12.24	0.170	0.208	0.187	22	10	11
										13.34	0.186	0.228	0.205	-	-	-

P-value < 0.05
Tukey's Honestly Significant Difference (HSD) P-Value < 0.1 and Exp > Ref
Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insuffient data for analysis; "F" indicates female organism; "M" indicates male organisms; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the difference in R^2 of the three-way and two two-way interactions (cov×Area + cov×Year) met the criteria above. Next, the covariate interaction with Year (cov×Year) was dropped if not significant or if the difference in R^2 between models the one interaction with Area (cov×Year) and two interactions (cov×Area + cov×Year) met the criteria above. Finally, the covariate interaction with Area (cov×Area) was dropped if not significant or if the difference in R^2 with the parallel slope model met the criteria above.

Table G.36: Summary of Pair-Wise Statistical Comparisons Between Koocanusa Reservoir Study Areas for Redside Shiner Health Endpoints, 2015 to 2018

Sex	Response	Covariate	Transformation	Significant Covariate P- Values[a]		Two-way ANOVA or Two-Way ANCOVA (Parallel Slope Model) P- values			Year	Covariate Value	Measures of Central Tendancy			Magnitude of Difference ([Exposed-Reference]/Reference*100%)		
				Term (S)	P-value	Area	Year	Area x Year			Sand Creek	Elk River	Gold Creek	Sand Creek vs. Elk River	Sand Creek vs. Gold Creek	Gold Creek vs. Elk River
F	Adjusted Body Weight (g)	Fork Length (cm)	log_{10}	Cov	<0.001	0.985	<0.001	0.284	2015	9.8	12.5	12.5	12.5	ns	ns	ns
										10.1	13.6	13.6	13.6			
									2016	9.8	12.5	12.5	12.5			
										10.1	13.6	13.6	13.6			
									2018	9.8	11.6	11.6	11.6			
										10.1	12.6	12.6	12.6			
M	Age (yrs)	-	rank	-	-	0.002	<0.001	0.748	2015	-	2.00	3.00	2.00	0	0	0
									2016	-	3.00	3.00	3.00			
									2018	-	3.00	3.00	3.00			
	Fork Length (cm)	-	untrans	-	-	<0.001	0.361	0.012	2015	-	7.90	10.2	-	29	-	-
									2016	-	9.40	9.61	9.45	2.2	0.50	1.7
									2018	-	9.28	9.66	9.16	4.0	-1.3	5.4
	Adjusted Body Weight (g)	-	log_{10}	-	-	0.010	0.001	0.039	2015	-	8.21	12.6	-	54	-	-
									2016	-	11.2	11.3	11.5	0.24	1.9	-1.7
									2018	-	10.0	10.9	9.30	8.7	-7.3	17
	Adjusted Body Weight (g)	Age (yrs)	log_{10}	Cov	<0.001	0.356	<0.001	0.096	2015	2	9.05	9.05	9.05	ns	ns	ns
										3	11.2	11.2	11.2			
									2016	2	9.43	9.43	9.43			
										3	11.7	11.7	11.7			
									2018	2	7.80	7.80	7.80			
										3	9.67	9.67	9.67			
	Fork Length (cm)	Age (yrs)	log_{10}	Cov	<0.001	0.114	0.003	0.248	2015	2	8.30	8.30	8.30	ns	ns	ns
										3	8.94	8.94	8.94			
									2016	2	8.89	8.89	8.89			
										3	9.57	9.57	9.57			
									2018	2	8.57	8.57	8.57			
										3	9.23	9.23	9.23			
	Gonad Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	0.113	<0.001	0.150	2015	9.763	0.137	0.137	0.137	ns	ns	ns
										10.407	0.150	0.150	0.150			
									2016	9.763	0.121	0.121	0.121			
										10.407	0.133	0.133	0.133			
									2018	9.763	0.0900	0.0900	0.0900			
										10.407	0.0987	0.0987	0.0987			
	Liver Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov x Area x Year	0.006	0.016	0.001	0.083	2015	9.763	0.174	0.0668	-	-62	-	-
										10.085	0.179	0.0806		-		
										10.407	0.183	0.0967		-47		
									2016	9.763	0.143	0.154	0.161	-		
										10.085	0.147	0.162	0.170	10	16	-4.6
										10.407	0.151	0.169	0.178	-		
									2018	9.763	0.110	0.133	0.138	-		
										10.085	0.115	0.137	0.142	19	23	-3.0
										10.407	0.121	0.142	0.145	-		
	Adjusted Body Weight (g)	Fork Length (cm)	log_{10}	Cov	<0.001	0.437	<0.001	0.008	2015	9.4	-	10.2	-	-		
										9.85		11.7				
										10.3		13.2				
									2016	9.4	11.3	10.7	11.4	-		
										9.85	12.9	12.2	13.0	-5.5	0.70	-6.2
										10.3	14.6	13.8	14.7	-		
									2018	9.4	10.2	10.2	9.98	-		
										9.85	11.6	11.6	11.4	0.18	-1.9	2.1
										10.3	13.2	13.2	12.9	-		

P-value < 0.05
Tukey's Honestly Signficant Difference (HSD) P-Value < 0.1 and Exp > Ref
Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insuffient data for analysis; "F" indicates female organism; "M" indicates male organisms; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the difference in R^2 of the three-way and two two-way interactions (cov×Area + cov×Year) met the criteria above. Next, the covariate interaction with Year (cov×Year) was dropped if not significant or if the difference in R^2 between models the one interaction with Area (cov×Year) and two interactions (cov×Area + cov×Year) met the criteria above. Finally, the covariate interaction with Area (cov×Area) was dropped if not significant or if the difference in R^2 with the parallel slope model met the criteria above.

Table G.37: Among-Year Statistical Comparisons of Redside Shiner Health Endpoints at Koocanusa Reservoir Study Areas, 2015 to 2018

Sex	Response	Covariate	Transformation	Significant Covariate P- Values		Two-way ANOVA or Two-Way ANCOVA (Parallel Slope Model) P- values			Year		Covariate Value	Sand Creek	Elk River	Gold Creek
				Term (s)	P-value	Area	Year	Area x Year				MOD	MOD	MOD
F	Age (yrs)	-	rank	-	-	0.161	<0.001	0.260	2015	2016	-	-25		
										2018	-	0		
									2016	2018	-	33		
	Fork Length (cm)	-	untrans	-	-	0.081	<0.001	0.006	2015	2016	-	4.1	-13	-10
										2018	-	1.9	-12	-12
									2016	2018	-	-2.1	1.0	-1.5
	Adjusted Body Weight (g)	-	log_{10}	-	-	0.091	<0.001	0.029	2015	2016	-	12	-30	-28
										2018	-	-0.43	-34	-38
									2016	2018	-	-11	-6.7	-14
	Adjusted Body Weight (g)	Age (yrs)	log_{10}	Cov	<0.001	0.003	<0.001	0.253	2015	2016	3.5	-9.2		
										2018	3.5	-27		
									2016	2018	3.5	-20		
	Fork Length (cm)	Age (yrs)	log_{10}	Cov x Year	0.001	0.002	<0.001	0.165	2015	2016	3	0.49		
											4	-12		
										2018	3	-4.7		
										2018	4	-12		
									2016	2018	3	-5.1		
										2018	4	-0.19		
	Gonad Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	0.633	0.036	0.194	2015	2016	12.24	-17	59	98
										2018	12.24	-16	10	79
									2016	2018	12.24	1.7	-31	-9.6
	Liver Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	<0.001	0.003	0.027	2015	2016	12.24	-12	88	68
										2018	12.24	-2.1	55	37
									2016	2018	12.24	11	-18	-18
	Adjusted Body Weight (g)	Fork Length (cm)	log_{10}	Cov	<0.001	0.985	<0.001	0.284	2015	2016	9.95	0.074		
										2018	9.95	-7.4		
									2016	2018	9.95	-7.4		
M	Age (yrs)	-	rank	-	-	0.002	<0.001	0.748	2015	2016	-	50	0	50
										2018	-	50	0	50
									2016	2018	-		0	
	Fork Length (cm)	-	untrans	-	-	<0.001	0.361	0.012	2015	2016	-	19	-5.5	-
										2018	-	18	-5.0	-
									2016	2018	-	-1.3	0.49	-3.1
	Adjusted Body Weight (g)	-	log_{10}	-	-	0.010	0.001	0.039	2015	2016	-	37	-11	-
										2018	-	22	-14	-
									2016	2018	-	-11	-3.4	-19
	Adjusted Body Weight (g)	Age (yrs)	log_{10}	Cov	<0.001	0.356	<0.001	0.096	2015	2016	2.5	4.1		
										2018	2.5	-14		
									2016	2018	2.5	-17		
	Fork Length (cm)	Age (yrs)	log_{10}	Cov	<0.001	0.114	0.003	0.248	2015	2016	2.5	7.0		
										2018	2.5	3.2		
									2016	2018	2.5	-3.5		
	Gonad Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov	<0.001	0.113	<0.001	0.150	2015	2016	10.085	-11		
										2018	10.085	-34		
									2016	2018	10.085	-26		
	Liver Weight (g)	Adjusted Body Weight (g)	log_{10}	Cov x Area x Year	0.006	0.016	0.001	0.083	2015	2016	9.763	-	131	-
											10.085	-18	-	
											10.407	-	75	
										2018	9.763	-	99	-
											10.085	-35	-	
											10.407	-	47	
									2016	2018	10.085	-22	-15	-16
	Adjusted Body Weight (g)	Fork Length (cm)	log_{10}	Cov	<0.001	0.437	<0.001	0.008	2015	2016	9.85	-	4.4	-
										2018	9.85	-	-0.29	-
									2016	2018	9.85	-9.9	-4.5	-12

P-value < 0.05
Tukey's Honestly Significant Difference (HSD) P-Value < 0.1 and Exp > Ref
Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insuffient data for analysis; "F" indicates female organism; "M" indicates male organisms; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the difference in R^2 of the three-way and two two-way interactions (cov×Area + cov×Year) met the criteria above. Next, the covariate interaction with Year (cov×Year) was dropped if not significant or if the difference in R^2 between models the one interaction with Area (cov×Year) and two interactions (cov×Area + cov×Year) met the criteria above. Finally, the covariate interaction with Area (cov×Area) was dropped if not significant or if the difference in R^2 with the parallel slope model met the criteria above.

APPENDIX H
TISSUE

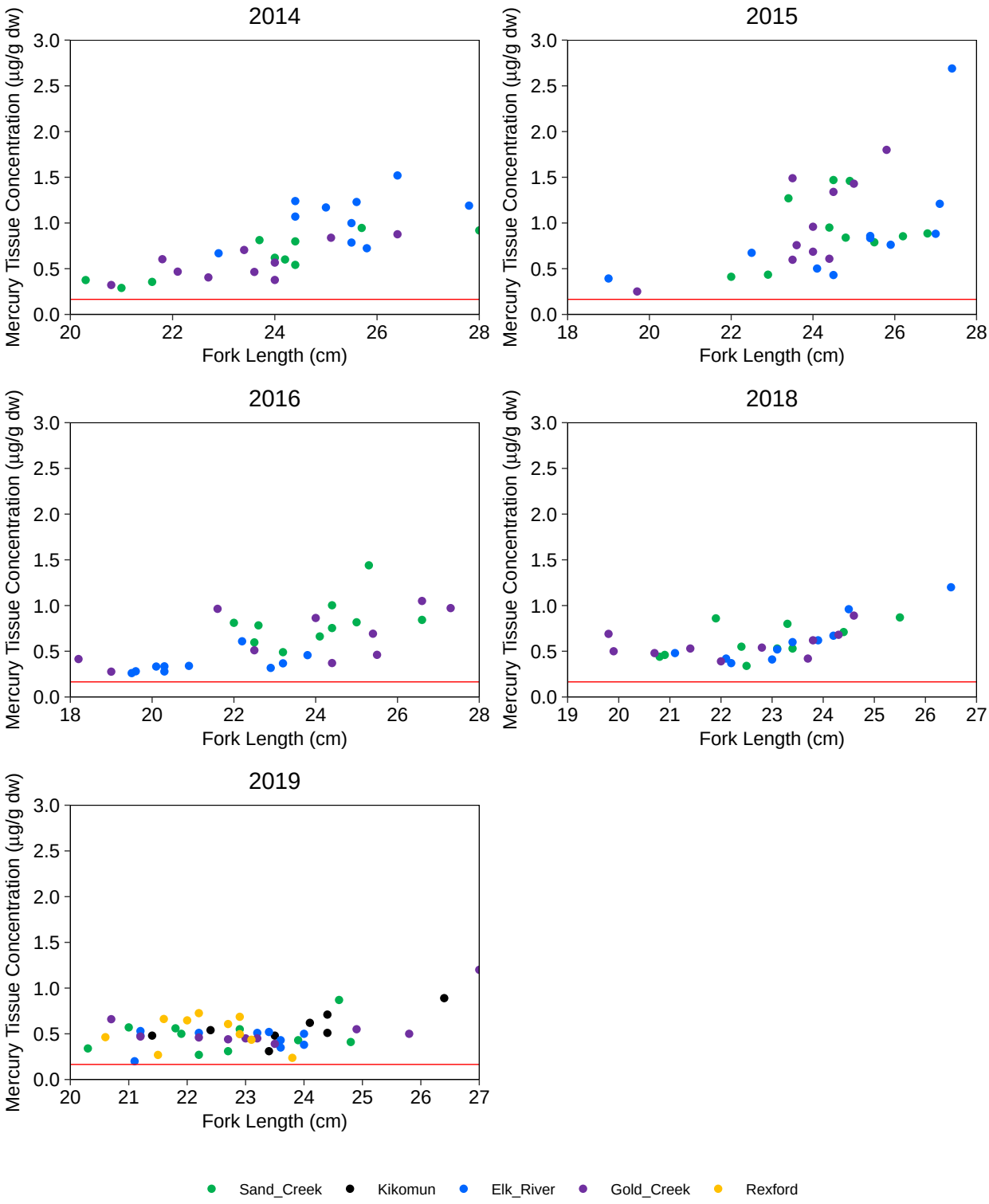


Figure H.1: Mercury Concentrations in Peamouth Chub Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

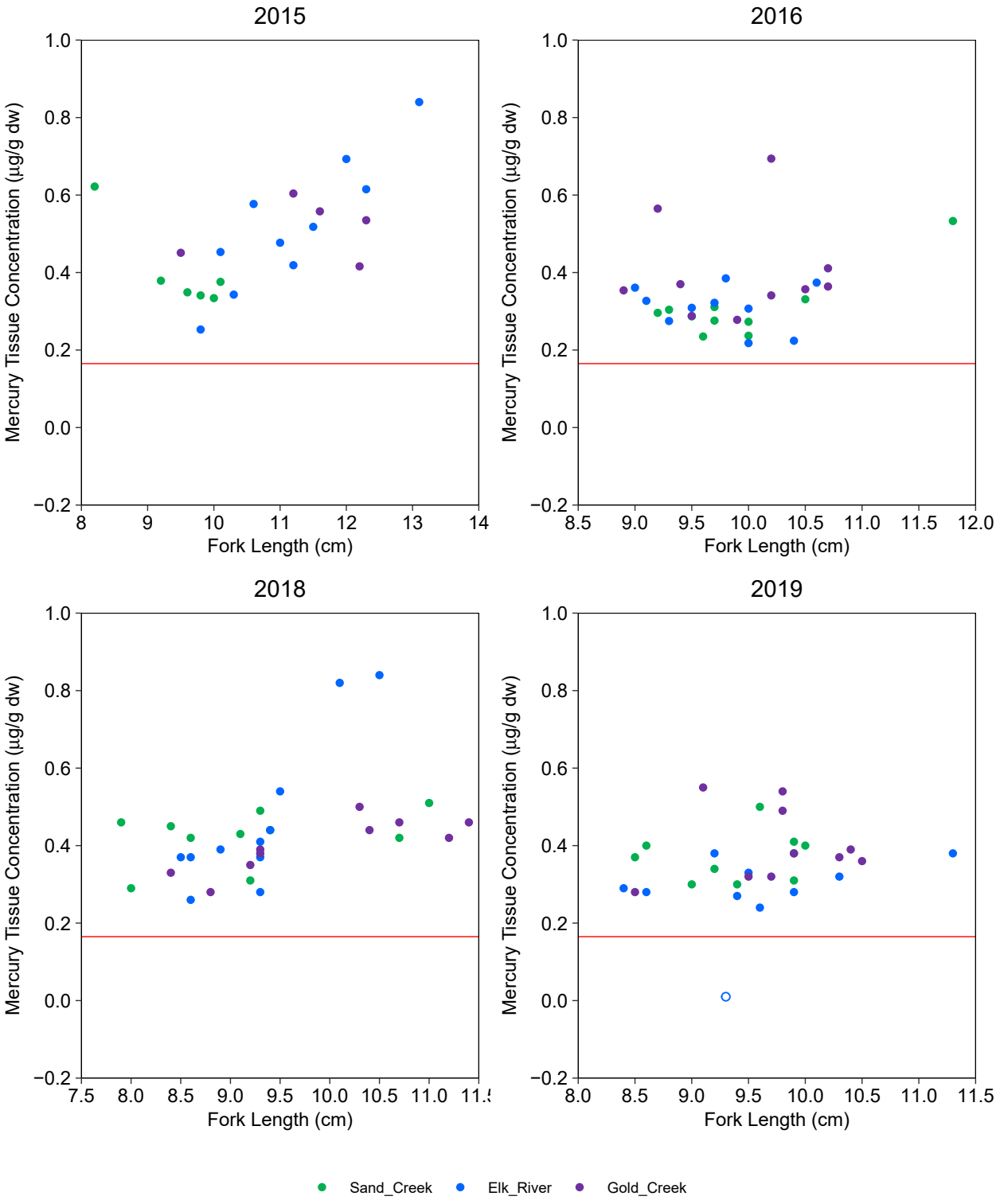


Figure H.2: Mercury Concentrations in Redside Shiner Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

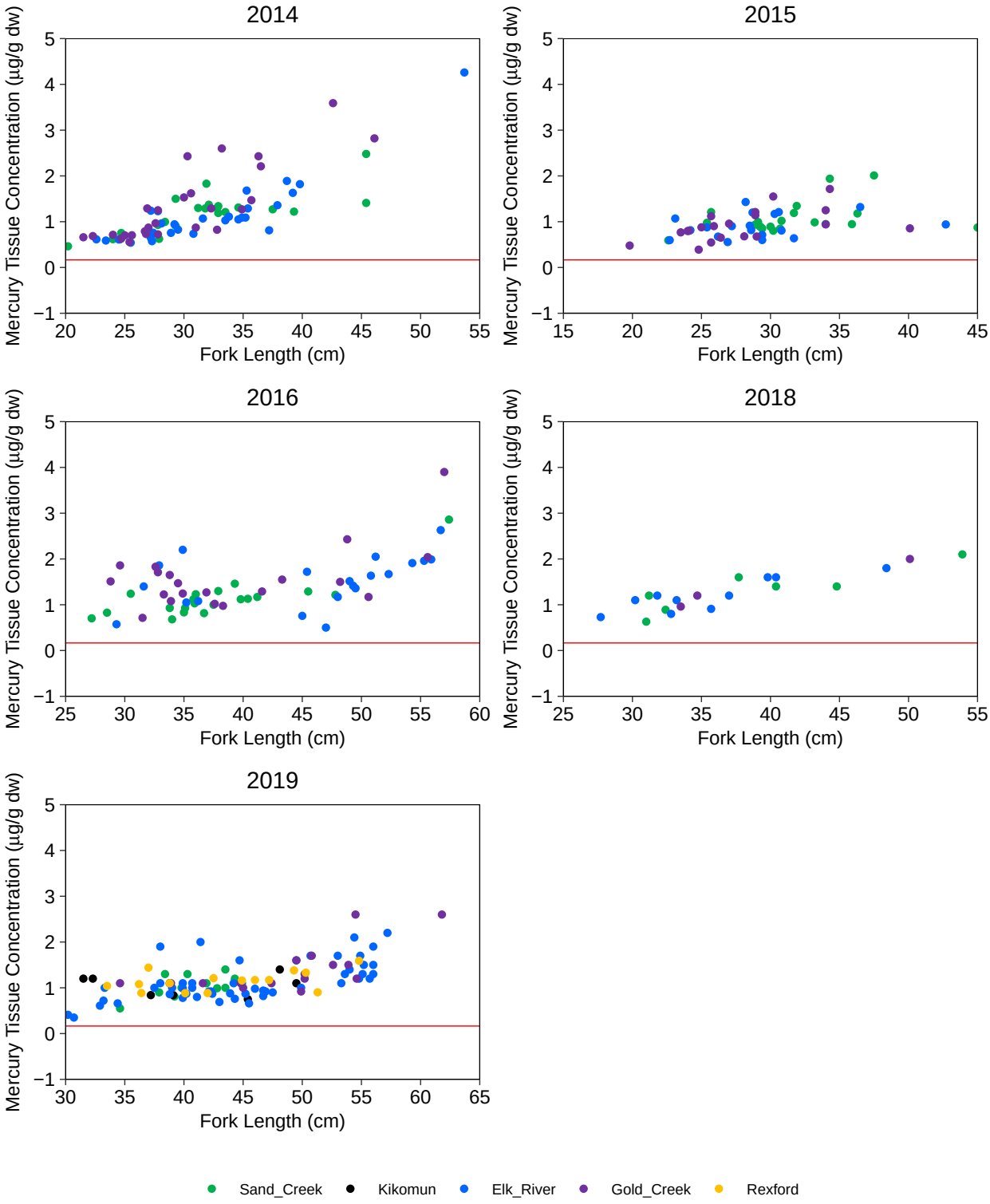


Figure H.3: Mercury Concentrations in Northern Pikeminnow Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

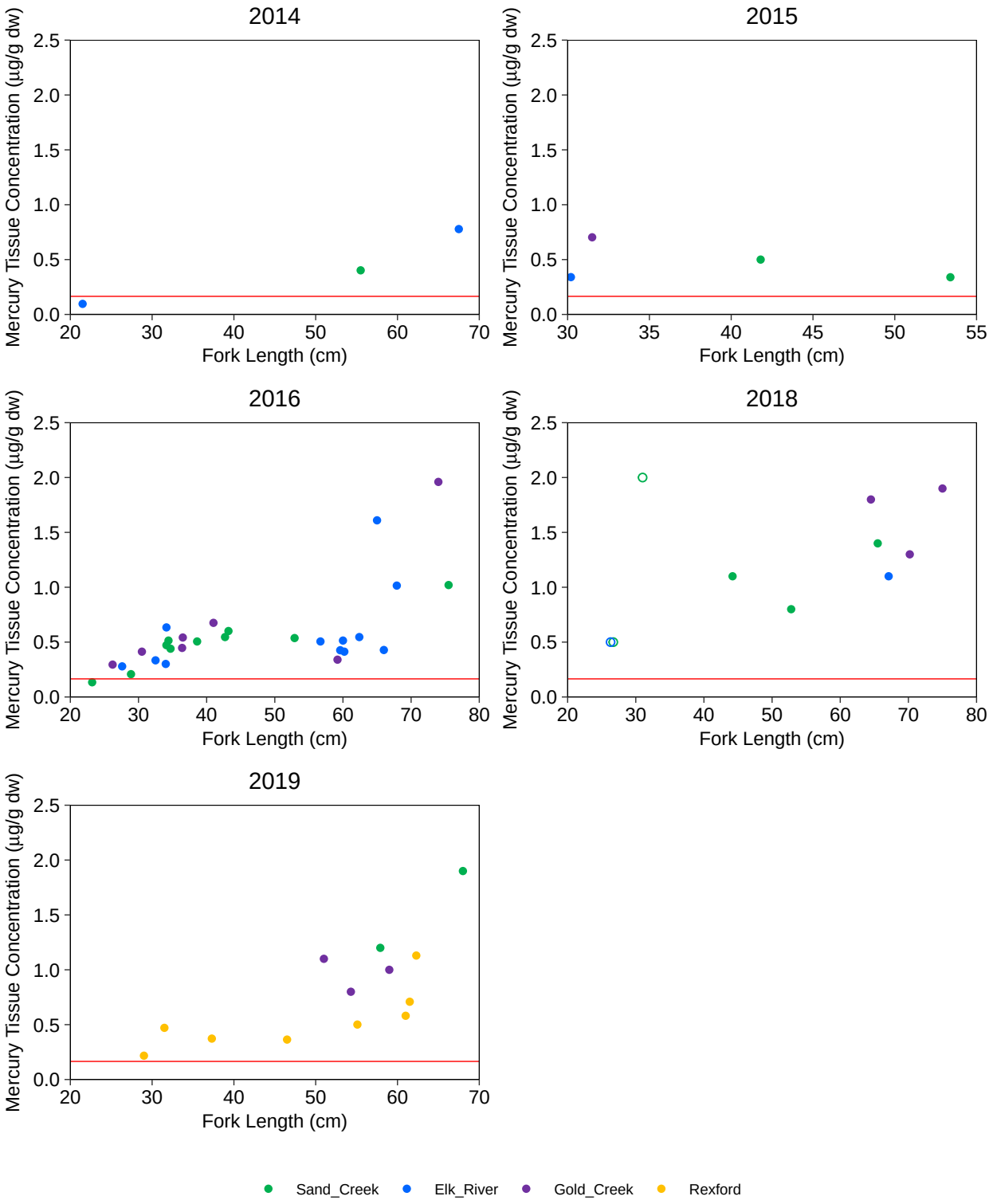


Figure H.4: Mercury Concentrations in Bull Trout Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

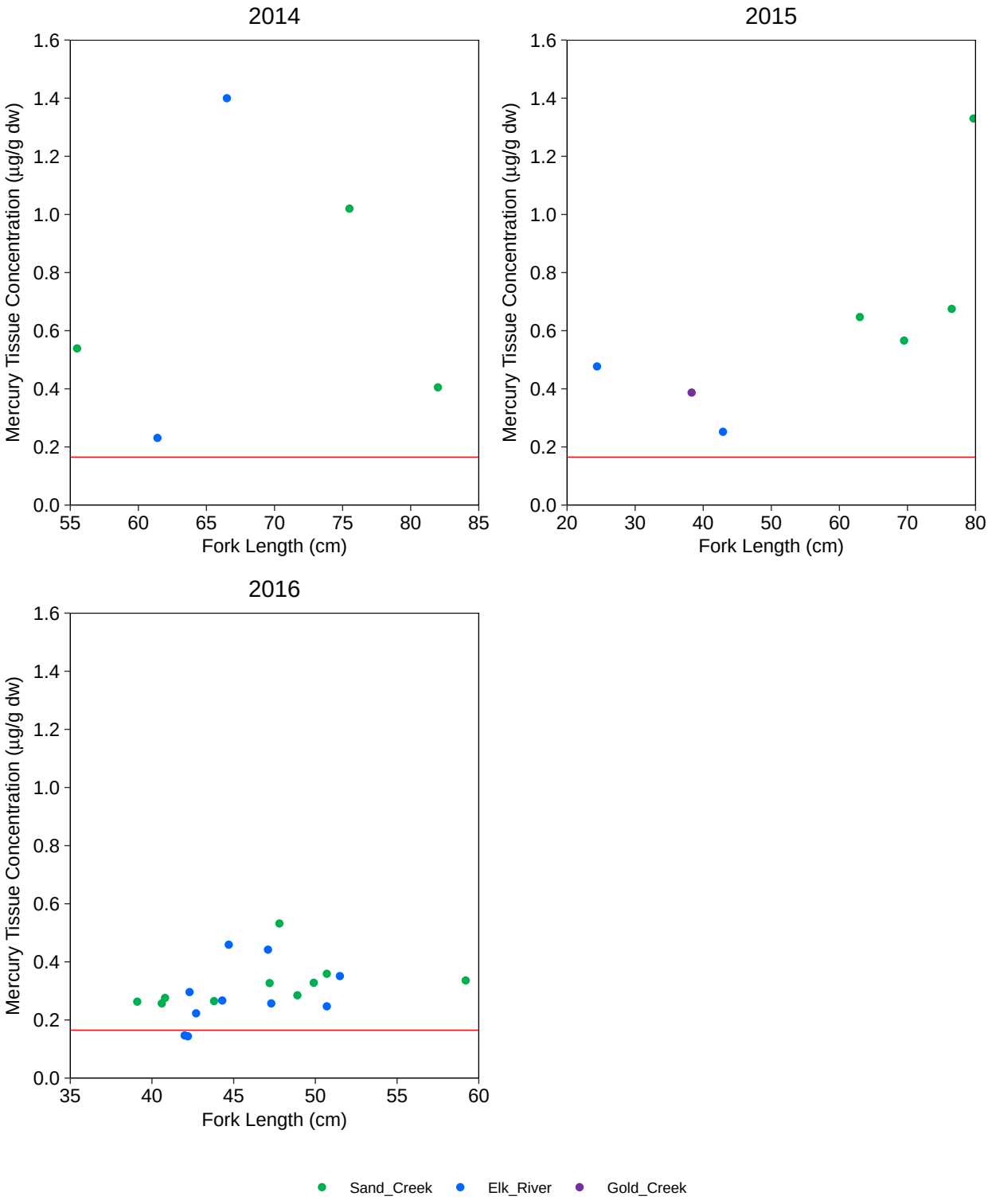


Figure H.5: Mercury Concentrations in Burbot Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

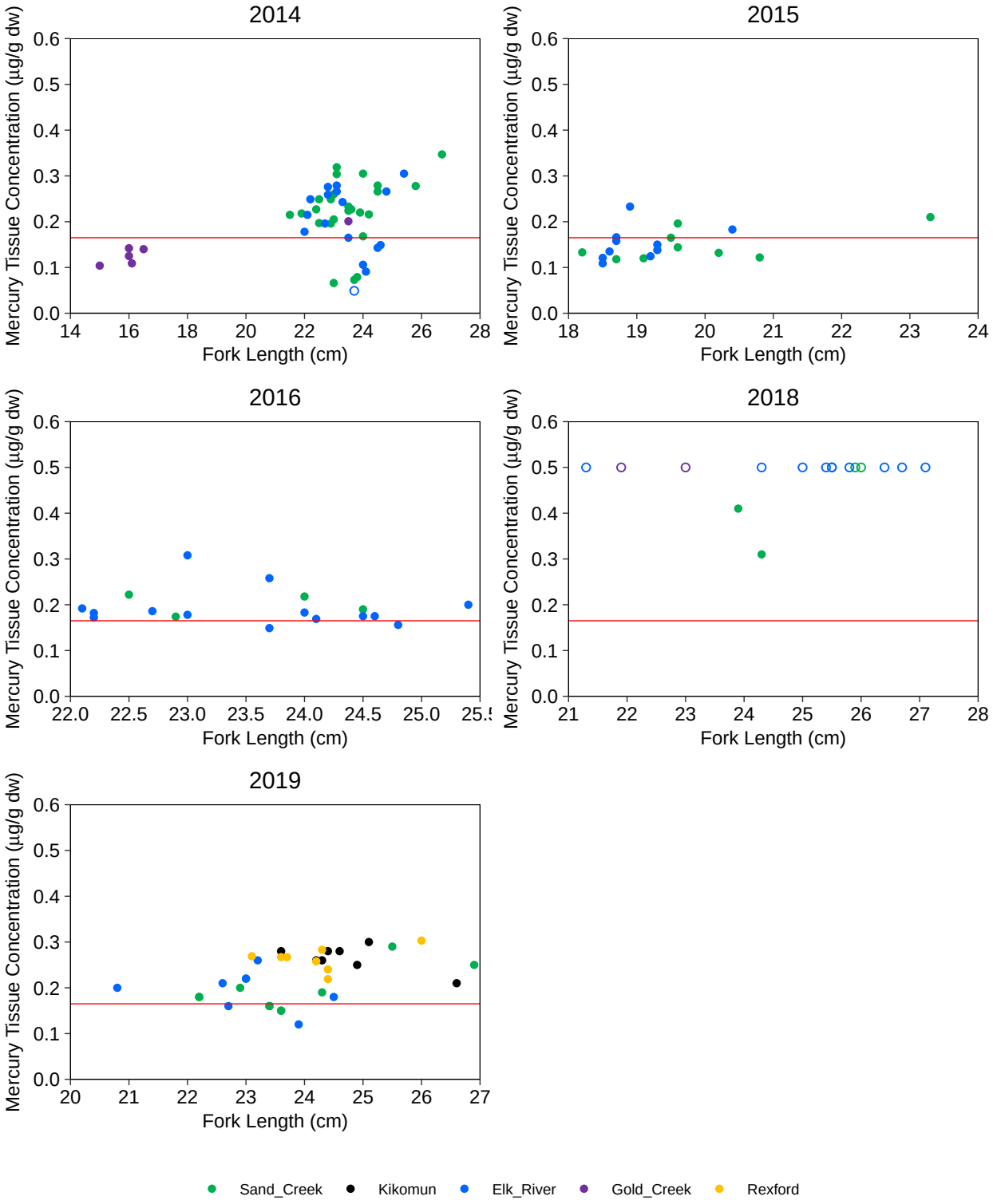


Figure H.6: Mercury Concentrations in Kokanee Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

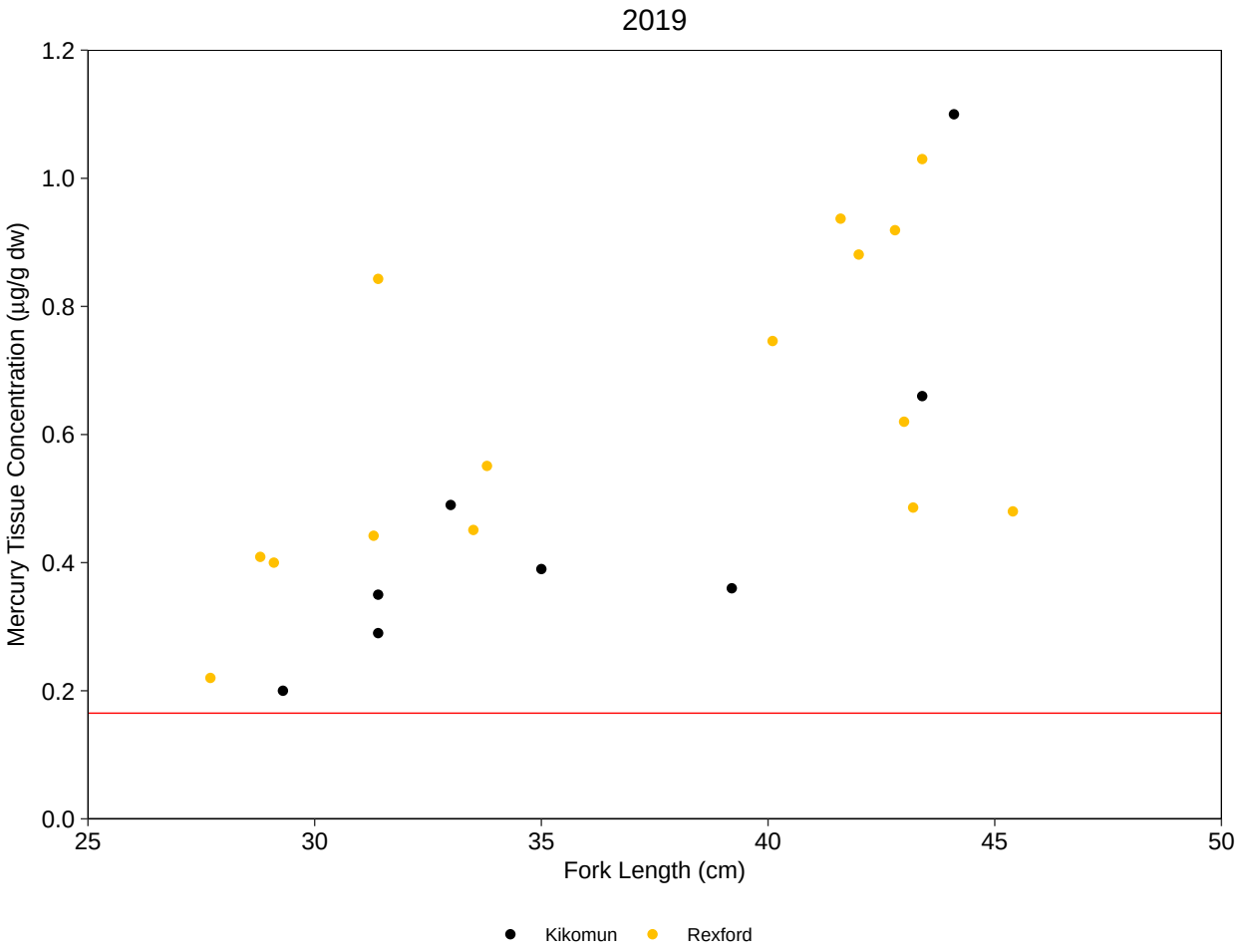


Figure H.7: Mercury Concentrations in Largescale Sucker Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

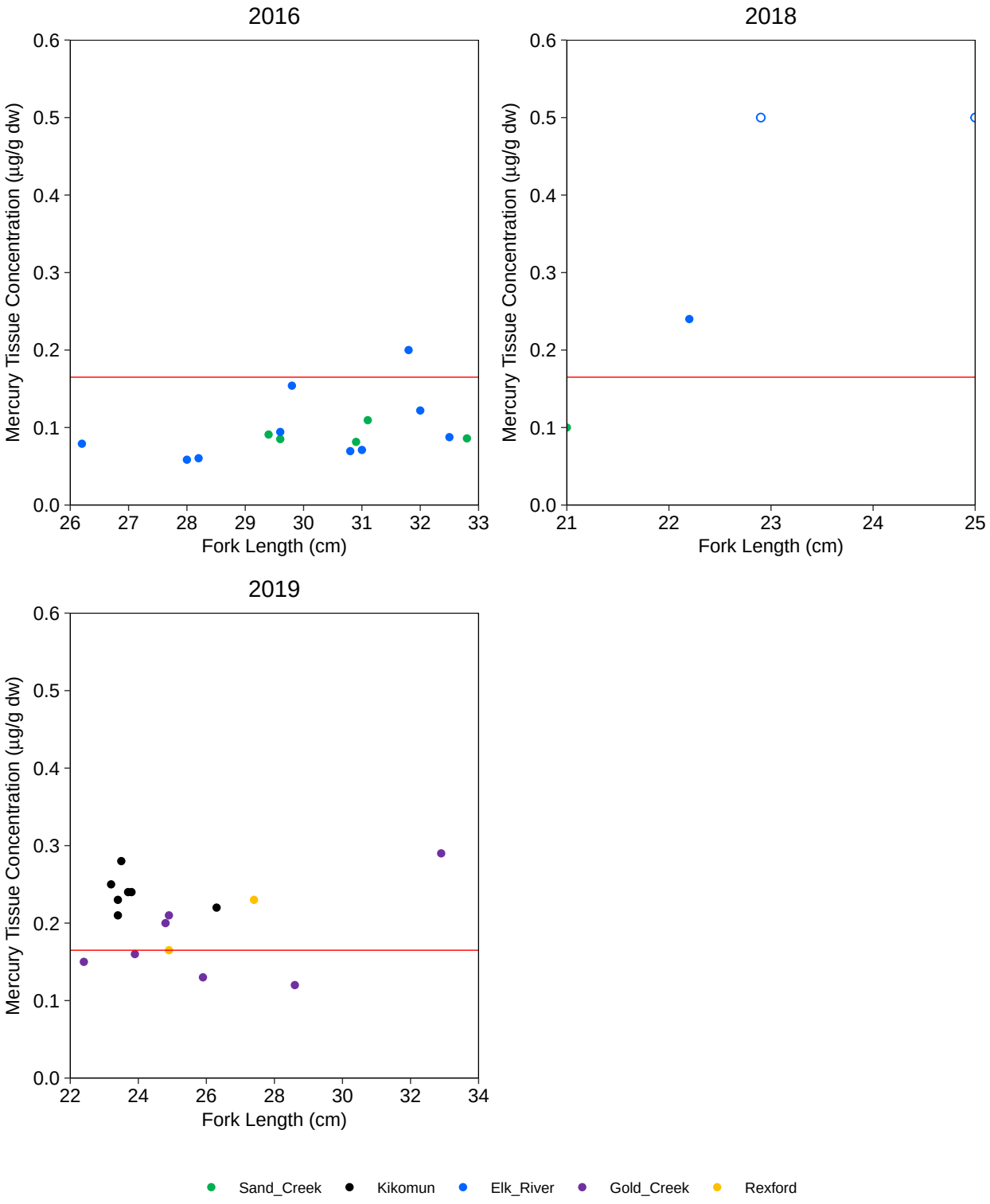


Figure H.8: Mercury Concentrations in Mountain Whitefish Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

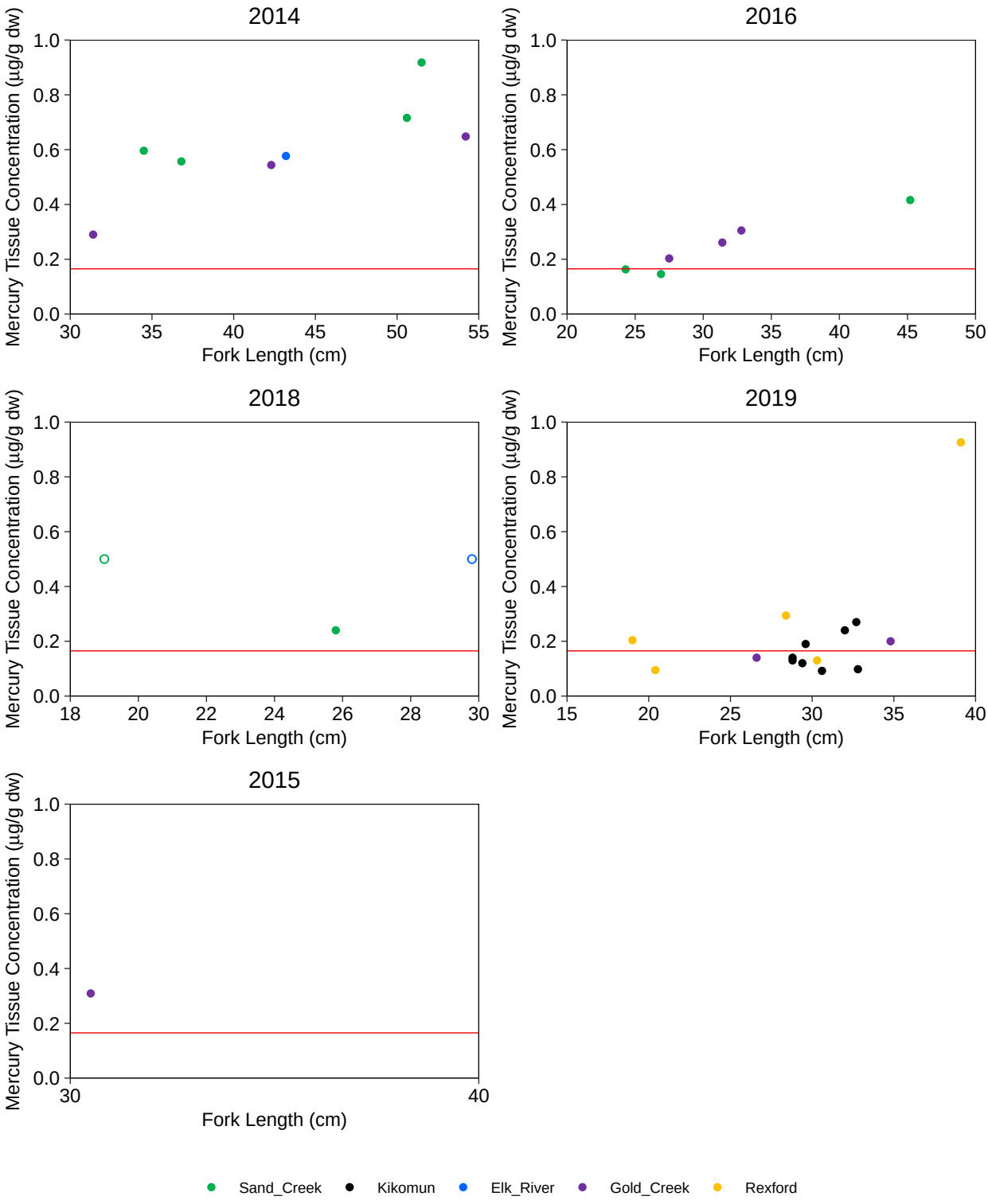


Figure H.9: Mercury Concentrations in Rainbow Trout Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

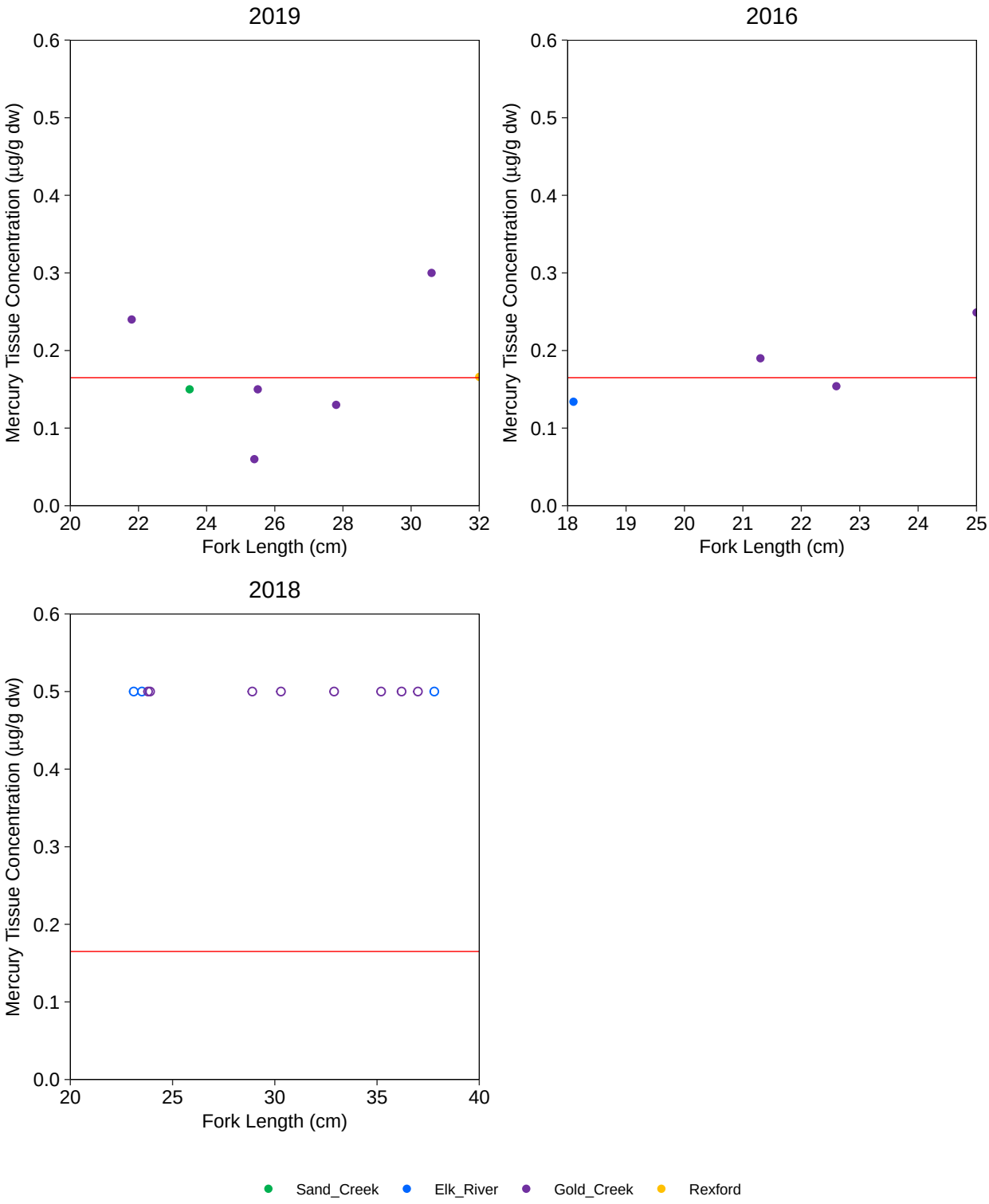


Figure H.10: Mercury Concentrations in Westslope Cutthroat Trout Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

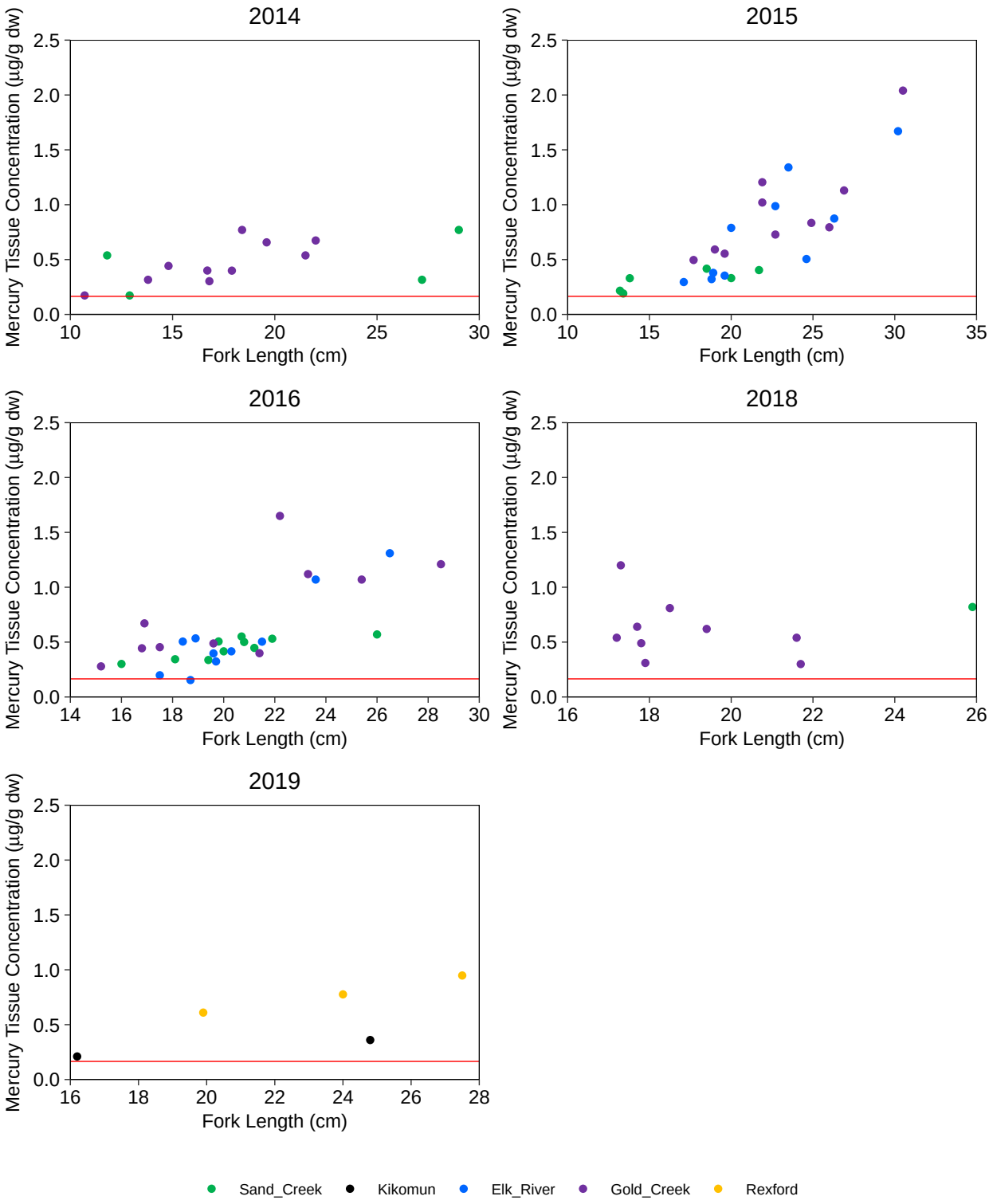


Figure H.11: Mercury Concentrations in Yellow Perch Muscle Tissue Relative to Fork Length in Areas Downstream and Upstream (Sand Creek) of the Elk River in The Koocanusa Reservoir

Notes: Red line = The BC guideline for the protection of wildlife (0.033 µg/g ww) was converted to dry weight (0.165 µg/g dw) based on an average moisture content in fish muscle in Koocanusa Reservoir of approximately 80%.

Table H.1: Metal Concentrations (µg/g Dry Weight) in Zooplankton and Benthic Invertebrates Collected in Koocanusa Reservoir, 2018

Tissue Type	Area	Month	Sample ID	Moisture	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead
				%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Zooplankton [a]	TN	June	RG_TN_ZOOT01_20180611	99.78	6,200	2	7	92	0.2	<10	1.8	6	2.2	11	4,600	6.7
		June	RG_TN_ZOOT02_20180611	99.90	4,700	<1	4	86	0.2	<10	1.3	5	2.1	11	4,400	9
		June	RG_TN_ZOOT03_20180611	99.73	6,000	<0.2	5.3	90	0.25	5	1.6	6	2.3	13	4,600	7.1
		June	RG_TN_ZOOT04_20180611	99.79	6,200	<0.2	4.7	90	0.26	6	1.3	6	2.2	12	4,600	7.7
		June	RG_TN_ZOOT05_20180611	99.83	3,900	<1	4.3	68	0.2	<10	1.3	<5	2	12	3,900	6.2
		August	RG_TN_ZOOT01_20180831	99.87	5,700	0.8	3.8	78	0.26	8	0.93	7	2.3	10	4,400	50
		August	RG_TN_ZOOT02_20180831	99.89	6,700	1.1	4	93	0.29	9	0.85	8	2.5	11	5,100	16
		August	RG_TN_ZOOT03_20180831	99.62	7,400	0.4	3.8	85	0.32	8	0.9	9	2.8	12	6,200	27
		August	RG_TN_ZOOT04_20180831	99.81	6,500	0.5	3.6	94	0.28	8	0.89	8	2.4	10	5,400	12
		August	RG_TN_ZOOT05_20180831	99.83	7,000	0.4	3.1	93	0.29	9	0.86	9	2.5	9.9	5,000	14
		August	RG_TN_ZOOTX01_20180831	99.88	2,800	2	3.8	72	0.1	<10	1	<5	1.4	13	2,500	93
		August	RG_TN_ZOOTX02_20180831	99.93	2,200	1	2.7	96	<0.1	<10	0.8	<5	1.1	9.5	1,900	20
		August	RG_TN_ZOOTX03_20180831	99.92	3,200	2	3.6	86	0.1	<10	0.9	<5	1.4	10	2,900	29
		August	RG_TN_ZOOTX04_20180831	99.94	7,400	3	4.4	130	0.3	10	0.9	10	3.1	14	6,400	52
		August	RG_TN_ZOOTX05_20180831	99.91	7,000	2	3.9	120	0.3	10	1	10	3.1	15	6,000	40
	T4	June	RG_T4_ZOOT02_20180609	97.90	1,500	<0.1	5	27	0.08	2	0.95	1.3	1.2	8.9	750	2
		June	RG_T4_ZOOT03_20180608	97.73	1,200	<0.1	6	26	0.06	2	0.94	1.4	1.2	9.5	700	6.6
		June	RG_T4_ZOOT04_20180609	97.83	1,200	<0.1	6	25	0.08	1	0.97	1	1.1	9	640	1.7
		June	RG_T4_ZOOT05_20180609	97.78	1,300	<0.1	6	28	0.08	2	0.96	1	1.3	8.5	780	1.6
		June	RG_T4_ZOOT06_20180609	97.53	1,300	<0.1	5.1	26	0.07	1	0.74	1.1	1.1	6.8	840	1.3
		August	RG_T4_ZOOT01_20180830	99.81	1,900	3	4.4	53	<0.1	<10	1.8	<5	1.1	16	1,800	8.2
		August	RG_T4_ZOOT02_20180830	99.84	2,600	2	5.8	65	0.1	<10	1.8	<5	1.2	14	1,900	6.4
		August	RG_T4_ZOOT03_20180830	99.80	3,000	1	5.4	65	0.12	5	1.8	4	2	14	2,700	8.6
		August	RG_T4_ZOOT04_20180831	99.87	3,200	1	5.5	70	0.1	<10	1.7	<5	1.8	17	3,200	14
		August	RG_T4_ZOOT05_20180831	99.79	3,400	1.1	4.7	64	0.13	6	1.9	5	1.5	20	2,600	260
		August	RG_T4_ZOOTX01_20180830	99.86	1,200	6	4.4	56	<0.1	<10	1.9	<5	1	17	1,200	14
		August	RG_T4_ZOOTX02_20180830	99.78	1,600	4	6.4	54	<0.1	<10	2	<5	1.2	17	1,600	8.9
		August	RG_T4_ZOOTX03_20180830	99.86	1,500	2	4.9	57	<0.1	<10	1.6	<5	1	16	1,400	330
		August	RG_T4_ZOOTX04_20180831	99.93	2,900	2	3.4	85	0.1	<10	1.8	<5	1.2	15	2,200	14
		August	RG_T4_ZOOTX05_20180831	99.91	2,800	3	5.1	78	0.1	<10	1.6	<5	1.6	17	3,000	140
Benthic Invertebrate	Sand Creek	April	RG_SC_BIT01_20180427	73.91	1,000	<50	<20	<20	<5	<500	6	<200	<5	30	2,000	<5
		April	RG_SC_BIT02_20180427	52.63	15,300	<10	<5	120	<1	<100	<1	<50	6	12	14,400	10
		April	RG_SC_BIT03_20180427	71.87	5,200	<10	<5	36	<1	<100	3	<50	2	19	6,300	5
		April	RG_SC_BIT04_20180427	57.30	5,600	<10	<5	42	<1	<100	3	<50	3	16	6,300	5
		April	RG_SC_BIT05_20180428	62.54	5,100	<10	<5	40	<1	<100	<1	<50	3	16	5,500	4
	TN	April	RG_TN_BIT_20180430	85.28	8,000	<50	<20	40	<5	<500	<5	<200	<5	<20	11,600	14
		August	RG_TN_BIT_20180829	88.07	5,600	<10	<5	47	<1	<100	1	<50	7	22	8,800	11
	Elk River	April	RG_ER_BIT01_20180427	66.38	<1,000	<50	<20	20	<5	<500	<5	<200	<5	20	<1,000	<5
		April	RG_ER_BIT02_20180427	71.29	900	<10	<5	12	<1	<100	<1	<50	<1	20	700	<1
		April	RG_ER_BIT03_20180427	70.68	2,800	<10	<5	32	<1	<100	1	<50	2	15	2,100	1
		April	RG_ER_BIT04_20180427	91.11	3,000	<50	<20	80	<5	<500	7	<200	<5	40	2,000	<5
		April	RG_ER_BIT05_20180427	73.15	9,000	<50	<20	90	<5	<500	9	<200	<5	<20	6,000	<5
	T4	April	RG_T4_BIT_20180429	91.57	6,900	<10	<5	75	<1	<100	3	<50	2	22	6,700	6
		August	RG_T4_BIT_20180828 [b]	79.80	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
		October	RG_T4_BIT_20181009	86.26	12,100	<1	9.3	110	0.40	10	1.1	16	5.4	22	16,300	11
	Gold Creek	April	RG_GC_BIT01_20180427	75.81	5,000	<50	<20	30	<5	<500	<5	<200	<5	30	6,000	<5
		April	RG_GC_BIT02_20180427	49.01	2,200	<10	<5	34	<1	<100	<1	<50	2	14	1,900	<1
		April	RG_GC_BIT03_20180427	72.85	<200	<10	<5	<5	<1	<100	<1	<50	<1	21	300	<1
		April	RG_GC_BIT04_20180428	94.02	6,000	<50	<20	90	<5	<500	<5	<200	<5	20	5,000	<5
		April	RG_GC_BIT05_20180428	83.79	2,700	<1	1	40	0.1	<10	0.4	<5	2.1	15	2,300	1.2

Note: N/R indicates that no results was recorded.

[a] ZOOT and ZOOTX samples were collected from the entire water column and from the top 10 m of the water column, respectively.

[b] Sample was inadvertently contaminated in the analytical testing process (resampled October 9, 2018).

Table H.1: Metal Concentrations (µg/g Dry Weight) in Zooplankton and Benthic Invertebrates Collected in Koocanusa Reservoir, 2018

Tissue Type	Area	Month	Sample ID	Moisture	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
				%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Zooplankton [a]	TN	June	RG_TN_ZOOT01_20180611	99.78	130	<0.05	<1	5	2	<0.1	150	<0.5	1.1	64	0.61	6	120
		June	RG_TN_ZOOT02_20180611	99.90	120	<0.05	<1	20	1.5	<0.1	160	<0.5	<0.5	60	0.97	6	110
		June	RG_TN_ZOOT03_20180611	99.73	140	0.05	0.5	17	2.3	0.04	160	0.1	1.3	59	0.48	6.1	120
		June	RG_TN_ZOOT04_20180611	99.79	140	0.04	0.5	4.8	2	0.03	160	0.1	0.3	59	0.55	6.1	110
		June	RG_TN_ZOOT05_20180611	99.83	130	<0.05	<1	4.2	1.7	<0.1	140	<0.5	<0.5	47	0.62	4	100
		August	RG_TN_ZOOT01_20180831	99.87	220	0.04	0.5	6	2.7	0.04	100	0.1	1.6	91	0.42	8.2	87
		August	RG_TN_ZOOT02_20180831	99.89	240	0.04	0.6	6.2	2.7	0.04	120	0.1	2.8	107	0.5	9.4	100
		August	RG_TN_ZOOT03_20180831	99.62	270	0.04	0.5	7.3	2.6	0.06	100	0.1	0.7	117	0.43	11	100
		August	RG_TN_ZOOT04_20180831	99.81	250	0.04	0.6	5.9	2.5	0.04	110	0.1	2.3	102	0.53	9.5	96
		August	RG_TN_ZOOT05_20180831	99.83	240	0.04	0.6	6.2	2.1	0.04	120	0.1	1.4	110	0.51	10	94
		August	RG_TN_ZOOTX01_20180831	99.88	120	<0.05	<1	4.5	3.2	<0.1	120	<0.5	5.6	58	0.68	4	120
		August	RG_TN_ZOOTX02_20180831	99.93	95	<0.05	<1	7.6	2.6	<0.1	170	<0.5	1.8	37	0.76	3	100
		August	RG_TN_ZOOTX03_20180831	99.92	130	<0.05	<1	4.2	3.3	<0.1	160	<0.5	1.6	52	0.82	5	100
		August	RG_TN_ZOOTX04_20180831	99.94	220	<0.05	1	8.2	3.3	<0.1	210	<0.5	2.2	130	1.2	11	120
		August	RG_TN_ZOOTX05_20180831	99.91	270	<0.05	1	8	2.8	<0.1	220	<0.5	1.4	120	1	11	120
	T4	June	RG_T4_ZOOT02_20180609	97.90	106	0.037	0.3	3	2.2	0.03	32	<0.05	0.37	14	0.09	1.7	78
		June	RG_T4_ZOOT03_20180608	97.73	104	0.039	0.4	2	2.7	0.02	33	<0.05	0.76	12	0.11	1.4	100
		June	RG_T4_ZOOT04_20180609	97.83	107	0.037	0.3	1.6	2.5	0.02	28	<0.05	0.21	10	0.094	1.4	86
		June	RG_T4_ZOOT05_20180609	97.78	114	0.039	0.3	2	2.7	0.02	34	<0.05	0.11	12	0.092	1.5	85
		June	RG_T4_ZOOT06_20180609	97.53	90	0.035	0.3	1.8	2.4	0.02	37	<0.05	0.1	12	0.082	1.5	70
		August	RG_T4_ZOOT01_20180830	99.81	94	0.05	<1	3.3	3.8	<0.1	91	<0.5	3.3	38	0.45	3	150
		August	RG_T4_ZOOT02_20180830	99.84	120	0.05	<1	3.8	4.9	<0.1	110	<0.5	3.8	47	0.48	4	150
		August	RG_T4_ZOOT03_20180830	99.80	160	0.05	0.8	5.1	4.7	0.05	110	<0.1	1.1	55	0.42	4.2	140
		August	RG_T4_ZOOT04_20180831	99.87	160	0.05	<1	5.9	4.4	<0.1	120	<0.5	3.1	59	0.59	5	130
		August	RG_T4_ZOOT05_20180831	99.79	140	0.06	0.8	6.9	3.8	0.06	94	0.2	4.3	66	0.43	5.3	130
		August	RG_T4_ZOOTX01_20180830	99.86	83	0.06	<1	3	3.9	<0.1	110	<0.5	4.8	27	0.81	2	150
		August	RG_T4_ZOOTX02_20180830	99.78	100	0.06	<1	4.1	4.9	<0.1	100	<0.5	2.3	34	0.48	2	160
		August	RG_T4_ZOOTX03_20180830	99.86	83	<0.05	<1	3.3	4.7	<0.1	110	<0.5	1.1	34	0.68	2	170
		August	RG_T4_ZOOTX04_20180831	99.93	120	0.06	1	4.7	3.2	<0.1	140	<0.5	2.5	46	0.94	4	130
		August	RG_T4_ZOOTX05_20180831	99.91	130	<0.05	1	4.5	4.2	<0.1	140	<0.5	3.2	69	0.81	4	140
Benthic Invertebrate	Sand Creek	April	RG_SC_BIT01_20180427	73.91	<50	<2	<50	<20	9	<5	<50	<20	<20	80	<2	<50	<200
		April	RG_SC_BIT02_20180427	52.63	330	<0.5	<10	14	<0.5	<1	180	<5	<5	250	0.6	20	80
		April	RG_SC_BIT03_20180427	71.87	120	<0.5	<10	5	3.8	<1	60	<5	<5	100	<0.5	<10	130
		April	RG_SC_BIT04_20180427	57.30	170	<0.5	<10	5	3.5	<1	80	<5	<5	81	<0.5	<10	100
		April	RG_SC_BIT05_20180428	62.54	120	<0.5	<10	6	6.3	<1	70	<5	<5	80	<0.5	<10	120
	TN	April	RG_TN_BIT_20180430	85.28	190	<2	<50	<20	<2	<5	70	<20	<20	100	<2	<50	<200
		August	RG_TN_BIT_20180829	88.07	170	<0.5	<10	10	4.7	<1	80	<5	<5	140	0.7	<10	100
	Elk River	April	RG_ER_BIT01_20180427	66.38	<50	<2	<50	<20	6	<5	<50	<20	<20	<20	<2	<50	<200
		April	RG_ER_BIT02_20180427	71.29	50	<0.5	<10	<5	5.4	<1	<10	<5	<5	12	<0.5	<10	150
		April	RG_ER_BIT03_20180427	70.68	80	<0.5	<10	<5	5	<1	10	<5	<5	34	<0.5	<10	100
		April	RG_ER_BIT04_20180427	91.11	140	<2	<50	<20	10	<5	<50	<20	<20	60	<2	<50	<200
		April	RG_ER_BIT05_20180427	73.15	220	<2	<50	<20	12	<5	70	<20	<20	180	<2	<50	<200
	T4	April	RG_T4_BIT_20180429	91.57	140	<0.5	<10	6	8.5	<1	60	<5	<5	97	0.5	10	160
		August	RG_T4_BIT_20180828 [b]	79.80	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
		October	RG_T4_BIT_20181009	86.26	310	0.06	<1	13	4.7	<0.1	130	<0.5	<0.5	170	0.56	19	94
	Gold Creek	April	RG_GC_BIT01_20180427	75.81	230	<2	<50	<20	4	<5	<50	<20	<20	80	<2	<50	<200
		April	RG_GC_BIT02_20180427	49.01	40	<0.5	<10	<5	2.8	<1	<10	<5	<5	55	<0.5	<10	90
		April	RG_GC_BIT03_20180427	72.85	10	<0.5	<10	<5	3.9	<1	<10	<5	<5	<5	<0.5	<10	80
		April	RG_GC_BIT04_20180428	94.02	120	<2	<50	<20	2	<5	<50	<20	<20	450	<2	<50	<200
		April	RG_GC_BIT05_20180428	83.79	110	<0.05	<1	2	2.3	<0.1	6	<0.5	<0.5	46	0.2	3	100

Note: N/R indicates that no results was recorded.

[a] ZOOT and ZOOTX samples were collected from the entire water column and from the top 10 m of the water column, respectively.

[b] Sample was inadvertently contaminated in the analytical testing process (resampled October 9, 2018).

Table H.2: **Metal Concentrations (µg/g Dry Weight) in Fish Tissue Collected in Koocanusa Reservoir, 2018**

Tissue Type	Species	Area	Month	Sample ID	Moisture	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead
					%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Muscle	Bull Trout	Sand Creek	April	RG_SC_BT01M_20180425	83.64	<1000	<50	<20	<20	<5	<500	<5	<200	<5	<20	<1000	<5
			April	RG_SC_BT03M_20180425	74.10	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_SC_BT04M_20180427	39.41	<200	<10	<5	24	<1	<100	<1	<50	<1	<5	300	4
			April	RG_SC_BT05M_20180428	78.74	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_SC_BT06M_20180428	76.11	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
		Elk River	April	RG_ER_BT01M_20180427	19.34	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_ER_BT02M_20180429	73.82	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
		Gold Creek	April	RG_GC_BT01M_20180425	79.02	200	<10	<5	<5	<1	<100	<1	<50	<1	<5	200	<1
			April	RG_GC_BT02M_20180427	75.25	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_GC_BT03M_20180428	76.97	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
	Kokanee	Sand Creek	April	RG_SC_KO01M_20180425	72.32	<20	<1	<0.5	1.2	<0.1	<10	<0.1	<5	<0.1	1	<20	<0.1
			April	RG_SC_KO02M_20180425	75.03	8	<0.1	0.08	0.07	<0.01	<1	<0.01	<0.5	<0.01	1.1	19	0.02
			April	RG_SC_KO03M_20180426	71.47	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_SC_KO04M_20180426	74.93	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
		Elk River	April	RG_ER_KO01M_20180428	56.16	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_ER_KO02M_20180429	20.70	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_KO01M_20180901	70.63	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_KO02M_20180901	71.93	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_KO03M_20180901	72.67	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_KO04M_20180901	69.87	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_KO05M_20180901	70.43	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_KO06M_20180901	70.82	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_KO07M_20180901	69.85	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_KO08M_20180901	70.57	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
		Gold Creek	April	RG_GC_KO01M_20180427	61.33	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_GC_KO01M_20180901	67.42	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
	Mountain Whitefish	Sand Creek	April	RG_SC_MW01M_20180427	77.68	<5	<0.2	0.2	0.1	<0.02	<2	<0.02	<1	0.03	1.6	18	<0.02
		Elk River	April	RG_ER_MW01M_20180425	57.94	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_ER_MW02M_20180428	74.77	7	<0.1	0.45	0.1	<0.01	<1	<0.01	<0.5	0.04	1.4	17	<0.01
			April	RG_ER_MW03M_20180429	41.05	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
	Northern Pikeminnow	Sand Creek	June	RG_SC_NSC01M_20180605	77.93	5	<0.1	<0.05	0.17	<0.01	<1	<0.01	<0.5	<0.01	0.8	13	0.05
			June	RG_SC_NSC02M_20180605	77.47	<2	<0.1	<0.05	0.07	<0.01	<1	<0.01	<0.5	<0.01	0.68	7	0.01
			June	RG_SC_NSC03M_20180605	78.87	2	<0.1	0.05	0.17	<0.01	<1	<0.01	<0.5	<0.01	0.82	13	0.03
			June	RG_SC_NSC04M_20180605	79.13	<2	<0.1	<0.05	0.2	<0.01	<1	<0.01	<0.5	<0.01	0.75	9	<0.01
			June	RG_SC_NSC05M_20180605	78.10	3	<0.1	0.06	0.55	<0.01	<1	<0.01	<0.5	<0.01	0.72	10	0.02
			June	RG_SC_NSC06M_20180610	78.76	2	<0.1	<0.05	0.15	<0.01	<1	<0.01	<0.5	<0.01	0.63	8	0.04
			June	RG_SC_NSC07M_20180610	77.19	<2	<0.1	0.06	0.06	<0.01	<1	<0.01	<0.5	<0.01	0.64	8	0.03
		Elk River	June	RG_ER_NSC01M_20180606	78.85	<2	<0.1	0.07	0.14	<0.01	<1	<0.01	<0.5	<0.01	0.58	8	0.04
			June	RG_ER_NSC02M_20180606	79.56	<2	<0.1	0.06	0.32	<0.01	<1	<0.01	<0.5	<0.01	0.69	13	0.05
			June	RG_ER_NSC03M_20180607	79.31	<2	<0.1	0.09	0.46	<0.01	<1	<0.01	<0.5	<0.01	0.56	10	<0.01
			June	RG_ER_NSC04M_20180607	77.85	<2	<0.1	0.05	0.18	<0.01	<1	<0.01	<0.5	<0.01	0.62	7	0.02
			June	RG_ER_NSC05M_20180607	80.22	<2	<0.1	0.07	1.9	<0.01	<1	<0.01	<0.5	<0.01	0.72	9	0.02
			June	RG_ER_NSC06M_20180607	78.93	<2	<0.1	0.1	0.71	<0.01	<1	<0.01	<0.5	<0.01	0.76	8	0.01
			September	RG_ER_NSC01M_20180901	75.32	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_NSC02M_20180901	71.3	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_NSC03M_20180901	77.42	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			September	RG_ER_NSC04M_20180901	76.65	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
		Gold Creek	June	RG_GC_NSC01M_20180607	78.92	<2	<0.1	0.07	0.65	<0.01	<1	<0.01	<0.5	<0.01	0.65	8	<0.01
			June	RG_GC_NSC02M_20180607	78.85	<2	<0.1	0.11	0.44	<0.01	<1	<0.01	<0.5	<0.01	0.73	8	0.04
			June	RG_GC_NSC03M_20180607	76.66	<2	<0.1	0.07	2.1	<0.01	<1	<0.01	<0.5	<0.01	0.79	8	0.06
	Peamouth Chub	Sand Creek	April	RG_SC_PCC01M_20180424	80.39	5	<0.1	0.16	1.6	<0.01	<1	<0.01	<0.5	0.02	0.99	23	0.05
			April	RG_SC_PCC02M_20180424	79.17	12	<0.1	0.1	1	<0.01	<1	<0.01	<0.5	0.02	1.1	25	0.09
			April	RG_SC_PCC03M_20180424	79.25	18	<0.1	0.27	1.4	<0.01	<1	<0.01	<0.5	0.04	2.4	53	0.06
			April	RG_SC_PCC06M_20180424	79.38	19	<0.1	0.13	1.5	<0.01	<1	0.01	<0.5	0.03	1.1	36	0.08
			April	RG_SC_PCC07M_20180424	78.55	4	<0.1	0.09	0.56	<0.01	<1	<0.01	<0.5	0.01	1.1	13	0.06
			April	RG_SC_PCC08M_20180424	79.32	8	<0.1	0.19	1.2	<0.01	<1	<0.01	<0.5	0.02	0.8	25	0.08
			April	RG_SC_PCC10M_20180424	78.63	4	<0.1	0.19	0.6	<0.01	<1	<0.01	<0.5	0.02	1.8	18	0.03
			April	RG_SC_PCC11M_20180424	79.00	7	<0.1	0.1	1	<0.01	<1	<0.01	<0.5	0.02	1.1	22	0.04
			April	RG_SC_PCC13M_20180424	75.22	2	<0.1	0.27	0.78	<0.01	<1	<0.01	<0.5	0.02	2.6	46	0.02
			April	RG_SC_PCC14M_20180424	77.91	6	<0.1	0.11	0.6	<0.01	<1	<0.01	<0.5	0.01	0.83	14	0.06

Table H.2: Metal Concentrations (µg/g Dry Weight) in Fish Tissue Collected in Koocanusa Reservoir, 2018

Tissue Type	Species	Area	Month	Sample ID	Moisture	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
					%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Muscle	Bull Trout	Sand Creek	April	RG_SC_BT01M_20180425	83.64	<50	<2	<50	<20	2	<5	<50	<20	<20	<20	<2	<50	<200
			April	RG_SC_BT03M_20180425	74.10	<10	0.8	<10	<5	1.8	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_SC_BT04M_20180427	39.41	20	<0.5	<10	<5	<0.5	<1	<10	<5	<5	6	<0.5	<10	<50
			April	RG_SC_BT05M_20180428	78.74	<10	1.1	<10	<5	2	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_SC_BT06M_20180428	76.11	<10	1.4	<10	<5	1.3	<1	<10	<5	<5	<5	<0.5	<10	<50
		Elk River	April	RG_ER_BT01M_20180427	19.34	<10	1.1	<10	<5	1.8	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_ER_BT02M_20180429	73.82	<10	<0.5	<10	<5	1.4	<1	<10	<5	<5	<5	<0.5	<10	<50
		Gold Creek	April	RG_GC_BT01M_20180425	79.02	<10	1.3	<10	<5	2.7	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_GC_BT02M_20180427	75.25	<10	1.9	<10	<5	2	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_GC_BT03M_20180428	76.97	<10	1.8	<10	<5	1.9	<1	<10	<5	<5	<5	<0.5	<10	<50
	Kokanee	Sand Creek	April	RG_SC_KO01M_20180425	72.32	<1	0.41	<1	<0.5	1.8	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	13
			April	RG_SC_KO02M_20180425	75.03	0.5	0.31	<0.1	<0.05	2	<0.01	0.3	0.08	<0.05	0.46	<0.005	<0.1	16
			April	RG_SC_KO03M_20180426	71.47	<10	<0.5	<10	<5	1.9	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_SC_KO04M_20180426	74.93	<10	<0.5	<10	<5	2	<1	<10	<5	<5	<5	<0.5	<10	<50
		Elk River	April	RG_ER_KO01M_20180428	56.16	<10	<0.5	<10	<5	2	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_ER_KO02M_20180429	20.70	<10	<0.5	<10	<5	1.8	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_KO01M_20180901	70.63	<10	<0.5	<10	<5	1.6	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_KO02M_20180901	71.93	<10	<0.5	<10	<5	1.5	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_KO03M_20180901	72.67	<10	<0.5	<10	<5	1.6	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_KO04M_20180901	69.87	<10	<0.5	<10	<5	1.4	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_KO05M_20180901	70.43	<10	<0.5	<10	<5	1.7	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_KO06M_20180901	70.82	<10	<0.5	<10	<5	1.8	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_KO07M_20180901	69.85	<10	<0.5	<10	<5	1.2	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_KO08M_20180901	70.57	<10	<0.5	<10	<5	1.6	<1	<10	<5	<5	<5	<0.5	<10	<50
		Gold Creek	April	RG_GC_KO01M_20180427	61.33	<10	<0.5	<10	<5	1.6	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_GC_KO01M_20180901	67.42	<10	<0.5	<10	<5	1.5	<1	<10	<5	<5	<5	<0.5	<10	<50
	Mountain Whitefish	Sand Creek	April	RG_SC_MW01M_20180427	77.68	1	0.1	<0.2	<0.1	6	<0.02	0.8	<0.1	<0.1	0.1	<0.01	<0.2	18
		Elk River	April	RG_ER_MW01M_20180425	57.94	<10	<0.5	<10	<5	3.5	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_ER_MW02M_20180428	74.77	0.8	0.24	<0.1	<0.05	2.2	<0.01	0.7	<0.05	<0.05	0.1	<0.005	<0.1	17
			April	RG_ER_MW03M_20180429	41.05	<10	<0.5	<10	<5	3	<1	<10	<5	<5	<5	<0.5	<10	<50
	Northern Pikeminnow	Sand Creek	June	RG_SC_NSC01M_20180605	77.93	0.5	1.4	<0.1	<0.05	1.7	<0.01	0.2	<0.05	<0.05	0.15	<0.005	<0.1	20
			June	RG_SC_NSC02M_20180605	77.47	0.2	1.4	<0.1	<0.05	1.3	<0.01	0.1	<0.05	<0.05	<0.05	<0.005	<0.1	18
			June	RG_SC_NSC03M_20180605	78.87	0.6	1.2	<0.1	<0.05	2.4	<0.01	0.4	<0.05	<0.05	0.19	<0.005	<0.1	32
			June	RG_SC_NSC04M_20180605	79.13	0.7	0.89	<0.1	<0.05	1.6	<0.01	0.6	<0.05	<0.05	<0.05	<0.005	<0.1	25
			June	RG_SC_NSC05M_20180605	78.10	1.1	0.63	<0.1	<0.05	2.7	<0.01	1.6	<0.05	<0.05	0.1	<0.005	<0.1	21
			June	RG_SC_NSC06M_20180610	78.76	0.4	1.6	<0.1	<0.05	2	<0.01	0.2	<0.05	<0.05	0.11	<0.005	<0.1	20
			June	RG_SC_NSC07M_20180610	77.19	0.2	2.1	<0.1	<0.05	1.6	<0.01	<0.1	<0.05	<0.05	<0.05	<0.005	<0.1	16
		Elk River	June	RG_ER_NSC01M_20180606	78.85	0.5	1.2	<0.1	<0.05	4	<0.01	0.3	<0.05	<0.05	<0.05	<0.005	<0.1	18
			June	RG_ER_NSC02M_20180606	79.56	0.7	1.2	<0.1	<0.05	3.1	<0.01	1	<0.05	<0.05	0.07	<0.005	<0.1	20
			June	RG_ER_NSC03M_20180607	79.31	0.8	1.1	<0.1	<0.05	2.5	<0.01	1.1	<0.05	<0.05	0.06	<0.005	<0.1	20
			June	RG_ER_NSC04M_20180607	77.85	0.4	1.6	<0.1	<0.05	4.8	<0.01	0.2	<0.05	<0.05	0.05	<0.005	<0.1	18
			June	RG_ER_NSC05M_20180607	80.22	0.5	0.91	<0.1	0.11	2.5	<0.01	0.2	<0.05	<0.05	0.06	<0.005	<0.1	21
			June	RG_ER_NSC06M_20180607	78.93	0.9	0.73	<0.1	<0.05	4.4	<0.01	0.8	<0.05	<0.05	<0.05	<0.005	<0.1	26
			September	RG_ER_NSC01M_20180901	75.32	<10	1.8	<10	<5	1.6	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_NSC02M_20180901	71.3	<10	1.6	<10	<5	2.2	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_NSC03M_20180901	77.42	<10	1.1	<10	<5	2.5	<1	<10	<5	<5	<5	<0.5	<10	<50
			September	RG_ER_NSC04M_20180901	76.65	<10	0.8	<10	<5	1.4	<1	<10	<5	<5	<5	<0.5	<10	<50
		Gold Creek	June	RG_GC_NSC01M_20180607	78.92	0.6	1.2	<0.1	<0.05	2.9	<0.01	0.3	<0.05	<0.05	<0.05	<0.005	<0.1	22
			June	RG_GC_NSC02M_20180607	78.85	0.5	0.96	<0.1	<0.05	2.7	<0.01	0.5	<0.05	<0.05	0.06	<0.005	<0.1	24
			June	RG_GC_NSC03M_20180607	76.66	0.3	2	<0.1	<0.05	1.7	<0.01	0.2	<0.05	<0.05	0.06	<0.005	<0.1	18
	Peamouth Chub	Sand Creek	April	RG_SC_PCC01M_20180424	80.39	1.1	0.71	<0.1	<0.05	2.2	<0.01	3.4	<0.05	<0.05	0.42	<0.005	<0.1	32
			April	RG_SC_PCC02M_20180424	79.17	1.3	0.8	<0.1	0.16	1.4	<0.01	3.2	<0.05	<0.05	0.4	<0.005	<0.1	22
			April	RG_SC_PCC03M_20180424	79.25	1.3	0.87	<0.1	<0.05	2	<0.01	1.8	<0.05	<0.05	0.25	<0.005	<0.1	47
			April	RG_SC_PCC06M_20180424	79.38	1.6	0.53	<0.1	0.06	2.2	<0.01	4.3	<0.05	<0.05	0.32	<0.005	<0.1	34
			April	RG_SC_PCC07M_20180424	78.55	0.9	0.44	<0.1	<0.05	1.9	<0.01	2.4	<0.05	<0.05	0.11	<0.005	<0.1	22
			April	RG_SC_PCC08M_20180424	79.32	1.3	0.86	<0.1	0.06	2	<0.01	3	<0.05	<0.05	0.12	<0.005	<0.1	34
			April	RG_SC_PCC10M_20180424	78.63	0.6	0.55	<0.1	<0.05	1.7	<0.01	0.6	<0.05	<0.05	0.09	<0.005	<0.1	33
			April	RG_SC_PCC11M_20180424	79.00	1.2	0.53	<0.1	<0.05	1.9	<0.01	3.2	<0.05	<0.05	0.12	<0.005	<0.1	24
			April	RG_SC_PCC13M_20180424	75.22	0.7	0.34	<0.1	<0.05	1.4	<0.01	0.6	<0.05	<0.05	0.06	<0.005	<0.1	47
			April	RG_SC_PCC14M_20180424	77.91	1	0.46	<0.1	<0.05	1.7	<0.01	3.2	<0.05	<0.05	0.12	<0.005	<0.1	23

Table H.2: **Metal Concentrations (µg/g Dry Weight) in Fish Tissue Collected in Koocanusa Reservoir, 2018**

Tissue Type	Species	Area	Month	Sample ID	Moisture	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead
					%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Muscle	Peamouth Chub	Elk River	April	RG_ER_PCC01M_20180425	78.71	<2	<0.1	0.12	1.3	<0.01	<1	<0.01	<0.5	0.02	0.67	15	0.04
			April	RG_ER_PCC02M_20180425	76.98	5	<0.1	0.08	1.1	<0.01	<1	<0.01	<0.5	0.02	0.68	10	0.01
			April	RG_ER_PCC03M_20180425	77.81	<2	<0.1	0.15	1	<0.01	<1	<0.01	<0.5	0.02	1.4	18	<0.01
			April	RG_ER_PCC06M_20180425	78.57	3	<0.1	0.15	0.96	<0.01	<1	<0.01	<0.5	0.01	1.5	17	0.01
			April	RG_ER_PCC08M_20180426	79.63	3	<0.1	0.1	1.1	<0.01	<1	<0.01	<0.5	0.01	0.92	12	0.01
			April	RG_ER_PCC09M_20180426	79.32	<2	<0.1	0.1	1.2	<0.01	<1	<0.01	<0.5	0.01	1.2	13	0.03
			April	RG_ER_PCC11M_20180426	75.70	<5	<0.2	0.1	0.5	<0.02	<2	<0.02	<1	<0.02	1.3	21	0.03
			April	RG_ER_PCC12M_20180426	80.66	3	<0.1	0.12	1.1	<0.01	<1	<0.01	<0.5	0.01	1.2	20	0.02
			April	RG_ER_PCC16M_20180426	79.36	6	<0.1	0.21	1.7	<0.01	<1	0.02	<0.5	0.02	1	23	0.03
			April	RG_ER_PCC17M_20180426	76.65	6	<0.1	0.27	1.1	<0.01	<1	<0.01	<0.5	0.02	2.8	33	0.02
		Gold Creek	April	RG_GC_PCC01M_20180425	76.73	<20	<1	<0.5	0.7	<0.1	<10	<0.1	<5	<0.1	1.1	<20	<0.1
			April	RG_GC_PCC02M_20180425	76.78	<20	<1	<0.5	1.1	<0.1	<10	<0.1	<5	<0.1	0.8	<20	<0.1
			April	RG_GC_PCC04M_20180425	77.15	<20	<1	<0.5	0.9	<0.1	<10	<0.1	<5	<0.1	1.6	20	<0.1
			April	RG_GC_PCC08M_20180425	75.09	40	<1	<0.5	1.4	<0.1	<10	<0.1	<5	<0.1	1.2	40	<0.1
			April	RG_GC_PCC09M_20180426	77.78	<20	<1	<0.5	1	<0.1	<10	<0.1	<5	<0.1	0.7	<20	<0.1
			April	RG_GC_PCC11M_20180426	76.94	<20	<1	<0.5	1.4	<0.1	<10	<0.1	<5	<0.1	0.9	20	<0.1
			April	RG_GC_PCC14M_20180426	74.40	<20	<1	<0.5	0.8	<0.1	<10	<0.1	<5	<0.1	0.9	20	<0.1
			April	RG_GC_PCC15M_20180426	78.69	<20	<1	<0.5	1.3	<0.1	<10	<0.1	<5	<0.1	0.8	<20	<0.1
			April	RG_GC_PCC17M_20180426	74.77	<50	<2	<1	1	<0.2	<20	<0.2	<10	<0.2	1	<50	<0.2
			April	RG_GC_PCC18M_20180426	75.18	<20	<1	<0.5	0.8	<0.1	<10	<0.1	<5	<0.1	1	20	<0.1
	Rainbow Trout	Sand Creek	April	RG_SC_RT01M_20180427	81.54	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_SC_RT02M_20180427	75.87	10	<0.1	<0.05	0.17	<0.01	<1	<0.01	<0.5	0.02	1.2	23	<0.01
		Elk River	September	RG_ER_RT01M_20180901	75.06	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
	Redside Shiner	Sand Creek	April	RG_SC_RSC02M_20180424	74.98	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	1.2	<20	<0.1
			April	RG_SC_RSC04M_20180424	74.87	<20	<1	<0.5	1.3	<0.1	<10	<0.1	<5	<0.1	2.5	30	<0.1
			April	RG_SC_RSC05M_20180424	76.89	20	<1	<0.5	1.8	<0.1	<10	<0.1	<5	<0.1	1.7	40	<0.1
			April	RG_SC_RSC06M_20180424	78.66	<20	<1	<0.5	1	<0.1	<10	<0.1	<5	<0.1	2.6	20	<0.1
			April	RG_SC_RSC09M_20180424	76.41	<20	<1	<0.5	1.7	<0.1	<10	<0.1	<5	<0.1	2.5	30	<0.1
			April	RG_SC_RSC10M_20180424	76.75	<20	<1	<0.5	1.6	<0.1	<10	<0.1	<5	<0.1	1.4	20	<0.1
			April	RG_SC_RSC11M_20180426	75.67	<20	<1	<0.5	0.6	<0.1	<10	<0.1	<5	<0.1	1.9	30	0.1
			April	RG_SC_RSC13M_20180426	76.01	<20	<1	<0.5	0.6	<0.1	<10	<0.1	<5	<0.1	1.2	<20	<0.1
			April	RG_SC_RSC17M_20180427	74.70	<20	<1	<0.5	1.4	<0.1	<10	<0.1	<5	<0.1	1.2	<20	<0.1
			April	RG_SC_RSC18M_20180427	77.56	6	<0.2	<0.1	2	<0.02	<2	<0.02	<1	<0.02	2.2	24	<0.02
		Elk River	April	RG_ER_RSC01M_20180425	76.30	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	1.1	<20	<0.1
			April	RG_ER_RSC07M_20180425	74.87	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	1	<20	<0.1
			April	RG_ER_RSC08M_20180425	77.14	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	1.1	<20	<0.1
			April	RG_ER_RSC09M_20180425	77.58	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	2.5	<20	<0.1
			April	RG_ER_RSC10M_20180425	76.40	<20	<1	<0.5	0.7	<0.1	<10	<0.1	<5	<0.1	1.7	<20	<0.1
			April	RG_ER_RSC11M_20180425	71.25	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	1.4	20	<0.1
			April	RG_ER_RSC12M_20180425	74.76	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	0.9	<20	<0.1
			April	RG_ER_RSC14M_20180425	78.01	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	1.2	<20	<0.1
			April	RG_ER_RSC15M_20180425	76.27	<20	<1	<0.5	1.1	<0.1	<10	<0.1	<5	<0.1	2.4	30	<0.1
			April	RG_ER_RSC16M_20180425	78.14	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	1.2	<20	<0.1
			April	RG_ER_RSC19M_20180425	77.23	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	1.1	<20	<0.1
		Gold Creek	April	RG_GC_RSC02M_20180424	68.96	<20	<1	<0.5	1.2	<0.1	<10	<0.1	<5	<0.1	1.6	30	<0.1
			April	RG_GC_RSC04M_20180424	69.38	<20	<1	<0.5	1.9	<0.1	<10	<0.1	<5	<0.1	1.8	20	<0.1
			April	RG_GC_RSC09M_20180426	76.89	<20	<1	<0.5	0.9	<0.1	<10	<0.1	<5	<0.1	2.1	30	<0.1
			April	RG_GC_RSC16M_20180426	70.41	<20	<1	<0.5	1.9	<0.1	<10	<0.1	<5	<0.1	1.8	30	<0.1
			April	RG_GC_RSC17M_20180427	76.55	<20	<1	<0.5	1.2	<0.1	<10	<0.1	<5	<0.1	1.7	20	<0.1
			April	RG_GC_RSC18M_20180427	74.69	<20	<1	<0.5	1.1	<0.1	<10	<0.1	<5	<0.1	1.3	30	<0.1
			April	RG_GC_RSC19M_20180427	76.27	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	1	<20	<0.1
			April	RG_GC_RSC20M_20180427	77.81	9	<0.2	0.1	1	<0.02	<2	<0.02	<1	0.02	1.6	28	0.03
			April	RG_GC_RSC21M_20180427	76.82	<5	<0.2	<0.1	2.2	<0.02	<2	<0.02	<1	0.04	2.6	29	0.04
			April	RG_GC_RSC24M_20180427	67.22	<20	<1	<0.5	1.2	<0.1	<10	<0.1	<5	<0.1	1.6	30	<0.1
	Westslope Cutthroat Trout	Elk River	April	RG_ER_WCT01M_20180425	61.19	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_ER_WCT02M_20180430	54.49	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			June	RG_ER_WCT01M_20180607	77.98	<200	<10	<5	14	<1	<100	<1	<50	<1	<5	<200	<1
		Gold Creek	April	RG_GC_WCT01M_20180425	74.92	300	<10	<5	<5	<1	<100	<1	<50	<1	20	300	<1
			April	RG_GC_WCT02M_20180425	76.95	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_GC_WCT03M_20180425	66.83	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1

Table H.2: **Metal Concentrations (µg/g Dry Weight) in Fish Tissue Collected in Koocanusa Reservoir, 2018**

Tissue Type	Species	Area	Month	Sample ID	Moisture	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
					%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Muscle	Peamouth Chub	Elk River	April	RG_ER_PCC01M_20180425	78.71	1.5	0.62	<0.1	<0.05	2.1	<0.01	5.7	<0.05	<0.05	0.1	<0.005	<0.1	19
			April	RG_ER_PCC02M_20180425	76.98	1	0.41	<0.1	<0.05	2.8	<0.01	4.4	<0.05	<0.05	0.19	<0.005	<0.1	36
			April	RG_ER_PCC03M_20180425	77.81	0.8	0.42	<0.1	<0.05	4.4	<0.01	2.5	<0.05	<0.05	0.05	<0.005	<0.1	42
			April	RG_ER_PCC06M_20180425	78.57	0.8	0.48	<0.1	<0.05	2	<0.01	2.7	<0.05	<0.05	0.48	<0.005	<0.1	41
			April	RG_ER_PCC08M_20180426	79.63	0.9	0.52	<0.1	<0.05	2.6	<0.01	3.7	<0.05	<0.05	0.16	<0.005	<0.1	27
			April	RG_ER_PCC09M_20180426	79.32	1	0.67	<0.1	<0.05	2.7	0.14	4	<0.05	<0.05	0.07	<0.005	<0.1	28
			April	RG_ER_PCC11M_20180426	75.70	0.4	0.6	<0.2	<0.1	2.4	<0.02	0.4	<0.1	<0.1	<0.1	<0.01	<0.2	28
			April	RG_ER_PCC12M_20180426	80.66	0.8	0.96	<0.1	<0.05	2.2	<0.01	1.8	<0.05	<0.05	0.1	<0.005	<0.1	28
			April	RG_ER_PCC16M_20180426	79.36	1.3	1.2	<0.1	<0.05	5	<0.01	6.7	<0.05	<0.05	0.16	<0.005	<0.1	35
			April	RG_ER_PCC17M_20180426	76.65	0.9	0.37	<0.1	<0.05	1.9	<0.01	1.8	<0.05	<0.05	0.32	<0.005	<0.1	49
		Gold Creek	April	RG_GC_PCC01M_20180425	76.73	<1	0.53	<1	<0.5	1.6	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	30
			April	RG_GC_PCC02M_20180425	76.78	1	0.54	<1	<0.5	2.1	<0.1	3	<0.5	<0.5	<0.5	<0.05	<1	30
			April	RG_GC_PCC04M_20180425	77.15	<1	0.69	<1	<0.5	4.5	<0.1	1	<0.5	<0.5	<0.5	<0.05	<1	26
			April	RG_GC_PCC08M_20180425	75.09	1	0.39	<1	<0.5	2.3	<0.1	3	<0.5	<0.5	<0.5	<0.05	<1	32
			April	RG_GC_PCC09M_20180426	77.78	1	0.42	<1	<0.5	3.3	<0.1	3	<0.5	<0.5	<0.5	<0.05	<1	21
			April	RG_GC_PCC11M_20180426	76.94	1	0.48	<1	<0.5	3.4	<0.1	3	<0.5	<0.5	0.6	<0.05	<1	49
			April	RG_GC_PCC14M_20180426	74.40	<1	0.89	<1	<0.5	1.8	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	23
			April	RG_GC_PCC15M_20180426	78.69	1	0.62	<1	<0.5	2	<0.1	4	<0.5	<0.5	<0.5	<0.05	<1	43
			April	RG_GC_PCC17M_20180426	74.77	<2	0.5	<2	<1	4.2	<0.2	2	<1	<1	<1	<0.1	<2	20
			April	RG_GC_PCC18M_20180426	75.18	1	0.68	<1	<0.5	1.5	<0.1	3	<0.5	<0.5	<0.5	<0.05	<1	29
	Rainbow Trout	Sand Creek	April	RG_SC_RT01M_20180427	81.54	<10	<0.5	<10	<5	1.8	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_SC_RT02M_20180427	75.87	0.8	0.24	<0.1	<0.05	1.4	<0.01	1	<0.05	<0.05	0.2	<0.005	<0.1	16
		Elk River	September	RG_ER_RT01M_20180901	75.06	<10	<0.5	<10	<5	1.2	<1	<10	<5	<5	<5	<0.5	<10	<50
	Redside Shiner	Sand Creek	April	RG_SC_RSC02M_20180424	74.98	1	0.44	<1	<0.5	1.7	<0.1	1	<0.5	<0.5	1	<0.05	<1	50
			April	RG_SC_RSC04M_20180424	74.87	1	0.46	<1	<0.5	1.7	<0.1	1	<0.5	<0.5	1.3	<0.05	<1	82
			April	RG_SC_RSC05M_20180424	76.89	3	0.31	<1	<0.5	2.1	<0.1	9	<0.5	<0.5	<0.5	<0.05	<1	74
			April	RG_SC_RSC06M_20180424	78.66	1	0.45	<1	<0.5	2.3	<0.1	1	<0.5	<0.5	<0.5	<0.05	<1	70
			April	RG_SC_RSC09M_20180424	76.41	1	0.29	<1	<0.5	3.3	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	78
			April	RG_SC_RSC10M_20180424	76.75	2	0.42	<1	<0.5	1.8	<0.1	1	<0.5	<0.5	0.7	<0.05	<1	60
			April	RG_SC_RSC11M_20180426	75.67	2	0.43	<1	<0.5	1.8	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	71
			April	RG_SC_RSC13M_20180426	76.01	2	0.42	<1	<0.5	2.2	<0.1	3	<0.5	<0.5	0.7	<0.05	<1	38
			April	RG_SC_RSC17M_20180427	74.70	3	0.49	<1	<0.5	1.6	<0.1	12	<0.5	<0.5	0.6	<0.05	<1	55
			April	RG_SC_RSC18M_20180427	77.56	2	0.51	<0.2	<0.1	1.6	<0.02	4.4	<0.1	<0.1	<0.1	<0.01	<0.2	51
		Elk River	April	RG_ER_RSC01M_20180425	76.30	1	0.82	<1	<0.5	1.5	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	26
			April	RG_ER_RSC07M_20180425	74.87	1	0.44	<1	<0.5	2.5	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	24
			April	RG_ER_RSC08M_20180425	77.14	1	0.84	<1	<0.5	1.7	<0.1	3	<0.5	<0.5	<0.5	<0.05	<1	23
			April	RG_ER_RSC09M_20180425	77.58	1	0.39	<1	<0.5	2.2	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	30
			April	RG_ER_RSC10M_20180425	76.40	1	0.28	<1	<0.5	1.8	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	63
			April	RG_ER_RSC11M_20180425	71.25	1	0.54	<1	<0.5	1.8	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	22
			April	RG_ER_RSC12M_20180425	74.76	1	0.41	<1	<0.5	1.8	<0.1	3	<0.5	<0.5	<0.5	<0.05	<1	23
			April	RG_ER_RSC14M_20180425	78.01	1	0.37	<1	<0.5	2.2	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	26
			April	RG_ER_RSC15M_20180425	76.27	1	0.26	<1	<0.5	3.5	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	85
			April	RG_ER_RSC16M_20180425	78.14	1	0.37	<1	<0.5	1.8	<0.1	3	<0.5	<0.5	<0.5	<0.05	<1	26
			April	RG_ER_RSC19M_20180425	77.23	<1	0.37	<1	<0.5	1.6	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	23
		Gold Creek	April	RG_GC_RSC02M_20180424	68.96	1	0.39	<1	<0.5	2.3	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	81
			April	RG_GC_RSC04M_20180424	69.38	1	0.33	<1	<0.5	2	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	86
			April	RG_GC_RSC09M_20180426	76.89	1	0.44	<1	<0.5	2.4	<0.1	1	<0.5	<0.5	<0.5	<0.05	<1	60
			April	RG_GC_RSC16M_20180426	70.41	2	0.28	<1	<0.5	2.5	<0.1	7	<0.5	<0.5	<0.5	<0.05	<1	59
			April	RG_GC_RSC17M_20180427	76.55	2	0.46	<1	<0.5	2.7	<0.1	4	<0.5	<0.5	<0.5	<0.05	<1	33
			April	RG_GC_RSC18M_20180427	74.69	2	0.38	<1	<0.5	2.4	<0.1	5	<0.5	<0.5	<0.5	<0.05	<1	64
			April	RG_GC_RSC19M_20180427	76.27	1	0.46	<1	<0.5	2.8	<0.1	1	<0.5	<0.5	<0.5	<0.05	<1	25
			April	RG_GC_RSC20M_20180427	77.81	1.7	0.42	<0.2	<0.1	2.6	<0.02	1.9	<0.1	<0.1	0.6	<0.01	<0.2	56
			April	RG_GC_RSC21M_20180427	76.82	1.7	0.5	<0.2	<0.1	2.1	<0.02	3.6	<0.1	<0.1	0.2	<0.01	<0.2	110
			April	RG_GC_RSC24M_20180427	67.22	2	0.35	<1	<0.5	2.9	<0.1	3	<0.5	<0.5	<0.5	<0.05	<1	66
	Westslope Cutthroat Trout	Elk River	April	RG_ER_WCT01M_20180425	61.19	<10	<0.5	<10	<5	2.7	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_ER_WCT02M_20180430	54.49	<10	<0.5	<10	<5	1.4	<1	<10	<5	<5	<5	<0.5	<10	<50
			June	RG_ER_WCT01M_20180607	77.98	<10	<0.5	<10	<5	8.6	<1	<10	<5	<5	<5	<0.5	<10	<50
		Gold Creek	April	RG_GC_WCT01M_20180425	74.92	<10	<0.5	<10	<5	1.6	<1	<10	<5	<5	6	<0.5	<10	<50
			April	RG_GC_WCT02M_20180425	76.95	<10	<0.5	<10	<5	1.3	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_GC_WCT03M_20180425	66.83	<10	<0.5	<10	<5	1.5	<1	<10	<5	<5	<5	<0.5	<10	<50

Table H.2: Metal Concentrations (µg/g Dry Weight) in Fish Tissue Collected in Koocanusa Reservoir, 2018

Tissue Type	Species	Area	Month	Sample ID	Moisture	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead
					%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Muscle	Westslope Cutthroat Trout	Gold Creek	April	RG_GC_WCT04M_20180425	75.00	200	<10	<5	<5	<1	<100	<1	<50	<1	6	200	<1
			April	RG_GC_WCT05M_20180425	14.60	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_GC_WCT06M_20180425	21.13	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_GC_WCT07M_20180425	20.75	<200	<10	<5	6	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_GC_WCT08M_20180425	12.92	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
	Yellow Perch	Sand Creek	April	RG_SC_YP01M_20180427	79.90	4	<0.1	<0.05	0.22	<0.01	<1	<0.01	<0.5	0.02	0.77	11	0.01
		Gold Creek	April	RG_GC_YP01M_20180425	80.16	5	<0.1	<0.05	0.1	<0.01	<1	<0.01	<0.5	0.02	0.93	14	<0.01
			April	RG_GC_YP02M_20180425	74.14	2	<0.1	<0.05	0.24	<0.01	<1	<0.01	<0.5	0.03	0.8	12	<0.01
			April	RG_GC_YP03M_20180425	65.82	<20	<1	<0.5	0.5	<0.1	<10	<0.1	<5	<0.1	0.7	20	<0.1
			April	RG_GC_YP04M_20180425	79.27	13	<0.1	<0.05	0.36	<0.01	<1	<0.01	<0.5	0.02	1.2	23	0.01
			April	RG_GC_YP05M_20180425	74.06	3	<0.1	<0.05	0.59	<0.01	<1	<0.01	<0.5	0.02	1	12	<0.01
			April	RG_GC_YP06M_20180425	77.86	4	<0.1	<0.05	0.3	<0.01	<1	<0.01	<0.5	0.02	0.86	13	<0.01
			April	RG_GC_YP07M_20180425	76.50	<5	<0.2	<0.1	0.2	<0.02	<2	<0.02	<1	<0.02	1.2	13	<0.02
			April	RG_GC_YP08M_20180425	74.92	<5	<0.2	<0.1	<0.1	<0.02	<2	<0.02	<1	<0.02	0.8	14	<0.02
			April	RG_GC_YP09M_20180425	79.18	5	<0.1	<0.05	0.2	<0.01	<1	<0.01	<0.5	0.02	0.93	14	0.01
Ovary	Northern Pikeminnow	Sand Creek	June	RG_SC_NSC01O_20180605	76.39	7	<0.1	0.12	0.18	<0.01	<1	0.01	<0.5	0.06	3.4	110	0.07
			June	RG_SC_NSC02O_20180605	74.75	2	<0.1	0.08	0.13	<0.01	<1	<0.01	<0.5	0.04	3.9	90	0.05
			June	RG_SC_NSC03O_20180605	75.02	5	<0.1	0.08	0.25	<0.01	<1	0.01	<0.5	0.05	4.2	120	0.02
			June	RG_SC_NSC04O_20180605	73.98	7	<0.1	0.17	0.14	<0.01	<1	<0.01	<0.5	0.04	2.9	100	0.03
			June	RG_SC_NSC05O_20180605	74.63	4	<0.1	0.18	0.41	<0.01	<1	0.01	<0.5	0.05	3.8	120	0.02
			June	RG_SC_NSC06O_20180610	77.89	3	<0.1	0.09	0.38	<0.01	<1	0.02	<0.5	0.06	3.5	190	0.14
			June	RG_SC_NSC07O_20180610	70.90	<2	<0.1	<0.05	0.14	<0.01	<1	<0.01	<0.5	0.03	2.5	68	0.02
		Elk River	June	RG_ER_NSC01O_20180606	73.74	2	<0.1	0.13	0.36	<0.01	<1	0.02	<0.5	0.04	2.7	140	0.19
			June	RG_ER_NSC02O_20180606	74.22	<5	<0.2	0.2	0.4	<0.02	<2	0.02	<1	0.02	4.2	130	0.11
			June	RG_ER_NSC03O_20180607	79.67	<20	<1	<0.5	1.8	<0.1	<10	<0.1	<5	<0.1	5.2	190	0.3
			June	RG_ER_NSC04O_20180607	67.68	<2	<0.1	0.12	0.11	<0.01	<1	<0.01	<0.5	0.04	2.8	67	0.01
			June	RG_ER_NSC05O_20180607	82.36	4	<0.1	0.06	1.4	<0.01	<1	0.02	<0.5	0.07	4.3	280	0.08
			June	RG_ER_NSC06O_20180607	71.15	<5	<0.2	0.2	9.3	<0.02	<2	<0.02	<1	0.03	3.4	84	0.04
		Gold Creek	June	RG_GC_NSC01O_20180607	75.18	<2	<0.1	0.1	0.87	<0.01	<1	<0.01	<0.5	0.05	3.1	130	0.04
			June	RG_GC_NSC02O_20180607	76.94	<5	<0.2	0.2	0.8	<0.02	<2	<0.02	<1	0.03	3.4	150	0.06
			June	RG_GC_NSC03O_20180607	63.78	<2	<0.1	0.07	0.25	<0.01	<1	<0.01	<0.5	0.03	2.8	31	0.01
	Peamouth Chub	Sand Creek	April	RG_SC_PCC01O_20180424	66.39	23	<0.1	0.15	1.7	<0.01	<1	0.01	<0.5	0.1	4.5	110	0.09
			April	RG_SC_PCC02O_20180424	67.38	24	<0.1	0.08	2.2	<0.01	<1	0.01	<0.5	0.06	3.4	69	0.05
			April	RG_SC_PCC03O_20180424	66.31	17	<0.1	0.22	1	<0.01	<1	0.02	<0.5	0.08	3.8	100	0.04
			April	RG_SC_PCC06O_20180424	68.68	10	<0.1	0.1	1.4	<0.01	<1	0.02	<0.5	0.07	4.7	65	0.04
			April	RG_SC_PCC07O_20180424	72.05	7	<0.1	0.23	1.4	<0.01	<1	0.01	<0.5	0.08	4.1	80	0.06
			April	RG_SC_PCC08O_20180424	67.82	4	<0.1	0.11	0.93	<0.01	<1	0.01	<0.5	0.07	2.1	76	0.05
			April	RG_SC_PCC10O_20180424	66.74	6	<0.1	0.39	2	<0.01	<1	0.02	<0.5	0.06	3.9	54	0.06
			April	RG_SC_PCC11O_20180424	65.36	5	<0.1	0.12	1.5	<0.01	<1	0.01	<0.5	0.08	3.9	56	0.03
			April	RG_SC_PCC13O_20180424	60.54	4	<0.1	0.36	0.95	<0.01	<1	<0.01	<0.5	0.04	3.4	43	0.02
			April	RG_SC_PCC14O_20180424	63.05	<2	<0.1	0.24	0.4	<0.01	<1	<0.01	<0.5	0.05	3.2	52	0.02
		Elk River	April	RG_ER_PCC01O_20180425	66.13	2	<0.1	0.13	0.91	<0.01	<1	0.04	<0.5	0.06	4.1	100	0.02

Table H.2: Metal Concentrations (µg/g Dry Weight) in Fish Tissue Collected in Koocanusa Reservoir, 2018

Tissue Type	Species	Area	Month	Sample ID	Moisture	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
					%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Muscle	Westslope Cutthroat Trout	Gold Creek	April	RG_GC_WCT04M_20180425	75.00	<10	<0.5	<10	<5	2	<1	<10	<5	<5	6	<0.5	<10	<50
			April	RG_GC_WCT05M_20180425	14.60	<10	<0.5	<10	<5	7.3	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_GC_WCT06M_20180425	21.13	<10	<0.5	<10	<5	6.3	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_GC_WCT07M_20180425	20.75	<10	<0.5	<10	<5	0.7	<1	<10	<5	<5	<5	<0.5	<10	<50
			April	RG_GC_WCT08M_20180425	12.92	<10	<0.5	<10	<5	2.9	<1	<10	<5	<5	5	<0.5	<10	<50
	Yellow Perch	Sand Creek	April	RG_SC_YP01M_20180427	79.90	1.2	0.82	<0.1	<0.05	1.8	<0.01	2.5	<0.05	<0.05	0.09	<0.005	<0.1	32
		Gold Creek	April	RG_GC_YP01M_20180425	80.16	0.8	0.54	<0.1	<0.05	3.1	<0.01	0.5	<0.05	<0.05	0.14	<0.005	<0.1	24
			April	RG_GC_YP02M_20180425	74.14	1.4	0.81	<0.1	<0.05	5.9	<0.01	1.1	<0.05	<0.05	0.14	<0.005	<0.1	24
			April	RG_GC_YP03M_20180425	65.82	2	1.2	<1	<0.5	4	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	41
			April	RG_GC_YP04M_20180425	79.27	1.2	0.54	<0.1	<0.05	2.7	<0.01	1.3	<0.05	<0.05	0.35	<0.005	<0.1	34
			April	RG_GC_YP05M_20180425	74.06	1.6	0.3	<0.1	<0.05	2.4	<0.01	4.1	<0.05	<0.05	0.1	<0.005	<0.1	40
			April	RG_GC_YP06M_20180425	77.86	0.9	0.49	<0.1	<0.05	2.7	<0.01	1.6	<0.05	<0.05	0.1	<0.005	<0.1	27
			April	RG_GC_YP07M_20180425	76.50	1	0.64	<0.2	<0.1	3.1	<0.02	1.1	<0.1	<0.1	0.1	<0.01	<0.2	34
			April	RG_GC_YP08M_20180425	74.92	0.6	0.31	<0.2	<0.1	2.7	<0.02	<0.2	<0.1	<0.1	0.1	<0.01	<0.2	21
			April	RG_GC_YP09M_20180425	79.18	1	0.62	<0.1	<0.05	2.9	<0.01	0.7	<0.05	<0.05	0.12	<0.005	<0.1	29
Ovary	Northern Pikeminnow	Sand Creek	June	RG_SC_NSC01O_20180605	76.39	1.7	0.11	0.1	<0.05	16	<0.01	0.2	<0.05	<0.05	0.2	<0.005	<0.1	330
			June	RG_SC_NSC02O_20180605	74.75	1.5	0.17	<0.1	<0.05	5.4	<0.01	0.3	<0.05	<0.05	0.06	<0.005	<0.1	130
			June	RG_SC_NSC03O_20180605	75.02	5.3	0.076	0.2	<0.05	9.2	<0.01	1.1	<0.05	<0.05	0.08	<0.005	<0.1	210
			June	RG_SC_NSC04O_20180605	73.98	6	0.053	0.1	<0.05	5.4	<0.01	0.3	<0.05	<0.05	0.16	<0.005	<0.1	190
			June	RG_SC_NSC05O_20180605	74.63	2.2	0.033	0.1	<0.05	13	<0.01	0.3	<0.05	<0.05	0.07	<0.005	<0.1	350
			June	RG_SC_NSC06O_20180610	77.89	1.4	0.12	0.1	<0.05	27	<0.01	0.6	<0.05	0.06	0.08	<0.005	<0.1	320
			June	RG_SC_NSC07O_20180610	70.90	1.1	0.12	<0.1	<0.05	5.8	<0.01	0.2	<0.05	<0.05	<0.05	<0.005	<0.1	130
		Elk River	June	RG_ER_NSC01O_20180606	73.74	1.7	0.065	<0.1	<0.05	16	<0.01	0.2	0.06	<0.05	0.06	<0.005	<0.1	310
			June	RG_ER_NSC02O_20180606	74.22	0.8	0.07	<0.2	<0.1	19	<0.02	<0.2	<0.1	<0.1	<0.1	<0.01	<0.2	520
			June	RG_ER_NSC03O_20180607	79.67	2	0.08	<1	<0.5	17	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	670
			June	RG_ER_NSC04O_20180607	67.68	1.3	0.11	<0.1	<0.05	24	<0.01	0.2	<0.05	<0.05	<0.05	<0.005	<0.1	130
			June	RG_ER_NSC05O_20180607	82.36	1.6	0.18	<0.1	0.05	26	<0.01	0.9	<0.05	<0.05	0.14	<0.005	<0.1	640
			June	RG_ER_NSC06O_20180607	71.15	1	0.04	<0.2	<0.1	26	<0.02	<0.2	<0.1	<0.1	<0.1	<0.01	<0.2	500
		Gold Creek	June	RG_GC_NSC01O_20180607	75.18	2	0.1	0.1	<0.05	13	<0.01	0.1	<0.05	<0.05	<0.05	<0.005	<0.1	230
			June	RG_GC_NSC02O_20180607	76.94	1.1	0.12	<0.2	<0.1	19	<0.02	<0.2	<0.1	<0.1	<0.1	<0.01	<0.2	470
			June	RG_GC_NSC03O_20180607	63.78	1.9	0.078	<0.1	<0.05	3.6	<0.01	0.2	<0.05	<0.05	<0.05	<0.005	<0.1	88
	Peamouth Chub	Sand Creek	April	RG_SC_PCC01O_20180424	66.39	6.7	0.032	0.1	0.07	11	0.01	0.6	<0.05	<0.05	0.45	0.007	<0.1	100
			April	RG_SC_PCC02O_20180424	67.38	11	0.041	0.2	<0.05	11	<0.01	0.6	<0.05	<0.05	0.47	<0.005	<0.1	120
			April	RG_SC_PCC03O_20180424	66.31	6.6	0.044	0.1	<0.05	9	0.02	0.5	<0.05	<0.05	0.26	<0.005	<0.1	110
			April	RG_SC_PCC06O_20180424	68.68	14	0.03	0.1	0.05	15	0.02	0.6	<0.05	<0.05	0.22	0.008	<0.1	130
			April	RG_SC_PCC07O_20180424	72.05	14	0.038	0.2	<0.05	12	0.02	0.5	<0.05	<0.05	0.12	<0.005	<0.1	150
			April	RG_SC_PCC08O_20180424	67.82	7.1	0.059	0.1	<0.05	23	<0.01	0.3	<0.05	<0.05	0.11	0.006	<0.1	130
			April	RG_SC_PCC10O_20180424	66.74	6.9	0.03	0.1	<0.05	8.4	0.02	0.3	<0.05	<0.05	0.12	<0.005	<0.1	160
			April	RG_SC_PCC11O_20180424	65.36	12	0.027	0.1	<0.05	9.9	0.02	0.4	<0.05	<0.05	0.07	0.005	<0.1	120
			April	RG_SC_PCC13O_20180424	60.54	4.9	0.022	<0.1	<0.05	5.9	0.02	0.2	<0.05	<0.05	0.07	<0.005	<0.1	100
			April	RG_SC_PCC14O_20180424	63.05	6.3	0.022	0.1	<0.05	6.9	0.01	0.3	<0.05	<0.05	0.06	<0.005	<0.1	100
		Elk River	April	RG_ER_PCC01O_20180425	66.13	8.3	0.041	0.1	<0.05	8.7	0.01	0.4	<0.05	<0.05	0.08	0.005	<0.1	110

Table H.2: **Metal Concentrations (µg/g Dry Weight) in Fish Tissue Collected in Koocanusa Reservoir, 2018**

Tissue Type	Species	Area	Month	Sample ID	Moisture	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead
					%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Ovary	Peamouth Chub	Elk River	April	RG_ER_PCC02O_20180425	72.36	5	<0.1	0.24	2.5	<0.01	<1	0.02	<0.5	0.07	4.6	110	0.01
			April	RG_ER_PCC03O_20180425	64.24	<2	<0.1	0.18	1.4	<0.01	<1	0.01	<0.5	0.06	3.8	54	0.03
			April	RG_ER_PCC06O_20180425	67.87	4	<0.1	0.37	0.57	<0.01	<1	<0.01	<0.5	0.05	4.3	63	<0.01
			April	RG_ER_PCC08O_20180426	76.89	8	<0.1	0.12	2.2	<0.01	<1	0.02	<0.5	0.05	2.8	110	0.04
			April	RG_ER_PCC09O_20180426	66.94	8	<0.1	0.08	0.75	<0.01	<1	0.02	<0.5	0.07	2.8	120	0.02
			April	RG_ER_PCC11O_20180426	66.57	3	<0.1	0.13	0.59	<0.01	<1	0.02	<0.5	0.06	4.2	73	0.01
			April	RG_ER_PCC12O_20180426	71.47	3	<0.1	0.08	0.54	<0.01	<1	0.03	<0.5	0.08	4.6	98	0.02
			April	RG_ER_PCC16O_20180426	67.79	6	<0.1	0.18	0.86	<0.01	<1	0.06	<0.5	0.06	4.5	94	0.01
			April	RG_ER_PCC17O_20180426	69.40	6	<0.1	0.42	1.7	<0.01	<1	0.02	<0.5	0.07	4.5	75	0.02
		Gold Creek	April	RG_GC_PCC01O_20180427	62.19	<20	<1	<0.5	1	<0.1	<10	<0.1	<5	<0.1	3.6	40	<0.1
			April	RG_GC_PCC02O_20180425	75.27	<20	<1	<0.5	3.3	<0.1	<10	<0.1	<5	<0.1	4.1	120	<0.1
			April	RG_GC_PCC04O_20180425	68.53	70	<1	<0.5	2.1	<0.1	<10	<0.1	<5	<0.1	2.5	120	<0.1
			April	RG_GC_PCC08O_20180425	62.66	<20	<1	<0.5	0.9	<0.1	<10	<0.1	<5	<0.1	2.6	40	<0.1
			April	RG_GC_PCC09O_20180426	68.00	<20	<1	<0.5	0.9	<0.1	<10	<0.1	<5	0.1	2.8	90	<0.1
			April	RG_GC_PCC11O_20180426	67.06	<20	<1	<0.5	1.2	<0.1	<10	<0.1	<5	<0.1	3.1	60	<0.1
			April	RG_GC_PCC14O_20180426	62.05	<20	<1	<0.5	0.9	<0.1	<10	<0.1	<5	<0.1	3.7	70	<0.1
			April	RG_GC_PCC15O_20180426	65.13	<20	<1	<0.5	1	<0.1	<10	<0.1	<5	<0.1	3	60	<0.1
			April	RG_GC_PCC17O_20180426	67.97	<20	<1	<0.5	1.5	<0.1	<10	<0.1	<5	<0.1	4	70	<0.1
			April	RG_GC_PCC18O_20180426	61.96	10	<0.1	0.34	0.53	<0.01	<1	<0.01	<0.5	0.04	3	59	0.02
	Redside Shiner	Sand Creek	April	RG_SC_RSC02O_20180424	73.09	<20	<1	<0.5	1.8	<0.1	<10	<0.1	<5	<0.1	6.4	120	<0.1
			April	RG_SC_RSC04O_20180424	73.65	<200	<10	<5	<5	<1	<100	<1	<50	<1	6	<200	<1
			April	RG_SC_RSC05O_20180424	73.55	20	<1	<0.5	1.9	<0.1	<10	<0.1	<5	<0.1	7.2	140	0.2
			April	RG_SC_RSC06O_20180424	77.13	<20	<1	<0.5	1.6	<0.1	<10	<0.1	<5	<0.1	3.9	120	<0.1
			April	RG_SC_RSC09O_20180424	75.48	<200	<10	<5	<5	<1	<100	<1	<50	<1	6	<200	<1
			April	RG_SC_RSC10O_20180424	75.73	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	5.8	140	<0.1
			April	RG_SC_RSC11O_20180426	73.54	30	<1	<0.5	1.3	<0.1	<10	<0.1	<5	<0.1	6.8	150	<0.1
			April	RG_SC_RSC13O_20180426	71.34	6	<0.2	0.5	1.2	<0.02	<2	0.38	<1	0.12	6.1	130	0.05
			April	RG_SC_RSC17O_20180427	75.65	<20	<1	<0.5	0.8	<0.1	<10	<0.1	<5	<0.1	6.2	130	<0.1
			April	RG_SC_RSC18O_20180427	74.62	<20	<1	<0.5	2.2	<0.1	<10	<0.1	<5	<0.1	5.1	190	<0.1
		Elk River	April	RG_ER_RSC01O_20180425	70.08	<5	<0.2	0.4	0.9	<0.02	<2	<0.02	<1	0.09	5.4	120	<0.02
			April	RG_ER_RSC07O_20180425	70.29	<20	<1	<0.5	0.8	<0.1	<10	<0.1	<5	<0.1	6.7	130	0.3
			April	RG_ER_RSC08O_20180425	71.43	<20	<1	<0.5	0.7	<0.1	<10	<0.1	<5	<0.1	8.1	140	<0.1
			April	RG_ER_RSC09O_20180425	73.49	<20	<1	<0.5	2.2	<0.1	<10	<0.1	<5	0.1	7.4	130	0.1
			April	RG_ER_RSC10O_20180425	54.60	<200	<10	<5	<5	<1	<100	<1	<50	<1	6	<200	<1
			April	RG_ER_RSC11O_20180425	73.96	<20	<1	<0.5	1.1	<0.1	<10	<0.1	<5	<0.1	6.3	110	<0.1
			April	RG_ER_RSC12O_20180425	72.33	<20	<1	<0.5	1.2	<0.1	<10	0.2	<5	<0.1	7.1	140	<0.1
			April	RG_ER_RSC14O_20180425	74.62	<20	<1	<0.5	1.2	<0.1	<10	<0.1	<5	<0.1	7.8	130	<0.1
			April	RG_ER_RSC15O_20180425	69.92	<20	<1	<0.5	1.3	<0.1	<10	<0.1	<5	<0.1	5.1	120	<0.1
			April	RG_ER_RSC16O_20180425	82.15	<200	<10	<5	<5	<1	<100	<1	<50	<1	<5	<200	<1
			April	RG_ER_RSC19O_20180425	75.19	<20	<1	<0.5	0.9	<0.1	<10	<0.1	<5	<0.1	7	150	<0.1
		Gold Creek	April	RG_GC_RSC02O_20180424	67.81	<20	<1	<0.5	1.1	<0.1	<10	<0.1	<5	<0.1	5.7	120	<0.1
			April	RG_GC_RSC04O_20180424	67.93	<200	<10	<5	<5	<1	<100	<1	<50	<1	6	<200	<1
			April	RG_GC_RSC09O_20180426	72.13	80	<1	<0.5	1.4	<0.1	<10	<0.1	<5	0.2	8.3	200	0.1
			April	RG_GC_RSC16O_20180426	68.19	20	<1	<0.5	1.3	<0.1	<10	<0.1	<5	<0.1	4.2	130	<0.1
			April	RG_GC_RSC17O_20180427	65.63	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	7.3	120	<0.1
			April	RG_GC_RSC18O_20180427	72.72	<20	<1	<0.5	1.1	<0.1	<10	<0.1	<5	<0.1	5.4	140	<0.1
			April	RG_GC_RSC19O_20180427	73.44	<20	<1	<0.5	1.2	<0.1	<10	0.2	<5	<0.1	6.6	180	<0.1
			April	RG_GC_RSC20O_20180427	69.32	<20	<1	<0.5	0.6	<0.1	<10	<0.1	<5	<0.1	6.4	150	<0.1
			April	RG_GC_RSC21O_20180427	72.45	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	0.1	5.9	130	<0.1
			April	RG_GC_RSC24O_20180427	72.78	<20	<1	<0.5	<0.5	<0.1	<10	<0.1	<5	<0.1	6.3	120	<0.1
	Yellow Perch	Sand Creek	April	RG_SC_YP01O_20180427	83.37	<2	<0.1	<0.05	0.14	<0.01	<1	<0.01	<0.5	0.04	2.1	29	<0.01
		Gold Creek	April	RG_GC_YP01O_20180425	81.39	3	<0.1	<0.05	0.26	<0.01	<1	<0.01	<0.5	0.04	2.1	34	<0.01
			April	RG_GC_YP02O_20180425	80.89	<2	<0.1	<0.05	0.28	<0.01	<1	<0.01	<0.5	0.1	2.2	37	<0.01
			April	RG_GC_YP03O_20180425	81.84	<2	<0.1	<0.05	0.34	<0.01	<1	<0.01	<0.5	0.08	2.3	38	<0.01
			April	RG_GC_YP04O_20180425	82.50	<2	<0.1	0.06	0.3	<0.01	<1	<0.01	<0.5	0.05	2.5	33	<0.01
			April	RG_GC_YP05O_20180425	83.75	<2	<0.1	<0.05	0.33	<0.01	<1	<0.01	<0.5	0.06	2.2	33	<0.01

Table H.2: **Metal Concentrations (µg/g Dry Weight) in Fish Tissue Collected in Koocanusa Reservoir, 2018**

Tissue Type	Species	Area	Month	Sample ID	Moisture	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
					%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Ovary	Peamouth Chub	Elk River	April	RG_ER_PCC02O_20180425	72.36	16	0.034	0.2	<0.05	16	0.02	0.7	<0.05	<0.05	0.09	<0.005	<0.1	160
			April	RG_ER_PCC03O_20180425	64.24	4.4	0.024	<0.1	<0.05	18	0.01	0.3	<0.05	<0.05	0.06	<0.005	<0.1	120
			April	RG_ER_PCC06O_20180425	67.87	11	0.035	0.2	<0.05	10	0.02	0.3	<0.05	<0.05	0.1	<0.005	<0.1	140
			April	RG_ER_PCC08O_20180426	76.89	14	0.06	0.2	<0.05	20	0.01	0.5	<0.05	<0.05	0.25	<0.005	<0.1	160
			April	RG_ER_PCC09O_20180426	66.94	6.5	0.035	0.1	<0.05	12	<0.01	0.3	<0.05	<0.05	0.2	<0.005	<0.1	110
			April	RG_ER_PCC11O_20180426	66.57	10	0.036	0.1	<0.05	9.5	0.02	0.3	<0.05	<0.05	0.08	<0.005	<0.1	120
			April	RG_ER_PCC12O_20180426	71.47	13	0.077	0.2	<0.05	10	0.01	0.7	<0.05	<0.05	0.1	<0.005	<0.1	150
			April	RG_ER_PCC16O_20180426	67.79	9.7	0.1	0.2	<0.05	21	0.02	0.4	<0.05	<0.05	0.1	<0.005	<0.1	120
			April	RG_ER_PCC17O_20180426	69.40	12	0.043	0.2	<0.05	13	0.02	0.4	<0.05	<0.05	0.15	<0.005	<0.1	160
		Gold Creek	April	RG_GC_PCC01O_20180427	62.19	5	<0.05	<1	<0.5	4.5	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	90
			April	RG_GC_PCC02O_20180425	75.27	19	0.05	<1	1.5	21	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	200
			April	RG_GC_PCC04O_20180425	68.53	10	0.05	<1	<0.5	16	<0.1	<1	<0.5	<0.5	1.5	<0.05	<1	120
			April	RG_GC_PCC08O_20180425	62.66	5	<0.05	<1	<0.5	4.7	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	80
			April	RG_GC_PCC09O_20180426	68.00	10	<0.05	<1	<0.5	22	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	120
			April	RG_GC_PCC11O_20180426	67.06	6	<0.05	<1	<0.5	9.9	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	110
			April	RG_GC_PCC14O_20180426	62.05	8	<0.05	<1	<0.5	12	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	100
			April	RG_GC_PCC15O_20180426	65.13	5	<0.05	<1	<0.5	6.6	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	100
			April	RG_GC_PCC17O_20180426	67.97	15	<0.05	<1	<0.5	16	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	140
			April	RG_GC_PCC18O_20180426	61.96	4.7	0.025	<0.1	<0.05	6.5	0.01	0.3	<0.05	<0.05	0.31	<0.005	<0.1	99
	Redside Shiner	Sand Creek	April	RG_SC_RSC02O_20180424	73.09	7	<0.05	<1	<0.5	11	<0.1	<1	<0.5	<0.5	1.2	<0.05	<1	280
			April	RG_SC_RSC04O_20180424	73.65	<10	<0.5	<10	<5	21	<1	<10	<5	<5	<5	<0.5	<10	360
			April	RG_SC_RSC05O_20180424	73.55	9	<0.05	<1	<0.5	16	<0.1	2	<0.5	<0.5	<0.5	<0.05	<1	270
			April	RG_SC_RSC06O_20180424	77.13	12	<0.05	<1	<0.5	8.2	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	300
			April	RG_SC_RSC09O_20180424	75.48	<10	<0.5	<10	<5	14	<1	<10	<5	<5	<5	<0.5	<10	250
			April	RG_SC_RSC10O_20180424	75.73	7	<0.05	<1	<0.5	12	<0.1	<1	<0.5	<0.5	3.2	<0.05	<1	240
			April	RG_SC_RSC11O_20180426	73.54	9	<0.05	<1	<0.5	27	<0.1	1	<0.5	<0.5	1	<0.05	<1	250
			April	RG_SC_RSC13O_20180426	71.34	8.3	0.04	<0.2	<0.1	22	<0.02	0.6	<0.1	<0.1	<0.1	<0.01	<0.2	240
			April	RG_SC_RSC17O_20180427	75.65	14	0.05	<1	<0.5	13	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	240
			April	RG_SC_RSC18O_20180427	74.62	6	<0.05	<1	<0.5	20	<0.1	<1	<0.5	<0.5	1.2	<0.05	<1	280
		Elk River	April	RG_ER_RSC01O_20180425	70.08	7.4	0.04	<0.2	<0.1	22	<0.02	0.6	<0.1	<0.1	<0.1	<0.01	<0.2	220
			April	RG_ER_RSC07O_20180425	70.29	6	<0.05	<1	<0.5	35	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	240
			April	RG_ER_RSC08O_20180425	71.43	6	0.08	<1	<0.5	29	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	240
			April	RG_ER_RSC09O_20180425	73.49	6	<0.05	<1	<0.5	25	<0.1	<1	<0.5	<0.5	1.5	<0.05	<1	270
			April	RG_ER_RSC10O_20180425	54.60	<10	<0.5	<10	<5	15	<1	<10	<5	<5	<5	<0.5	<10	290
			April	RG_ER_RSC11O_20180425	73.96	7	<0.05	<1	<0.5	14	<0.1	1	<0.5	<0.5	<0.5	<0.05	<1	220
			April	RG_ER_RSC12O_20180425	72.33	6	0.05	<1	<0.5	26	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	240
			April	RG_ER_RSC14O_20180425	74.62	7	<0.05	<1	<0.5	12	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	230
			April	RG_ER_RSC15O_20180425	69.92	10	<0.05	<1	<0.5	22	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	210
			April	RG_ER_RSC16O_20180425	82.15	<10	<0.5	<10	<5	16	<1	<10	<5	<5	<5	<0.5	<10	350
			April	RG_ER_RSC19O_20180425	75.19	10	<0.05	<1	<0.5	9.6	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	210
		Gold Creek	April	RG_GC_RSC02O_20180424	67.81	9	<0.05	<1	<0.5	5.9	<0.1	1	<0.5	<0.5	<0.5	<0.05	<1	220
			April	RG_GC_RSC04O_20180424	67.93	<10	<0.5	<10	<5	9.2	<1	<10	<5	<5	<5	<0.5	<10	270
			April	RG_GC_RSC09O_20180426	72.13	11	0.05	<1	<0.5	7.6	<0.1	2	<0.5	<0.5	1.6	<0.05	<1	240
			April	RG_GC_RSC16O_20180426	68.19	9	<0.05	<1	<0.5	8.6	<0.1	<1	<0.5	<0.5	0.5	<0.05	<1	220
			April	RG_GC_RSC17O_20180427	65.63	8	<0.05	<1	<0.5	12	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	210
			April	RG_GC_RSC18O_20180427	72.72	11	<0.05	<1	<0.5	13	<0.1	1	<0.5	<0.5	<0.5	<0.05	<1	200
			April	RG_GC_RSC19O_20180427	73.44	11	<0.05	<1	<0.5	7.8	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	190
			April	RG_GC_RSC20O_20180427	69.32	8	<0.05	<1	<0.5	8.2	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	170
			April	RG_GC_RSC21O_20180427	72.45	12	<0.05	<1	<0.5	20	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	200
			April	RG_GC_RSC24O_20180427	72.78	13	<0.05	<1	<0.5	17	<0.1	<1	<0.5	<0.5	<0.5	<0.05	<1	180
	Yellow Perch	Sand Creek	April	RG_SC_YP01O_20180427	83.37	2.8	0.042	<0.1	<0.05	2.4	<0.01	1.8	<0.05	<0.05	0.06	<0.005	<0.1	79
		Gold Creek	April	RG_GC_YP01O_20180425	81.39	2.1	0.018	<0.1	<0.05	3.6	<0.01	1.4	<0.05	<0.05	0.07	<0.005	<0.1	74
			April	RG_GC_YP02O_20180425	80.89	2.7	0.038	<0.1	<0.05	5.7	<0.01	1.4	<0.05	<0.05	0.06	<0.005	<0.1	76
			April	RG_GC_YP03O_20180425	81.84	4.4	0.061	<0.1	<0.05	3.9	<0.01	1.5	<0.05	<0.05	<0.05	<0.005	<0.1	85
			April	RG_GC_YP04O_20180425	82.50	2.3	0.025	<0.1	<0.05	3.2	<0.01	1.4	<0.05	<0.05	<0.05	<0.005	<0.1	85
			April	RG_GC_YP05O_20180425	83.75	4.1	0.011	<0.1	<0.05	2.9	<0.01	1.5	<0.05	<0.05	<0.05	<0.005	<0.1	81

Table H.3: Selenium Concentration (mg/kg) in Fish Muscle, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Bull Trout	Tobacco River	2008-05-14	Muscle	1.9
		2008-05-14	Muscle	1.8
		2008-05-14	Muscle	1.4
		2008-05-14	Muscle	1.5
		2008-05-14	Muscle	1.7
		2008-05-14	Muscle	1.8
		2008-05-14	Muscle	1.7
		2008-05-14	Muscle	1.7
		2008-05-14	Muscle	<0.1
		2008-05-14	Muscle	2.0
		2008-05-14	Muscle	1.8
		2008-05-14	Muscle	2.0
		2008-05-14	Muscle	1.1
		2008-05-14	Muscle	1.8
		2008-05-14	Muscle	1.7
		2008-05-14	Muscle	1.6
		2008-05-14	Muscle	1.4
		2008-05-14	Muscle	2.0
		2008-05-14	Muscle	1.6
		2008-05-14	Muscle	2.0
	Rexford	2018-05-08	Filet	2.3
		2018-05-08	Filet	2.4
		2018-05-08	Filet	2.2
		2018-05-08	Filet	2.1
		2018-05-08	Filet	3.2
		2013-05-14	Muscle	2.9
		2013-05-14	Muscle	2.0
		2013-05-14	Muscle	2.9
		2013-05-14	Muscle	2.2
		2013-05-14	Muscle	3.8
		2013-09-25	Muscle	2.1
		2013-05-14	Muscle	3.5
		2013-05-14	Muscle	2.4
		2013-05-14	Muscle	2.5
		2013-05-14	Muscle	4.0
		2013-05-14	Muscle	3.8
		2013-05-14	Muscle	2.4
		2013-05-14	Muscle	2.9
		2013-05-14	Muscle	2.5
		2013-05-14	Muscle	2.7
		2013-05-14	Muscle	3.0
		2013-05-14	Muscle	3.7
		2013-05-14	Muscle	3.2
		2013-05-14	Muscle	2.5
		2013-05-14	Muscle	3.2
		2013-05-14	Muscle	2.5
		2013-05-14	Muscle	3.4
		2013-05-14	Muscle	2.4
		2013-05-14	Muscle	2.4
		2013-09-25	Muscle	2.3
		2013-05-14	Muscle	2.6
		2013-05-14	Muscle	3.1
	Tenmile Creek	2018-05-09	Filet	1.8
	McGillivray	2013-05-15	Muscle	2.8
		2013-05-15	Muscle	2.2
		2013-05-15	Muscle	2.2
		2013-05-15	Muscle	2.3
		2013-05-15	Muscle	2.5
		2013-05-15	Muscle	2.4
Burbot	Sophie Creek	2017-05-17	Filet	5.0
	Young Creek	2016-03-23	Muscle	4.2
	Dodge Creek	2016-04-06	Muscle	2.7
	Tobacco River	2017-05-17	Filet	3.4
	Rexford	2013-05-14	Muscle	5.0
	Pinkham Creek	2016-12-02	Filet	1.9
	Sutton Creek	2016-03-09	Muscle	3.7
	Big Creek	2016-12-02	Filet	5.4
		2016-04-01	Muscle	2.6
	McGuire Creek	2016-03-25	Muscle	4.1

Table H.3: Selenium Concentration (mg/kg) in Fish Muscle, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Burbot	Parsnip Creek	2015-12-23	Muscle	4.1
		2015-12-23	Muscle	4.5
	Tenmile Creek	2016-01-27	Muscle	4.2
	Bristow Creek	2015-12-04	Muscle	5.4
		2016-04-11	Muscle	3.8
	Fivemile Creek	2017-02-08	Filet	5.9
		2017-02-08	Filet	3.8
		2017-02-08	Filet	4.4
	Warland Creek	2016-12-07	Filet	3.7
		2015-12-18	Muscle	3.6
	Cripplehorse Creek	2016-12-29	Filet	3.5
	Canyon Creek	2016-12-29	Filet	3.9
Kokanee	Young Creek	2018-09-20	Filet	1.4
	Murray Creek	2018-09-20	Filet	1.5
	Tobacco River	2018-09-20	Filet	1.4
		2018-09-20	Filet	1.6
		2018-09-20	Filet	1.7
		2008-09-17	Muscle	2.1
		2008-09-17	Muscle	1.3
		2008-09-17	Muscle	1.6
		2008-09-17	Muscle	1.5
		2008-09-17	Muscle	1.5
		2008-09-17	Muscle	1.5
		2008-09-17	Muscle	2.1
		2008-09-17	Muscle	2.0
		2008-09-17	Muscle	1.9
		2008-09-17	Muscle	2.0
		2008-09-17	Muscle	1.7
		2008-09-17	Muscle	1.8
		2008-09-17	Muscle	2.0
		2008-09-17	Muscle	1.6
		2008-09-17	Muscle	1.9
		2008-09-17	Muscle	1.7
		2008-09-17	Muscle	1.5
		2008-09-17	Muscle	1.5
		2008-09-17	Muscle	1.7
		2008-09-17	Muscle	1.8
		2008-09-17	Muscle	1.5
	Rexford	2018-05-08	Filet	2.0
		2018-05-08	Filet	1.8
		2018-05-08	Filet	2.4
		2018-05-08	Filet	2.0
		2018-05-08	Filet	2.0
		2013-09-25	Muscle	2.0
		2013-09-25	Muscle	2.4
		2013-09-25	Muscle	2.1
		2013-09-25	Muscle	1.9
		2013-09-25	Muscle	2.0
		2013-09-25	Muscle	2.4
		2013-09-25	Muscle	2.0
		2013-09-25	Muscle	1.6
		2013-09-25	Muscle	2.0
		2013-09-25	Muscle	2.1
		2013-09-25	Muscle	2.0
		2013-09-25	Muscle	2.1
		2013-09-25	Muscle	2.4
		2013-09-25	Muscle	1.9
		2013-09-25	Muscle	2.2
		2013-09-25	Muscle	2.2
	Tenmile Creek	2018-05-09	Filet	2.6
	Barron Creek	2018-09-21	Filet	1.6
		2018-09-21	Filet	1.2
	Warland Creek	2018-09-21	Filet	1.3
		2018-09-21	Filet	1.3
		2018-09-21	Filet	1.4
		2018-09-21	Filet	1.3
	McGillivray	2013-05-15	Muscle	2.2
		2013-05-15	Muscle	2.3
		2013-05-15	Muscle	2.4
Largescale Sucker	Sophie Creek	2018-09-20	Filet	3.4
		2018-09-20	Filet	4.1
	Young Creek	2018-09-20	Filet	2.8

Table H.3: Selenium Concentration (mg/kg) in Fish Muscle, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Largescale Sucker	Murray Creek	2018-09-20	Filet	3.8
	Tobacco River	2018-09-20	Filet	3.6
		2018-09-20	Filet	2.7
	Rexford	2018-05-08	Filet	4.4
		2018-05-08	Filet	5.3
		2018-05-08	Filet	4.7
		2018-05-08	Filet	1.4
		2018-05-08	Filet	3.9
		2018-05-08	Filet	5.1
		2018-05-08	Filet	4.9
		2018-05-08	Filet	4.5
		2018-05-08	Filet	4.2
		2018-05-08	Filet	5.3
	Tenmile Creek	2018-05-09	Filet	6.2
		2018-05-09	Filet	5.1
		2018-05-09	Filet	5.3
		2018-05-09	Filet	3.1
		2018-05-09	Filet	5.9
		2018-05-09	Filet	4.6
		2018-05-09	Filet	4.5
		2018-05-09	Filet	3.7
		2018-05-09	Filet	5.3
		2018-05-09	Filet	4.7
	Barron Creek	2018-09-21	Filet	3.4
		2018-09-21	Filet	5.4
	Warland Creek	2018-09-21	Filet	3.3
		2018-09-21	Filet	3.9
		2018-09-21	Filet	4.8
	Jackson Creek	2018-09-21	Filet	3.8
		2018-09-21	Filet	5.1
	Canyon Creek	2018-09-21	Filet	2.9
		2018-09-21	Filet	3.8
		2018-09-21	Filet	3.5
Longnose Sucker	Sophie Creek	2017-05-17	Filet	9.9
		2017-05-17	Filet	4.3
		2017-05-17	Filet	6.4
		2017-05-17	Filet	7.8
		2017-05-17	Filet	5.4
	Sandhill	2017-05-17	Filet	10
	Tobacco River	2008-05-14	Muscle	3.1
		2008-05-14	Muscle	3.2
		2008-05-14	Muscle	4.2
		2008-05-14	Muscle	2.8
		2008-05-14	Muscle	3.6
		2008-05-14	Muscle	4.3
		2008-05-14	Muscle	3.2
		2008-05-14	Muscle	5.1
		2008-05-14	Muscle	2.5
		2008-05-14	Muscle	2.5
		2008-05-14	Muscle	3.2
		2008-05-14	Muscle	3.5
		2008-05-14	Muscle	3.0
		2008-05-14	Muscle	4.4
		2017-05-17	Filet	7.9
		2017-05-17	Filet	6.8
	Rexford	2013-05-14	Muscle	5.9
		2013-05-14	Muscle	5.7
		2013-05-14	Muscle	6.0
		2013-05-14	Muscle	6.7
		2013-05-14	Muscle	3.6
		2013-05-14	Muscle	6.6
		2013-05-14	Muscle	5.3
		2013-05-14	Muscle	5.9
		2013-05-14	Muscle	5.5
		2013-05-14	Muscle	5.3
		2013-05-14	Muscle	6.0
		2013-05-14	Muscle	6.4
		2013-05-14	Muscle	5.8
		2013-05-14	Muscle	1.5
		2013-05-14	Muscle	4.9
		2018-05-08	Filet	4.8

Table H.3: Selenium Concentration (mg/kg) in Fish Muscle, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Longnose Sucker	Rexford	2018-05-08	Filet	4.5
		2018-05-08	Filet	4.2
		2018-05-08	Filet	4.7
		2018-05-08	Filet	5.0
		2018-05-08	Filet	4.1
		2018-05-08	Filet	5.3
		2018-05-08	Filet	4.6
		2018-05-08	Filet	5.4
		2018-05-08	Filet	5.0
	Tenmile Creek	2018-05-09	Filet	4.5
		2018-05-09	Filet	5.9
		2018-05-09	Filet	3.2
		2018-05-09	Filet	5.3
	McGillivray	2013-05-15	Muscle	5.6
		2013-05-15	Muscle	4.4
		2013-05-15	Muscle	6.3
		2013-05-15	Muscle	5.0
		2013-05-15	Muscle	4.6
		2013-05-15	Muscle	6.4
		2013-05-15	Muscle	6.2
		2013-05-15	Muscle	6.0
		2013-05-15	Muscle	5.1
		2013-05-15	Muscle	5.1
		2013-05-15	Muscle	6.8
		2013-05-15	Muscle	6.0
		2013-05-15	Muscle	4.8
		2013-05-15	Muscle	6.5
		2013-05-15	Muscle	5.8
	Canyon Creek	2018-09-21	Filet	3.9
Mountain Whitefish	Tobacco River	2008-05-14	Muscle	2.0
		2008-05-14	Muscle	2.9
	Warland Creek	2018-09-21	Filet	2.3
		2018-09-21	Filet	1.8
		2018-09-21	Filet	2.3
	Jackson Creek	2018-09-21	Filet	4.7
		2018-09-21	Filet	1.4
		2018-09-21	Filet	3.2
	Canyon Creek	2018-09-21	Filet	2.7
		2018-09-21	Filet	3.2
		2018-09-21	Filet	2.4
		2018-09-21	Filet	1.7
Northern Pikeminnow	Young Creek	2018-09-20	Filet	1.7
		2018-09-20	Filet	2.0
	Sandhill	2018-09-20	Filet	2.5
		2018-09-20	Filet	1.1
	Murray Creek	2018-09-20	Filet	1.8
	Tobacco River	2018-09-20	Filet	1.7
		2018-09-20	Filet	1.3
		2018-09-20	Filet	1.9
		2018-09-20	Filet	2.0
		2018-09-20	Filet	2.0
		2018-09-20	Filet	0.90
		2008-05-14	Muscle	1.3
		2008-05-14	Muscle	1.0
		2008-05-14	Muscle	1.4
		2008-05-14	Muscle	1.0
		2008-05-14	Muscle	1.2
		2008-05-14	Muscle	1.1
		2008-05-14	Muscle	1.2
		2008-05-14	Muscle	1.2
		2008-05-14	Muscle	1.9
		2008-05-14	Muscle	1.9
		2008-05-14	Muscle	1.7
		2008-05-14	Muscle	1.2
		2008-05-14	Muscle	1.3
		2008-05-14	Muscle	1.3
		2008-05-14	Muscle	1.5
		2008-05-14	Muscle	1.2
		2008-05-14	Muscle	1.3
		2008-05-14	Muscle	1.0
		2008-05-14	Muscle	1.1
		2008-05-14	Muscle	1.6

Table H.3: Selenium Concentration (mg/kg) in Fish Muscle, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Northern Pikeminnow	Rexford	2018-05-08	Filet	1.4
		2018-05-08	Filet	1.3
		2018-05-08	Filet	1.1
		2018-05-08	Filet	1.9
		2018-05-08	Filet	1.6
		2018-05-08	Filet	1.6
		2018-05-08	Filet	1.4
		2018-05-08	Filet	1.1
		2018-05-08	Filet	1.4
		2018-05-08	Filet	1.4
		2013-05-14	Muscle	1.8
		2013-05-14	Muscle	1.8
		2013-05-14	Muscle	1.3
		2013-05-14	Muscle	1.5
		2013-05-14	Muscle	1.5
		2013-05-14	Muscle	2.3
		2013-05-14	Muscle	2.3
		2013-05-14	Muscle	2.3
		2013-05-14	Muscle	1.9
		2013-05-14	Muscle	2.4
		2013-05-14	Muscle	1.7
		2013-05-14	Muscle	1.5
		2013-05-14	Muscle	1.7
		2013-05-14	Muscle	1.8
		2013-05-14	Muscle	2.0
	Tenmile Creek	2018-05-09	Filet	1.3
		2018-05-09	Filet	1.6
		2018-05-09	Filet	1.3
		2018-05-09	Filet	1.2
		2018-05-09	Filet	1.6
		2018-05-09	Filet	1.7
		2018-05-09	Filet	1.2
		2018-05-09	Filet	1.1
		2018-05-09	Filet	1.1
		2018-05-09	Filet	1.1
	Barron Creek	2018-09-21	Filet	2.2
		2018-09-21	Filet	3.0
		2018-09-21	Filet	2.0
	Warland Creek	2018-09-21	Filet	1.7
		2018-09-21	Filet	1.1
		2018-09-21	Filet	1.7
	McGillivray	2013-05-15	Muscle	1.6
		2013-05-15	Muscle	1.9
		2013-05-15	Muscle	1.5
		2013-05-15	Muscle	1.9
		2013-05-15	Muscle	2.3
		2013-05-15	Muscle	1.5
		2013-05-15	Muscle	1.7
		2013-05-15	Muscle	1.9
		2013-05-15	Muscle	1.7
		2013-05-15	Muscle	1.7
	Jackson Creek	2018-09-21	Filet	2.1
	Canyon Creek	2018-09-21	Filet	2.5
		2018-09-21	Filet	1.1
		2018-09-21	Filet	2.9
Peamouth Chub	Young Creek	2018-09-20	Filet	2.8
		2018-09-20	Filet	1.7
	Sandhill	2018-09-20	Filet	1.5
		2018-09-20	Filet	1.6
	Murray Creek	2018-09-20	Filet	2.0
	Tobacco River	2008-05-14	Muscle	2.3
		2008-05-14	Muscle	1.8
		2008-05-14	Muscle	2.6
		2008-05-14	Muscle	3.5
		2008-05-14	Muscle	2.7
		2008-05-14	Muscle	3.1
		2008-05-14	Muscle	2.7
		2008-05-14	Muscle	1.9
		2008-05-14	Muscle	2.8
		2008-05-14	Muscle	1.9

Table H.3: Selenium Concentration (mg/kg) in Fish Muscle, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Peamouth Chub	Tobacco River	2008-05-14	Muscle	2.9
		2008-05-14	Muscle	4.2
		2008-05-14	Muscle	2.9
		2008-05-14	Muscle	3.2
		2008-05-14	Muscle	4.2
		2008-05-14	Muscle	2.9
		2008-05-14	Muscle	1.7
		2008-05-14	Muscle	3.7
		2008-05-14	Muscle	3.3
		2008-05-14	Muscle	4.6
		2018-09-20	Filet	1.5
		2018-09-20	Filet	1.8
		2018-09-20	Filet	1.5
		2018-09-20	Filet	1.8
		2018-09-20	Filet	1.7
	Rexford	2013-05-14	Muscle	6.7
		2013-05-14	Muscle	3.3
		2013-05-14	Muscle	5.0
		2013-05-14	Muscle	2.8
		2013-05-14	Muscle	6.8
		2013-05-14	Muscle	8.4
		2013-05-14	Muscle	8.4
		2013-05-14	Muscle	5.4
		2013-05-14	Muscle	3.3
		2013-05-14	Muscle	2.7
		2013-05-14	Muscle	8.0
		2013-05-14	Muscle	4.7
		2013-05-14	Muscle	4.7
		2013-05-14	Muscle	3.0
		2013-05-14	Muscle	4.1
		2013-05-14	Muscle	4.8
		2018-05-08	Filet	2.4
		2018-05-08	Filet	1.9
		2018-05-08	Filet	2.3
		2018-05-08	Filet	2.7
		2018-05-08	Filet	2.2
		2018-05-08	Filet	2.0
		2018-05-08	Filet	2.6
		2018-05-08	Filet	3.5
		2018-05-08	Filet	2.5
		2018-05-08	Filet	3.2
	Tenmile Creek	2018-05-09	Filet	2.0
		2018-05-09	Filet	2.3
		2018-05-09	Filet	2.7
		2018-05-09	Filet	2.8
		2018-05-09	Filet	2.5
		2018-05-09	Filet	2.3
		2018-05-09	Filet	1.9
		2018-05-09	Filet	2.0
		2018-05-09	Filet	2.2
		2018-05-09	Filet	2.2
	Barron Creek	2018-09-21	Filet	1.8
		2018-09-21	Filet	1.9
		2018-09-21	Filet	2.7
	Warland Creek	2018-09-21	Filet	1.8
		2018-09-21	Filet	1.5
		2018-09-21	Filet	1.7
	McGillivray	2013-05-15	Muscle	2.6
		2013-05-15	Muscle	3.3
		2013-05-15	Muscle	3.0
		2013-05-15	Muscle	2.7
		2013-05-15	Muscle	2.7
		2013-05-15	Muscle	3.4
		2013-05-15	Muscle	2.5
		2013-05-15	Muscle	3.3
		2013-05-15	Muscle	2.7
		2013-05-15	Muscle	3.2
		2013-05-15	Muscle	2.1
		2013-05-15	Muscle	3.0
		2013-05-15	Muscle	4.8
		2013-05-15	Muscle	4.3

Table H.3: Selenium Concentration (mg/kg) in Fish Muscle, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Peamouth Chub	McGillivray	2013-05-15	Muscle	3.0
	Jackson Creek	2018-09-21	Filet	1.3
	Canyon Creek	2018-09-21	Filet	1.9
		2018-09-21	Filet	1.7
		2018-09-21	Filet	1.8
Rainbow Trout	Sophie Creek	2016-05-17	Muscle	4.1
		2016-05-17	Muscle	2.9
		2016-05-17	Muscle	4.7
		2016-05-17	Muscle	1.9
		2016-05-17	Muscle	2.2
		2016-05-17	Muscle	2.8
	Young Creek	2017-09-22	Muscle	1.5
		2017-09-22	Muscle	1.9
		2016-05-16	Muscle	2.6
		2016-05-17	Muscle	3.5
		2016-05-17	Muscle	3.4
		2017-05-17	Filet	1.9
	Sandhill	2017-09-22	Filet	2.0
		2018-09-20	Filet	1.6
	Dodge Creek	2016-05-17	Muscle	2.1
		2017-05-17	Filet	2.8
	Tobacco River	2017-09-22	Muscle	3.2
		2017-09-22	Muscle	3.5
		2016-05-16	Muscle	2.9
		2016-05-17	Muscle	2.1
		2016-05-16	Muscle	2.2
		2016-05-17	Muscle	2.2
		2008-05-14	Muscle	1.5
		2008-05-14	Muscle	1.6
		2017-05-17	Filet	1.7
		2017-09-22	Filet	3.8
	Rexford	2013-05-14	Muscle	3.1
		2013-09-25	Muscle	2.9
		2016-05-16	Muscle	2.9
		2016-05-16	Muscle	3.6
		2013-05-14	Muscle	2.7
		2013-05-14	Muscle	1.9
		2013-05-14	Muscle	2.8
		2013-05-14	Muscle	2.4
		2013-09-25	Muscle	2.5
		2013-05-14	Muscle	4.1
		2013-09-25	Muscle	1.9
		2013-09-25	Muscle	2.2
		2013-05-14	Muscle	3.2
		2013-09-25	Muscle	2.5
		2017-09-22	Filet	6.3
		2018-05-08	Filet	2.0
		2018-05-08	Filet	1.7
		2018-05-08	Filet	2.2
	Black Lake	2016-05-17	Muscle	3.3
		2016-05-16	Muscle	4.0
		2016-05-16	Filet	2.9
		2016-05-16	Filet	3.6
		2017-05-17	Filet	3.0
	Jackson Creek	2018-09-21	Filet	1.4
		2018-09-21	Filet	1.4
		2018-09-21	Filet	2.0
Redside Shiner	Rexford	2018-05-08	Filet	2.4
	Tenmile Creek	2018-05-09	Filet	5.0
		2018-05-09	Filet	3.4
		2018-05-09	Filet	4.1
		2018-05-09	Filet	5.9
		2018-05-09	Filet	2.9
		2018-05-09	Filet	4.7
		2018-05-09	Filet	4.0
		2018-05-09	Filet	2.6
		2018-05-09	Filet	7.0
		2018-05-09	Filet	5.9
Westslope Cutthroat Trout	Sophie Creek	2017-09-21	Muscle	4.7
		2016-05-17	Muscle	7.6
		2016-05-17	Muscle	2.4

Table H.3: Selenium Concentration (mg/kg) in Fish Muscle, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Westslope Cutthroat Trout	Sophie Creek	2016-05-17	Muscle	7.0
		2017-09-21	Filet	1.4
	Dodge Creek	2017-05-17	Filet	4.5
	Rexford	2013-09-25	Muscle	1.4
		2013-05-14	Muscle	6.1
		2018-05-08	Filet	6.3
	Tenmile Creek	2018-05-09	Filet	1.7
		2018-05-09	Filet	3.3
Yellow Perch	Sandhill	2017-05-17	Filet	4.4
	Tobacco River	2016-09-15	Filet	2.7
		2017-05-17	Filet	6.3
		2017-05-17	Filet	5.7
		2017-05-17	Filet	5.9
		2017-05-17	Filet	4.6
		2017-05-17	Filet	5.7
	Black Lake	2017-05-17	Filet	5.4

Table H.4: Selenium Concentration (mg/kg) in Fish Gonad, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Burbot	Pinkham Creek	12-2-16	Gonads	5.2
	Fivemile Creek	2-8-17	Gonads	3.8
	Cripplehorse Creek	12-29-16	Gonads	6.3
Kokanee	Young Creek	9-20-18	Gonads	5.6
	Murray Creek	9-20-18	Gonads	3.9
	Tobacco River	9-17-08	Gonads or Ovary	2.9
		9-17-08	Gonads or Ovary	4.9
		9-17-08	Gonads or Ovary	3.0
		9-17-08	Gonads or Ovary	4.3
		9-17-08	Gonads or Ovary	3.4
		9-17-08	Gonads or Ovary	3.1
		9-17-08	Gonads or Ovary	3.5
		9-17-08	Gonads or Ovary	3.6
		9-17-08	Gonads or Ovary	3.5
		9-17-08	Gonads or Ovary	4.3
		9-17-08	Gonads or Ovary	4.4
		9-17-08	Gonads or Ovary	3.3
		9-17-08	Gonads or Ovary	4.0
		9-17-08	Gonads or Ovary	3.6
		9-17-08	Gonads or Ovary	3.4
		9-17-08	Gonads or Ovary	3.6
		9-17-08	Gonads or Ovary	3.4
		9-17-08	Gonads or Ovary	3.8
		9-17-08	Gonads or Ovary	3.1
		9-17-08	Gonads or Ovary	4.7
		9-17-08	Gonads or Ovary	3.0
		9-17-08	Gonads or Ovary	3.7
		9-20-18	Gonads	4.0
		9-20-18	Gonads	4.9
		9-20-18	Gonads	6.0
	Rexford	9-25-13	Gonads or Ovary	3.8
		9-25-13	Gonads or Ovary	4.2
		9-25-13	Gonads or Ovary	3.2
		9-25-13	Gonads or Ovary	5.1
		9-25-13	Gonads or Ovary	3.5
		9-25-13	Gonads or Ovary	3.1
		9-25-13	Gonads or Ovary	3.8
		9-25-13	Gonads or Ovary	3.3
		9-25-13	Gonads or Ovary	3.7
		9-25-13	Gonads or Ovary	3.3
	Barron Creek	9-21-18	Gonads	3.3
	Warland Creek	9-21-18	Gonads	2.8
		9-21-18	Gonads	7.8
		9-21-18	Gonads	3.4
		9-21-18	Gonads	4.1
Largescale Sucker	Rexford	5-8-18	Gonads	6.7
		5-8-18	Gonads	6.2
		5-8-18	Gonads	5.7
		5-8-18	Gonads	1.6
		5-8-18	Gonads	6.3
		5-8-18	Gonads	6.0
		5-8-18	Gonads	7.0
		5-8-18	Gonads	5.8
		5-8-18	Gonads	7.0
	Tenmile Creek	5-9-18	Gonads	7.6
		5-9-18	Gonads	4.2
Longnose Sucker	Sophie Creek	5-17-17	Gonads	7.1
		5-17-17	Gonads	21
		5-17-17	Gonads	10
	Sandhill	5-17-17	Gonads	14
	Tobacco River	5-14-08	Gonads or Ovary	5.6
		5-14-08	Gonads or Ovary	4.1
		5-14-08	Gonads or Ovary	5.6
		5-14-08	Gonads or Ovary	4.0
	Rexford	5-8-18	Gonads	6.0
		5-8-18	Gonads	6.6
	Tenmile Creek	5-9-18	Gonads	6.6
	McGillivray	5-15-13	Gonads or Ovary	6.9
Mountain Whitefish	Warland Creek	9-21-18	Gonads	5.2
		9-21-18	Gonads	9.6
	Jackson Creek	9-21-18	Gonads	7.9
	Canyon Creek	9-21-18	Gonads	6.1

Table H.4: Selenium Concentration (mg/kg) in Fish Gonad, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Northern Pikeminnow	Tobacco River	5-14-08	Gonads or Ovary	2.5
		5-14-08	Gonads or Ovary	3.5
		5-14-08	Gonads or Ovary	2.9
		5-14-08	Gonads or Ovary	5.5
		5-14-08	Gonads or Ovary	3.2
		5-14-08	Gonads or Ovary	2.8
		5-14-08	Gonads or Ovary	4.2
		5-14-08	Gonads or Ovary	3.6
		5-14-08	Gonads or Ovary	4.2
		5-14-08	Gonads or Ovary	3.5
		5-14-08	Gonads or Ovary	2.7
		5-14-08	Gonads or Ovary	5.9
		5-14-08	Gonads or Ovary	2.8
		5-14-08	Gonads or Ovary	2.7
		5-14-08	Gonads or Ovary	3.0
		5-14-08	Gonads or Ovary	3.7
		5-14-08	Gonads or Ovary	3.6
		5-14-08	Gonads or Ovary	4.9
	Rexford	5-14-13	Gonads or Ovary	8.1
		5-14-13	Gonads or Ovary	2.7
		5-14-13	Gonads or Ovary	2.4
		5-14-13	Gonads or Ovary	4.7
		5-14-13	Gonads or Ovary	5.0
		5-14-13	Gonads or Ovary	6.0
		5-14-13	Gonads or Ovary	4.1
		5-14-13	Gonads or Ovary	3.2
		5-14-13	Gonads or Ovary	4.3
		5-14-13	Gonads or Ovary	3.2
		5-14-13	Gonads or Ovary	4.4
		5-14-13	Gonads or Ovary	3.4
		5-14-13	Gonads or Ovary	5.3
		5-8-18	Gonads	4.6
		5-8-18	Gonads	5.5
		5-8-18	Gonads	3.5
		5-8-18	Gonads	3.9
		5-8-18	Gonads	2.4
		5-8-18	Gonads	6.7
		5-8-18	Gonads	3.5
		5-8-18	Gonads	2.2
		5-8-18	Gonads	2.7
		5-8-18	Gonads	2.3
	Tenmile Creek	5-9-18	Gonads	3.0
		5-9-18	Gonads	3.0
		5-9-18	Gonads	3.1
		5-9-18	Gonads	3.8
		5-9-18	Gonads	1.8
		5-9-18	Gonads	2.5
		5-9-18	Gonads	2.9
		5-9-18	Gonads	3.4
	McGillivray	5-15-13	Gonads or Ovary	3.3
		5-15-13	Gonads or Ovary	2.7
		5-15-13	Gonads or Ovary	3.9
		5-15-13	Gonads or Ovary	2.8
		5-15-13	Gonads or Ovary	4.7
		5-15-13	Gonads or Ovary	4.2
		5-15-13	Gonads or Ovary	2.8
		5-15-13	Gonads or Ovary	2.8
		5-15-13	Gonads or Ovary	3.5
Peamouth Chub	Tobacco River	5-14-08	Gonads or Ovary	6.1
		5-14-08	Gonads or Ovary	5.8
		5-14-08	Gonads or Ovary	7.3
		5-14-08	Gonads or Ovary	6.7
		5-14-08	Gonads or Ovary	8.2
		5-14-08	Gonads or Ovary	6.7
		5-14-08	Gonads or Ovary	12
		5-14-08	Gonads or Ovary	11
		5-14-08	Gonads or Ovary	5.7
		5-14-08	Gonads or Ovary	11
		5-14-08	Gonads or Ovary	7.1
		5-14-08	Gonads or Ovary	5.8

Table H.4: Selenium Concentration (mg/kg) in Fish Gonad, Koocanusa Reservoir (Montana), 2008 to 2018

Common Name	Area	Date	Tissue Type	Result (mg/kg dw)
Peamouth Chub	Tobacco River	5-14-08	Gonads or Ovary	7.7
		5-14-08	Gonads or Ovary	4.0
		5-14-08	Gonads or Ovary	5.0
		5-14-08	Gonads or Ovary	8.3
		5-14-08	Gonads or Ovary	9.0
		5-14-08	Gonads or Ovary	7.3
		5-14-08	Gonads or Ovary	4.7
		5-14-08	Gonads or Ovary	7.3
	Rexford	5-14-13	Gonads or Ovary	9.0
		5-14-13	Gonads or Ovary	6.3
		5-14-13	Gonads or Ovary	9.7
		5-14-13	Gonads or Ovary	7.9
		5-14-13	Gonads or Ovary	6.7
		5-14-13	Gonads or Ovary	12
		5-14-13	Gonads or Ovary	8.2
		5-14-13	Gonads or Ovary	9.2
		5-14-13	Gonads or Ovary	7.1
		5-14-13	Gonads or Ovary	6.7
		5-14-13	Gonads or Ovary	7.3
		5-14-13	Gonads or Ovary	11
		5-14-13	Gonads or Ovary	7.3
		5-14-13	Gonads or Ovary	11
		5-14-13	Gonads or Ovary	15
		5-14-13	Gonads or Ovary	6.2
		5-14-13	Gonads or Ovary	7.2
		5-8-18	Gonads	7.5
		5-8-18	Gonads	6.4
		5-8-18	Gonads	6.5
		5-8-18	Gonads	6.4
		5-8-18	Gonads	5.6
		5-8-18	Gonads	8.2
		5-8-18	Gonads	13
		5-8-18	Gonads	11
		5-8-18	Gonads	6.6
		5-8-18	Gonads	8.2
	Tenmile Creek	5-9-18	Gonads	7.5
		5-9-18	Gonads	18
		5-9-18	Gonads	11
		5-9-18	Gonads	8.7
		5-9-18	Gonads	8.8
		5-9-18	Gonads	13
		5-9-18	Gonads	6.6
		5-9-18	Gonads	9.1
		5-9-18	Gonads	4.1
		5-9-18	Gonads	7.4
	McGillivray	5-15-13	Gonads or Ovary	11
		5-15-13	Gonads or Ovary	8.1
		5-15-13	Gonads or Ovary	12
		5-15-13	Gonads or Ovary	12
		5-15-13	Gonads or Ovary	8.4
		5-15-13	Gonads or Ovary	8.4
		5-15-13	Gonads or Ovary	22
		5-15-13	Gonads or Ovary	5.4
		5-15-13	Gonads or Ovary	7.3
		5-15-13	Gonads or Ovary	7.6
		5-15-13	Gonads or Ovary	9.6
		5-15-13	Gonads or Ovary	8.7
		5-15-13	Gonads or Ovary	12
		5-15-13	Gonads or Ovary	5.8
		5-15-13	Gonads or Ovary	9.1
		5-15-13	Gonads or Ovary	5.5
Rainbow Trout	Rexford	5-14-13	Gonads or Ovary	4.7
Redside Shiner	Tenmile Creek	5-9-18	Gonads	26
		5-9-18	Gonads	15
		5-9-18	Gonads	21
Westslope Cutthroat Trout	Dodge Creek	5-17-17	Gonads	12
	Rexford	5-14-13	Gonads or Ovary	10
Yellow Perch	Sandhill	5-17-17	Gonads	5.6

Table H.5: Selenium Concentration (mg/kg) in Zooplankton, Koocanusa Reservoir (Montana), 2016 to 2018

Station	Date	Wet/Dry Weight	Selenium (µg/g)
International Boundary	2016-07-26	Wet	0.24
	2016-08-16	Wet	0.282
	2016-09-20	Wet	0.176
	2016-09-20	Wet	0.107
	2016-07-26	Wet	0.2
	2016-08-16	Wet	0.262
	2017-07-25	Dry	0.153
	2017-08-28	Dry	3.26
	2017-09-26	Dry	3.28
	2017-07-25	Dry	0.162
	2017-08-28	Dry	1.96
	2017-09-26	Dry	4.23
	2018-04-24	Dry	0.471
	2018-05-22	Dry	2.57
	2018-06-12	Dry	1.03
	2018-07-10	Dry	1.66
	2018-04-24	Dry	1.05
	2018-05-22	Dry	1.67
	2018-06-12	Dry	0.693
	2018-07-10	Dry	0.942
	2018-08-28	Dry	2.8
	2018-08-28	Dry	2.46
	2018-10-23	Dry	4.38
Tenmile Creek	2016-07-26	Wet	0.17
	2016-08-16	Wet	0.266
	2016-09-20	Wet	0.059
	2017-07-25	Dry	0.178
	2017-08-28	Dry	1.82
	2017-09-26	Dry	3.46
	2018-04-24	Dry	0.978
	2018-05-22	Dry	1.91
	2018-06-12	Dry	0.697
	2018-07-10	Dry	0.924
	2018-08-28	Dry	2
	2018-10-23	Dry	3.15
Forebay	2016-07-26	Wet	0.19
	2016-08-16	Wet	0.241
	2016-09-20	Wet	0.097
	2017-07-25	Dry	0.29
	2017-08-28	Dry	2.33
	2017-09-26	Dry	2.46
	2018-04-24	Dry	1.02
	2018-05-22	Dry	1.5
	2018-06-12	Dry	0.341
	2018-07-10	Dry	1.02
	2018-08-28	Dry	1.82
	2018-10-23	Dry	2.98
	2018-10-23	Dry	3.04

Table H.6: Metal Concentrations (µg/g dry weight) in Zooplankton and Benthic Invertebrates Collected in Koocanusa Reservoir, 2019

Tissue Type	Area	Month	Sample ID	Moisture	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt
				%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Zooplankton[a]	RG_TN	August	RG_TN-1-ZOOT_20190822	99.8	1,300	0.2	2.7	43	0.05	<5	1.3	1.7	0.7
			RG_TN-2-ZOOT_20190822	99.8	1,400	0.2	2.4	46	0.05	<5	1.2	1.8	0.7
			RG_TN-3-ZOOT_20190822	99.9	2,100	0.1	2.8	62	0.09	<50	1.3	<5	<5
			RG_TN-4-ZOOT_20190822	99.8	1,100	0.1	2.6	38	0.04	<5	1.4	1.3	0.7
			RG_TN-5-ZOOT_20190822	99.8	1,100	<0.1	2.6	39	0.06	<50	1.2	<5	<5
	RG_T4	June	RG_T4-1_ZOOT_20190614	92.2	1,400	0.1	2.9	25	0.05	<2	0.5	2	1.2
			RG_T4-2_ZOOT_20190614	92.0	1,500	0.1	2.6	19	0.05	1	0.5	1.8	1.1
			RG_T4-3_ZOOT_20190614	92.1	1,600	0.1	2.6	22	0.06	1	0.6	1.9	1.0
			RG_T4-4_ZOOT_20190614	93.6	1,300	0.1	2.7	20	0.05	1	0.6	1.5	0.9
			RG_T4-5_ZOOT_20190614	91.5	1,500	0.2	2.6	44	0.07	3	0.6	1.9	1.5
		August	RG_T4-1-ZOOT_20190821	99.8	2,200	0.2	3.0	51	0.08	<5	1.3	2.4	1
			RG_T4-2-ZOOT_20190821	99.7	1,700	0.1	3.1	41	0.07	<5	1.3	1.9	0.9
			RG_T4-3-ZOOT_20190821	99.6	1,600	0.1	3.4	42	0.06	<5	1.4	1.8	0.9
			RG_T4-4-ZOOT_20190821	99.5	1,200	0.1	3.2	36	0.05	<5	1.3	1.4	0.8
			RG_T4-5-ZOOT_20190821	99.5	1,100	0.1	3.1	35	0.04	<5	1.5	1.5	0.7
Benthic Invertebrates	RG_TN	April	RG_TN-INV_20190425	84.9	2,000	<0.1	3.0	17	0.06	<50	1.6	<5	<5
		August	RG_TN_INV_20190822	86.3	3,700	0.2	10	40	0.16	<50	0.23	<5	<5
	RG_T4	April	RG_T4-INV_20190425	81.6	7,400	0.16	6.0	78	0.29	8	1.7	9.8	3.6
		August	RG_T4_INV_20190821	42.4	820	<0.1	12	26	0.03	<50	0.3	<5	<5

[a] Zooplankton were absent from samples collected from RG_TN in June.

Table H.6: Metal Concentrations (µg/g dry weight) in Zooplankton and Benthic Invertebrates Collected in Koocanusa Reservoir, 2019

Tissue Type	Area	Month	Sample ID	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium
				µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Zooplankton[a]	RG_TN	August	RG_TN-1-ZOOT_20190822	8.7	950	1.8	58	0.04	0.4	2	3.1	0.04	108
			RG_TN-2-ZOOT_20190822	8.2	990	1.5	64	0.03	0.7	7.1	3.0	0.04	96
			RG_TN-3-ZOOT_20190822	9.0	1,600	2.4	84	0.02	<0.5	12	3.1	0.03	130
			RG_TN-4-ZOOT_20190822	7.5	940	1.4	62	0.03	0.5	1.7	3.1	0.03	91
			RG_TN-5-ZOOT_20190822	7.0	1,200	1.2	60	0.03	<0.5	<5	3.1	0.03	97
	RG_T4	June	RG_T4-1_ZOOT_20190614	7.8	1,400	6.9	84	0.04	0.3	2.2	3.4	0.03	18
			RG_T4-2_ZOOT_20190614	6.7	1,300	2.9	67	0.04	0.3	1.9	3.0	0.02	18
			RG_T4-3_ZOOT_20190614	7.0	1,300	2.0	73	0.05	0.3	1.7	2.9	0.03	22
			RG_T4-4_ZOOT_20190614	8.5	1,200	1.6	71	0.04	0.3	1.6	2.9	0.02	21
			RG_T4-5_ZOOT_20190614	9.1	2,200	2.1	127	0.04	0.3	4	3.1	0.03	39
		August	RG_T4-1-ZOOT_20190821	9.1	1,700	2.0	96	0.03	0.5	2.7	3.5	0.04	90
			RG_T4-2-ZOOT_20190821	10	1,200	1.3	78	0.03	0.4	2.8	3.4	0.04	77
			RG_T4-3-ZOOT_20190821	10	1,100	1.5	77	0.04	0.4	2.4	3.7	0.04	73
			RG_T4-4-ZOOT_20190821	9.0	940	2.1	66	0.04	0.4	2	3.6	0.04	70
			RG_T4-5-ZOOT_20190821	9.2	860	10.0	65	0.04	0.4	2.2	3.6	0.08	71
Benthic Invertebrates	RG_TN	April	RG_TN-INV_20190425	20	3,600	4.0	85	0.04	<0.5	<5	5.2	<0.02	30
		August	RG_TN_INV_20190822	22	5,200	8.0	96	0.05	<0.5	<5	2.9	0.06	44
	RG_T4	April	RG_T4-INV_20190425	20	10,200	6.8	220	0.04	0.5	9.1	8.0	0.08	73
		August	RG_T4_INV_20190821	18	5,000	0.7	45	<0.02	<0.5	<5	1.5	0.06	230

[a] Zooplankton were absent from samples collected from RG_TN in June.

Table H.6: Metal Concentrations (µg/g dry weight) in Zooplankton and Benthic Invertebrates Collected in Koocanusa Reservoir, 2019

Tissue Type	Area	Month	Sample ID	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
				µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Zooplankton[a]	RG_TN	August	RG_TN-1-ZOOT_20190822	0.050	1.1	22	0.31	1.7	100
			RG_TN-2-ZOOT_20190822	0.050	0.6	28	0.36	1.8	100
			RG_TN-3-ZOOT_20190822	<0.1	<2	36	0.50	3.0	120
			RG_TN-4-ZOOT_20190822	0.040	0.4	16	0.35	1.4	93
			RG_TN-5-ZOOT_20190822	<0.1	<2	120	0.30	2.0	80
	RG_T4	June	RG_T4-1_ZOOT_20190614	0.04	0.3	21	0.08	2.0	150
			RG_T4-2_ZOOT_20190614	0.032	0.2	16	0.07	2.0	140
			RG_T4-3_ZOOT_20190614	0.036	0.2	18	0.07	2.2	130
			RG_T4-4_ZOOT_20190614	0.035	0.3	13	0.07	1.8	150
			RG_T4-5_ZOOT_20190614	0.065	0.2	22	0.56	2.5	120
		August	RG_T4-1-ZOOT_20190821	0.070	0.4	46	0.33	2.8	110
			RG_T4-2-ZOOT_20190821	0.060	0.3	34	0.23	2.2	100
			RG_T4-3-ZOOT_20190821	0.060	0.4	27	0.21	2.1	100
			RG_T4-4-ZOOT_20190821	0.050	0.4	21	0.18	1.7	100
			RG_T4-5-ZOOT_20190821	0.050	1.6	22	0.20	1.6	130
Benthic Invertebrates	RG_TN	April	RG_TN-INV_20190425	<0.1	<2	50	0.30	3.0	100
		August	RG_TN_INV_20190822	<0.1	<2	60	0.50	5.0	110
	RG_T4	April	RG_T4-INV_20190425	0.140	0.2	87	0.39	13.0	110
		August	RG_T4_INV_20190821	<0.1	<2	9	<0.1	2.0	<50

[a] Zooplankton were absent from samples collected from RG_TN in June.

Table H.7: Metal Concentrations (µg/g dry weight) in Fish Muscle Collected in Koocanusa Reservoir, 2019

Species	Area	Sample ID	Moisture	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium
			%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
PCC	RG_SC	RG_SC_PCC-01-M_20190424	78.5	<2	<0.01	0.2	1.0	<0.01	<1	<0.01
		RG_SC_PCC-02-M_20190424	77.8	6	<0.01	0.1	0.8	<0.01	<1	<0.01
		RG_SC_PCC-03-M_20190424	78.1	24	0.02	0.2	1.3	<0.01	<1	<0.01
		RG_SC_PCC-04-M_20190424	77.8	<2	<0.01	0.1	0.6	<0.01	<1	<0.01
		RG_SC_PCC-05-M_20190424	76.5	8	<0.01	0.1	0.8	<0.01	<1	<0.01
		RG_SC_PCC-06-M_20190424	77.0	6	0.02	0.2	1.5	<0.01	<1	<0.01
		RG_SC_PCC-07-M_20190424	77.5	5	<0.01	0.1	1.6	<0.01	<1	<0.01
		RG_SC_PCC-08-M_20190424	79.5	4	<0.01	0.1	1.9	<0.01	<1	0.01
		RG_SC_PCC-09-M_20190424	78.4	2	0.01	0.1	1.1	<0.01	<1	<0.01
		RG_SC_PCC-10-M_20190424	78.3	2	<0.01	0.1	0.8	<0.01	<1	<0.01
	RG_ER	RG_ER_PCC-01-M_20190423	77.7	12	<0.01	0.1	0.9	<0.01	<1	0.02
		RG_ER_PCC-02-M_20190423	77.6	3	<0.01	0.1	0.6	<0.01	<1	<0.01
		RG_ER_PCC-03-M_20190424	78.3	<2	<0.01	0.1	0.7	<0.01	<1	<0.01
		RG_ER_PCC-04-M_20190423	77.5	<2	<0.01	0.2	0.6	<0.01	<1	<0.01
		RG_ER_PCC-05-M_20190423	75.7	18	<0.01	0.2	1.9	<0.01	<1	0.01
		RG_ER_PCC-06-M_20190423	77.4	12	<0.01	0.1	1.2	<0.01	<1	<0.01
		RG_ER_PCC-07-M_20190424	78.3	<2	<0.01	0.3	1.1	<0.01	<1	<0.01
		RG_ER_PCC-08-M_20190424	77.3	8	<0.01	0.2	0.6	<0.01	<1	<0.01
		RG_ER_PCC-09-M_20190424	76.6	<2	<0.01	0.2	0.7	<0.01	<1	<0.01
		RG_ER_PCC-10-M_20190424	77.9	5	<0.01	0.1	0.8	<0.01	<1	<0.01
	RG_GC	RG_GC_PCC-01-M_20190425	78.0	4	<0.01	0.1	2.8	<0.01	<1	<0.01
		RG_GC_PCC-02-M_20190425	77.5	3	<0.01	0.1	1.1	<0.01	<1	<0.01
		RG_GC_PCC-03-M_20190425	77.6	<2	<0.01	0.2	0.5	<0.01	<1	<0.01
		RG_GC_PCC-04-M_20190425	79.1	4	<0.01	0.1	0.7	<0.01	<1	<0.01
		RG_GC_PCC-05-M_20190425	74.0	3	<0.01	0.2	2.4	<0.01	<1	<0.01
		RG_GC_PCC-06-M_20190425	76.1	9	<0.01	0.1	1.9	<0.01	<1	<0.01
		RG_GC_PCC-07-M_20190425	78.4	4	<0.01	0.1	1.2	<0.01	<1	<0.01
		RG_GC_PCC-08-M_20190425	77.4	4	<0.01	0.1	1.6	<0.01	<1	<0.01
		RG_GC_PCC-09-M_20190425	77.3	<2	<0.01	0.1	1.0	<0.01	<1	<0.01
		RG_GC_PCC-10-M_20190425	78.3	<2	<0.01	0.1	2.0	<0.01	<1	<0.01
RSC	RG_SC	RG_SC_RSC-01-M_20190424	76.9	<5	<0.02	0.1	0.6	<0.02	<2	<0.02
		RG_SC_RSC-02-M_20190424	76.0	<5	<0.02	0.1	1.4	<0.02	<5	<0.02
		RG_SC_RSC-03-M_20190424	77.3	10	<0.02	0.1	0.8	<0.02	<5	<0.02
		RG_SC_RSC-04-M_20190424	77.3	<5	<0.02	0.1	0.8	<0.02	<2	<0.02
		RG_SC_RSC-05-M_20190424	78.2	<5	<0.02	0.1	0.3	<0.02	<2	<0.02
		RG_SC_RSC-06-M_20190424	76.8	5	<0.02	0.1	1.0	<0.02	<2	<0.02
		RG_SC_RSC-07-M_20190424	76.3	10	<0.02	0.1	0.5	<0.02	<2	<0.02
		RG_SC_RSC-08-M_20190424	77.8	<5	<0.02	0.1	0.5	<0.02	<2	<0.02
		RG_SC_RSC-09-M_20190424	76.6	8	<0.02	0.1	0.5	<0.02	<5	<0.02
		RG_SC_RSC-10-M_20190424	75.7	<5	0.02	0.1	1.5	<0.02	<2	<0.02
	RG_ER	RG_ER_RSC-01-M_20190423	76.5	<5	<0.02	0.1	<0.5	<0.02	<5	<0.02
		RG_ER_RSC-02-M_20190423	76.2	5	<0.02	0.2	0.6	<0.02	<5	<0.02
		RG_ER_RSC-03-M_20190423	72.6	37	<0.02	0.2	2.5	<0.02	<5	0.02
		RG_ER_RSC-04-M_20190424	76.3	<5	<0.02	0.1	0.6	<0.02	<5	<0.02
		RG_ER_RSC-05-M_20190424	76.1	18	<0.02	0.2	2.0	<0.02	<5	<0.02
		RG_ER_RSC-06-M_20190424	76.9	7	<0.02	0.2	0.5	<0.02	<5	<0.02
		RG_ER_RSC-07-M_20190424	76.8	<5	<0.02	0.1	<0.5	<0.02	<5	<0.02
		RG_ER_RSC-08-M_20190424	76.6	32	<0.02	0.1	1.3	<0.02	<5	<0.02
		RG_ER_RSC-09-M_20190424	77.8	<5	<0.02	0.1	1.4	<0.02	<5	<0.02
		RG_ER_RSC-10-M_20190424	78.0	<5	<0.02	<0.02	<0.05	<0.02	<2	<0.02
	RG_GC	RG_GC_RSC-01-M_20190425	77.4	<5	<0.02	0.1	1.5	<0.02	<5	<0.02
		RG_GC_RSC-02-M_20190425	76.3	<5	<0.02	0.1	<0.5	<0.02	<5	<0.02
		RG_GC_RSC-03-M_20190425	76.3	<5	<0.02	0.1	2.3	<0.02	<2	<0.02
		RG_GC_RSC-04-M_20190425	77.9	<5	<0.02	0.1	1.2	<0.02	<2	<0.02
		RG_GC_RSC-05-M_20190425	77.3	<5	<0.02	<0.05	1.9	<0.02	<5	<0.02
		RG_GC_RSC-06-M_20190425	76.8	<5	<0.02	0.1	1.3	<0.02	<5	<0.02
		RG_GC_RSC-07-M_20190425	77.2	<5	<0.02	0.1	1.0	<0.02	<5	<0.02
		RG_GC_RSC-08-M_20190425	76.4	<5	<0.02	0.1	2.4	<0.02	<2	<0.02
		RG_GC_RSC-09-M_20190425	77.2	<5	<0.02	0.1	1.4	<0.02	<5	<0.02
		RG_GC_RSC-10-M_20190425	76.9	8	0.03	0.1	1.0	<0.02	<2	<0.02
BT	RG_SC	RG_SC-BT-01-M_20190424	85.0	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_SC-BT-02-M_20190425	76.0	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
	RG_GC	RG_GC-BT-01-M_20190426	80.5	<50	<0.10	<0.5	<5.0	<0.02	<50	0.03
		RG_GC-BT-02-M_20190426	82.5	<50	<0.10	<0.5	<5.0	<0.02	<50	0.05
		RG_GC-BT-03-M_20190426	91.0	620	<0.10	<0.5	<5.0	<0.02	<50	<0.02
KO	RG_SC	RG_SC-KO-01-M_20190424	74.9	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_SC-KO-02-M_20190424	75.0	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_SC-KO-03-M_20190424	75.0	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_SC-KO-04-M_20190424	71.2	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_SC-KO-05-M_20190424	74.5	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_SC-KO-01_M_20190826	57.8	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_SC-KO-02_M_20190826	74.4	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_SC-KO-03_M_20190826	74.0	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
	RG_ER	RG_ER-KO-01-M_20190424	70.0	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_ER-KO-02-M_20190424	75.5	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_ER-KO-03-M_20190426	72.8	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_ER-KO-04-M_20190426	72.7	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_ER-KO-05-M_20190426	67.1	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_ER-KO-06-M_20190426	59.7	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_ER-KO-01_M_20190826	73.8	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
MWF	RG_GC	RG_GC-MWF-01-M_20190425	79.3	36	<0.02	1.0	<0.5	<0.02	<5	<0.02
		RG_GC-MWF-02-M_20190426	79.8	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_GC-MWF-03-M_20190426	78.9	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_GC-MWF-04-M_20190426	78.0	<50	<0.10	0.6	<5.0	<0.02	<50	<0.02
		RG_GC-MWF-05-M_20190426	73.4	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_GC-MWF-06-M_20190426	66.5	<50	<0.10	0.5	<5.0	<0.02	<50	<0.02
		RG_GC-MWF-07-M_20190426	80.3	<50	<0.10	0.6	<5.0	<0.02	<50	<0.02
RBT	RG_GC	RG_GC-RBT-01-M_20190425	74.0	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_GC-RBT-02-M_20190426	78.7	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
WCT	RG_SC	RG_SC-WCT-01-M_20190424	79.5	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
	RG_GC	RG_GC-WCT-01-M_20190425	74.5	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_GC-WCT-02-M_20190426	73.8	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_GC-WCT-03-M_20190426	79.5	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_GC-WCT-04-M_20190426	77.3	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02
		RG_GC-WCT-05-M_20190426	75.9	<50	<0.10	<0.5	<5.0	<0.02	<50	<0.02

Note: PCC - Peamouth Chub, RSC - Redside Shiner, BT - Bull Trout, KO - Kokanee, MWF - Mountain Whitefish, RBT - Rainbow Trout, WCT - Westslope Cutthroat Trout

Table H.7: Metal Concentrations (µg/g dry weight) in Fish Muscle Collected in Koocanusa Reservoir, 2019

Species	Area	Sample ID	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum
			µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
PCC	RG_SC	RG_SC_PCC-01-M_20190424	<0.05	0.02	1.0	10	0.01	1.0	0.55	<0.02
		RG_SC_PCC-02-M_20190424	0.08	0.02	1.1	19	0.06	0.9	0.31	<0.02
		RG_SC_PCC-03-M_20190424	0.06	0.04	2.1	33	0.07	2.2	0.27	<0.02
		RG_SC_PCC-04-M_20190424	<0.05	0.01	0.9	7	0.01	1.0	0.34	<0.02
		RG_SC_PCC-05-M_20190424	0.09	0.02	1.0	14	0.05	1.4	0.50	<0.02
		RG_SC_PCC-06-M_20190424	<0.05	0.03	1.8	16	0.07	1.3	0.56	<0.02
		RG_SC_PCC-07-M_20190424	<0.05	0.03	1.0	13	0.03	1.8	0.43	<0.02
		RG_SC_PCC-08-M_20190424	<0.05	0.02	1.3	24	0.04	0.6	0.87	<0.02
		RG_SC_PCC-09-M_20190424	<0.05	0.02	0.9	10	0.02	0.9	0.41	<0.02
		RG_SC_PCC-10-M_20190424	<0.05	0.02	0.8	7	0.03	1.2	0.57	<0.02
	RG_ER	RG_ER_PCC-01-M_20190423	0.08	0.02	1.0	18	0.19	1.2	0.50	<0.02
		RG_ER_PCC-02-M_20190423	<0.05	0.01	1.0	10	0.01	0.8	0.35	<0.02
		RG_ER_PCC-03-M_20190424	<0.05	0.02	0.9	8	0.01	0.9	0.52	<0.02
		RG_ER_PCC-04-M_20190423	<0.05	0.01	1.0	10	0.01	0.9	0.53	<0.02
		RG_ER_PCC-05-M_20190423	0.06	0.03	2.0	35	0.11	1.5	0.51	<0.02
		RG_ER_PCC-06-M_20190423	0.05	0.02	0.9	15	0.03	1.4	0.20	<0.02
		RG_ER_PCC-07-M_20190424	<0.05	0.01	1.0	10	<0.01	1.0	0.48	<0.02
		RG_ER_PCC-08-M_20190424	<0.05	0.02	0.9	20	0.02	1.4	0.51	<0.02
		RG_ER_PCC-09-M_20190424	<0.05	0.02	1.7	16	<0.01	0.7	0.43	<0.02
		RG_ER_PCC-10-M_20190424	<0.05	0.01	0.9	15	0.02	1.0	0.38	<0.02
	RG_GC	RG_GC_PCC-01-M_20190425	<0.05	0.04	1.6	26	0.05	1.6	0.66	<0.02
		RG_GC_PCC-02-M_20190425	<0.05	<0.01	1.4	12	<0.01	0.7	1.20	<0.02
		RG_GC_PCC-03-M_20190425	<0.05	<0.01	1.5	15	<0.01	0.4	0.55	<0.02
		RG_GC_PCC-04-M_20190425	<0.05	0.02	1.1	15	<0.01	0.9	0.50	<0.02
		RG_GC_PCC-05-M_20190425	0.07	0.03	2.2	20	<0.01	1.4	0.39	<0.02
		RG_GC_PCC-06-M_20190425	<0.05	0.03	1.0	18	0.03	1.3	0.45	<0.02
		RG_GC_PCC-07-M_20190425	<0.05	0.01	0.8	9	<0.01	0.9	0.44	<0.02
		RG_GC_PCC-08-M_20190425	<0.05	0.03	1.5	15	<0.01	1.0	0.45	<0.02
		RG_GC_PCC-09-M_20190425	<0.05	0.02	1.1	11	<0.01	0.8	0.47	<0.02
		RG_GC_PCC-10-M_20190425	0.08	0.02	0.7	9	<0.01	1.5	0.46	<0.02
RSC	RG_SC	RG_SC_RSC-01-M_20190424	<0.1	0.04	1.8	18	<0.02	1.0	0.40	<0.05
		RG_SC_RSC-02-M_20190424	<0.5	<0.5	2.6	27	0.05	1.8	0.41	<0.05
		RG_SC_RSC-03-M_20190424	<0.5	<0.5	1.1	22	0.1	2.5	0.31	<0.05
		RG_SC_RSC-04-M_20190424	<0.1	<0.02	1.7	17	<0.02	1.5	0.30	<0.05
		RG_SC_RSC-05-M_20190424	<0.1	0.02	0.9	10	<0.02	1.4	0.30	<0.05
		RG_SC_RSC-06-M_20190424	0.7	<0.02	1.5	19	<0.02	1.7	0.50	<0.05
		RG_SC_RSC-07-M_20190424	1.8	<0.02	1.3	27	<0.02	1.9	0.34	<0.05
		RG_SC_RSC-08-M_20190424	0.3	<0.02	1.2	12	<0.02	1.5	0.38	<0.05
		RG_SC_RSC-09-M_20190424	1.7	<0.5	1.0	20	<0.05	1.5	0.37	<0.05
		RG_SC_RSC-10-M_20190424	<0.1	<0.02	2.3	23	<0.02	1.8	0.40	<0.05
	RG_ER	RG_ER_RSC-01-M_20190423	<0.5	<0.5	1.2	10	<0.05	1.5	0.28	<0.05
		RG_ER_RSC-02-M_20190423	<0.5	<0.5	1.2	13	<0.05	1.2	0.38	<0.05
		RG_ER_RSC-03-M_20190423	<0.5	<0.5	3.2	73	0.22	3.0	0.27	<0.05
		RG_ER_RSC-04-M_20190424	<0.5	<0.5	1.1	11	<0.05	1.3	0.28	<0.05
		RG_ER_RSC-05-M_20190424	<0.5	<0.5	2.8	54	0.09	2.1	0.33	<0.05
		RG_ER_RSC-06-M_20190424	<0.5	<0.5	1.0	18	<0.05	1.6	0.32	<0.05
		RG_ER_RSC-07-M_20190424	<0.5	<0.5	0.9	12	<0.05	1.3	0.24	<0.05
		RG_ER_RSC-08-M_20190424	<0.5	<0.5	2.7	62	0.10	2.3	0.29	<0.05
		RG_ER_RSC-09-M_20190424	<0.5	<0.5	1.6	22	<0.05	1.6	0.38	<0.05
		RG_ER_RSC-10-M_20190424	0.3	0.14	<0.1	<5	<0.02	<0.2	<0.01	<0.05
	RG_GC	RG_GC_RSC-01-M_20190425	<0.5	<0.5	2.0	19	<0.05	0.8	0.54	<0.05
		RG_GC_RSC-02-M_20190425	<0.5	<0.5	0.8	12	<0.05	1.2	0.36	<0.05
		RG_GC_RSC-03-M_20190425	<0.1	0.05	3.6	38	<0.02	1.8	0.37	<0.05
		RG_GC_RSC-04-M_20190425	<0.1	0.02	2.0	20	0.03	1.2	0.38	<0.05
		RG_GC_RSC-05-M_20190425	<0.5	<0.5	4.6	19	<0.05	1.8	0.32	<0.05
		RG_GC_RSC-06-M_20190425	<0.5	<0.5	2.9	27	<0.05	1.5	0.39	<0.05
		RG_GC_RSC-07-M_20190425	<0.5	<0.5	1.0	17	<0.05	2.0	0.55	<0.05
		RG_GC_RSC-08-M_20190425	<0.1	0.02	3.2	33	<0.02	1.4	0.32	<0.05
		RG_GC_RSC-09-M_20190425	<0.5	<0.5	2.1	22	<0.05	1.7	0.49	<0.05
		RG_GC_RSC-10-M_20190425	<0.1	0.02	1.6	23	0.04	1.0	0.28	<0.05
BT	RG_SC	RG_SC-BT-01-M_20190424	<5.0	<5.0	<5.0	<50	<0.5	<5.0	1.90	<0.5
		RG_SC-BT-02-M_20190425	<5.0	<5.0	<5.0	<50	<0.5	<5.0	1.20	<0.5
	RG_GC	RG_GC-BT-01-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.80	<0.5
		RG_GC-BT-02-M_20190426	<5.0	<5.0	<5.0	60	<0.5	<5.0	1.10	<0.5
		RG_GC-BT-03-M_20190426	<5.0	<5.0	<5.0	640	3.1	6.0	1.00	<0.5
KO	RG_SC	RG_SC-KO-01-M_20190424	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.29	<0.5
		RG_SC-KO-02-M_20190424	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.20	<0.5
		RG_SC-KO-03-M_20190424	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.22	<0.5
		RG_SC-KO-04-M_20190424	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.19	<0.5
		RG_SC-KO-05-M_20190424	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.25	<0.5
		RG_SC-KO-01_M_20190826	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.18	<0.5
		RG_SC-KO-02_M_20190826	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.15	<0.5
		RG_SC-KO-03_M_20190826	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.16	<0.5
	RG_ER	RG_ER-KO-01-M_20190424	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.21	<0.5
		RG_ER-KO-02-M_20190424	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.26	<0.5
		RG_ER-KO-03-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.22	<0.5
		RG_ER-KO-04-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.20	<0.5
		RG_ER-KO-05-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.12	<0.5
		RG_ER-KO-06-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.16	<0.5
		RG_ER-KO-01_M_20190826	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.18	<0.5
MWF	RG_GC	RG_GC-MWF-01-M_20190425	<0.5	<0.5	1.2	43	0.09	1.6	0.13	<0.05
		RG_GC-MWF-02-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.29	<0.5
		RG_GC-MWF-03-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.21	<0.5
		RG_GC-MWF-04-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.16	<0.5
		RG_GC-MWF-05-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.12	<0.5
		RG_GC-MWF-06-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.20	<0.5
		RG_GC-MWF-07-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.15	<0.5
RBT	RG_GC	RG_GC-RBT-01-M_20190425	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.14	<0.5
		RG_GC-RBT-02-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.20	<0.5
WCT	RG_SC	RG_SC-WCT-01-M_20190424	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.15	<0.5
	RG_GC	RG_GC-WCT-01-M_20190425	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.13	<0.5
		RG_GC-WCT-02-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.30	<0.5
		RG_GC-WCT-03-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.06	<0.5
		RG_GC-WCT-04-M_20190426	<5.0	<5.0	<5.0	<50	<0.5	<5.0	0.15	<0.5
		RG_GC-WCT-05-M_20190426	<5.0	<5.0	<5.0	70	<0.5	<5.0	0.24	<0.5

Note: PCC - Peamouth Chub, RSC - Redside Shiner, BT - Bull Trout, KO - Kokanee, MWF - Mountain Whitefish, RBT - Rainbow Trout, WCT - Westslope Cutthroat Trout

Table H.7: Metal Concentrations (µg/g dry weight) in Fish Muscle Collected in Koocanusa Reservoir, 2019

Species	Area	Sample ID	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium
			µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
PCC	RG_SC	RG_SC_PCC-01-M_20190424	<0.05	2.2	<0.01	2.9	0.014	<0.05	<0.2	<0.005
		RG_SC_PCC-02-M_20190424	<0.05	2.3	<0.01	3.2	0.018	<0.05	0.2	<0.005
		RG_SC_PCC-03-M_20190424	0.1	1.8	<0.01	4.0	0.011	<0.05	0.5	<0.005
		RG_SC_PCC-04-M_20190424	<0.05	3.0	<0.01	2.3	0.010	<0.05	<0.2	<0.005
		RG_SC_PCC-05-M_20190424	0.05	1.8	<0.01	4.5	0.022	<0.05	0.2	<0.005
		RG_SC_PCC-06-M_20190424	0.13	1.7	<0.01	5.7	0.030	<0.05	<0.2	<0.005
		RG_SC_PCC-07-M_20190424	<0.05	2.4	<0.01	8.8	0.015	<0.05	<0.2	<0.005
		RG_SC_PCC-08-M_20190424	<0.05	2.9	<0.01	1.2	<0.005	<0.05	<0.2	<0.005
		RG_SC_PCC-09-M_20190424	<0.05	1.8	<0.01	3.9	0.012	<0.05	<0.2	<0.005
		RG_SC_PCC-10-M_20190424	<0.05	1.2	<0.01	5.1	0.012	<0.05	<0.2	<0.005
	RG_ER	RG_ER_PCC-01-M_20190423	0.12	1.2	<0.01	5.0	0.021	<0.05	0.5	<0.005
		RG_ER_PCC-02-M_20190423	<0.05	2.1	0.01	2.3	0.012	<0.05	<0.2	<0.005
		RG_ER_PCC-03-M_20190424	<0.05	1.9	<0.01	4.1	0.016	<0.05	<0.2	<0.005
		RG_ER_PCC-04-M_20190423	<0.05	2.8	<0.01	2.0	0.013	<0.05	<0.2	<0.005
		RG_ER_PCC-05-M_20190423	0.09	2.2	<0.01	4.3	0.017	<0.05	0.6	<0.005
		RG_ER_PCC-06-M_20190423	<0.05	3.3	<0.01	3.8	0.008	<0.05	0.2	<0.005
		RG_ER_PCC-07-M_20190424	<0.05	2.0	<0.01	3.3	0.014	<0.05	<0.2	<0.005
		RG_ER_PCC-08-M_20190424	<0.05	1.6	<0.01	4.6	0.014	<0.05	<0.2	<0.005
		RG_ER_PCC-09-M_20190424	<0.05	2.0	<0.01	2.6	0.018	<0.05	<0.2	<0.005
		RG_ER_PCC-10-M_20190424	<0.05	1.8	<0.01	4.0	0.016	<0.05	<0.2	<0.005
	RG_GC	RG_GC_PCC-01-M_20190425	<0.05	3.7	<0.01	8.4	0.009	<0.05	<0.2	<0.005
		RG_GC_PCC-02-M_20190425	<0.05	2.7	<0.01	2.6	0.013	<0.05	<0.2	<0.005
		RG_GC_PCC-03-M_20190425	<0.05	2.0	<0.01	0.4	0.023	<0.05	<0.2	<0.005
		RG_GC_PCC-04-M_20190425	<0.05	2.0	<0.01	2.7	0.019	<0.05	<0.2	<0.005
		RG_GC_PCC-05-M_20190425	<0.05	1.7	<0.01	7.2	0.039	<0.05	<0.2	<0.005
		RG_GC_PCC-06-M_20190425	<0.05	2.1	<0.01	8.4	0.033	<0.05	0.3	<0.005
		RG_GC_PCC-07-M_20190425	<0.05	1.9	<0.01	3.5	0.014	<0.05	<0.2	<0.005
		RG_GC_PCC-08-M_20190425	<0.05	2.0	<0.01	5.8	0.030	<0.05	<0.2	<0.005
		RG_GC_PCC-09-M_20190425	<0.05	1.8	<0.01	3.2	0.024	<0.05	<0.2	<0.005
		RG_GC_PCC-10-M_20190425	<0.05	3.3	<0.01	7.5	0.019	<0.05	<0.2	0.007
RSC	RG_SC	RG_SC_RSC-01-M_20190424	<0.1	1.3	<0.02	1.1	0.010	<0.1	<0.5	<0.01
		RG_SC_RSC-02-M_20190424	<0.5	1.4	<0.02	3.3	0.020	<0.2	<0.5	<0.02
		RG_SC_RSC-03-M_20190424	<0.5	1.5	<0.02	5.3	0.010	<0.2	0.6	<0.02
		RG_SC_RSC-04-M_20190424	<0.1	3.2	<0.02	0.8	0.020	<0.1	<0.5	<0.01
		RG_SC_RSC-05-M_20190424	<0.1	1.5	<0.02	2.4	0.020	<0.1	<0.5	<0.01
		RG_SC_RSC-06-M_20190424	0.3	2.0	<0.02	3.0	0.020	<0.1	<0.5	<0.01
		RG_SC_RSC-07-M_20190424	0.7	1.5	<0.02	2.4	0.020	<0.1	0.5	<0.01
		RG_SC_RSC-08-M_20190424	0.1	1.8	<0.02	2.2	0.020	<0.1	<0.5	<0.01
		RG_SC_RSC-09-M_20190424	0.8	2.0	<0.02	2.2	0.020	<0.2	<0.5	<0.02
		RG_SC_RSC-10-M_20190424	<0.1	1.7	<0.02	3.7	0.020	<0.1	<0.5	<0.01
	RG_ER	RG_ER_RSC-01-M_20190423	<0.5	1.8	<0.02	1.5	0.010	<0.2	<0.5	<0.02
		RG_ER_RSC-02-M_20190423	<0.5	1.6	<0.02	1.2	<0.010	<0.2	<0.5	<0.02
		RG_ER_RSC-03-M_20190423	<0.5	2.6	<0.02	3.3	<0.010	<0.2	1.1	<0.02
		RG_ER_RSC-04-M_20190424	<0.5	1.5	<0.02	2.8	<0.010	<0.2	<0.5	<0.02
		RG_ER_RSC-05-M_20190424	<0.5	1.8	<0.02	3.2	0.010	<0.2	0.7	<0.02
		RG_ER_RSC-06-M_20190424	<0.5	2.3	<0.02	2.1	<0.010	<0.2	<0.5	<0.02
		RG_ER_RSC-07-M_20190424	<0.5	1.8	<0.02	1.6	<0.010	<0.2	<0.5	<0.02
		RG_ER_RSC-08-M_20190424	<0.5	1.8	<0.02	2.7	<0.010	<0.2	1.4	<0.02
		RG_ER_RSC-09-M_20190424	<0.5	1.6	<0.02	5.3	0.020	<0.2	<0.5	<0.02
		RG_ER_RSC-10-M_20190424	<0.1	0.02	<0.02	<0.1	<0.010	<0.1	<0.5	<0.01
	RG_GC	RG_GC_RSC-01-M_20190425	<0.5	3.2	<0.02	0.6	0.020	<0.2	<0.5	<0.02
		RG_GC_RSC-02-M_20190425	<0.5	1.6	<0.02	2.0	0.010	<0.2	<0.5	<0.02
		RG_GC_RSC-03-M_20190425	<0.1	2.2	<0.02	3.2	0.020	<0.1	<0.5	<0.01
		RG_GC_RSC-04-M_20190425	<0.1	2.5	<0.02	2.0	<0.010	<0.1	<0.5	<0.01
		RG_GC_RSC-05-M_20190425	<0.5	2.6	<0.02	4.4	0.020	<0.2	<0.5	<0.02
		RG_GC_RSC-06-M_20190425	<0.5	3.5	<0.02	5.0	0.020	<0.2	<0.5	<0.02
		RG_GC_RSC-07-M_20190425	<0.5	1.9	<0.02	8.0	0.020	<0.2	<0.5	<0.02
		RG_GC_RSC-08-M_20190425	<0.1	1.8	<0.02	4.4	0.040	<0.1	<0.5	<0.01
		RG_GC_RSC-09-M_20190425	<0.5	2.3	<0.02	6.7	0.020	<0.2	<0.5	<0.02
		RG_GC_RSC-10-M_20190425	<0.1	1.6	<0.02	1.9	0.030	<0.1	<0.5	<0.01
BT	RG_SC	RG_SC-BT-01-M_20190424	<5.0	1.7	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_SC-BT-02-M_20190425	<5.0	1.9	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
	RG_GC	RG_GC-BT-01-M_20190426	<5.0	1.8	<0.02	1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-BT-02-M_20190426	<5.0	1.7	<0.02	1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-BT-03-M_20190426	<5.0	2.4	<0.02	2.0	<0.100	<2.0	8.0	<0.1
KO	RG_SC	RG_SC-KO-01-M_20190424	<5.0	1.7	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_SC-KO-02-M_20190424	<5.0	1.5	<0.02	<1.0	0.100	<2.0	<5.0	<0.1
		RG_SC-KO-03-M_20190424	<5.0	1.9	<0.02	<1.0	0.100	<2.0	<5.0	<0.1
		RG_SC-KO-04-M_20190424	<5.0	1.4	<0.02	<1.0	0.100	<2.0	<5.0	<0.1
		RG_SC-KO-05-M_20190424	<5.0	1.6	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_SC-KO-01_M_20190826	<5.0	1.6	<0.02	2.0	<0.100	<2.0	<5.0	<0.1
		RG_SC-KO-02_M_20190826	<5.0	1.6	<0.02	1.0	<0.100	<2.0	<5.0	<0.1
		RG_SC-KO-03_M_20190826	<5.0	1.6	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
	RG_ER	RG_ER-KO-01-M_20190424	<5.0	1.4	<0.02	2.0	<0.100	<2.0	<5.0	<0.1
		RG_ER-KO-02-M_20190424	<5.0	1.6	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_ER-KO-03-M_20190426	<5.0	1.4	<0.02	<1.0	0.100	<2.0	<5.0	<0.1
		RG_ER-KO-04-M_20190426	<5.0	1.3	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_ER-KO-05-M_20190426	<5.0	1.4	<0.02	3.0	<0.100	<2.0	<5.0	<0.1
		RG_ER-KO-06-M_20190426	<5.0	1.5	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_ER-KO-01_M_20190826	<5.0	1.8	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
MWF	RG_GC	RG_GC-MWF-01-M_20190425	<0.5	3.6	<0.02	1.4	0.050	<0.2	1.2	<0.02
		RG_GC-MWF-02-M_20190426	<5.0	1.5	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-MWF-03-M_20190426	<5.0	2.3	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-MWF-04-M_20190426	<5.0	2.3	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-MWF-05-M_20190426	<5.0	4.2	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-MWF-06-M_20190426	<5.0	1.8	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-MWF-07-M_20190426	<5.0	2.0	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
RBT	RG_GC	RG_GC-RBT-01-M_20190425	<5.0	0.8	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-RBT-02-M_20190426	<5.0	1.2	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
WCT	RG_SC	RG_SC-WCT-01-M_20190424	<5.0	2.8	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
	RG_GC	RG_GC-WCT-01-M_20190425	<5.0	3.6	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-WCT-02-M_20190426	<5.0	4.0	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-WCT-03-M_20190426	<5.0	2.1	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-WCT-04-M_20190426	<5.0	3.4	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_GC-WCT-05-M_20190426	<5.0	2.1	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1

Note: PCC - Peamouth Chub, RSC - Redside Shiner, BT - Bull Trout, KO - Kokanee, MWF - Mountain Whitefish, RBT - Rainbow Trout, WCT - Westslope Cutthroat Trout

Table H.7: Metal Concentrations (µg/g dry weight) in Fish Muscle Collected in Koocanusa Reservoir, 2019

Species	Area	Sample ID	Vanadium	Zinc
			µg/g dw	µg/g dw
PCC	RG_SC	RG_SC_PCC-01-M_20190424	<0.1	23
		RG_SC_PCC-02-M_20190424	<0.1	19
		RG_SC_PCC-03-M_20190424	<0.1	41
		RG_SC_PCC-04-M_20190424	<0.1	23
		RG_SC_PCC-05-M_20190424	<0.1	17
		RG_SC_PCC-06-M_20190424	<0.1	43
		RG_SC_PCC-07-M_20190424	<0.1	24
		RG_SC_PCC-08-M_20190424	<0.1	32
		RG_SC_PCC-09-M_20190424	<0.1	23
		RG_SC_PCC-10-M_20190424	<0.1	26
	RG_ER	RG_ER_PCC-01-M_20190423	<0.1	22
		RG_ER_PCC-02-M_20190423	<0.1	20
		RG_ER_PCC-03-M_20190424	<0.1	19
		RG_ER_PCC-04-M_20190423	<0.1	20
		RG_ER_PCC-05-M_20190423	<0.1	41
		RG_ER_PCC-06-M_20190423	<0.1	18
		RG_ER_PCC-07-M_20190424	<0.1	32
		RG_ER_PCC-08-M_20190424	<0.1	22
		RG_ER_PCC-09-M_20190424	<0.1	36
		RG_ER_PCC-10-M_20190424	<0.1	23
	RG_GC	RG_GC_PCC-01-M_20190425	<0.1	37
		RG_GC_PCC-02-M_20190425	<0.1	15
		RG_GC_PCC-03-M_20190425	<0.1	25
		RG_GC_PCC-04-M_20190425	<0.1	22
		RG_GC_PCC-05-M_20190425	<0.1	47
		RG_GC_PCC-06-M_20190425	<0.1	27
		RG_GC_PCC-07-M_20190425	<0.1	23
		RG_GC_PCC-08-M_20190425	<0.1	34
		RG_GC_PCC-09-M_20190425	<0.1	31
		RG_GC_PCC-10-M_20190425	<0.1	18
RSC	RG_SC	RG_SC_RSC-01-M_20190424	<0.2	48
		RG_SC_RSC-02-M_20190424	<0.2	70
		RG_SC_RSC-03-M_20190424	<0.2	28
		RG_SC_RSC-04-M_20190424	<0.2	58
		RG_SC_RSC-05-M_20190424	<0.2	27
		RG_SC_RSC-06-M_20190424	<0.2	38
		RG_SC_RSC-07-M_20190424	<0.2	47
		RG_SC_RSC-08-M_20190424	<0.2	35
		RG_SC_RSC-09-M_20190424	<0.2	36
		RG_SC_RSC-10-M_20190424	<0.2	82
	RG_ER	RG_ER_RSC-01-M_20190423	<0.2	38
		RG_ER_RSC-02-M_20190423	<0.2	21
		RG_ER_RSC-03-M_20190423	<0.2	88
		RG_ER_RSC-04-M_20190424	<0.2	25
		RG_ER_RSC-05-M_20190424	<0.2	62
		RG_ER_RSC-06-M_20190424	<0.2	40
		RG_ER_RSC-07-M_20190424	<0.2	18
		RG_ER_RSC-08-M_20190424	<0.2	54
		RG_ER_RSC-09-M_20190424	<0.2	55
		RG_ER_RSC-10-M_20190424	<0.2	<1
	RG_GC	RG_GC_RSC-01-M_20190425	<0.2	68
		RG_GC_RSC-02-M_20190425	<0.2	19
		RG_GC_RSC-03-M_20190425	<0.2	100
		RG_GC_RSC-04-M_20190425	<0.2	64
		RG_GC_RSC-05-M_20190425	<0.2	35
		RG_GC_RSC-06-M_20190425	<0.2	67
		RG_GC_RSC-07-M_20190425	<0.2	38
		RG_GC_RSC-08-M_20190425	<0.2	100
		RG_GC_RSC-09-M_20190425	<0.2	70
		RG_GC_RSC-10-M_20190425	<0.2	54
BT	RG_SC	RG_SC-BT-01-M_20190424	<1.0	<50
		RG_SC-BT-02-M_20190425	<1.0	<50
	RG_GC	RG_GC-BT-01-M_20190426	<1.0	<50
		RG_GC-BT-02-M_20190426	<1.0	<50
		RG_GC-BT-03-M_20190426	<1.0	<50
KO	RG_SC	RG_SC-KO-01-M_20190424	<1.0	<50
		RG_SC-KO-02-M_20190424	<1.0	<50
		RG_SC-KO-03-M_20190424	<1.0	<50
		RG_SC-KO-04-M_20190424	<1.0	<50
		RG_SC-KO-05-M_20190424	<1.0	<50
		RG_SC-KO-01_M_20190826	<1.0	110
		RG_SC-KO-02_M_20190826	<1.0	130
		RG_SC-KO-03_M_20190826	<1.0	120
	RG_ER	RG_ER-KO-01-M_20190424	<1.0	<50
		RG_ER-KO-02-M_20190424	<1.0	<50
		RG_ER-KO-03-M_20190426	<1.0	<50
		RG_ER-KO-04-M_20190426	<1.0	<50
		RG_ER-KO-05-M_20190426	<1.0	<50
		RG_ER-KO-06-M_20190426	<1.0	<50
		RG_ER-KO-01_M_20190826	<1.0	170
MWF	RG_GC	RG_GC-MWF-01-M_20190425	<0.2	22
		RG_GC-MWF-02-M_20190426	<1.0	<50
		RG_GC-MWF-03-M_20190426	<1.0	<50
		RG_GC-MWF-04-M_20190426	<1.0	<50
		RG_GC-MWF-05-M_20190426	<1.0	<50
		RG_GC-MWF-06-M_20190426	<1.0	<50
		RG_GC-MWF-07-M_20190426	<1.0	<50
RBT	RG_GC	RG_GC-RBT-01-M_20190425	<1.0	50
		RG_GC-RBT-02-M_20190426	<1.0	<50
WCT	RG_SC	RG_SC-WCT-01-M_20190424	<1.0	<50
	RG_GC	RG_GC-WCT-01-M_20190425	<1.0	<50
		RG_GC-WCT-02-M_20190426	<1.0	<50
		RG_GC-WCT-03-M_20190426	<1.0	<50
		RG_GC-WCT-04-M_20190426	<1.0	<50
		RG_GC-WCT-05-M_20190426	<1.0	<50

Note: PCC - Peamouth Chub, RSC - Redside Shiner, BT - Bull Trout, KO - Kokanee, MWF - Mountain Whitefish, RBT - Rainbow Trout, WCT - Westslope Cutthroat Trout

Table H.8: Metal Concentrations (µg/g dry weight) in Fish Ovaries Collected in Koocanusa Reservoir, 2019

Species	Area	Sample ID	Moisture	Aluminum	Antimony	Arsenic	Barium	Beryllium
			%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
PCC	RG_SC	RG_SC_PCC-01-O_20190424	64.6	160	0.02	0.3	4.3	<0.01
		RG_SC_PCC-02-O_20190424	69.5	8	<0.01	0.4	1.5	<0.01
		RG_SC_PCC-03-O_20190424	62.7	140	0.01	0.3	2.6	<0.01
		RG_SC_PCC-04-O_20190424	62.4	6	<0.01	0.2	0.9	<0.01
		RG_SC_PCC-05-O_20190424	60.8	3	<0.01	0.3	0.8	<0.01
		RG_SC_PCC-06-O_20190424	73.0	96	0.02	0.3	2.6	<0.01
		RG_SC_PCC-07-O_20190424	72.3	8	<0.01	0.1	0.8	<0.01
		RG_SC_PCC-08-O_20190424	69.5	6	<0.01	0.1	3.2	<0.01
		RG_SC_PCC-09-O_20190424	66.6	13	0.01	0.3	1.5	<0.01
		RG_SC_PCC-10-O_20190424	67.3	13	<0.01	0.5	1.0	<0.01
	RG_ER	RG_ER_PCC-01-O_20190423	60.4	4	<0.01	0.5	0.8	<0.01
		RG_ER_PCC-02-O_20190423	62.4	5	<0.01	0.3	0.5	<0.01
		RG_ER_PCC-03-O_20190425	60.4	3	<0.01	0.5	0.7	<0.01
		RG_ER_PCC-04-O_20190423	62.2	4	<0.01	0.2	0.8	<0.01
		RG_ER_PCC-05-O_20190423	63.7	9	<0.01	0.3	0.7	<0.01
		RG_ER_PCC-06-O_20190423	61.2	6	<0.01	0.2	1.0	<0.01
		RG_ER_PCC-07-O_20190424	63.2	<2	<0.01	0.4	1.0	<0.01
		RG_ER_PCC-08-O_20190424	60.2	<2	<0.01	0.4	0.4	<0.01
		RG_ER_PCC-09-O_20190424	65.4	7	<0.01	0.3	0.9	<0.01
		RG_ER_PCC-10-O_20190424	63.2	4	<0.01	0.4	0.7	<0.01
	RG_GC	RG_GC_PCC-01-O_20190425	74.2	8	<0.01	0.1	0.5	<0.01
		RG_GC_PCC-02-O_20190425	64.1	3	<0.01	0.2	1.9	<0.01
		RG_GC_PCC-03-O_20190425	63.4	7	<0.01	0.4	0.8	<0.01
		RG_GC_PCC-04-O_20190425	74.8	6	<0.01	0.2	1.8	<0.01
		RG_GC_PCC-05-O_20190425	70.8	6	<0.01	0.4	1.0	<0.01
		RG_GC_PCC-06-O_20190425	67.7	2	<0.01	0.2	0.8	<0.01
		RG_GC_PCC-07-O_20190425	76.0	12	<0.01	0.7	8.5	<0.01
		RG_GC_PCC-08-O_20190425	67.4	4	<0.01	0.4	1.3	<0.01
		RG_GC_PCC-09-O_20190425	74.8	9	<0.01	0.5	1.4	<0.01
		RG_GC_PCC-10-O_20190425	78.8	11	<0.01	0.4	3.7	<0.01
RSC	RG_SC	RG_SC_RSC-01-O_20190424	75.0	5	<0.02	0.2	1.2	<0.02
		RG_SC_RSC-02-O_20190424	72.8	6	<0.02	0.2	0.4	<0.02
		RG_SC_RSC-03-O_20190424	75.5	18	<0.02	0.3	1.2	<0.02
		RG_SC_RSC-04-O_20190424	75.2	6	<0.02	0.2	1.0	<0.02
		RG_SC_RSC-05-O_20190424	74.5	28	<0.02	0.4	1.6	<0.02
		RG_SC_RSC-06-O_20190424	74.0	44	<0.02	0.4	2.0	<0.02
		RG_SC_RSC-07-O_20190424	73.5	12	<0.02	0.3	0.6	<0.02
		RG_SC_RSC-08-O_20190424	74.4	<5	<0.02	0.3	0.6	<0.02
		RG_SC_RSC-09-O_20190424	67.1	<50	<0.1	<0.5	<5	<0.02
		RG_SC_RSC-10-O_20190424	75.5	16	<0.02	0.2	0.8	<0.02
	RG_ER	RG_ER_RSC-01-O_20190423	71.4	51	<0.02	0.7	2.4	<0.02
		RG_ER_RSC-02-O_20190423	77.0	17	<0.02	0.3	1.6	<0.02
		RG_ER_RSC-03-O_20190423	71.0	17	<0.02	0.6	1.6	<0.02
		RG_ER_RSC-04-O_20190423	75.4	13	<0.02	0.3	1.3	<0.02
		RG_ER_RSC-05-O_20190424	74.8	21	0.06	0.4	1.3	<0.02
		RG_ER_RSC-06-O_20190424	74.7	16	0.03	0.2	1.7	<0.02
		RG_ER_RSC-07-O_20190424	75.4	8	<0.02	0.3	1.2	<0.02
		RG_ER_RSC-08-O_20190424	75.4	8	<0.02	0.3	1.4	<0.02
		RG_ER_RSC-09-O_20190424	74.9	<5	<0.02	0.2	3.4	<0.02
		RG_ER_RSC-10-O_20190424	75.8	35	0.02	0.3	1.9	<0.02
	RG_GC	RG_GC_RSC-01-O_20190425	74.3	<5	<0.02	0.1	1.2	<0.02
		RG_GC_RSC-02-O_20190425	75.3	110	<0.02	0.2	1.6	<0.02
		RG_GC_RSC-03-O_20190425	75.4	7	<0.02	0.1	0.4	<0.02
		RG_GC_RSC-04-O_20190425	75.8	<5	<0.02	0.1	0.9	<0.02
		RG_GC_RSC-05-O_20190425	75.3	20	<0.02	0.3	3.7	<0.02
		RG_GC_RSC-06-O_20190425	75.3	<5	<0.02	0.2	1.4	<0.02
		RG_GC_RSC-07-O_20190425	75.6	8	<0.02	0.2	1.7	<0.02
		RG_GC_RSC-08-O_20190425	75.3	17	<0.02	0.2	0.8	<0.02
		RG_GC_RSC-09-O_20190425	74.7	7	<0.02	0.3	1.6	<0.02
		RG_GC_RSC-10-O_20190425	71.7	<5	<0.02	0.7	1.9	<0.02

Note: PCC - Peamouth Chub, RSC - Redside Shiner

Table H.8: Metal Concentrations (µg/g dry weight) in Fish Ovaries Collected in Koocanusa Reservoir, 2019

Species	Area	Sample ID	Boron	Cadmium	Chromium	Cobalt	Copper	Iron
			µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
PCC	RG_SC	RG_SC_PCC-01-O_20190424	<1	0.1	0.2	0.11	4.4	180
		RG_SC_PCC-02-O_20190424	<1	0.02	0.06	0.08	2.9	75
		RG_SC_PCC-03-O_20190424	<1	<0.01	0.17	0.11	3.7	140
		RG_SC_PCC-04-O_20190424	<1	0.03	<0.05	0.06	3.1	35
		RG_SC_PCC-05-O_20190424	<1	<0.01	<0.05	0.05	2.9	36
		RG_SC_PCC-06-O_20190424	<1	0.02	0.17	0.1	4.0	160
		RG_SC_PCC-07-O_20190424	<1	0.02	<0.05	0.09	3.5	100
		RG_SC_PCC-08-O_20190424	<1	0.03	<0.05	0.07	2.1	110
		RG_SC_PCC-09-O_20190424	<1	0.02	0.06	0.09	4.1	100
		RG_SC_PCC-10-O_20190424	<1	0.01	<0.05	0.05	2.7	68
	RG_ER	RG_ER_PCC-01-O_20190423	<1	<0.01	<0.05	0.05	3.0	45
		RG_ER_PCC-02-O_20190423	<1	<0.01	<0.05	0.06	2.9	52
		RG_ER_PCC-03-O_20190425	<1	<0.01	<0.05	0.05	2.6	50
		RG_ER_PCC-04-O_20190423	<1	<0.01	<0.05	0.07	2.9	53
		RG_ER_PCC-05-O_20190423	<1	<0.01	<0.05	0.07	3.3	63
		RG_ER_PCC-06-O_20190423	<1	<0.01	<0.05	0.07	2.8	48
		RG_ER_PCC-07-O_20190424	<1	0.01	<0.05	0.05	2.6	47
		RG_ER_PCC-08-O_20190424	<1	<0.01	<0.05	0.06	2.7	41
		RG_ER_PCC-09-O_20190424	<1	0.01	<0.05	0.05	2.1	57
		RG_ER_PCC-10-O_20190424	<1	0.01	<0.05	0.05	2.6	54
	RG_GC	RG_GC_PCC-01-O_20190425	<1	0.02	0.44	0.28	2.2	170
		RG_GC_PCC-02-O_20190425	<1	<0.01	<0.05	0.05	3.7	66
		RG_GC_PCC-03-O_20190425	<1	0.03	<0.05	0.05	2.8	55
		RG_GC_PCC-04-O_20190425	<1	0.04	<0.05	0.1	4.2	110
		RG_GC_PCC-05-O_20190425	<1	0.02	0.09	0.07	3.4	74
		RG_GC_PCC-06-O_20190425	<1	<0.01	<0.05	0.06	3.0	69
		RG_GC_PCC-07-O_20190425	<1	0.09	0.15	0.07	3.3	150
		RG_GC_PCC-08-O_20190425	<1	0.03	0.15	0.09	3.1	75
		RG_GC_PCC-09-O_20190425	<1	0.02	<0.05	0.06	3.7	110
		RG_GC_PCC-10-O_20190425	<1	0.06	0.17	0.11	5.4	120
RSC	RG_SC	RG_SC_RSC-01-O_20190424	<2	0.02	<0.1	0.11	6.2	98
		RG_SC_RSC-02-O_20190424	<2	<0.02	<0.1	0.07	5.5	110
		RG_SC_RSC-03-O_20190424	<5	0.02	<0.5	<0.5	6.5	140
		RG_SC_RSC-04-O_20190424	<5	0.02	<0.5	<0.5	5.9	120
		RG_SC_RSC-05-O_20190424	<5	<0.02	2.6	<0.5	7.4	160
		RG_SC_RSC-06-O_20190424	<5	0.05	1.4	<0.5	6.5	170
		RG_SC_RSC-07-O_20190424	<2	<0.02	2.6	0.11	6.6	120
		RG_SC_RSC-08-O_20190424	<5	<0.02	<0.5	<0.5	5.4	130
		RG_SC_RSC-09-O_20190424	<50	<0.02	<5	<5	5.0	150
		RG_SC_RSC-10-O_20190424	<5	0.02	0.9	<0.5	7.2	140
	RG_ER	RG_ER_RSC-01-O_20190423	<5	0.06	0.5	<0.5	7.5	180
		RG_ER_RSC-02-O_20190423	<5	0.04	<0.5	<0.5	7.3	120
		RG_ER_RSC-03-O_20190423	<5	0.08	<0.5	<0.5	6.1	110
		RG_ER_RSC-04-O_20190423	<5	0.03	<0.5	<0.5	6.1	140
		RG_ER_RSC-05-O_20190424	<5	<0.02	<0.5	<0.5	5.2	150
		RG_ER_RSC-06-O_20190424	<2	0.03	0.1	0.14	4.6	130
		RG_ER_RSC-07-O_20190424	<5	<0.02	<0.5	<0.5	5.3	110
		RG_ER_RSC-08-O_20190424	<5	0.02	<0.5	<0.5	5.9	110
		RG_ER_RSC-09-O_20190424	<2	0.05	<0.1	0.09	6.2	130
		RG_ER_RSC-10-O_20190424	<5	0.08	<0.5	<0.5	6.0	140
	RG_GC	RG_GC_RSC-01-O_20190425	<2	0.03	<0.1	0.08	6.7	150
		RG_GC_RSC-02-O_20190425	<2	0.02	0.2	0.11	4.7	300
		RG_GC_RSC-03-O_20190425	<2	<0.02	0.2	0.11	5.9	140
		RG_GC_RSC-04-O_20190425	<5	0.02	<0.5	<0.5	4.0	170
		RG_GC_RSC-05-O_20190425	<5	0.14	0.6	<0.5	6.5	230
		RG_GC_RSC-06-O_20190425	<2	0.06	<0.1	0.09	7.0	120
		RG_GC_RSC-07-O_20190425	<5	0.02	<0.5	<0.5	6.0	130
		RG_GC_RSC-08-O_20190425	<5	0.03	<0.5	<0.5	5.0	160
		RG_GC_RSC-09-O_20190425	<2	0.05	<0.1	0.09	6.0	130
		RG_GC_RSC-10-O_20190425	<5	0.03	<0.5	<0.5	5.6	97

Note: PCC - Peamouth Chub, RSC - Redside Shiner

Table H.8: Metal Concentrations (µg/g dry weight) in Fish Ovaries Collected in Koocanusa Reservoir, 2019

Species	Area	Sample ID	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium
			ug/g	ug/g	ug/g	µg/g dw	µg/g dw	µg/g dw
PCC	RG_SC	RG_SC_PCC-01-O_20190424	0.18	9.1	0.025	0.10	0.19	10
		RG_SC_PCC-02-O_20190424	0.08	11	0.035	0.20	<0.05	21
		RG_SC_PCC-03-O_20190424	0.12	9.5	0.012	0.09	0.14	7.3
		RG_SC_PCC-04-O_20190424	0.03	4.2	0.014	0.10	<0.05	12
		RG_SC_PCC-05-O_20190424	0.02	5.0	0.013	0.08	<0.05	12
		RG_SC_PCC-06-O_20190424	0.14	13	0.052	0.21	0.25	13
		RG_SC_PCC-07-O_20190424	0.03	8.1	0.035	0.23	<0.05	16
		RG_SC_PCC-08-O_20190424	0.06	5.4	0.049	0.14	<0.05	12
		RG_SC_PCC-09-O_20190424	0.05	7.5	0.034	0.15	0.29	8.8
		RG_SC_PCC-10-O_20190424	0.04	4.8	0.030	0.15	<0.05	11
	RG_ER	RG_ER_PCC-01-O_20190423	0.03	3.6	0.016	0.09	0.12	5.4
		RG_ER_PCC-02-O_20190423	0.05	4.7	0.014	0.08	0.2	7.4
		RG_ER_PCC-03-O_20190425	0.02	5.2	0.021	0.08	<0.05	6.1
		RG_ER_PCC-04-O_20190423	0.01	4.8	0.021	0.08	<0.05	11.2
		RG_ER_PCC-05-O_20190423	0.05	5.6	0.018	0.10	<0.05	8.3
		RG_ER_PCC-06-O_20190423	0.03	3.5	0.007	0.07	<0.05	9.5
		RG_ER_PCC-07-O_20190424	<0.01	3.1	0.025	0.08	<0.05	6.5
		RG_ER_PCC-08-O_20190424	<0.01	4.3	0.019	0.07	<0.05	6.0
		RG_ER_PCC-09-O_20190424	0.02	7.0	0.024	0.12	<0.05	6.4
		RG_ER_PCC-10-O_20190424	<0.01	4.5	0.017	0.11	<0.05	8.3
	RG_GC	RG_GC_PCC-01-O_20190425	0.03	4.7	0.045	0.27	0.1	18
		RG_GC_PCC-02-O_20190425	<0.01	5.6	0.051	0.09	<0.05	12
		RG_GC_PCC-03-O_20190425	<0.01	5.1	0.027	0.10	<0.05	6.5
		RG_GC_PCC-04-O_20190425	<0.01	15	0.064	0.24	<0.05	12
		RG_GC_PCC-05-O_20190425	0.01	14	0.040	0.17	<0.05	14
		RG_GC_PCC-06-O_20190425	<0.01	5.7	0.028	0.12	<0.05	10
		RG_GC_PCC-07-O_20190425	0.02	7.6	0.042	0.19	<0.05	14
		RG_GC_PCC-08-O_20190425	<0.01	7.3	0.035	0.16	<0.05	9.3
		RG_GC_PCC-09-O_20190425	0.02	13	0.044	0.16	<0.05	18
		RG_GC_PCC-10-O_20190425	0.11	18	0.057	0.21	0.08	23
RSC	RG_SC	RG_SC_RSC-01-O_20190424	0.07	11	0.03	0.19	<0.1	20
		RG_SC_RSC-02-O_20190424	0.03	10	0.03	0.14	<0.1	7.6
		RG_SC_RSC-03-O_20190424	0.19	4.9	0.04	0.17	<0.5	17
		RG_SC_RSC-04-O_20190424	<0.05	10	0.03	0.15	<0.5	15
		RG_SC_RSC-05-O_20190424	<0.05	5.8	0.03	0.15	1	12
		RG_SC_RSC-06-O_20190424	<0.05	6.4	0.04	0.16	0.7	12
		RG_SC_RSC-07-O_20190424	<0.02	11	0.03	0.18	1.1	16
		RG_SC_RSC-08-O_20190424	<0.05	8.2	0.03	0.16	<0.5	8.4
		RG_SC_RSC-09-O_20190424	<0.5	9	0.05	<0.5	<5.0	17
		RG_SC_RSC-10-O_20190424	<0.05	10	0.04	0.15	<0.5	8.8
	RG_ER	RG_ER_RSC-01-O_20190423	0.10	9.3	0.03	0.18	<0.5	11
		RG_ER_RSC-02-O_20190423	<0.05	8.7	0.03	0.21	<0.5	18
		RG_ER_RSC-03-O_20190423	0.05	6.1	0.03	0.10	<0.5	22
		RG_ER_RSC-04-O_20190423	<0.05	6.6	0.03	0.16	<0.5	8.6
		RG_ER_RSC-05-O_20190424	0.10	8.2	0.03	0.19	<0.5	11
		RG_ER_RSC-06-O_20190424	0.04	8.5	0.02	0.15	<0.1	15
		RG_ER_RSC-07-O_20190424	<0.05	14	0.02	0.20	<0.5	11
		RG_ER_RSC-08-O_20190424	<0.05	15	0.03	0.16	<0.5	18
		RG_ER_RSC-09-O_20190424	0.02	7.8	0.03	0.15	<0.1	9.4
		RG_ER_RSC-10-O_20190424	0.07	8.6	0.03	0.14	<0.5	13
	RG_GC	RG_GC_RSC-01-O_20190425	<0.02	8.5	0.03	0.14	0.3	17
		RG_GC_RSC-02-O_20190425	<0.02	7.8	0.04	0.18	<0.1	18
		RG_GC_RSC-03-O_20190425	0.04	5.3	0.02	0.18	<0.1	33
		RG_GC_RSC-04-O_20190425	<0.05	6.0	0.02	0.2	<0.5	12
		RG_GC_RSC-05-O_20190425	0.12	10	0.04	0.21	<0.5	20
		RG_GC_RSC-06-O_20190425	0.02	5.6	0.02	0.18	<0.1	14
		RG_GC_RSC-07-O_20190425	<0.05	6.9	0.04	0.15	<0.5	28
		RG_GC_RSC-08-O_20190425	<0.05	11	0.02	0.20	<0.5	11
		RG_GC_RSC-09-O_20190425	0.02	6.0	0.02	0.18	<0.1	8.3
		RG_GC_RSC-10-O_20190425	<0.05	7.5	0.02	0.19	<0.5	7.5

Note: PCC - Peamouth Chub, RSC - Redside Shiner

Table H.8: Metal Concentrations (µg/g dry weight) in Fish Ovaries Collected in Koocanusa Reservoir, 2019

Species	Area	Sample ID	Silver	Strontium	Thallium	Tin	Titanium	Uranium
			µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
PCC	RG_SC	RG_SC_PCC-01-O_20190424	0.04	1.6	0.016	<0.05	2.7	0.009
		RG_SC_PCC-02-O_20190424	0.02	0.5	0.021	<0.05	0.3	<0.005
		RG_SC_PCC-03-O_20190424	0.02	1.4	0.005	<0.05	2.3	0.006
		RG_SC_PCC-04-O_20190424	0.03	0.3	0.008	<0.05	<0.2	<0.005
		RG_SC_PCC-05-O_20190424	0.01	0.3	0.014	<0.05	<0.2	<0.005
		RG_SC_PCC-06-O_20190424	0.02	1.3	0.032	<0.05	1.7	<0.005
		RG_SC_PCC-07-O_20190424	0.02	0.5	0.021	<0.05	0.2	<0.005
		RG_SC_PCC-08-O_20190424	0.03	0.4	<0.005	<0.05	<0.2	0.009
		RG_SC_PCC-09-O_20190424	0.02	0.5	0.010	<0.05	0.3	<0.005
		RG_SC_PCC-10-O_20190424	0.02	0.6	0.016	<0.05	0.2	<0.005
	RG_ER	RG_ER_PCC-01-O_20190423	0.01	0.3	0.006	<0.05	<0.2	<0.005
		RG_ER_PCC-02-O_20190423	0.02	0.2	0.008	<0.05	0.3	<0.005
		RG_ER_PCC-03-O_20190425	0.01	0.2	0.010	<0.05	<0.2	<0.005
		RG_ER_PCC-04-O_20190423	0.02	0.2	0.008	<0.05	<0.2	<0.005
		RG_ER_PCC-05-O_20190423	0.02	0.3	0.010	<0.05	0.3	<0.005
		RG_ER_PCC-06-O_20190423	0.02	0.2	0.006	<0.05	<0.2	<0.005
		RG_ER_PCC-07-O_20190424	0.01	0.4	0.010	<0.05	<0.2	<0.005
		RG_ER_PCC-08-O_20190424	0.01	0.2	0.007	<0.05	<0.2	<0.005
		RG_ER_PCC-09-O_20190424	<0.01	0.3	0.014	<0.05	<0.2	<0.005
		RG_ER_PCC-10-O_20190424	0.01	0.3	0.012	<0.05	<0.2	<0.005
	RG_GC	RG_GC_PCC-01-O_20190425	0.02	0.4	0.006	<0.05	<0.2	<0.005
		RG_GC_PCC-02-O_20190425	0.02	0.3	0.012	<0.05	<0.2	<0.005
		RG_GC_PCC-03-O_20190425	0.01	0.3	0.017	<0.05	0.2	<0.005
		RG_GC_PCC-04-O_20190425	0.02	0.5	0.045	<0.05	<0.2	<0.005
		RG_GC_PCC-05-O_20190425	<0.01	0.4	0.024	<0.05	0.3	<0.005
		RG_GC_PCC-06-O_20190425	0.01	0.3	0.014	<0.05	<0.2	<0.005
		RG_GC_PCC-07-O_20190425	0.02	0.6	0.034	<0.05	0.3	<0.005
		RG_GC_PCC-08-O_20190425	0.01	0.4	0.022	<0.05	0.5	<0.005
		RG_GC_PCC-09-O_20190425	0.01	0.5	0.044	<0.05	0.3	<0.005
		RG_GC_PCC-10-O_20190425	0.02	0.6	0.047	<0.05	0.3	<0.005
RSC	RG_SC	RG_SC_RSC-01-O_20190424	0.02	0.6	0.020	<0.1	<0.5	<0.01
		RG_SC_RSC-02-O_20190424	<0.02	0.5	0.020	<0.1	<0.5	<0.01
		RG_SC_RSC-03-O_20190424	0.03	0.7	0.020	<0.2	1.1	<0.02
		RG_SC_RSC-04-O_20190424	0.04	0.5	0.030	<0.2	<0.5	<0.02
		RG_SC_RSC-05-O_20190424	0.02	0.7	0.030	<0.2	0.5	<0.02
		RG_SC_RSC-06-O_20190424	0.02	1.2	0.030	<0.2	0.6	<0.02
		RG_SC_RSC-07-O_20190424	0.03	0.5	0.020	<0.1	0.5	<0.01
		RG_SC_RSC-08-O_20190424	0.03	0.5	0.030	<0.2	<0.5	<0.02
		RG_SC_RSC-09-O_20190424	<0.02	<1.0	<0.100	<2.0	<5.0	<0.1
		RG_SC_RSC-10-O_20190424	0.03	0.7	0.020	<0.2	<0.5	<0.02
	RG_ER	RG_ER_RSC-01-O_20190423	0.02	0.9	0.020	<0.2	3.1	<0.02
		RG_ER_RSC-02-O_20190423	0.04	0.6	0.010	<0.2	<0.5	<0.02
		RG_ER_RSC-03-O_20190423	0.03	1.0	0.020	<0.2	1.2	<0.02
		RG_ER_RSC-04-O_20190423	0.02	0.9	0.020	<0.2	<0.5	<0.02
		RG_ER_RSC-05-O_20190424	<0.02	0.8	0.020	<0.2	3.8	<0.02
		RG_ER_RSC-06-O_20190424	0.02	0.7	0.030	<0.1	<0.5	<0.01
		RG_ER_RSC-07-O_20190424	0.02	0.6	0.020	<0.2	<0.5	<0.02
		RG_ER_RSC-08-O_20190424	0.02	0.6	0.010	<0.2	<0.5	<0.02
		RG_ER_RSC-09-O_20190424	0.04	1.0	0.020	<0.1	<0.5	<0.01
		RG_ER_RSC-10-O_20190424	0.02	0.8	0.020	<0.2	5.4	<0.02
	RG_GC	RG_GC_RSC-01-O_20190425	0.06	0.6	0.040	<0.1	<0.5	<0.01
		RG_GC_RSC-02-O_20190425	<0.02	1.2	0.030	<0.1	3.8	<0.01
		RG_GC_RSC-03-O_20190425	0.02	0.6	0.030	<0.1	<0.5	<0.01
		RG_GC_RSC-04-O_20190425	<0.02	0.5	0.020	<0.2	<0.5	<0.02
		RG_GC_RSC-05-O_20190425	0.02	8.7	0.040	<0.2	0.8	<0.02
		RG_GC_RSC-06-O_20190425	0.03	0.6	0.040	<0.1	<0.5	<0.01
		RG_GC_RSC-07-O_20190425	<0.02	0.6	0.040	<0.2	<0.5	<0.02
		RG_GC_RSC-08-O_20190425	<0.02	0.6	0.040	<0.2	0.7	<0.02
		RG_GC_RSC-09-O_20190425	0.05	0.5	0.040	<0.1	<0.5	<0.01
		RG_GC_RSC-10-O_20190425	<0.02	0.5	0.040	<0.2	<0.5	<0.02

Note: PCC - Peamouth Chub, RSC - Redside Shiner

Table H.8: Metal Concentrations (µg/g dry weight) in Fish Ovaries Collected in Koocanusa Reservoir, 2019

Species	Area	Sample ID	Vanadium	Zinc
			µg/g dw	µg/g dw
PCC	RG_SC	RG_SC_PCC-01-O_20190424	0.2	110
		RG_SC_PCC-02-O_20190424	<0.1	110
		RG_SC_PCC-03-O_20190424	0.2	99
		RG_SC_PCC-04-O_20190424	<0.1	90
		RG_SC_PCC-05-O_20190424	<0.1	81
		RG_SC_PCC-06-O_20190424	0.1	170
		RG_SC_PCC-07-O_20190424	<0.1	150
		RG_SC_PCC-08-O_20190424	<0.1	120
		RG_SC_PCC-09-O_20190424	<0.1	120
		RG_SC_PCC-10-O_20190424	<0.1	120
	RG_ER	RG_ER_PCC-01-O_20190423	<0.1	100
		RG_ER_PCC-02-O_20190423	<0.1	86
		RG_ER_PCC-03-O_20190425	<0.1	88
		RG_ER_PCC-04-O_20190423	<0.1	100
		RG_ER_PCC-05-O_20190423	<0.1	100
		RG_ER_PCC-06-O_20190423	<0.1	86
		RG_ER_PCC-07-O_20190424	<0.1	100
		RG_ER_PCC-08-O_20190424	<0.1	86
		RG_ER_PCC-09-O_20190424	<0.1	120
		RG_ER_PCC-10-O_20190424	<0.1	88
	RG_GC	RG_GC_PCC-01-O_20190425	<0.1	160
		RG_GC_PCC-02-O_20190425	<0.1	86
		RG_GC_PCC-03-O_20190425	<0.1	100
		RG_GC_PCC-04-O_20190425	<0.1	130
		RG_GC_PCC-05-O_20190425	<0.1	120
		RG_GC_PCC-06-O_20190425	<0.1	94
		RG_GC_PCC-07-O_20190425	<0.1	280
		RG_GC_PCC-08-O_20190425	<0.1	120
		RG_GC_PCC-09-O_20190425	<0.1	200
		RG_GC_PCC-10-O_20190425	<0.1	210
RSC	RG_SC	RG_SC_RSC-01-O_20190424	<0.2	230
		RG_SC_RSC-02-O_20190424	<0.2	150
		RG_SC_RSC-03-O_20190424	<0.2	210
		RG_SC_RSC-04-O_20190424	<0.2	200
		RG_SC_RSC-05-O_20190424	<0.2	250
		RG_SC_RSC-06-O_20190424	<0.2	240
		RG_SC_RSC-07-O_20190424	<0.2	160
		RG_SC_RSC-08-O_20190424	<0.2	190
		RG_SC_RSC-09-O_20190424	<1.0	240
		RG_SC_RSC-10-O_20190424	<0.2	140
	RG_ER	RG_ER_RSC-01-O_20190423	0.2	280
		RG_ER_RSC-02-O_20190423	<0.2	280
		RG_ER_RSC-03-O_20190423	<0.2	260
		RG_ER_RSC-04-O_20190423	<0.2	230
		RG_ER_RSC-05-O_20190424	<0.2	220
		RG_ER_RSC-06-O_20190424	<0.2	260
		RG_ER_RSC-07-O_20190424	<0.2	240
		RG_ER_RSC-08-O_20190424	<0.2	240
		RG_ER_RSC-09-O_20190424	<0.2	220
		RG_ER_RSC-10-O_20190424	<0.2	270
	RG_GC	RG_GC_RSC-01-O_20190425	<0.2	200
		RG_GC_RSC-02-O_20190425	0.3	270
		RG_GC_RSC-03-O_20190425	<0.2	180
		RG_GC_RSC-04-O_20190425	<0.2	250
		RG_GC_RSC-05-O_20190425	<0.2	250
		RG_GC_RSC-06-O_20190425	<0.2	220
		RG_GC_RSC-07-O_20190425	<0.2	240
		RG_GC_RSC-08-O_20190425	<0.2	180
		RG_GC_RSC-09-O_20190425	<0.2	230
		RG_GC_RSC-10-O_20190425	<0.2	230

Note: PCC - Peamouth Chub, RSC - Redside Shiner

Table H.9: Selenium Concentrations (mg/kg wet weight) in Benthic Invertebrates Collected from Montana, 2019

Area	Month	Station ID	Selenium
			mg/kg ww
Rexford	May	RG_RFBL	2.00
		RG_RFDO	1.95
		RG_RFMSO	1.45
		RG_RFMU	0.901
		RG_RFNSO	1.20
		RG_RFTO	1.83
		RG_RFTON	2.62
		RG_RFYO	2.89
	September	Rexford Surface Tow	0.071
		RG_RFBL	0.667
		RG_RFDO	1.11
		RG_RFMSO	0.839
		RG_RFMU	0.561
		RG_RFNSO	1.07
		RG_RFTO	3.30
		RG_RFTON	0.431
		RG_RFYO	1.66
Tenmile	May	RG_TMBA	3.58
		RG_TMBB	1.98
		RG_TMCA	0.892
		RG_TMJA	1.41
		RG_TMNB	2.21
		RG_TMSB	2.54
		RG_TMSP	1.16
		RG_TMWA	1.05

Table H.10: **Metal Concentrations (µg/g dry weight) in Fish Muscle Collected at Rexford Area, 2019**

Species	Month	Sample ID	Total Solids	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum
			%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Bull Trout	May	Rexford-BT-01	24.5	1.93	≤ 0.022	0.142	0.057	≤ 0.057	≤ 3.72	≤ 0.0080	≤ 0.176	≤ 0.020	0.909	14.8	≤ 0.018	0.271	1.13	≤ 0.016
		Rexford-BT-02	24.6	1.71	≤ 0.022	0.936	0.040	≤ 0.057	≤ 3.72	≤ 0.0080	≤ 0.176	0.062	1.29	12.2	≤ 0.018	0.269	0.501	≤ 0.016
		Rexford-BT-03	14.4	3.54	≤ 0.037	0.331	0.146	≤ 0.097	≤ 6.35	≤ 0.013	≤ 0.301	≤ 0.033	1.26	20.00	≤ 0.030	0.474	0.217	≤ 0.027
		Rexford-BT-04	24.6	2.15	≤ 0.019	0.217	0.082	≤ 0.051	≤ 3.33	≤ 0.0070	1.16	0.033	1.04	22.2	≤ 0.016	0.390	0.581	≤ 0.014
		Rexford-BT-05	25.6	4.12	≤ 0.020	0.505	0.061	≤ 0.052	≤ 3.39	≤ 0.0070	≤ 0.161	0.022	1.50	16.7	≤ 0.016	0.415	0.364	≤ 0.014
		Rexford-BT-06	23.8	1.77	≤ 0.023	0.211	≤ 0.038	≤ 0.061	≤ 3.99	≤ 0.0080	≤ 0.189	0.023	1.39	12.9	≤ 0.019	0.289	0.373	≤ 0.017
		Rexford-BT-07	23.4	2.65	≤ 0.022	0.144	0.071	≤ 0.057	≤ 3.76	≤ 0.0080	≤ 0.178	≤ 0.020	0.795	10.3	≤ 0.018	0.280	0.709	≤ 0.016
		Rexford-BT-08	21.1	1.56	≤ 0.025	0.351	≤ 0.040	≤ 0.065	≤ 4.24	≤ 0.0090	≤ 0.201	0.027	0.844	11.9	≤ 0.020	0.336	0.471	≤ 0.018
Largescale Sucker	May	Rexford-CSU-01	19.9	4.90	≤ 0.026	0.298	0.336	≤ 0.069	≤ 4.53	0.035	≤ 0.214	0.040	2.66	25.4	≤ 0.021	0.456	0.480	≤ 0.019
		Rexford-CSU-02	19.7	3.98	≤ 0.025	0.295	1.20	≤ 0.065	≤ 4.24	0.012	≤ 0.201	0.040	1.57	16.7	0.032	2.05	1.03	≤ 0.018
		Rexford-CSU-03	18.7	4.10	≤ 0.027	0.207	0.229	≤ 0.071	≤ 4.66	0.013	≤ 0.221	0.040	1.31	12.9	≤ 0.022	0.532	0.746	≤ 0.020
		Rexford-CSU-04	16.7	5.42	≤ 0.027	0.366	0.683	≤ 0.072	≤ 4.70	≤ 0.010	≤ 0.223	0.035	1.19	13.9	≤ 0.022	0.974	0.937	≤ 0.020
		Rexford-CSU-05	19.2	6.35	≤ 0.027	0.224	0.241	≤ 0.071	≤ 4.65	≤ 0.010	≤ 0.220	0.035	1.17	14.3	≤ 0.022	0.401	0.881	≤ 0.020
		Rexford-CSU-06	20.5	8.89	≤ 0.024	0.371	0.813	≤ 0.062	≤ 4.08	0.018	≤ 0.193	0.048	1.41	25.9	0.041	1.58	0.620	≤ 0.017
		Rexford-CSU-07	18.2	20.80	≤ 0.027	0.408	1.49	≤ 0.072	≤ 4.69	0.017	≤ 0.222	0.073	2.38	53.2	0.054	2.76	0.486	≤ 0.020
		Rexford-CSU-08	18.3	6.72	≤ 0.028	0.218	0.703	≤ 0.073	≤ 4.76	≤ 0.010	≤ 0.225	0.027	0.956	18.9	0.028	1.23	0.919	≤ 0.020
	September	RG_REX_CSU-M-01	19.6	1.93	≤ 0.028	0.080	2.82	≤ 0.074	≤ 4.85	≤ 0.010	≤ 0.230	0.030	1.15	1.15	0.029	3.51	0.551	≤ 0.036
		RG_REX_CSU-M-02	18.2	1.71	≤ 0.030	0.118	1.28	≤ 0.079	≤ 5.18	≤ 0.011	≤ 0.246	0.037	1.46	1.46	≤ 0.025	2.75	0.451	≤ 0.038
		RG_REX_CSU-M-03	16.8	3.54	≤ 0.032	0.162	1.68	≤ 0.084	≤ 5.49	≤ 0.012	≤ 0.260	0.045	1.31	1.31	≤ 0.026	2.32	0.843	≤ 0.040
		RG_REX_CSU-M-04	16.5	2.15	≤ 0.033	0.185	0.364	≤ 0.087	≤ 5.69	≤ 0.012	≤ 0.269	0.052	1.71	1.71	≤ 0.027	0.820	0.442	≤ 0.042
		RG_REX_CSU-M-05	17.8	4.12	≤ 0.030	0.080	0.365	≤ 0.080	≤ 5.24	≤ 0.011	≤ 0.248	≤ 0.028	1.23	1.23	≤ 0.025	0.801	0.400	≤ 0.039
		RG_REX_CSU-M-06	18.2	1.77	≤ 0.030	0.139	1.09	≤ 0.079	≤ 5.21	≤ 0.011	≤ 0.247	0.034	0.909	0.909	≤ 0.025	2.14	0.409	≤ 0.038
		RG_REX_CSU-M-07	18.9	2.65	≤ 0.028	0.246	0.358	≤ 0.075	≤ 4.89	≤ 0.010	≤ 0.232	0.033	1.48	1.48	≤ 0.023	0.834	0.220	≤ 0.036
Kokanee	May	Rexford-KO-01	25.0	3.19	≤ 0.035	0.153	0.091	≤ 0.093	≤ 6.12	≤ 0.013	≤ 0.290	≤ 0.032	0.813	7.20	≤ 0.029	0.173	-	≤ 0.026
		Rexford-KO-02	24.6	9.40	≤ 0.044	0.214	0.214	≤ 0.116	≤ 7.63	≤ 0.016	≤ 0.361	≤ 0.040	1.28	15.0	0.042	0.545	-	≤ 0.032
		Rexford-KO-03	24.7	3.92	≤ 0.036	0.155	0.177	≤ 0.095	≤ 6.22	≤ 0.013	≤ 0.295	≤ 0.033	1.05	11.4	≤ 0.029	0.287	-	≤ 0.026
		Rexford-KO-04	21.5	5.88	≤ 0.046	0.129	0.149	≤ 0.120	≤ 7.87	≤ 0.017	≤ 0.373	≤ 0.041	1.43	13.6	≤ 0.037	0.280	-	≤ 0.033
		Rexford-KO-05	20.4	4.07	≤ 0.049	0.126	0.240	≤ 0.130	≤ 8.51	≤ 0.018	≤ 0.403	≤ 0.045	1.09	12.6	≤ 0.040	0.303	-	≤ 0.036
		Rexford-KO-06	43.8	2.78	≤ 0.025	0.084	0.055	≤ 0.065	≤ 4.26	≤ 0.009	≤ 0.202	≤ 0.022	0.385	5.32	≤ 0.020	0.089	-	≤ 0.018
		Rexford-KO-07	36.8	3.07	≤ 0.026	0.144	0.242	≤ 0.070	≤ 4.57	≤ 0.010	≤ 0.217	≤ 0.024	0.980	11.1	≤ 0.022	0.155	-	≤ 0.019
	September	RG_REX_KO-M-01	19.0	4.90	≤ 0.010	0.118	0.188	≤ 0.064	≤ 33.0	≤ 0.008	≤ 0.018	0.032	2.14	42.0	≤ 4.9	0.488	0.283	≤ 0.046
		RG_REX_KO-M-02	18.4	3.98	≤ 0.029	0.172	0.086	≤ 0.077	≤ 5.04	≤ 0.011	≤ 0.239	≤ 0.027	2.86	27.4	≤ 0.024	0.390	0.240	0.027
		RG_REX_KO-M-03	20.9	4.10	≤ 0.025	0.115	≤ 0.041	≤ 0.067	≤ 4.38	≤ 0.009	≤ 0.207	≤ 0.023	1.90	14.3	≤ 0.021	0.236	0.258	≤ 0.032
		RG_REX_KO-M-04	18.9	5.42	≤ 0.029	0.183	0.226	≤ 0.076	≤ 5.00	≤ 0.011	≤ 0.237	0.036	2.48	26.0	≤ 0.024	0.408	0.267	0.023
		RG_REX_KO-M-05	22.2	6.35	≤ 0.024	0.118	0.072	≤ 0.063	≤ 4.14	≤ 0.009	≤ 0.196	0.023	1.66	17.9	≤ 0.020	0.235	0.269	≤ 0.030
		RG_REX_KO-M-06	21.3	8.89	≤ 0.025	0.242	≤ 0.041	≤ 0.066	≤ 4.33	≤ 0.009	≤ 0.205	0.028	3.46	26.5	≤ 0.021	0.239	0.219	≤ 0.032
		RG_REX_KO-M-07	21.6	20.8	≤ 0.025	0.103	0.084	≤ 0.067	≤ 4.37	≤ 0.009	≤ 0.207	≤ 0.023	1.45	15.4	≤ 0.021	0.281	0.303	≤ 0.032
		RG_REX_KO-M-08	19.6	6.72	≤ 0.028	0.157	≤ 0.045	≤ 0.073	≤ 4.79	≤ 0.01	≤ 0.227	0.026	4.22	29.8	≤ 0.023	0.289	0.267	0.021
Mountain Whitefish	May	Rexford-MF-01	21.8	3.54	≤ 0.024	0.644	0.175	≤ 0.063	≤ 4.10	≤ 0.0090	≤ 0.194	≤ 0.022	0.982	11.5	≤ 0.019	0.558	0.230	≤ 0.017
		Rexford-MF-02	20.8	4.73	≤ 0.051	0.861	0.102	≤ 0.135	≤ 8.84	≤ 0.0190	≤ 0.419	0.058	1.40	14.3	≤ 0.042	0.486	0.165	≤ 0.037
Northern Pikeminnow	May	Rexford-NSC-01	19.6	3.43	≤ 0.024	0.127	0.210	≤ 0.063	≤ 4.14	≤ 0.0090	≤ 0.196	≤ 0.022	0.704	11.7	≤ 0.02	0.567	1.44	≤ 0.017
		Rexford-NSC-02	21.8	4.77	≤ 0.022	0.265	0.264	≤ 0.058	≤ 3.82	≤ 0.0080	≤ 0.181	≤ 0.020	0.905	11.9	0.029	0.199	1.33	≤ 0.016
		Rexford-NSC-03	17.7	4.15	≤ 0.028	0.194	0.325	≤ 0.074	≤ 4.87	≤ 0.0100	≤ 0.231	≤ 0.026	0.931	13.0	≤ 0.023	0.486	1.08	≤ 0.021
		Rexford-NSC-04	18.4	3.69	≤ 0.028	0.289	0.134	≤ 0.074	≤ 4.84	≤ 0.0100	≤ 0.229	≤ 0.025	0.782	11.8	≤ 0.023	0.266	1.17	≤ 0.02
		Rexford-NSC-05	22.3	2.63	≤ 0.023	0.268	0.141	≤ 0.062	≤ 4.04	≤ 0.0080	≤ 0.191	≤ 0.021	0.748	6.42	≤ 0.019	0.169	1.59	≤ 0.017
		Rexford-NSC-06	21.7	2.25	≤ 0.024	0.158	0.488	≤ 0.063	≤ 4.13	≤ 0.0090	≤ 0.196	≤ 0.022	0.892	8.32	≤ 0.02	0.705	1.10	≤ 0.017
		Rexford-NSC-07	21.4	3.6	≤ 0.024	0.127	0.124	≤ 0.064	≤ 4.21	≤ 0.0090	≤ 0.199	≤ 0.022	0.923	10.6	≤ 0.02	0.299	1.21	≤ 0.018
		Rexford-NSC-08	17.9	4.57	≤ 0.029	0.240	0.255	≤ 0.078	≤ 5.09	≤ 0.0110	≤ 0.241	≤ 0.027	0.981	13.1	≤ 0.024	0.645	0.886	≤ 0.021
		Rexford-NSC-09	25.4	3.37	≤ 0.02	0.385	0.180	≤ 0.052	≤ 3.41	≤ 0.0070	≤ 0.162	≤ 0.018	1.61	13.7	≤ 0.016	0.310	0.901	≤ 0.014
		Rexford-NSC-10	23.5	2.86	≤ 0.022	0.193	0.257	≤ 0.058	≤ 3.82	≤ 0.0080	≤ 0.181	≤ 0.020	0.795	12.1	≤ 0.018	0.219	1.16	≤ 0.016

Table H.10: Metal Concentrations (µg/g dry weight) in Fish Muscle Collected at Rexford Area, 2019

Species	Month	Sample ID	Total Solids	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum
			%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Northern Pikeminnow	May	Rexford-NSC-11	18.0	5.59	≤ 0.027	0.199	0.267	≤ 0.071	≤ 4.67	≤ 0.0100	≤ 0.221	≤ 0.025	1.32	15.7	0.024	0.327	1.04	≤ 0.020
		Rexford-NSC-12	20.9	5.44	≤ 0.025	0.164	0.262	≤ 0.067	≤ 4.40	≤ 0.0090	≤ 0.208	≤ 0.023	1.23	14.6	≤ 0.021	0.295	0.886	≤ 0.019
		Rexford-NSC-13	21.9	2.25	≤ 0.023	0.274	0.669	≤ 0.060	≤ 3.95	≤ 0.0080	≤ 0.187	≤ 0.021	2.19	19.2	≤ 0.019	0.926	0.882	≤ 0.017
		Rexford-NSC-14	25.0	2.96	≤ 0.021	0.269	0.191	≤ 0.056	≤ 3.64	≤ 0.0080	≤ 0.173	≤ 0.019	1.33	15.2	≤ 0.017	0.191	1.17	≤ 0.015
		Rexford-NSC-15	24.7	3.76	≤ 0.019	0.303	0.159	≤ 0.051	≤ 3.33	≤ 0.0070	≤ 0.158	≤ 0.018	1.07	12.0	≤ 0.016	0.180	1.38	≤ 0.014
	September	RG_REX_NSC-M-01	18.7	9.40	≤ 0.029	0.033	0.510	≤ 0.076	≤ 5.00	≤ 0.011	≤ 0.237	≤ 0.026	1.52	1.52	≤ 0.024	0.507	1.37	≤ 0.037
		RG_REX_NSC-M-02	18.1	3.92	≤ 0.030	0.040	0.861	≤ 0.079	≤ 5.20	≤ 0.011	≤ 0.246	≤ 0.027	1.62	1.62	≤ 0.025	0.747	0.625	≤ 0.038
		RG_REX_NSC-M-03	18.5	5.88	0.030	0.055	1.70	≤ 0.078	≤ 5.10	≤ 0.011	≤ 0.242	≤ 0.027	1.87	1.87	≤ 0.024	1.84	0.799	≤ 0.038
		RG_REX_NSC-M-04	19.1	4.07	≤ 0.028	0.071	1.18	≤ 0.075	≤ 4.92	≤ 0.010	≤ 0.233	≤ 0.026	2.10	2.10	≤ 0.023	1.04	1.05	≤ 0.036
		RG_REX_NSC-M-05	19.7	2.78	≤ 0.027	0.044	0.629	≤ 0.072	≤ 4.70	≤ 0.010	≤ 0.223	≤ 0.025	1.84	1.84	≤ 0.022	0.692	0.623	≤ 0.035
		RG_REX_NSC-M-06	19.5	3.07	≤ 0.028	0.131	2.26	≤ 0.073	≤ 4.82	≤ 0.010	≤ 0.228	≤ 0.025	2.72	2.72	≤ 0.023	1.74	1.65	≤ 0.035
		RG_REX_NSC-M-07	19.5	3.54	≤ 0.028	0.081	0.162	≤ 0.073	≤ 4.80	≤ 0.010	≤ 0.227	≤ 0.025	2.65	2.65	≤ 0.023	0.374	0.964	≤ 0.035
		RG_REX_NSC-M-08	21.2	4.73	≤ 0.026	0.033	0.0890	≤ 0.068	≤ 4.43	≤ 0.009	≤ 0.210	≤ 0.023	1.04	1.04	≤ 0.021	0.122	2.18	≤ 0.033
Peamouth Chub	May	Rexford-PCC-01	18.5	10.1	≤ 0.048	0.185	1.38	≤ 0.127	≤ 8.32	≤ 0.018	≤ 0.394	≤ 0.044	1.04	15.3	≤ 0.039	1.57	-	≤ 0.035
		Rexford-PCC-02	13.2	13.6	≤ 0.073	0.170	0.396	≤ 0.191	≤ 12.5	≤ 0.026	≤ 0.594	≤ 0.066	0.953	16.6	≤ 0.059	0.65	-	≤ 0.053
		Rexford-PCC-03	19.7	17.9	≤ 0.047	0.256	1.35	≤ 0.123	≤ 8.05	≤ 0.017	≤ 0.381	≤ 0.042	2.22	31.4	≤ 0.038	1.54	-	≤ 0.034
		Rexford-PCC-04	19.7	9.73	≤ 0.052	0.168	1.30	≤ 0.136	≤ 8.92	≤ 0.019	≤ 0.423	≤ 0.047	1.72	22.1	≤ 0.042	0.661	-	≤ 0.038
		Rexford-PCC-05	17.8	7.45	≤ 0.050	0.188	0.759	≤ 0.131	≤ 8.60	≤ 0.018	≤ 0.407	≤ 0.045	0.868	12.8	≤ 0.041	0.681	0.237	≤ 0.036
		Rexford-PCC-06	18.1	18.8	≤ 0.053	0.181	0.733	≤ 0.139	≤ 9.09	≤ 0.019	≤ 0.430	≤ 0.048	0.844	15.5	0.075	0.727	-	≤ 0.038
		Rexford-PCC-07	17.1	12.0	≤ 0.054	0.260	2.30	≤ 0.141	≤ 9.24	≤ 0.019	≤ 0.438	≤ 0.049	1.83	28.3	≤ 0.044	2.26	0.269	≤ 0.039
		Rexford-PCC-08	-	0.990	≤ 0.009	0.039	0.069	≤ 0.024	≤ 1.58	≤ 0.003	≤ 0.075	≤ 0.008	0.210	2.86	≤ 0.008	0.112	-	≤ 0.007
	September	RG_REX_PCC-M-01	18.1	4.77	≤ 0.029	0.060	1.74	≤ 0.076	≤ 5.00	≤ 0.011	≤ 0.237	≤ 0.026	1.05	1.05	0.028	1.17	0.607	≤ 0.037
		RG_REX_PCC-M-02	17.8	4.15	≤ 0.030	0.291	1.87	≤ 0.078	≤ 5.12	≤ 0.011	≤ 0.243	≤ 0.027	1.17	1.17	≤ 0.024	0.793	0.686	≤ 0.038
		RG_REX_PCC-M-03	18.3	3.69	≤ 0.028	0.120	3.14	≤ 0.074	≤ 4.85	≤ 0.010	≤ 0.230	≤ 0.026	1.13	1.13	≤ 0.023	1.31	0.496	≤ 0.036
		RG_REX_PCC-M-04	17.9	2.63	≤ 0.029	0.176	3.28	≤ 0.077	≤ 5.04	≤ 0.011	≤ 0.239	≤ 0.027	1.22	1.22	≤ 0.024	2.08	0.726	≤ 0.037
		RG_REX_PCC-M-05	17.3	2.25	≤ 0.031	0.096	1.48	≤ 0.081	≤ 5.31	≤ 0.011	≤ 0.252	≤ 0.028	1.61	1.61	≤ 0.025	0.825	0.647	≤ 0.039
		RG_REX_PCC-M-06	18.5	3.60	≤ 0.025	0.248	2.45	≤ 0.066	≤ 4.30	0.010	≤ 0.204	≤ 0.023	1.15	1.15	≤ 0.020	1.42	0.662	≤ 0.032
		RG_REX_PCC-M-07	17.5	4.57	≤ 0.030	0.103	2.24	≤ 0.078	≤ 5.10	≤ 0.011	≤ 0.242	≤ 0.027	1.17	1.17	≤ 0.024	1.37	0.435	≤ 0.038
		RG_REX_PCC-M-08	17.7	3.37	≤ 0.030	0.288	1.66	≤ 0.080	≤ 5.22	≤ 0.011	≤ 0.247	≤ 0.027	1.93	1.93	≤ 0.025	0.846	0.463	≤ 0.038
Redside Shiner	May	Rexford-RSC-01	22.2	34.6	≤ 0.046	0.182	1.19	≤ 0.122	≤ 8.00	0.021	≤ 0.379	≤ 0.042	2.13	30.8	0.141	1.39	-	≤ 0.034
		Rexford-RSC-02	27.6	29.4	≤ 0.037	0.159	1.69	≤ 0.099	≤ 6.47	≤ 0.014	≤ 0.306	0.058	2.28	27.6	0.120	1.28	-	≤ 0.027
		Rexford-RSC-03	22.4	80.4	≤ 0.046	0.225	2.29	≤ 0.122	≤ 8.00	≤ 0.017	≤ 0.379	≤ 0.042	2.72	34.8	0.115	2.02	-	≤ 0.034
		Rexford-RSC-04	17.8	20.8	≤ 0.059	0.179	0.882	≤ 0.157	≤ 10.3	≤ 0.022	≤ 0.486	≤ 0.054	1.37	19.2	0.094	1.03	-	≤ 0.043
		Rexford-RSC-05	21.5	15.7	≤ 0.050	0.173	0.532	≤ 0.131	≤ 8.57	≤ 0.018	≤ 0.406	≤ 0.045	1.20	13.1	≤ 0.041	0.931	-	≤ 0.036
		Rexford-RSC-06	17.8	67.2	≤ 0.057	0.137	2.33	≤ 0.151	≤ 9.89	0.024	≤ 0.468	≤ 0.052	2.60	63.6	0.086	1.46	-	≤ 0.042
		Rexford-RSC-07	-	6.88	≤ 0.012	0.039	0.516	≤ 0.031	≤ 2.05	≤ 0.004	≤ 0.097	≤ 0.011	0.546	8.12	0.020	0.605	-	≤ 0.009
		Rexford-RSC-08	22.0	35.7	≤ 0.047	0.163	2.05	≤ 0.124	≤ 8.14	0.023	≤ 0.386	≤ 0.043	2.48	42.6	0.068	1.88	-	≤ 0.034
Rainbow Trout	September	RG_REX_RBT-M-01	22.7	5.59	≤ 0.024	0.055	0.042	≤ 0.063	≤ 4.15	≤ 0.009	≤ 0.197	≤ 0.022	1.98	1.98	≤ 0.020	0.259	0.294	≤ 0.031
		RG_REX_RBT-M-02	17.8	5.44	0.031	0.064	0.070	≤ 0.081	≤ 5.29	≤ 0.011	≤ 0.251	≤ 0.028	1.15	1.15	≤ 0.025	0.217	0.926	≤ 0.039
		RG_REX_RBT-M-03	22.9	2.25	≤ 0.023	0.067	0.041	≤ 0.062	≤ 4.05	≤ 0.009	≤ 0.192	0.038	2.13	2.13	≤ 0.019	0.332	0.130	≤ 0.030
		RG_REX_RBT-M-04	22.6	2.96	0.024	0.075	0.134	≤ 0.064	≤ 4.20	≤ 0.009	≤ 0.199	≤ 0.022	1.41	1.41	≤ 0.020	0.418	0.204	≤ 0.031
		RG_REX_RBT-M-05	22.5	3.76	≤ 0.024	0.509	0.048	≤ 0.064	≤ 4.21	≤ 0.009	≤ 0.199	0.041	2.25	2.25	≤ 0.020	0.558	0.095	≤ 0.031
Westslope Cutthroat Trout	May	Rexford-WCT-01	21.0	4.53	≤ 0.026	0.215	0.103	≤ 0.068	≤ 4.45	≤ 0.009	≤ 0.211	0.033	1.39	17.9	0.023	0.350	0.166	≤ 0.019
Yellow Perch	May	Rexford-YP-01	17.4	6.05	≤ 0.057	0.081	0.296	≤ 0.151	≤ 9.90	≤ 0.021	≤ 0.469	≤ 0.052	0.831	10.3	≤ 0.047	0.482	0.0145	≤ 0.042
		Rexford-YP-02	20.2	6.61	≤ 0.026	≤ 0.022	0.238	≤ 0.069	≤ 4.52	≤ 0.010	≤ 0.214	≤ 0.024	1.63	12.8	≤ 0.021	0.676	0.776	≤ 0.019
		Rexford-YP-03	17.8	5.70	≤ 0.049	0.071	0.191	≤ 0.130	≤ 8.50	≤ 0.018	≤ 0.403	≤ 0.045	0.793	10.1	≤ 0.040	0.545	0.948	≤ 0.036
		Rexford-YP-04	19.0	7.06	≤ 0.053	0.098	0.209	≤ 0.140	≤ 9.18	≤ 0.019	≤ 0.435	≤ 0.048	0.643	9.9	≤ 0.043	0.503	0.610	≤ 0.039

Notes: BT = Bull Trout, CSU = Largescale Sucker, KO = Kokanee, MWF = Mountain Whitefish, NSC = Northern Pikeminnow, PCC = Peamouth Chub, RSC = Redside Shiner, RBT = Rainbow Trout, WCT = Westslope Cutthroat Trout, YP = Yellow Perch, " - " indicates no data available.

Table H.10: **Metal Concentrations (µg/g dry weight) in Fish Muscle Collected at Rexford Area, 2019**

Species	Month	Sample ID	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
			µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Bull Trout	May	Rexford-BT-01	≤ 0.049	2.16	≤ 0.0060	≤ 0.114	0.082	0.061	0.077	≤ 0.00040	≤ 0.016	14.0
		Rexford-BT-02	≤ 0.049	1.65	≤ 0.0060	≤ 0.114	0.073	0.049	0.057	≤ 0.00040	≤ 0.016	13.2
		Rexford-BT-03	≤ 0.084	1.72	≤ 0.010	0.338	0.102	0.072	0.099	≤ 0.00070	≤ 0.027	22.4
		Rexford-BT-04	1.17	1.55	≤ 0.0050	≤ 0.102	0.075	0.049	0.065	≤ 0.00040	0.016	12.5
		Rexford-BT-05	≤ 0.045	1.74	≤ 0.0050	0.135	0.054	0.043	0.127	≤ 0.00040	≤ 0.014	15.5
		Rexford-BT-06	≤ 0.052	1.67	≤ 0.0060	≤ 0.122	0.154	0.050	0.062	≤ 0.00040	≤ 0.017	15.0
		Rexford-BT-07	≤ 0.050	1.82	≤ 0.0060	≤ 0.115	0.083	0.090	0.066	0.0030	≤ 0.016	11.5
		Rexford-BT-08	≤ 0.056	1.40	≤ 0.0070	0.200	0.091	0.056	0.046	≤ 0.00040	≤ 0.018	16.5
Largescale Sucker	May	Rexford-CSU-01	≤ 0.060	4.08	0.020	0.299	0.033	≤ 0.033	0.098	≤ 0.00050	≤ 0.019	23.8
		Rexford-CSU-02	≤ 0.056	3.71	≤ 0.0070	1.92	0.019	≤ 0.031	0.086	≤ 0.00040	≤ 0.018	27.2
		Rexford-CSU-03	≤ 0.061	4.99	≤ 0.0070	0.258	≤ 0.017	≤ 0.034	0.078	0.0010	≤ 0.020	27.8
		Rexford-CSU-04	≤ 0.062	3.63	≤ 0.0070	0.912	0.030	≤ 0.035	0.094	0.0040	≤ 0.020	23.6
		Rexford-CSU-05	≤ 0.061	4.09	≤ 0.0070	0.368	0.020	≤ 0.034	0.110	0.0010	≤ 0.020	28.1
		Rexford-CSU-06	≤ 0.054	4.86	≤ 0.0060	1.32	0.016	≤ 0.030	0.141	≤ 0.00040	≤ 0.017	20.9
		Rexford-CSU-07	0.066	4.46	≤ 0.0070	1.81	0.031	≤ 0.035	0.272	0.0020	0.025	27.2
		Rexford-CSU-08	≤ 0.063	1.84	≤ 0.0080	1.42	≤ 0.018	≤ 0.035	0.112	≤ 0.00050	≤ 0.020	27.5
	September	RG_REX_CSU-M-01	≤ 0.064	3.81	≤ 0.0080	5.25	≤ 0.018	0.067	0.113	0.0020	≤ 0.020	34.1
		RG_REX_CSU-M-02	≤ 0.068	2.54	≤ 0.0080	2.96	≤ 0.019	0.072	0.077	0.00060	≤ 0.022	20.6
		RG_REX_CSU-M-03	≤ 0.072	2.92	≤ 0.0090	2.33	0.028	0.099	0.072	0.0010	≤ 0.023	25.3
		RG_REX_CSU-M-04	≤ 0.075	4.41	≤ 0.0090	0.525	0.027	0.120	0.078	≤ 0.00060	≤ 0.024	26.7
		RG_REX_CSU-M-05	≤ 0.069	2.96	≤ 0.0080	0.636	≤ 0.019	0.131	0.073	≤ 0.00060	≤ 0.022	19.3
		RG_REX_CSU-M-06	≤ 0.069	5.27	≤ 0.0080	2.81	≤ 0.019	0.061	0.181	0.00080	≤ 0.022	21.0
		RG_REX_CSU-M-07	≤ 0.064	5.39	≤ 0.0080	1.17	0.021	≤ 0.036	0.104	≤ 0.00050	≤ 0.021	26.1
Kokanee	May	Rexford-KO-01	≤ 0.081	1.65	≤ 0.010	0.262	0.081	≤ 0.045	0.069	≤ 0.00060	≤ 0.026	11.8
		Rexford-KO-02	≤ 0.100	2.00	≤ 0.012	0.775	0.131	≤ 0.056	0.182	≤ 0.00080	≤ 0.032	18.2
		Rexford-KO-03	≤ 0.082	1.81	≤ 0.010	0.352	0.101	≤ 0.046	0.199	0.0010	≤ 0.026	20.4
		Rexford-KO-04	≤ 0.104	2.10	≤ 0.012	0.474	0.086	≤ 0.058	0.113	0.0020	≤ 0.033	23.6
		Rexford-KO-05	≤ 0.112	1.66	≤ 0.013	0.709	0.081	≤ 0.063	0.141	0.0030	≤ 0.036	16.8
		Rexford-KO-06	≤ 0.056	0.749	≤ 0.007	0.196	0.044	≤ 0.031	0.076	≤ 0.00040	≤ 0.018	7.34
		Rexford-KO-07	≤ 0.060	1.20	≤ 0.007	0.366	0.063	≤ 0.034	0.077	0.0010	≤ 0.019	15.8
	September	RG_REX_KO-M-01	0.117	1.93	≤ 1.60	0.339	0.076	≤ 0.026	0.085	0.00090	≤ 0.049	18.4
		RG_REX_KO-M-02	≤ 0.066	2.00	≤ 0.0080	0.292	0.100	≤ 0.037	0.079	0.00070	≤ 0.021	27.0
		RG_REX_KO-M-03	≤ 0.058	1.90	≤ 0.0070	≤ 0.134	0.081	≤ 0.032	0.043	≤ 0.00050	≤ 0.018	≤ 17.4
		RG_REX_KO-M-04	≤ 0.066	1.93	≤ 0.0080	0.834	0.092	≤ 0.037	0.057	≤ 0.00050	≤ 0.021	25.1
		RG_REX_KO-M-05	≤ 0.054	2.03	≤ 0.0070	0.260	0.087	≤ 0.030	0.045	≤ 0.00040	≤ 0.017	17.2
		RG_REX_KO-M-06	≤ 0.057	1.85	≤ 0.0070	0.149	0.090	≤ 0.032	0.062	≤ 0.00050	≤ 0.018	20.8
		RG_REX_KO-M-07	≤ 0.058	2.07	≤ 0.0070	0.501	0.083	≤ 0.032	0.043	≤ 0.00050	≤ 0.018	17.7
		RG_REX_KO-M-08	≤ 0.063	1.96	≤ 0.0080	≤ 0.146	0.077	≤ 0.035	0.042	≤ 0.00050	≤ 0.020	32.7
Mountain Whitefish	May	Rexford-MF-01	≤ 0.054	3.19	≤ 0.0060	0.586	0.108	≤ 0.030	0.066	≤ 0.0010	≤ 0.017	14.4
		Rexford-MF-02	≤ 0.116	2.41	≤ 0.014	≤ 0.270	0.079	0.071	0.104	≤ 0.0009	≤ 0.037	13.9
Northern Pikeminnow	May	Rexford-NSC-01	≤ 0.054	1.65	≤ 0.0070	0.261	0.021	0.060	0.077	0.0008	≤ 0.017	18.0
		Rexford-NSC-02	≤ 0.050	1.03	≤ 0.0060	0.352	0.018	0.063	0.101	0.0008	≤ 0.016	22.3
		Rexford-NSC-03	≤ 0.064	1.50	≤ 0.0080	0.565	0.050	0.108	0.085	0.0040	≤ 0.021	33.4
		Rexford-NSC-04	0.214	1.17	≤ 0.0080	0.256	0.022	0.059	0.081	≤ 0.0005	≤ 0.020	16.2
		Rexford-NSC-05	≤ 0.053	1.05	≤ 0.0060	0.393	0.019	0.053	0.069	0.0010	≤ 0.017	12.9
		Rexford-NSC-06	≤ 0.054	1.43	≤ 0.0070	1.95	0.054	0.052	0.059	0.0010	≤ 0.017	21.9
		Rexford-NSC-07	≤ 0.055	1.32	≤ 0.0070	0.275	0.024	0.055	0.062	0.0030	≤ 0.018	18.0
		Rexford-NSC-08	0.212	1.39	≤ 0.0080	0.674	0.066	0.079	0.104	0.0010	0.028	22.5
		Rexford-NSC-09	≤ 0.045	0.803	≤ 0.0050	0.147	0.024	0.062	0.116	≤ 0.0004	0.020	17.4
		Rexford-NSC-10	≤ 0.050	1.11	≤ 0.0060	0.228	0.021	0.061	0.080	≤ 0.0004	≤ 0.016	15.2

Table H.10: Metal Concentrations (µg/g dry weight) in Fish Muscle Collected at Rexford Area, 2019

Species	Month	Sample ID	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
			µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Northern Pikeminnow	May	Rexford-NSC-11	≤ 0.062	1.56	≤ 0.0070	0.288	0.073	≤ 0.034	0.095	≤ 0.0005	≤ 0.020	21.7
		Rexford-NSC-12	≤ 0.058	1.04	≤ 0.0070	0.335	0.023	≤ 0.032	0.082	≤ 0.0005	≤ 0.019	16.4
		Rexford-NSC-13	≤ 0.052	1.03	≤ 0.0060	2.48	0.045	≤ 0.029	0.064	0.0020	≤ 0.017	21.1
		Rexford-NSC-14	≤ 0.048	0.930	≤ 0.0060	0.241	0.020	≤ 0.027	0.061	0.0007	≤ 0.015	13.9
		Rexford-NSC-15	≤ 0.044	0.925	≤ 0.0050	0.225	≤ 0.012	≤ 0.025	0.061	0.0040	≤ 0.014	15.0
	September	RG_REX_NSC-M-01	≤ 0.066	3.01	≤ 0.0080	1.63	≤ 0.018	≤ 0.037	0.083	0.0030	≤ 0.021	23.7
		RG_REX_NSC-M-02	≤ 0.068	1.79	≤ 0.0080	2.49	≤ 0.019	≤ 0.038	0.064	≤ 0.00050	≤ 0.022	26.9
		RG_REX_NSC-M-03	≤ 0.067	2.50	≤ 0.0080	5.14	≤ 0.019	≤ 0.038	0.076	0.0010	≤ 0.021	30.5
		RG_REX_NSC-M-04	≤ 0.065	2.24	≤ 0.0080	5.58	≤ 0.018	≤ 0.036	0.090	0.00060	≤ 0.021	31.3
		RG_REX_NSC-M-05	≤ 0.062	1.75	≤ 0.0070	1.66	≤ 0.017	≤ 0.035	0.078	≤ 0.00050	≤ 0.020	21.1
		RG_REX_NSC-M-06	≤ 0.063	1.73	≤ 0.0080	7.14	≤ 0.018	≤ 0.035	0.075	0.0020	≤ 0.020	30.8
		RG_REX_NSC-M-07	≤ 0.063	1.87	≤ 0.0080	0.382	≤ 0.018	≤ 0.035	0.087	≤ 0.00050	≤ 0.020	21.2
		RG_REX_NSC-M-08	≤ 0.058	1.53	≤ 0.0070	0.448	≤ 0.016	≤ 0.033	0.069	≤ 0.00050	≤ 0.019	14.5
Peamouth Chub	May	Rexford-PCC-01	≤ 0.110	2.23	≤ 0.013	5.77	≤ 0.031	≤ 0.061	0.172	0.0020	≤ 0.035	21.2
		Rexford-PCC-02	≤ 0.165	2.38	≤ 0.020	0.921	≤ 0.046	≤ 0.092	0.244	0.0030	≤ 0.053	30.3
		Rexford-PCC-03	≤ 0.106	1.91	≤ 0.013	2.89	0.034	≤ 0.059	1.62	0.0080	≤ 0.034	45.7
		Rexford-PCC-04	≤ 0.117	3.38	≤ 0.014	1.34	≤ 0.033	≤ 0.066	0.175	≤ 0.0009	≤ 0.038	22.0
		Rexford-PCC-05	≤ 0.113	1.96	≤ 0.014	1.5	≤ 0.032	≤ 0.063	0.157	0.0020	≤ 0.036	19.7
		Rexford-PCC-06	≤ 0.120	2.05	≤ 0.014	1.28	≤ 0.033	≤ 0.067	0.256	0.0040	≤ 0.038	32.1
		Rexford-PCC-07	≤ 0.122	2.19	≤ 0.015	5.89	≤ 0.034	≤ 0.068	0.206	≤ 0.0010	≤ 0.039	36.0
		Rexford-PCC-08	≤ 0.021	0.332	≤ 0.0030	0.126	≤ 0.006	≤ 0.012	0.023	0.0010	≤ 0.0070	3.36
	September	RG_REX_PCC-M-01	0.080	2.28	≤ 0.0080	3.44	≤ 0.018	≤ 0.037	0.158	0.0010	≤ 0.021	23.5
		RG_REX_PCC-M-02	≤ 0.067	2.31	≤ 0.0080	2.36	≤ 0.019	≤ 0.038	0.085	0.0020	≤ 0.022	32.5
		RG_REX_PCC-M-03	≤ 0.064	2.10	≤ 0.0080	4.31	≤ 0.018	≤ 0.036	0.099	0.0010	≤ 0.020	28.8
		RG_REX_PCC-M-04	≤ 0.066	3.25	≤ 0.0080	5.40	≤ 0.019	≤ 0.037	0.084	0.0020	≤ 0.021	34.7
		RG_REX_PCC-M-05	≤ 0.070	2.12	≤ 0.0080	3.02	≤ 0.020	≤ 0.039	0.073	0.0010	≤ 0.022	38.4
		RG_REX_PCC-M-06	≤ 0.057	2.83	≤ 0.0070	3.94	≤ 0.016	≤ 0.032	0.090	0.0010	≤ 0.018	31.2
		RG_REX_PCC-M-07	≤ 0.067	2.17	≤ 0.0080	5.94	≤ 0.019	≤ 0.038	0.098	0.0010	0.023	30.3
		RG_REX_PCC-M-08	≤ 0.069	3.67	≤ 0.0080	1.92	≤ 0.019	≤ 0.038	0.069	0.0007	≤ 0.022	33.5
Redside Shiner	May	Rexford-RSC-01	0.188	2.46	≤ 0.013	1.82	≤ 0.029	≤ 0.059	0.713	0.0020	≤ 0.034	71.4
		Rexford-RSC-02	1.54	2.19	≤ 0.010	1.74	0.027	≤ 0.048	0.384	0.0020	≤ 0.027	77.8
		Rexford-RSC-03	≤ 0.105	2.95	≤ 0.013	3.38	≤ 0.029	≤ 0.059	0.832	0.0070	≤ 0.034	108
		Rexford-RSC-04	≤ 0.135	1.98	≤ 0.016	1.50	≤ 0.038	≤ 0.076	0.394	≤ 0.0010	≤ 0.043	33.8
		Rexford-RSC-05	≤ 0.113	1.94	≤ 0.014	0.953	≤ 0.032	≤ 0.063	0.270	0.0030	≤ 0.036	43.5
		Rexford-RSC-06	0.400	2.39	≤ 0.016	1.99	≤ 0.036	≤ 0.073	0.789	0.0220	0.052	86.5
		Rexford-RSC-07	≤ 0.027	0.615	≤ 0.0030	0.728	≤ 0.008	≤ 0.015	0.094	≤ 0.0002	≤ 0.009	18.5
		Rexford-RSC-08	0.222	2.76	≤ 0.013	2.01	≤ 0.030	≤ 0.060	0.380	0.0030	≤ 0.034	111
Rainbow Trout	September	RG_REX_RBT-M-01	≤ 0.055	1.75	≤ 0.0070	0.197	0.025	≤ 0.031	0.04	≤ 0.00040	≤ 0.017	19.9
		RG_REX_RBT-M-02	≤ 0.070	1.61	≤ 0.0080	0.344	0.053	≤ 0.039	0.06	0.0040	≤ 0.022	21.8
		RG_REX_RBT-M-03	≤ 0.053	2.63	≤ 0.0060	0.150	0.017	≤ 0.030	0.04	≤ 0.00040	≤ 0.017	17.4
		RG_REX_RBT-M-04	≤ 0.055	1.55	≤ 0.0070	0.645	0.018	≤ 0.031	0.08	0.00080	≤ 0.018	18.9
		RG_REX_RBT-M-05	≤ 0.055	1.32	≤ 0.0070	≤ 0.128	≤ 0.016	0.032	0.04	≤ 0.00040	≤ 0.018	20.5
Westslope Cutthroat Trout	May	Rexford-WCT-01	≤ 0.059	7.43	≤ 0.0070	0.328	0.026	≤ 0.033	0.082	0.00090	≤ 0.019	15.2
Yellow Perch	May	Rexford-YP-01	≤ 0.13	1.32	≤ 0.016	≤ 0.302	0.058	≤ 0.073	0.171	≤ 0.0010	≤ 0.042	24.8
		Rexford-YP-02	≤ 0.060	3.12	≤ 0.0070	0.740	0.043	0.035	0.130	≤ 0.0010	≤ 0.019	23.8
		Rexford-YP-03	≤ 0.112	3.34	≤ 0.013	≤ 0.260	0.054	≤ 0.063	0.112	0.0020	≤ 0.036	20.5
		Rexford-YP-04	≤ 0.121	2.72	≤ 0.014	≤ 0.280	0.036	≤ 0.068	0.145	≤ 0.0010	≤ 0.039	22.5

Notes: BT = Bull Trout, CSU = Largescale Sucker, KO = Kokanee, MWF = Mountain Whitefish, NSC = Northern Pikeminnow, PCC = Peamouth Chub, RSC = Redside Shiner, RBT = Rainbow Trout, WCT = Westslope Cutthroat Trout, YP = Yellow Perch, " - " indicates no data available.

Table H.11: **Metal Concentrations (µg/g dry weight) in Fish Ovaries Collected at Rexford Area, 2019**

Species	Month	Sample ID	Total Solids	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese
			%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Largescale Sucker	May	Rexford-CSU-01	35.1	1.35	≤ 0.015	0.172	1.34	≤ 0.04	≤ 2.63	0.011	≤ 0.125	0.124	4.13	44.2	≤ 0.012	7.22
		Rexford-CSU-02	32.0	1.28	≤ 0.017	0.185	0.648	≤ 0.044	≤ 2.9	0.029	≤ 0.137	0.122	6.88	59	≤ 0.014	20.0
		Rexford-CSU-03	35.2	1.82	≤ 0.013	0.129	0.798	≤ 0.034	≤ 2.23	0.015	≤ 0.106	0.144	3.72	44.8	≤ 0.011	12.2
		Rexford-CSU-04	33.6	1.35	≤ 0.016	0.213	0.820	≤ 0.042	≤ 2.74	0.017	≤ 0.130	0.175	4.26	64.7	≤ 0.013	19.8
		Rexford-CSU-05	18.9	34.3	≤ 0.055	0.280	5.19	≤ 0.144	≤ 9.43	0.719	≤ 0.447	0.243	39.9	278	0.172	12.0
		Rexford-CSU-06	36.0	3.44	≤ 0.014	0.246	0.687	≤ 0.037	≤ 2.44	0.020	≤ 0.116	0.218	4.27	41.4	≤ 0.012	11.2
		Rexford-CSU-07	36.0	4.15	≤ 0.013	0.224	1.070	≤ 0.035	≤ 2.31	0.018	≤ 0.110	0.155	5.03	41.1	0.016	13.4
		Rexford-CSU-08	37.7	1.40	≤ 0.013	0.092	0.670	≤ 0.034	≤ 2.23	≤ 0.005	≤ 0.106	0.075	2.61	24.6	≤ 0.011	8.32
Northern Pikeminnow	May	Rexford-NSC-01	27.6	3.27	≤ 0.018	0.129	0.139	≤ 0.049	≤ 3.18	0.018	≤ 0.151	0.054	3.31	166	0.017	1.70
		Rexford-NSC-02	27.1	1.31	≤ 0.020	0.115	0.112	≤ 0.053	≤ 3.44	≤ 0.007	≤ 0.163	0.040	3.36	68.2	≤ 0.016	1.06
		Rexford-NSC-03	24.3	3.14	≤ 0.041	0.225	0.153	≤ 0.109	≤ 7.14	≤ 0.015	≤ 0.338	≤ 0.038	3.79	133	0.045	1.42
		Rexford-NSC-04	31.4	1.39	≤ 0.016	0.146	0.112	≤ 0.043	≤ 2.79	≤ 0.006	≤ 0.132	0.035	3.25	58.7	≤ 0.013	0.805
		Rexford-NSC-05	24.4	1.39	≤ 0.019	0.168	0.096	≤ 0.049	≤ 3.20	≤ 0.007	≤ 0.152	0.036	3.01	67.5	≤ 0.015	0.616
		Rexford-NSC-06	24.7	2.33	≤ 0.022	0.137	0.076	≤ 0.057	≤ 3.74	0.011	≤ 0.177	0.034	2.99	178	0.029	1.28
		Rexford-NSC-07	24.9	3.45	≤ 0.021	0.316	0.145	≤ 0.056	≤ 3.66	0.009	≤ 0.173	0.034	3.27	122	≤ 0.017	2.14
		Rexford-NSC-08	22.1	4.06	≤ 0.046	0.154	0.264	≤ 0.122	≤ 8.01	≤ 0.017	≤ 0.379	0.048	3.54	131	≤ 0.038	1.57
		Rexford-NSC-09	26.1	2.25	≤ 0.018	0.268	0.108	≤ 0.049	≤ 3.19	≤ 0.007	≤ 0.151	0.037	3.51	82.6	≤ 0.015	2.40
		Rexford-NSC-10	25.4	3.00	≤ 0.020	0.117	0.096	≤ 0.053	≤ 3.49	≤ 0.007	≤ 0.165	0.033	2.84	118	≤ 0.017	1.21
		Rexford-NSC-11	18.6	8.67	≤ 0.027	0.264	0.226	≤ 0.071	≤ 4.67	0.014	≤ 0.221	0.049	3.79	180	0.039	1.77
		Rexford-NSC-12	21.1	7.04	≤ 0.026	0.179	0.187	≤ 0.069	≤ 4.51	0.012	≤ 0.214	0.042	3.90	137	0.031	2.09
		Rexford-NSC-13	23.7	4.19	≤ 0.023	0.183	0.090	≤ 0.061	≤ 3.99	≤ 0.008	≤ 0.189	0.045	3.39	122	≤ 0.019	4.01
		Rexford-NSC-14	29.5	2.15	≤ 0.018	0.211	0.124	≤ 0.047	≤ 3.05	≤ 0.006	≤ 0.144	0.038	2.99	67.7	≤ 0.014	1.00
		Rexford-NSC-15	24.6	1.86	≤ 0.022	0.110	0.073	≤ 0.057	≤ 3.76	≤ 0.008	≤ 0.178	0.044	3.62	69.3	≤ 0.018	1.37
Peamouth Chub	May	Rexford-PCC-01	35.4	5.4	≤ 0.030	0.263	0.586	≤ 0.078	≤ 5.1	0.013	≤ 0.241	0.054	3.23	53.7	≤ 0.024	7.38
		Rexford-PCC-02	38.3	4.62	≤ 0.014	0.162	0.549	≤ 0.037	≤ 2.42	0.011	≤ 0.114	0.053	3.55	54.6	≤ 0.011	4.28
		Rexford-PCC-03	38.1	1.17	≤ 0.013	0.182	0.552	≤ 0.033	≤ 2.17	0.010	≤ 0.103	0.057	3.79	45.5	≤ 0.010	3.98
		Rexford-PCC-04	34.9	2.55	≤ 0.026	0.147	1.14	≤ 0.069	≤ 4.50	0.021	≤ 0.213	0.085	2.81	59.7	≤ 0.021	7.48
		Rexford-PCC-05	32.4	13.3	≤ 0.031	0.348	1.70	≤ 0.083	≤ 5.44	0.023	≤ 0.257	0.060	4.15	90.1	0.031	10.0
		Rexford-PCC-06	33.4	3.11	≤ 0.028	0.200	0.701	≤ 0.075	≤ 4.91	≤ 0.010	≤ 0.232	0.070	3.25	72.2	0.030	6.13
		Rexford-PCC-07	32.5	7.22	≤ 0.032	0.331	0.766	≤ 0.085	≤ 5.57	≤ 0.012	≤ 0.264	0.058	4.02	63.9	≤ 0.026	6.33
		Rexford-PCC-08	38.8	1.22	≤ 0.012	0.163	0.721	≤ 0.032	≤ 2.09	0.008	≤ 0.099	0.050	3.37	47.0	≤ 0.01	4.42
Redside Shiner	May	Rexford-RSC-01	27.0	8.57	≤ 0.039	0.279	1.08	≤ 0.102	≤ 6.66	0.068	≤ 0.316	0.077	5.95	95.5	0.042	10.1
		Rexford-RSC-02	39.9	16.2	≤ 0.026	0.154	0.739	≤ 0.068	≤ 4.47	0.032	≤ 0.212	0.079	5.48	155	0.087	10.7
		Rexford-RSC-03	-	2.09	≤ 0.011	0.077	0.406	≤ 0.028	≤ 1.85	0.016	≤ 0.088	0.032	1.61	38.6	0.013	4.43
		Rexford-RSC-04	29.2	9.75	≤ 0.037	0.154	1.00	≤ 0.098	≤ 6.45	0.020	≤ 0.306	0.089	5.66	128	0.064	6.20
		Rexford-RSC-05	-	4.31	≤ 0.011	0.094	0.265	≤ 0.028	≤ 1.86	0.011	≤ 0.088	0.029	2.68	52.7	0.024	3.20
		Rexford-RSC-06	-	2.96	≤ 0.066	0.112	0.528	≤ 0.175	≤ 11.4	0.149	≤ 0.542	≤ 0.060	1.58	31.2	≤ 0.054	4.00
		Rexford-RSC-07	-	2.62	≤ 0.023	0.117	0.692	≤ 0.061	≤ 4.03	0.027	≤ 0.191	0.040	2.35	53.0	0.034	5.26
		Rexford-RSC-08	-	1.49	≤ 0.026	0.067	0.406	≤ 0.067	≤ 4.42	0.032	≤ 0.209	0.027	2.23	39.9	≤ 0.021	1.92
Westslope Cutthroat Trout	May	Rexford-WCT-01	40.1	0.800	≤ 0.012	0.241	0.543	≤ 0.031	≤ 2.00	0.005	≤ 0.095	0.139	7.77	50.8	≤ 0.009	1.54

Table H.11: Metal Concentrations (µg/g dry weight) in Fish Ovaries Collected at Rexford Area, 2019

Species	Month	Sample ID	Total Solids	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese
			%	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Yellow Perch	May	Rexford-YP-01	17.0	≤ 1.17	≤ 0.030	0.045	0.247	≤ 0.079	≤ 5.18	≤ 0.011	≤ 0.246	0.030	2.80	30.3	≤ 0.025	1.95
		Rexford-YP-03	14.4	16.5	≤ 0.060	0.122	0.208	≤ 0.157	≤ 10.3	≤ 0.022	≤ 0.487	0.068	3.27	73.2	≤ 0.049	1.28
Kokanee	September	RG_REX_KO-O-01	38.5	1.35	≤ 0.014	0.017	0.222	≤ 0.037	≤ 2.43	≤ 0.005	≤ 0.115	≤ 0.013	0.778	7.89	≤ 0.011	0.222
		RG_REX_KO-O-02	37.7	1.28	≤ 0.015	0.113	0.414	≤ 0.038	≤ 2.52	≤ 0.005	≤ 0.119	0.042	31.3	31.2	≤ 0.012	1.99
		RG_REX_KO-O-03	39.7	1.82	≤ 0.014	0.133	0.422	≤ 0.036	≤ 2.39	≤ 0.005	≤ 0.113	0.042	31.2	46.9	≤ 0.011	2.70
		RG_REX_KO-O-04	38.1	1.35	≤ 0.014	0.025	0.345	≤ 0.038	≤ 2.47	≤ 0.005	≤ 0.117	≤ 0.013	0.789	7.83	≤ 0.012	0.365
		RG_REX_KO-O-05	40.3	34.3	≤ 0.013	0.187	0.392	≤ 0.035	≤ 2.30	0.036	≤ 0.109	0.090	36.1	62.9	≤ 0.011	3.35
		RG_REX_KO-O-06	39.9	3.44	≤ 0.014	0.199	0.481	≤ 0.036	≤ 2.34	0.010	≤ 0.111	0.063	29.9	59.8	≤ 0.011	2.79
		RG_REX_KO-O-07	41.3	4.15	≤ 0.013	0.170	0.345	≤ 0.035	≤ 2.29	0.009	≤ 0.108	0.055	33.1	58.1	≤ 0.011	2.11
		RG_REX_KO-O-08	39.2	1.40	≤ 0.014	0.128	0.338	≤ 0.036	≤ 2.34	≤ 0.005	≤ 0.111	0.041	25.6	40.4	≤ 0.011	2.71

Note: CSU = Largescale Sucker, NSC = Northern Pikeminnow, PCC = Peamouth Chub, RSC = Redside Shiner, WCT = Westslope Cutthroat Trout, YP = Yellow Perch, KO = Kokanee, " - " indicates no data available.

Table H.11: Metal Concentrations (µg/g dry weight) in Fish Ovaries Collected at Rexford Area, 2019

Species	Month	Sample ID	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
			µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Largescale Sucker	May	Rexford-CSU-01	0.0121	0.052	≤ 0.035	5.54	0.049	0.284	0.024	≤ 0.019	0.034	0.0010	≤ 0.011	76.6
		Rexford-CSU-02	0.0212	0.110	0.039	5.05	0.061	0.384	0.015	0.023	0.034	0.0020	≤ 0.012	97.1
		Rexford-CSU-03	0.0131	0.061	0.047	5.99	0.030	0.236	0.013	≤ 0.016	0.038	≤ 0.0002	≤ 0.009	84.5
		Rexford-CSU-04	0.0181	0.067	0.064	5.68	0.022	0.458	0.023	≤ 0.020	0.038	0.0010	≤ 0.012	94.5
		Rexford-CSU-05	-	0.075	0.202	5.97	0.106	10.5	0.039	≤ 0.070	0.560	0.0040	0.060	781
		Rexford-CSU-06	0.0116	0.076	0.065	5.56	0.035	0.278	0.010	≤ 0.018	0.053	0.0010	≤ 0.010	80.4
		Rexford-CSU-07	0.00936	0.057	0.048	5.07	0.065	0.291	0.013	≤ 0.017	0.058	0.0010	≤ 0.010	69.3
		Rexford-CSU-08	0.0144	0.039	≤ 0.029	2.49	0.034	0.212	≤ 0.008	≤ 0.016	0.029	0.0020	≤ 0.009	65.4
Northern Pikeminnow	May	Rexford-NSC-01	0.0782	0.117	≤ 0.042	3.89	≤ 0.005	0.383	0.056	0.048	0.072	0.0010	0.049	315
		Rexford-NSC-02	0.0817	0.118	≤ 0.045	2.45	0.007	0.335	0.028	0.048	0.043	≤ 0.0004	0.027	142
		Rexford-NSC-03	-	0.075	≤ 0.094	5.11	≤ 0.011	0.285	0.101	≤ 0.053	0.121	≤ 0.0008	≤ 0.030	434
		Rexford-NSC-04	0.0694	0.076	≤ 0.037	2.24	0.009	0.254	0.017	0.036	0.039	0.0020	0.022	125
		Rexford-NSC-05	0.169	0.140	≤ 0.042	1.81	0.007	0.374	0.032	0.046	0.045	0.0010	0.042	153
		Rexford-NSC-06	0.101	0.113	≤ 0.049	3.49	≤ 0.006	0.339	0.106	0.071	0.078	0.0020	0.053	320
		Rexford-NSC-07	0.0730	0.097	≤ 0.048	3.21	≤ 0.006	0.487	0.060	0.051	0.067	≤ 0.0004	≤ 0.015	295
		Rexford-NSC-08	-	0.110	≤ 0.105	3.5	≤ 0.013	0.611	0.128	≤ 0.059	0.138	0.0020	≤ 0.034	325
		Rexford-NSC-09	0.125	0.105	≤ 0.042	2.59	0.010	0.308	0.039	0.050	0.056	0.0020	0.033	153
		Rexford-NSC-10	0.114	0.098	≤ 0.046	1.99	0.009	0.428	0.033	≤ 0.026	0.057	0.0010	0.028	148
		Rexford-NSC-11	0.113	0.129	≤ 0.062	9.46	≤ 0.007	0.532	0.160	≤ 0.034	0.120	0.0030	≤ 0.020	370
		Rexford-NSC-12	0.0781	0.141	≤ 0.059	5.13	≤ 0.007	0.700	0.046	≤ 0.033	0.126	0.0030	0.040	269
		Rexford-NSC-13	0.0687	0.126	≤ 0.052	1.95	0.009	0.470	0.064	≤ 0.029	0.076	0.0030	0.040	205
		Rexford-NSC-14	0.0839	0.097	≤ 0.040	2.8	≤ 0.005	0.362	0.025	≤ 0.022	0.044	0.0010	0.031	141
		Rexford-NSC-15	0.170	0.102	≤ 0.050	2.2	0.009	0.328	≤ 0.014	≤ 0.028	0.043	≤ 0.0004	0.035	127
Peamouth Chub	May	Rexford-PCC-01	-	0.097	≤ 0.067	5.1	0.019	0.326	≤ 0.019	≤ 0.038	0.104	0.0010	≤ 0.021	74.5
		Rexford-PCC-02	0.0141	0.076	≤ 0.032	6.75	0.017	0.445	0.013	0.033	0.138	0.0040	0.023	84.8
		Rexford-PCC-03	0.0140	0.069	≤ 0.029	5.77	0.020	0.274	0.015	0.058	0.040	≤ 0.0006	≤ 0.009	76.1
		Rexford-PCC-04	≤ 0.00046	0.090	≤ 0.059	8.37	0.012	0.269	≤ 0.017	≤ 0.033	0.055	≤ 0.0005	≤ 0.019	77.2
		Rexford-PCC-05	-	0.124	≤ 0.072	7.5	0.017	0.483	≤ 0.020	≤ 0.040	0.259	0.0020	0.024	99.8
		Rexford-PCC-06	0.0230	0.122	≤ 0.065	9.57	0.019	0.655	≤ 0.018	≤ 0.036	0.056	0.0030	≤ 0.021	84
		Rexford-PCC-07	-	0.100	≤ 0.073	7.87	0.013	0.385	≤ 0.021	≤ 0.041	0.259	≤ 0.0006	≤ 0.023	86.7
		Rexford-PCC-08	0.0133	0.067	≤ 0.027	7.3	0.017	0.244	≤ 0.008	0.041	0.028	0.0030	≤ 0.009	76.7
Redside Shiner	May	Rexford-RSC-01	-	0.141	≤ 0.088	19.7	0.069	0.500	≤ 0.025	≤ 0.049	0.162	≤ 0.0007	≤ 0.028	153
		Rexford-RSC-02	-	0.170	≤ 0.059	16.5	0.025	0.584	0.047	0.052	0.353	0.0020	0.029	151
		Rexford-RSC-03	-	0.055	≤ 0.024	5.71	0.007	0.312	0.012	≤ 0.014	0.053	≤ 0.0002	≤ 0.008	56.3
		Rexford-RSC-04	-	0.133	≤ 0.085	12.4	0.033	0.711	0.039	≤ 0.048	0.212	0.0020	≤ 0.027	174
		Rexford-RSC-05	-	0.057	≤ 0.024	3.54	0.012	0.185	0.009	≤ 0.014	0.089	0.0004	≤ 0.008	51.1
		Rexford-RSC-06	-	≤ 0.048	≤ 0.151	3.55	≤ 0.018	0.921	≤ 0.042	≤ 0.084	0.191	≤ 0.0010	≤ 0.048	32.9
		Rexford-RSC-07	-	0.074	≤ 0.053	3.38	0.010	0.263	≤ 0.015	≤ 0.030	0.122	≤ 0.0004	≤ 0.017	92.4
		Rexford-RSC-08	-	0.046	≤ 0.058	3.83	0.013	0.385	≤ 0.016	≤ 0.033	0.082	≤ 0.0005	≤ 0.019	62.3
Westslope Cutthroat Trout	May	Rexford-WCT-01	0.0102	0.026	≤ 0.026	11.9	0.027	1.47	≤ 0.007	≤ 0.015	0.030	0.0008	≤ 0.008	90.6

Table H.11: Metal Concentrations (µg/g dry weight) in Fish Ovaries Collected at Rexford Area, 2019

Species	Month	Sample ID	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
			µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw	µg/g dw
Yellow Perch	May	Rexford-YP-01	-	0.042	≤ 0.068	1.8	≤ 0.008	1.57	0.028	0.059	0.051	≤ 0.0010	≤ 0.022	81.7
		Rexford-YP-03	0.198	0.057	≤ 0.135	4.96	≤ 0.016	0.638	≤ 0.038	≤ 0.076	0.343	≤ 0.0010	≤ 0.043	151
Kokanee	September	RG_REX_KO-O-01	0.0127	≤ 0.018	≤ 0.032	1.42	≤ 0.004	0.590	≤ 0.009	≤ 0.018	0.040	0.0009	≤ 0.010	11.4
		RG_REX_KO-O-02	0.0135	0.038	≤ 0.033	4.12	0.122	1.90	≤ 0.009	≤ 0.019	0.042	0.0007	≤ 0.011	62.1
		RG_REX_KO-O-03	0.0212	0.022	≤ 0.031	3.65	0.074	1.82	≤ 0.009	≤ 0.018	0.036	0.0005	≤ 0.010	70.4
		RG_REX_KO-O-04	0.0205	≤ 0.018	≤ 0.033	1.09	≤ 0.004	1.40	≤ 0.009	≤ 0.018	0.046	≤ 0.0003	≤ 0.010	12.4
		RG_REX_KO-O-05	0.0195	0.028	≤ 0.03	5.40	0.128	1.71	0.031	≤ 0.017	0.041	0.0006	≤ 0.010	81.2
		RG_REX_KO-O-06	0.0232	0.047	≤ 0.031	3.90	0.130	1.71	≤ 0.009	≤ 0.017	0.036	0.0004	≤ 0.010	81.2
		RG_REX_KO-O-07	0.0257	0.056	≤ 0.03	4.20	0.114	1.66	≤ 0.008	≤ 0.017	0.033	0.0007	≤ 0.010	99.5
		RG_REX_KO-O-08	0.0145	0.041	≤ 0.031	4.29	0.109	1.80	≤ 0.009	≤ 0.017	0.035	0.0004	≤ 0.010	62.5

Note: CSU = Largescale Sucker, NSC = Northern Pikeminnow, PCC = Peamouth Chub, RSC = Redside Shiner, WCT = Westslope Cutthroat Trout, YP = Yellow Perch, KO = Kokanee, " - " indicates no data available.

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	%M	80.27	%
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	%M	73.72	%
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	%M	81.32	%
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	%M	80.44	%
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	%M	81.14	%
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	%M	83.15	%
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	%M	81.33	%
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	%M	80.8	%
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	81.99	%
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	81.24	%
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	81.33	%
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	80.11	%
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	78.07	%
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	77.49	%
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	79.16	%
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	78.92	%
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	80.26	%
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	65.32	%
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	59.98	%
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	62.44	%
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	59.57	%
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	65.03	%
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	62.19	%
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	60.08	%
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	59.01	%
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	%M	57.96	%
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	%M	78.63	%
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	%M	77.96	%
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	%M	77.96	%
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	%M	78	%
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	%M	78.44	%
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	%M	77.79	%
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	%M	77.73	%
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	%M	76.14	%
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	%M	65.16	%
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	%M	60.3	%
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	%M	56.02	%
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	%M	60.06	%
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	%M	58.27	%
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	%M	58.33	%
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	%M	58.7	%
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	%M	55.9	%
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	%M	79.83	%
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	%M	80.4	%
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	%M	79.04	%
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	%M	72.44	%
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	%M	80.57	%
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	%M	78.73	%
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	%M	77.56	%
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	%M	79.32	%
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	%M	74.17	%
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	%M	80.5	%
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	%M	77.8	%
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	%M	79.78	%
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	%M	81.07	%
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	%M	80.1	%
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	%M	83.15	%
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	%M	78.03	%
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	%M	79.95	%
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	%M	80.5	%
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	%M	96.42	%
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	%M	95.43	%
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	%M	97.49	%
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	%M	80.5	%
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	%M	76.46	%
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	%M	78.52	%
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	%M	76.46	%
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	%M	77.32	%
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	%M	78.11	%
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	%M	78.43	%
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	%M	78.68	%

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	0.09	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	0.09	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	0.12	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	0.09	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	0.08	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	0.08	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	0.09	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	0.11	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ag	0.09	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	0.06	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	0.12	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	0.13	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	0.14	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	0.12	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	0.1	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	0.09	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ag	0.15	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Ag	<0.01	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Ag	<0.01	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Al	3	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Al	2	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	4	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	4	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	3	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	2	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Al	2	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Al	2	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Al	3	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Al	4	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Al	4	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Al	9	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Al	4	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Al	9	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Al	16	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Al	3	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Al	2	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Al	<2	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Al	2	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Al	<2	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	As	0.28	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	As	0.19	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	As	0.11	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	As	0.08	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	As	0.22	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	As	0.14	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	As	0.12	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	As	0.17	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.11	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.4	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.12	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.13	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.13	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.14	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.07	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.15	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.39	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.15	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.21	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.12	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.17	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.16	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.15	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.08	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.2	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	As	0.23	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.14	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.11	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.1	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.08	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.08	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.1	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.19	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.09	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.22	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.14	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.15	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.14	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.15	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.15	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.21	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	As	0.2	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	As	0.02	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	As	0.02	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	As	0.04	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	As	0.1	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	As	0.01	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	As	0.03	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	As	0.03	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	As	0.05	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	As	0.1	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	As	0.15	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	As	0.24	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	As	0.22	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	As	0.17	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	As	0.18	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	As	0.28	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	As	0.19	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	As	0.07	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	As	0.08	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	As	0.07	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	As	0.06	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	As	0.05	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	As	0.03	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	As	0.08	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	As	0.07	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	As	0.04	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	As	0.04	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	As	0.06	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	As	0.03	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	As	0.02	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	B	<1	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	B	<1	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	B	<1	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	B	<1	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	B	<1	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	B	<1	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	B	<1	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	B	<1	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	B	<1	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	B	<1	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	B	<1	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	B	<1	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	B	<1	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	B	<1	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	B	<1	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	B	<1	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	B	<1	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	B	<1	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	B	<1	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	B	<1	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	B	<1	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	B	<1	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ba	0.41	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ba	0.09	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ba	0.5	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ba	0.56	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ba	0.2	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ba	0.47	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ba	0.75	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ba	0.88	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.85	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.29	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.12	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.06	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.24	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.1	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.18	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.06	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.15	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.38	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.31	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.36	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.38	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.44	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.34	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.44	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.4	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ba	0.31	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.09	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.08	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.12	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.07	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.15	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.13	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.07	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.11	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.37	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.32	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.26	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.34	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.27	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.3	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.34	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ba	0.3	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ba	0.44	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ba	0.86	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ba	0.1	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ba	0.23	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ba	0.36	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ba	0.16	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ba	0.28	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ba	0.11	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ba	0.04	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ba	1.3	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ba	1.9	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ba	1.7	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ba	0.64	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ba	1.2	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ba	1.1	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ba	0.81	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ba	1.4	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ba	0.53	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ba	0.11	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ba	0.05	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ba	0.07	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ba	0.05	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ba	0.04	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ba	0.12	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ba	0.07	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ba	0.06	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ba	0.1	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Ba	0.24	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Ba	0.13	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Be	<0.01	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Be	<0.01	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cd	0.02	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	0.01	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	0.01	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	0.02	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	0.02	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cd	0.01	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cd	0.05	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cd	0.01	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cd	0.01	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cd	0.01	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Cd	<0.01	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Cd	<0.01	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Co	0.03	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Co	0.06	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Co	0.03	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Co	0.03	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Co	0.06	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.04	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.01	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.01	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.06	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.04	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.04	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.03	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.07	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.06	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.04	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.05	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Co	0.04	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.01	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.03	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.06	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.01	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.01	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.08	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.06	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.08	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.06	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.05	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.06	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.05	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Co	0.08	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Co	0.01	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Co	0.01	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Co	<0.01	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Co	<0.01	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Co	0.01	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Co	<0.01	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Co	<0.01	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Co	<0.01	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Co	<0.01	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Co	0.03	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Co	0.03	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Co	0.01	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Co	0.03	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Co	0.04	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Co	0.04	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Co	0.04	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Co	0.04	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Co	0.05	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Co	<0.01	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Co	0.04	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Co	0.02	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Co	0.04	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cr	0.07	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	0.06	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cr	0.12	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cr	0.1	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cr	0.14	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cr	0.16	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cr	0.17	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cr	0.08	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cr	0.07	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cr	0.08	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cr	<0.05	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Cr	0.08	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Cr	0.06	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cu	1.4	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cu	1	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cu	0.71	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cu	1	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cu	2.7	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cu	1	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cu	0.56	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Cu	0.76	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	1.4	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	1.2	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	1.5	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	1.9	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	1.7	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	2.3	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	1.7	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	2.4	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	1.1	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	23	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	17	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	30	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	23	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	26	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	28	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	33	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	26	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Cu	18	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	1.1	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	0.9	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	1.1	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	1.1	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	1	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	1	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	1.9	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	0.98	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	43	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	37	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	35	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	36	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	26	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	26	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	24	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Cu	40	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cu	0.86	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cu	1.1	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cu	1.1	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cu	1.4	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cu	0.85	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cu	1	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cu	0.84	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cu	0.83	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Cu	0.79	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cu	1	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cu	1.5	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cu	1.1	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cu	1.2	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cu	1	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cu	0.7	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cu	1.1	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cu	1.6	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Cu	1.4	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cu	1.9	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cu	1.1	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cu	1.8	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cu	0.81	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cu	1.4	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cu	1.1	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cu	0.99	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cu	0.9	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Cu	1.3	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Cu	0.66	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Cu	0.57	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Fe	17	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Fe	10	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Fe	8	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Fe	16	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Fe	39	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Fe	14	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Fe	12	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Fe	10	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	20	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	29	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	19	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	15	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	17	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	20	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	18	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	18	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	27	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	73	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	40	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	49	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	50	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	54	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	44	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	44	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	47	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Fe	42	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	10	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	12	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	10	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	13	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	10	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	13	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	14	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	8	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	250	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	48	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	46	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	48	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	47	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	56	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	54	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Fe	68	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Fe	10	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Fe	12	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Fe	16	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Fe	26	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Fe	14	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Fe	12	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Fe	10	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Fe	9	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Fe	11	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Fe	14	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Fe	24	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Fe	28	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Fe	21	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Fe	32	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Fe	51	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Fe	19	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Fe	27	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Fe	22	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Fe	16	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Fe	13	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Fe	19	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Fe	16	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Fe	13	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Fe	14	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Fe	10	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Fe	13	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Fe	14	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Fe	10	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Fe	7	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Hg	0.39	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Hg	0.36	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Hg	0.29	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Hg	0.66	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Hg	1.1	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Hg	0.49	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Hg	0.2	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Hg	0.35	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.28	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.3	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.21	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.28	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.25	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.28	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.26	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.26	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.31	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.03	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.02	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.019	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.013	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.016	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.018	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.013	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.018	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Hg	0.02	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.22	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.25	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.24	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.24	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.23	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.28	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.21	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.22	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.072	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.021	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.02	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.017	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.017	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.024	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.021	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Hg	0.024	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Hg	1.2	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Hg	1.1	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Hg	0.84	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Hg	0.75	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Hg	1.2	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Hg	1.1	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Hg	0.84	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Hg	1.4	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Hg	1.3	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Hg	0.48	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Hg	0.54	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Hg	0.71	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Hg	0.62	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Hg	0.31	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Hg	0.48	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Hg	0.51	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Hg	0.89	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Hg	0.97	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Hg	0.12	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Hg	0.13	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Hg	0.098	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Hg	0.19	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Hg	0.092	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Hg	0.14	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Hg	0.27	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Hg	0.24	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Hg	0.15	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Hg	0.21	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Hg	0.36	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mn	0.6	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mn	1.1	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mn	1	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mn	0.8	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mn	1.5	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mn	2.9	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	0.6	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	0.6	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	0.5	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	0.5	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	2.3	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	2.5	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	2	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	2.8	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	1.7	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	2	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	2.3	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	3	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mn	2.4	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	0.2	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	0.2	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	0.2	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	0.2	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	0.2	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	2.7	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	2.6	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	2.7	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	2.5	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	2	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	2.1	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	2.3	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mn	3	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mn	0.7	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mn	1.1	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mn	0.6	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mn	0.1	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mn	0.2	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mn	1	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mn	1.2	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mn	1.5	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mn	0.8	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mn	0.8	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mn	1.2	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mn	0.5	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mn	1.2	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mn	0.7	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mn	0.5	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mn	0.3	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mn	0.4	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Mn	0.8	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Mn	0.5	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	0.04	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	0.03	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	0.02	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	0.03	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	0.02	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	0.03	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	0.02	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	0.04	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Mo	0.03	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	0.05	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	0.03	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	0.02	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	0.03	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	0.03	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	0.03	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	0.03	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Mo	0.03	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Mo	<0.02	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Mo	<0.02	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ni	0.05	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ni	0.06	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Ni	<0.05	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Ni	<0.05	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Pb	0.01	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Pb	0.01	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Pb	0.02	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Pb	0.01	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Pb	0.02	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Pb	0.04	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Pb	0.03	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Pb	0.01	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Pb	0.02	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Pb	0.2	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Pb	0.02	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Pb	<0.01	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Pb	0.01	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Pb	<0.01	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Sb	<0.01	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Sb	<0.01	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Se	3.9	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Se	1.7	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Se	3.4	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Se	2.2	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Se	2.6	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Se	5.8	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Se	2.7	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Se	1.3	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	2.2	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	1.8	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	1.9	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	1.9	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	2	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	2.2	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	2	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	2	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	1.9	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	3.8	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	3.8	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	4.9	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	4.9	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	4.4	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	5	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	5.6	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	4.7	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Se	3.8	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Se	2.1	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Se	1.8	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Se	2	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Se	1.8	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Se	1.8	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Se	1.8	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Se	1.8	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Se	1.9	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Se	6.7	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Se	4.2	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Se	4	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Se	5.9	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Se	4	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Se	4.2	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Se	4.2	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Se	5.2	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Se	1.8	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Se	2	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Se	1.9	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Se	1.2	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Se	2.2	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Se	2.9	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Se	1.2	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Se	1.4	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Se	1.4	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Se	2.8	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Se	2.2	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Se	2.1	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Se	2.1	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Se	2.3	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Se	2.2	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Se	3.4	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Se	1.7	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Se	1.8	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Se	2.5	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Se	2.5	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Se	5.1	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Se	2.1	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Se	4.8	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Se	4.4	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Se	1.9	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Se	1.2	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Se	4.2	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Se	2.8	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Se	2.2	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Sn	<0.05	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Sn	<0.05	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sr	0.73	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sr	0.22	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sr	2	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sr	0.65	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sr	0.24	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sr	0.77	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sr	1.6	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Sr	3.2	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	1.3	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	0.8	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	0.4	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	0.2	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	1.6	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	0.58	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	0.51	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	0.27	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	0.81	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	1.7	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	1.5	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	1.6	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	1.4	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	2.2	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	1.8	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	2.1	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	2	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Sr	1.6	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	0.42	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	0.26	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	0.51	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	0.21	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	0.67	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	0.82	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	0.33	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	0.6	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	2.4	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	1.8	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	1.2	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	1.4	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	1.3	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	1.4	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	1.4	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Sr	1.4	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sr	1.2	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sr	0.96	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sr	0.15	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sr	0.37	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sr	1.4	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sr	0.2	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sr	0.7	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sr	0.31	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Sr	0.14	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sr	3.8	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sr	4.8	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sr	6.2	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sr	1.8	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sr	1.4	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sr	1.8	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sr	0.95	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sr	3.1	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Sr	0.8	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sr	0.31	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sr	0.29	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sr	0.25	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sr	0.28	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sr	0.17	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sr	0.62	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sr	0.53	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sr	0.56	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Sr	0.41	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Sr	1.3	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Sr	1.3	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	0.2	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ti	0.5	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ti	0.2	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ti	0.3	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Ti	<0.2	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Ti	<0.2	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Tl	0.038	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Tl	0.014	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Tl	0.014	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Tl	0.009	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Tl	0.012	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Tl	0.017	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Tl	0.008	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Tl	0.006	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.058	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.077	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.057	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.075	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.052	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.055	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.059	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.064	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.08	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.009	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.006	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.006	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	<0.005	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.006	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.009	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	<0.005	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.006	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Tl	0.006	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.053	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.071	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.064	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.058	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.066	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.06	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.056	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.058	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.014	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.038	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.024	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.007	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.019	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.005	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.015	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Tl	0.024	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Tl	0.006	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Tl	0.006	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Tl	0.009	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Tl	0.012	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Tl	0.008	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Tl	0.005	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Tl	0.011	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Tl	0.01	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Tl	0.008	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Tl	<0.005	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Tl	<0.005	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Tl	0.009	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Tl	0.009	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Tl	<0.005	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Tl	<0.005	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Tl	0.008	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Tl	<0.005	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Tl	<0.005	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Tl	0.02	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Tl	0.02	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Tl	0.031	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Tl	0.038	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Tl	0.13	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Tl	0.019	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Tl	0.019	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Tl	0.038	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Tl	0.02	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Tl	0.02	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Tl	0.026	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	U	<0.005	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	U	<0.005	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	V	<0.1	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	V	<0.1	µg/g dw

Table H.12: Tissue Chemistry Results (Dry Weight) for Samples Collected at the Kikomun Creek Area, September 2019

Sample ID	Sample Type	Subject Taxonomic Name	Date	Analyte	Result	Units
RG_CAN_CSU_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Zn	30	µg/g dw
RG_CAN_CSU_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Zn	19	µg/g dw
RG_CAN_CSU_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Zn	15	µg/g dw
RG_CAN_CSU_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Zn	21	µg/g dw
RG_CAN_CSU_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Zn	38	µg/g dw
RG_CAN_CSU_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Zn	23	µg/g dw
RG_CAN_CSU_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Zn	19	µg/g dw
RG_CAN_CSU_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Catostomus macrocheilus*	17-Sep-19	Zn	26	µg/g dw
RG_CAN_KO_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	20	µg/g dw
RG_CAN_KO_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	19	µg/g dw
RG_CAN_KO_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	17	µg/g dw
RG_CAN_KO_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	18	µg/g dw
RG_CAN_KO_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	20	µg/g dw
RG_CAN_KO_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	20	µg/g dw
RG_CAN_KO_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	21	µg/g dw
RG_CAN_KO_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	19	µg/g dw
RG_CAN_KO_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	22	µg/g dw
RG_CAN_KO_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	77	µg/g dw
RG_CAN_KO_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	60	µg/g dw
RG_CAN_KO_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	69	µg/g dw
RG_CAN_KO_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	74	µg/g dw
RG_CAN_KO_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	84	µg/g dw
RG_CAN_KO_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	80	µg/g dw
RG_CAN_KO_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	61	µg/g dw
RG_CAN_KO_O-08_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	69	µg/g dw
RG_CAN_KO_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Oncorhynchus nerka*	17-Sep-19	Zn	57	µg/g dw
RG_CAN_MW_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	15	µg/g dw
RG_CAN_MW_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	14	µg/g dw
RG_CAN_MW_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	16	µg/g dw
RG_CAN_MW_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	15	µg/g dw
RG_CAN_MW_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	14	µg/g dw
RG_CAN_MW_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	17	µg/g dw
RG_CAN_MW_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	20	µg/g dw
RG_CAN_MW_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	13	µg/g dw
RG_CAN_MW_O-01_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	110	µg/g dw
RG_CAN_MW_O-02_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	66	µg/g dw
RG_CAN_MW_O-03_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	75	µg/g dw
RG_CAN_MW_O-04_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	79	µg/g dw
RG_CAN_MW_O-05_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	71	µg/g dw
RG_CAN_MW_O-06_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	83	µg/g dw
RG_CAN_MW_O-07_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	87	µg/g dw
RG_CAN_MW_O-DUP_2019-09-17	Fish Ovary/Ovary Tissue	*Prosopium williamsoni*	17-Sep-19	Zn	84	µg/g dw
RG_CAN_NSC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Zn	20	µg/g dw
RG_CAN_NSC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Zn	25	µg/g dw
RG_CAN_NSC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Zn	20	µg/g dw
RG_CAN_NSC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Zn	20	µg/g dw
RG_CAN_NSC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Zn	21	µg/g dw
RG_CAN_NSC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Zn	21	µg/g dw
RG_CAN_NSC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Zn	20	µg/g dw
RG_CAN_NSC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Zn	17	µg/g dw
RG_CAN_NSC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Ptychocheilus oregonensis*	17-Sep-19	Zn	12	µg/g dw
RG_CAN_PCC_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Zn	22	µg/g dw
RG_CAN_PCC_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Zn	29	µg/g dw
RG_CAN_PCC_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Zn	32	µg/g dw
RG_CAN_PCC_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Zn	26	µg/g dw
RG_CAN_PCC_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Zn	24	µg/g dw
RG_CAN_PCC_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Zn	21	µg/g dw
RG_CAN_PCC_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Zn	27	µg/g dw
RG_CAN_PCC_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Zn	30	µg/g dw
RG_CAN_PCC_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Mylocheilus caurinus*	17-Sep-19	Zn	20	µg/g dw
RG_CAN_RBT_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Zn	16	µg/g dw
RG_CAN_RBT_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Zn	15	µg/g dw
RG_CAN_RBT_M-03_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Zn	16	µg/g dw
RG_CAN_RBT_M-04_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Zn	16	µg/g dw
RG_CAN_RBT_M-05_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Zn	15	µg/g dw
RG_CAN_RBT_M-06_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Zn	16	µg/g dw
RG_CAN_RBT_M-07_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Zn	15	µg/g dw
RG_CAN_RBT_M-08_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Zn	16	µg/g dw
RG_CAN_RBT_M-DUP_2019-09-17	Fish Muscle/Muscle Tissue	*Oncorhynchus mykiss*	17-Sep-19	Zn	15	µg/g dw
RG_CAN_YP_M-01_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Zn	24	µg/g dw
RG_CAN_YP_M-02_2019-09-17	Fish Muscle/Muscle Tissue	*Perca flavescens*	17-Sep-19	Zn	22	µg/g dw

Table H.13: **Selenium Concentrations in Fish Tissue Samples Collected in the Spring, Koocanusa Reservoir Monitoring Program, 2014 to 2019**

Tissue Type	Fish Species	Trans-formation	Model P-values			Area Contrasts: Difference from Sand Creek: Exp-SC/SCx100						Difference Among Years											
												Sand Creek	Elk River	Gold Creek	Tobacco River	Rexford	Tenmile	Sand Creek	Elk River	Gold Creek	Tobacco River	Rexford	Tenmile
			Area× Year	Area	Year	Year	Elk River	Gold Creek	Tobacco River	Rexford	Tenmile	MOD						Letters					
Muscle	Peamouth Chub	log10	0.118	<0.001	<0.001	2014	47	30	-	-	-	b	b	b	-	-	-	C	AB	B	-	-	-
						2015			-	-	-	45	ns	ns	-	-	-	AB	AB	B	-	-	-
						2016			-	-	-	54	ns	42	-	-	-	A	A	A	-	-	-
						2018			ns	13	ns	ns	ns	ns	b	b	b	BC	BC	B	A	A	A
						2019			-		-	ns	-33	ns	-	ns	-	ABC	C	B	-	A	-
	Redside Shiner	rank	0.009	<0.001	0.113	2015	ns	ns	-	-	-	b	b	b	-	-	-	A	A	B	-	-	-
						2016	57	33	-	-	-	ns	ns	ns	-	-	-	A	A	AB	-	-	-
						2018	ns	36	-	-	144	ns	ns	35	-	-	b	A	AB	A	-	-	A
						2019	ns	41	-	52	-	ns	-14	ns	-	b	-	A	B	AB	-	A	-
	Northern Pikeminnow	rank	<0.001	<0.001	<0.001	2014	187	ns	-	-	-	b	b	b	-	-	-	AB	A	A	-	-	-
						2015	16	ns	-	-	-	ns	ns	ns	-	-	-	A	AB	A	-	-	-
						2016	ns	ns	-	-	-	ns	-68	ns	-	-	-	B	C	A	-	-	-
						2018	56	-	ns	ns	ns	ns	-50	-	b	b	b	AB	B	-	A	A	A
						2019	ns	ns	-	-45	-	ns	-62	-37	-	ns	-	AB	C	B	-	A	-
	Bull Trout	none	<0.001	0.004	0.062	2016	ns	43	-	-	-	b	b	b	-	-	-	A	A	A	-	-	-
						2018	-	-	-	61	-	ns	-	-	-	b	-	A	-	-	-	A	-
						2019	-	-	-	-	-	-	-	-	-	-30	-	-	-	-	-	B	-
	Kokanee	rank	0.352	<0.001	<0.001	2014	ns	-23	-	-	-	b	b	b	-	-	-	A	AB	A	-	-	-
						2015		-	-	-	-	ns	ns	-	-	-	-	AB	BC	-	-	-	-
						2016	-	-	-	-	-	-	ns	-	-	-	-	-	A	-	-	-	-
						2018	ns	-	-	8.1	-	ns	-16	-	-	b	-	AB	C	-	-	A	-
						2019		-	-		-	-15	-24	-	-	ns	-	B	C	-	-	A	-
	Largescale Sucker	log10	0.684	<0.001	<0.001	2014	158	37	-	-	-	b	b	b	-	-	-	A	A	A	-	-	-
						2015			-	-	-	ns	ns	ns	-	-	-	A	A	A	-	-	-
						2016	-	-	-	-	-	-	-	-44	-	-	-	-	-	B	-	-	-
						2018	-	-	-	-	-	-	-	-	-	b	-	-	-	-	-	A	-
						2019	-	-	-	-	-	-	-	-	-	ns	-	-	-	-	-	A	-
	Yellow Perch	rank	0.015	<0.001	0.174	2014	-	-	-	-	-	-	-	b	-	-	-	-	-	A	-	-	-
						2015	41	ns	-	-	-	b	b	ns	-	-	-	A	A	A	-	-	-
						2016	73	34	-	-	-	ns	ns	ns	-	-	-	A	A	A	-	-	-
						2018	-	-	-	-	-	-	-	ns	-	-	-	-	-	A	-	-	-
Ovary	Peamouth Chub	log10	0.015	0.005	<0.001	2014	ns	ns	-	-	-	b	b	b	-	-	-	B	B	B	-	-	-
						2015	ns	ns	-	-	-	101	82	ns	-	-	-	A	A	AB	-	-	-
						2016	ns	ns	-	-	-	126	89	ns	-	-	-	A	A	AB	-	-	-
						2018	ns	ns	-	ns	ns	74	90	ns	-	b	b	A	A	AB	-	A	A
						2019	-39	ns	-	-41	-	91	ns	65	-	ns	-	A	B	A	-	A	-
	Redside Shiner	log10	0.027	0.005	0.029	2015	ns	-54	-	-	-	b	b	b	-	-	-	AB	A	A	-	-	-
						2016	ns	ns	-	-	-	ns	ns	ns	-	-	-	A	A	A	-	-	-
						2018	ns	ns	-	-	-	ns	ns	ns	-	-	-	AB	A	A	-	-	-
						2019	ns	ns	-	ns	-	ns	ns	ns	-	b	-	B	A	A	-	A	-
	Northern Pikeminnow	rank	<0.001	<0.001	<0.001	2014	-	-	-	-	-	-	b	b	-	-	-	-	A	A	-	-	-
						2015	-	ns	-	-	-	b	-	ns	-	-	-	AB	-	A	-	-	-
						2016	ns	ns	-	-	-	ns	-70	ns	-	-	-	B	B	A	-	-	-
						2018	ns	-	-	-62	-67	ns	ns	-	-	b	b	AB	A	-	-	A	A
						2019	-73	-85	-	-86	-	ns	-75	ns	-	ns	-	A	B	A	-	A	-
	Yellow Perch	rank	0.112	<0.001	0.014	2015	-	-	-	-	-	-	b	b	-	-	-	-	A	B	-	-	-
						2016	99	70	-	-	-	b	ns	21	-	-	-	A	A	A	-	-	-
						2018	-	-	-	-	-	-	-	ns	-	-	-	-	-	AB	-	-	-

Model p-value < 0.1.

Magnitude of Difference (MOD) > 0 (Exposed greater than Sand Creek or year greater than baseline).

MOD < 0 (Exposed less than Sand Creek or year less than baseline).

Notes: "b" = baseline year (i.e., the first year enough samples were collected to be included in the analyses), "ns" = non-significant, "-" indicates not applicable as no data were collected for this species in the given year, * indicates a significant difference between the two areas at an α of 0.1.

Table H.14: Peamouth Chub Muscle Tissue Mercury Results, Area Comparison Statistics, 2014 to 2019

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-way ANCOVA (Parallel Slope Model) P-values			Year	Covariate Value	Measures of Central Tendency			Magnitude of Difference ([Exposed-Reference]/Reference*100%)		
				Term (s)	P-value	Area	Year	Area x Year			Sand Creek	Elk River	Gold Creek	Sand Creek vs. Elk River	Sand Creek vs. Gold Creek	Gold Creek vs. Elk River
F	Mercury Concentration (ug/g dw)	Fork Length (cm)	log10	Cov x Year	0.042	0.276	<0.001	0.004	2014	23.4	0.558	0.777	0.535	39	-4.0	45
									2015	23.4	0.700	0.614	0.803	-12	15	-24
									2016	23.4	0.746	0.424	0.604	-43	-19	-30
									2018	23.4	0.633	0.590	0.649	-6.9	2.6	-9.1
									2019	23.4	0.481	0.445	0.527	-7.5	9.5	-16

P-value < 0.05
Tukey's HSD P-Value < 0.1 and Exp > Ref
Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organism; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the difference in R^2 of the three-way and two two-way interactions (cov×Area + cov×Year) met the criteria above. Next, the covariate interaction with Year (cov×Year) was dropped if not significant or if the difference in R^2 between models the one interaction with Area (cov×Year) and two interactions (cov×Area + cov×Year) met the criteria above. Finally, the covariate interaction with Area (cov×Area) was dropped if not significant or if the difference in R^2 with the parallel slope model met the criteria above.

Table H.15: Peamouth Chub Muscle Tissue Mercury Results, Temporal Comparison Statistics, 2014 to 2019

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-way ANCOVA (Parallel Slope Model) P-values			Year Contrasts		Covariate Value	Magnitude of Difference ([Contrast-Baseline]/Baseline*100%)		
				Term (s)	P-value	Area	Year	Area x Year	Baseline Year	Contrast Year		Sand Creek	Elk River	Gold Creek
F	Mercury Concentration (ug/g dw)	Fork Length (cm)	log_{10}	Cov	<0.001	0.435	<0.001	0.005	2014	2015	23.4	26	-21	50
										2016		34	-45	13
										2018		11	-29	20
										2019		-14	-43	-1.6
									2015	2016	23.4	1.9	-34	-28
										2018		-17	-13	-22
										2019		-28	-24	-31
									2016	2018	23.4	-14	28	5.9
										2019		-36	5.0	-13
									2018	2019	23.4	-20	-21	-18

P-value < 0.05
Tukey's HSD P-Value < 0.1 and Exp > Ref
Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organism.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the difference in R^2 of the three-way and two two-way interactions (cov×Area + cov×Year) met the criteria above. Next, the covariate interaction with Year (cov×Year) was dropped if not significant or if the difference in R^2 between models the one interaction with Area (cov×Year) and two interactions (cov×Area + cov×Year) met the criteria above. Finally, the covariate interaction with Area (cov×Area) was dropped if not significant or if the difference in R^2 with the parallel slope model met the criteria above.

Table H.16: **Redside Shiner Muscle Tissue Mercury Results, Area Comparison Statistics, 2016 to 2019**

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-way ANCOVA (Parallel Slope Model) P-values			Year	Covariate Value	Measures of Central Tendency			Magnitude of Difference ([Exposed-Reference]/Reference*100%)		
				Term (s)	P-value	Area	Year	Area x Year			Sand Creek	Elk River	Gold Creek	Sand Creek vs. Elk River	Sand Creek vs. Gold Creek	Gold Creek vs. Elk River
F	Mercury Concentration (ug/g dw)	Fork Length (cm)	log_{10}	Cov x Area x Year	<0.001	0.265	<0.001	0.002	2015	9.8	0.354	0.326	0.491	-8.0	-	-34
										9.9	0.344	0.336	0.492	-	43	-
										10	0.334	0.347	0.493	3.9	-	-30
									2016	9.8	0.293	0.303	0.386	3.6	-	-
										9.9	0.300	0.300	0.387	-	29	-22
										10	0.307	0.297		-3.1	-	-
									2018	9.8	0.435	0.566	0.393	30	-	44
										9.9	0.438	0.594	0.398	-	-9.1	-
										10	0.441	0.623	0.404	41	-	54
									2019	9.8	0.373	0.310	0.392	-	-	-
										9.9	0.374	0.312	0.394	-16	5.4	-21
										10	0.376	0.315	0.397	-	-	-

P-value < 0.05
Tukey's HSD P-Value < 0.1 and Exp > Ref
Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organism; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the difference in R^2 of the three-way and two two-way interactions (cov×Area + cov×Year) met the criteria above. Next, the covariate interaction with Year (cov×Year) was dropped if not significant or if the difference in R^2 between models the one interaction with Area (cov×Year) and two interactions (cov×Area + cov×Year) met the criteria above. Finally, the covariate interaction with Area (cov×Area) was dropped if not significant or if the difference in R^2 with the parallel slope model met the criteria above.

Table H.17: Redside Shiner Muscle Tissue Mercury Results, Temporal Comparison Statistics, 2015 to 2019

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA and Two-way ANCOVA (Parallel Slope Model) P-value			Year Contrasts		Covariate Value	Magnitude of Difference ([Contrast-Baseline]/Baseline*100%)		
				Term (s)	P-value	Area	Year	Area x Year	Baseline Year	Contrast Year		Sand Creek	Elk River	Gold Creek
F	Mercury Concentration (ug/g dw)	Fork Length (cm)	log_{10}	Cov x Area x Year	<0.001	0.265	<0.001	0.002	2015	2016	9.8	-17	-6.9	-
											9.9	-	-	-21
											10	-8.2	-14	-
										2018	9.8	23	-	-
											9.9	-	76	-19
											10	32	-	-
										2019	9.8	-	-4.7	-
											9.9	8.8	-	-20
											10	-	-9.5	-
									2016	2018	9.8	-	87	-
											9.9	46	-	3.0
											10	-	109	-
										2019	9.9	25	4.0	2.0
									2018	2019	9.8	-	-45	-
											9.9	-15	-	-0.98
											10	-	-50	-

P-value < 0.05
Tukey's HSD P-Value < 0.1 and Exp > Ref
Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organisms; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the difference in R^2 of the three-way and two two-way interactions (cov×Area + cov×Year) met the criteria above. Next, the covariate interaction with Year (cov×Year) was dropped if not significant or if the difference in R^2 between models the one interaction with Area (cov×Year) and two interactions (cov×Area + cov×Year) met the criteria above. Finally, the covariate interaction with Area (cov×Area) was dropped if not significant or if the difference in R^2 with the parallel slope model met the criteria above.

Table H.18: Northern Pikeminnow Muscle Tissue Mercury Results, Area Comparison Statistics, 2016 to 2019

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-Way ANCOVA (Parallel Slope Model) P- values			Year	Covariate Value	Measures of Central Tendency			Magnitude of Difference ([Exposed-Reference]/Reference*100%)		
				Term (s)	P- value	Area	Year	Area x Year			Sand Creek	Elk River	Gold Creek	Sand Creek vs. Elk River	Sand Creek vs. Gold Creek	Gold Creek vs. Elk River
F	Mercury Concentration (ug/g dw)	Fork Length (cm)	log_{10}	Cov	<0.001	0.103	<0.001	0.873	2016	34.6	0.991	0.912	1.05	ns	ns	ns
										37.2	1.10	1.01	1.17			
										39.8	1.21	1.11	1.29			
									2018	34.6	1.13	1.04	1.20			
										37.2	1.26	1.16	1.34			
										39.8	1.39	1.28	1.47			
									2019	34.6	0.794	0.730	0.842			
										37.2	0.881	0.810	0.934			
										39.8	0.971	0.893	1.03			

P-value < 0.05
Tukey's HSD P-Value < 0.1 and Exp > Ref
Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organism; "ns" indicates no significant area term.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the difference in R^2 of the three-way and two two-way interactions (cov×Area + cov×Year) met the criteria above. Next, the covariate interaction with Year (cov×Year) was dropped if not significant or if the difference in R^2 between models the one interaction with Area (cov×Year) and two interactions (cov×Area + cov×Year) met the criteria above. Finally, the covariate interaction with Area (cov×Area) was dropped if not significant or if the difference in R^2 with the parallel slope model met the criteria above.

Table H.19: Northern Pikeminnow Muscle Tissue Mercury Results, Temporal Comparison Statistics, 2016 to 2019

Sex	Response	Covariate	Transformation	Significant Covariate P-values[a]		Two-way ANOVA or Two-Way ANCOVA (Parallel Slope Model) P- values			Year Contrasts		Covariate Value	Magnitude of Difference ([Contrast-Baseline]/Baseline*100%)		
				Term (s)	P-Value	Area	Year	Area x Year	Baseline Year	Contrast Year		Sand Creek	Elk River	Gold Creek
F	Mercury Concentration (ug/g dw)	Fork Length (cm)	log_{10}	Cov	<0.001	0.103	<0.001	0.873	2016	2018	37.2	14		
										2019	37.2	-20		
									2018	2019	37.2	-30		

P-value < 0.05
Tukey's HSD P-Value < 0.1 and Exp > Ref
Tukey's HSD P-Value < 0.1 and Exp < Ref

Notes: "-" indicates insufficient data for analysis; "F" indicates female organisms.

[a] Final ANCOVA models were built iteratively, with several simplifying steps to reduce model complexity while maintaining high explanatory power (i.e., difference in R^2 <0.02 and overall R^2>0.8; Environment Canada, 2012). The three-way covariate interaction (cov×Area×Year) was removed if not significant (p>0.05) or if the difference in R^2 of the three-way and two two-way interactions (cov×Area + cov×Year) met the criteria above. Next, the covariate interaction with Year (cov×Year) was dropped if not significant or if the difference in R^2 between models the one interaction with Area (cov×Year) and two interactions (cov×Area + cov×Year) met the criteria above. Finally, the covariate interaction with Area (cov×Area) was dropped if not significant or if the difference in R^2 with the parallel slope model met the criteria above.

Table H.20: Muscle Selenium Concentrations in Northern Pikeminnow, Koocanusa Reservoir, 2019

Area	Sample ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	Moisture
		ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	%
Sand Creek	6/20/2019 RG_SC-NPM-01-M_20190620	<2	<0.01	0.05	0.7	<0.01	<1	<0.01	<0.05	<0.01	2.5	31	<0.01	0.9	1	<0.02	<0.05	2.2	<0.01	2.7	0.013	<0.05	<0.2	<0.005	<0.1	27	78.73
	6/20/2019 RG_SC-NPM-02-M_20190620	<2	<0.01	0.03	0.69	<0.01	<1	<0.01	1.2	<0.01	1.2	24	<0.01	0.9	0.99	0.04	0.12	1.8	<0.01	3.8	0.01	<0.05	<0.2	<0.005	<0.1	23	80.68
	6/20/2019 RG_SC-NPM-03-M_20190620	<2	<0.01	0.04	1.1	<0.01	<1	<0.01	<0.05	<0.01	2.1	21	0.02	1.6	0.55	<0.02	<0.05	2	<0.01	5.1	0.012	<0.05	<0.2	<0.005	<0.1	34	79.58
	6/20/2019 RG_SC-NPM-04-M_20190620	<2	<0.01	0.07	0.77	<0.01	<1	<0.01	<0.05	<0.01	2.1	25	<0.01	0.8	1.1	<0.02	<0.05	2.6	<0.01	2.9	0.016	<0.05	<0.2	<0.005	<0.1	34	79.13
	6/20/2019 RG_SC-NPM-05-M_20190620	<2	<0.01	0.04	0.93	<0.01	<1	<0.01	<0.05	0.01	1.1	13	<0.01	0.9	0.81	<0.02	<0.05	2	<0.01	3.4	0.011	<0.05	<0.2	<0.005	<0.1	24	79.4
	7/24/2019 RG_SC-NPM-06-M_20190724	<2	<0.01	0.01	0.79	<0.01	<1	<0.01	0.32	0.01	0.85	17	<0.01	1.3	1.4	<0.02	<0.05	1.4	<0.01	4.8	<0.005	<0.05	<0.2	<0.005	<0.1	18	79.65
	7/25/2019 RG_SC-NPM-07-M_20190725	3	<0.01	0.06	1.1	<0.01	<1	<0.01	0.06	0.01	0.95	15	0.02	1.6	1.3	<0.02	<0.05	1.7	<0.01	4.7	0.007	<0.05	<0.2	<0.005	<0.1	44	80.43
	7/25/2019 RG_SC-NPM-08-M_20190725	<2	<0.01	0.1	1	<0.01	<1	<0.01	0.05	0.02	1	15	<0.01	1.8	1.3	<0.02	0.05	2.4	<0.01	6.6	0.014	<0.05	<0.2	<0.005	<0.1	24	78.64
	7/25/2019 RG_SC-NPM-09-M_20190725	<2	<0.01	0.02	0.24	<0.01	<1	<0.01	<0.05	0.01	1.8	19	<0.01	0.5	1.2	<0.02	<0.05	1.5	<0.01	1.1	0.006	<0.05	<0.2	<0.005	<0.1	19	76.51
	7/26/2019 RG_SC-NPM-10-M_20190726	<2	<0.01	0.07	0.39	<0.01	<1	<0.01	<0.05	0.01	0.76	10	<0.01	0.6	1	<0.02	0.06	1.4	<0.01	1.4	0.006	<0.05	<0.2	<0.005	<0.1	17	79.18
	7/26/2019 RG_SC-NPM-11-M_20190726	<2	<0.01	0.06	0.28	<0.01	<1	<0.01	<0.05	<0.01	1.1	14	<0.01	0.4	0.9	<0.02	<0.05	2.2	<0.01	1.1	0.013	<0.05	<0.2	<0.005	<0.1	21	79.53
Waldo Bay	6/21/2019 RG_WB-NPM-01-M_20190621	<2	<0.01	0.02	0.97	<0.01	<1	<0.01	<0.05	0.02	1.7	23	0.04	0.9	1.1	<0.02	<0.05	2.2	<0.01	2.8	0.01	<0.05	<0.2	<0.005	<0.1	28	77.69
	6/26/2019 RG-WB-NPM-02-M_20190626	<2	<0.01	0.09	2.4	<0.01	<1	<0.01	<0.05	0.02	2.6	28	0.01	1.7	0.99	<0.02	<0.05	2.9	<0.01	9.4	0.015	<0.05	<0.2	<0.005	<0.1	44	79.29
	6/26/2019 RG-WB-NPM-03-M_20190626	<2	<0.01	0.08	1.5	<0.01	<1	<0.01	<0.05	0.02	2.5	26	<0.01	1.5	1	<0.02	<0.05	2.9	<0.01	3.9	0.006	<0.05	<0.2	<0.005	<0.1	32	79.01
Elk River	6/14/2019 RG_ER-NPM-01-M_20190614	2	<0.01	0.15	0.25	<0.01	<1	<0.01	0.24	0.01	2	25	<0.01	0.3	1.3	<0.02	0.05	1.6	<0.01	3.8	0.016	<0.05	<0.2	<0.005	<0.1	19	72.64
	6/14/2019 RG_ER-NPM-02-M_20190614	<2	<0.01	0.21	0.95	<0.01	<1	<0.01	<0.05	0.02	2.6	24	0.02	0.8	2.2	<0.02	<0.05	1.3	<0.01	6.2	0.014	<0.05	<0.2	<0.005	<0.1	33	72.76
	6/17/2019 RG_ER-NPM-03-M_20190617	<2	<0.01	0.22	0.92	<0.01	<1	<0.01	0.15	0.02	3.5	33	0.06	0.6	1.2	<0.02	<0.05	1.2	<0.01	3.6	0.013	<0.05	<0.2	<0.005	<0.1	28	71.78
	6/17/2019 RG_ER-NPM-04-M_20190617	<2	<0.01	0.16	0.9	<0.01	<1	<0.01	<0.05	0.02	2.6	26	<0.01	0.6	0.66	<0.02	<0.05	1.2	<0.01	3	0.021	<0.05	0.2	<0.005	<0.1	22	71.16
	6/18/2019 RG_ER-NPM-05-M_20190618	<2	<0.01	0.04	0.72	<0.01	<1	<0.01	0.2	0.01	0.85	9	<0.01	0.6	1.7	<0.02	<0.05	1.6	<0.01	3.6	0.01	<0.05	<0.2	<0.005	<0.1	19	77.76
	6/18/2019 RG_ER-NPM-06-M_20190618	<2	<0.01	0.07	0.58	<0.01	<1	<0.01	<0.05	0.03	0.79	8	<0.01	0.8	2.1	<0.02	<0.05	1.6	<0.01	3	0.008	<0.05	<0.2	<0.005	<0.1	17	78.52
	6/18/2019 RG_ER-NPM-07-M_20190618	<2	<0.01	0.17	1.2	<0.01	<1	<0.01	<0.05	0.02	2.4	23	<0.01	1	0.9	<0.02	0.08	1.3	<0.01	5.7	0.013	<0.05	<0.2	<0.005	<0.1	24	72.59
	6/18/2019 RG_ER-NPM-08-M_20190618	<2	<0.01	0.03	0.75	<0.01	<1	<0.01	<0.05	0.01	0.95	13	0.01	0.4	1.9	<0.02	<0.05	1.6	<0.01	3.1	0.009	<0.05	<0.2	<0.005	<0.1	22	78.06
	6/19/2019 RG_ER-NPM-09-M_20190619	3	<0.01	0.06	1.7	<0.01	<1	<0.01	<0.05	0.03	2.5	27	0.09	1.2	0.94	<0.02	0.07	2	<0.01	8.5	0.017	<0.05	<0.2	<0.005	<0.1	38	76.79
	6/19/2019 RG_ER-NPM-10-M_20190619	<2	<0.01	0.03	0.95	<0.01	<1	<0.01	<0.05	0.02	1.7	16	0.02	0.7	0.98	<0.02	<0.05	1.9	<0.01	3	0.009	<0.05	<0.2	<0.005	<0.1	29	76.48
	6/19/2019 RG_ER-NPM-11-M_20190619	<2	<0.01	0.07	0.36	<0.01	<1	<0.01	<0.05	0.01	1.5	16	0.03	0.6	0.87	<0.02	<0.05	2.5	<0.01	1.4	0.012	<0.05	<0.2	<0.005	<0.1	18	78.43
	6/20/2019 RG_ER-NPM-12-M_20190620	<2	<0.01	0.17	0.2	<0.01	<1	<0.01	<0.05	<0.01	0.96	9	0.01	0.2	1.5	<0.02	<0.05	1.3	<0.01	0.61	0.01	<0.05	<0.2	<0.005	<0.1	15	72.41
	6/20/2019 RG_ER-NPM-13-M_20190620	<2	<0.01	0.08	0.78	<0.01	<1	<0.01	<0.05	0.02	1.1	11	0.01	0.7	1.5	<0.02	<0.05	1.5	<0.01	4.5	0.006	<0.05	<0.2	<0.005	<0.1	19	75.51
	6/20/2019 RG_ER-NPM-14-M_20190620	<2	<0.01	0.14	0.65	<0.01	<1	<0.01	<0.05	0.01	1.1	11	<0.01	0.6	1.3	<0.02	<0.05	1.7	<0.01	2.6	0.01	<0.05	<0.2	<0.005	<0.1	16	74.2
	6/20/2019 RG_ER-NPM-15-M_20190620	<2	<0.01	0.02	0.85	<0.01	<1	<0.01	<0.05	0.01	0.92	14	0.02	0.9	1.1	<0.02	<0.05	2.5	<0.01	2	0.008	<0.05	<0.2	<0.005	<0.1	24	79.46
	6/20/2019 RG_ER-NPM-16-M_20190620	<2	<0.01	0.04	1.4	<0.01	<1	<0.01	0.09	0.03	1.9	29	0.01	1.3	1	<0.02	<0.05	2.4	<0.01	4.8	0.011	<0.05	<0.2	<0.005	<0.1	34	80.14
	6/20/2019 RG_ER-NPM-17-M_20190620	<2	<0.01	0.08	1	<0.01	<1	<0.01	<0.05	0.02	2.2	22	<0.01	1	1.1	<0.02	<0.05	1.8	<0.01	3.7	0.013	<0.05	<0.2	<0.005	<0.1	26	78.24
	6/20/2019 RG_ER-NPM-18-M_20190620	<2	<0.01	0.07	0.46	<0.01	<1	<0.01	<0.05	<0.01	0.83	7	<0.01	0.4	1.7	<0.02	<0.05	2.5	<0.01	1.7	<0.005	<0.05	<0.2	<0.005	<0.1	20	74.74
	6/25/2019 RG_ER-NPM-19-M_20190625	<2	<0.01	0.08	1.6	<0.01	<1	<0.01	<0.05	0.02	1.8	17	<0.01	1	0.41	<0.02	<0.05	1.9	<0.01	2.2	0.021	<0.05	<0.2	<0.005	<0.1	38	78.49
	6/25/2019 RG_ER-NPM-20-M_20190625	<2	<0.01	0.08	1.6	<0.01	<1	<0.01	<0.05	0.03	2.7	27	0.01	1.4	0.92	<0.02	<0.05	2.9	<0.01	7.1	0.018	<0.05	<0.2	<0.005	<0.1	29	76
	6/27/2019 RG_ER-NPM-21-M_20190627	<2	<0.01	0.04	1.3	<0.01	<1	<0.01	<0.05	0.02	2.6	35	<0.01	1.9	0.78	<0.02	<0.05	3.4	<0.01	7.1	0.011	<0.05	<0.2	<0.005	<0.1	28	76.67
	6/28/2019 RG_ER-NPM-22-M_20190628	<2	<0.01	0.02	0.84	<0.01	<1	<0.01	<0.05	0.02	0.92	9	<0.01	1.2	0.61	<0.02	0.05	2.6	<0.01	3.3	0.016	<0.05	<0.2	<0.005	<0.1	18	76.61
	6/28/2019 RG_ER-NPM-23-M_20190628	<2	<0.01	0.01	2.4	<0.01	<1	<0.01	0.08	0.02	2.3	21	<0.01	1.3	1.9	<0.02	<0.05	3.6	<0.01	3.4	0.012	<0.05	<0.2	<0.005	<0.1	25	74.79
	6/28/2019 RG_ER-NPM-24-M_20190628	<2	<0.01	0.06	2	<0.01	<1	<0.01	0.22	0.02	1.5	20	<0.01	1.4	0.88	<0.02	<0.05	2.4	<0.01	8.4	0.008	<0.05	<0.2	<0.005	<0.1	28	78.9
	6/28/2019 RG_ER-NPM-25-M_20190628	<2	<0.01	0.02	0.5	<0.01	<1	<0.01	0.06	<0.01	1.1	10	<0.01	0.7	1	<0.02	<0.05	2.5	<0.01	1.5	0.012	<0.05	<0.2	<0.005	<0.1	17	75.15
	6/28/2019 RG_ER-NPM-26-M_20190628	<2	<0.01	0.04	1.1	<0.01	<1	<0.01	0.07	0.02	1.7	21	<0.01	1.5	1.1	<0.02	<0.05	1.1	<0.01	7.1	0.01	<0.05	<0.2	<0.005	<0.1	24	77.37
	6/28/2019 RG_ER-NPM-27-M_20190628	<2	<0.01	0.04	1.2	<0.01	<1	<0.01	<0.05	0.02	0.83	11	<0.01	1.2	0.35	<0.02	<0.05	2.3	<0.01	4.7	0.013	<0.05	<0.2	<0.005	<0.1	22	77.97
	7/3/2019 RG_ER-NPM-28-M_20190703	<2	<0.01	0.03	1.1	<0.01	<1	<0.01	<0.05	0.01	1.2	12	0.02	1.4	0.86	<0.02	<0.05	2.3	<0.01	4.7	0.01	<0.05	<0.2	<0.005	<0.1	19	76.85
	7/4/2019 RG_ER-NPM-29-M_20190704	<2	<0.01	0.03	0.37	<0.01	<1	<0.01	<0.05	0.01	1.7	21	<0.01	0.6	0.82	<0.02	<0.05	4.6	<0.01	0.75	0.011	<0.05	<0.2	<0.005	<0.1	21	78.32
	7/4/2019 RG_ER-NPM-30-M_20190704	<2	<0.01	0.03	0.58	<0.01	<1	<0.01	<0.05	<0.01	0.73	9	0.02	0.8	1.6	<0.02	<0.05	2.7	<0.01	2.3	0.006	<0.05	<0.2	<0.005	<0.1	15	77.17
	7/8/2019 RG_ER-NPM-31-M_20190708	3	<0.01	0.04	1.4	<0.01	<1	<0.01	13	0.05	2.3	170	0.02	1.6	0.72	<0.02	0.4	3.1	<0.01	2.7	0.019	<0.05	<0.2	<0.005	<0.1	33	78.99
	7/9/2019 RG_ER-NPM-32-M_20190709	<2	<0.01	0.12	0.77	<0.01	<1	<0.01	0.77	0.02	1.8	26	<0.01	0.5	1.2	<0.02	<0.05	1.3	<0.01	3.2	0.01	<0.05	<0.2	<0.005	<0.1	25	72.74
	7/9/2019 RG_ER-NPM-33-M_20190709	<2	<0.01	0.11	0.92	<0.01	<1	<0.01	0.11	0.02	2.2	21	<0.01	0.8	0.76	<0.02	<0.05	1.4	<0.01	3.9	0.021	<0.05	<0.2	<0.005	<0.1	26	75.45
	7/9/2019 RG_ER-NPM-34-M_20190709	<2	<0.01	0.12	1.5	<0.01	<1	<0.01	0.17	0.02	2	20	<0.01	1.1	1.4	<0.02	<0.05	1.6	<0.01	5.4	0.011	<0.05	<0.2	<0.005	<0.1	28	74.77
	7/9/2019 RG_ER-NPM-35-M_20190709	<2	<0.01	0.32	1.8	<0.01	<1	<0.01	0.14	0.02	2.2	24	<0.01	1.3	1	<0.02	<0.05	1.2	<0.01	4.6	0.01	<0.05	<0.2	<0.005	<0.1	31	77.08
	7/9/2019 RG_ER-NPM-36-M_20190709	<2	<0.01	0.06	1.4	<0.01	<1	<0.01	0.17	0.03	2.7	25	<0.01	1.4	2	<0.02	<0.05	3.9	<0.01	4.3	0.02	<0.05	<0.2	<0.005	<0.1	34	78.53
	7/9/2019 RG_ER-NPM-37-M_20190709	4	<0.01	0.11	1.8	<0.01	<1	<0.01	0.07	0.03	2.2	26	0.02	2	0.87	<0.02	<0.05	2.2	<0.01	6.6	0.009	<0.05	<0.2	<0.005	<0.1	33	79.86
	7/10/2019 RG_ER-NPM-38-M_20190710	<2	<0.01	0.04	1.2	<0.01	<1	<0.01	0.1	0.02	2.4	25	0.02	1.4	0.8	<0.02	0.05	4	<0.01	4	0.011	<0.05	<0.2	<0.005	<0.1	29	78.21
	7/10/2019 RG_ER-NPM-39-M_20190710	<2	<0.01	0.11	0.46	<0.01	<1	<0.01	0.06	0.01	1.6	15	<0.01	0.5	0.92	<0.02	<0.05	1.2	<0.01	1.7	0.027	<0.05	<0.2	<0.005	<0.1	20	76.75
	7/10/2019 RG_ER-NPM-40-M_20190710	5	<0.01	0.09	0.74	<0.01	<1	<0.01	0.11	0.02	1.6	27	0.04	0.9	0.66	<0.02	0.09	3	<0.01	1.2	0.01	<0.05	<0.2	<0.005	<0.1	32	79.51
	7/10/2019 RG_ER-NPM-41-M_20190710	<2	<0.01	0.12	0.91	<0.01	<1	<0.01	0.18	0.01	1	11	<0.01	0.8	0.87	<0.02	<0.05	1.3	<0.01	3.1	0.024	<0.05	<0.2	<0.005	<0.1	21	76.75
	7/10/2019 RG_ER-NPM-42-M_20190710	<2	<0.01	0.03	1.5	<0.01	<1	<0.01	0.08	0.02	1.7	15	<0.01	1.4	0.92	<0.02	<0.05	3.4	<0.01	5.2	0.009	<0.05	<0.2	<0.005	<0.1	29	78.08
	7/11/2019 RG_ER-NPM-43-M_20190711	<2	<0.01	0.05	1.1	<0.01	<1	<0.01	0.13	0.02	2.6	17	0.02	1.3	0.69	<0.02	<0.05	4.8	<0.01	4	0.022	<0.05	<0.2	<0.005	<0.1	26	79.26
	7/12/2019 RG_ER-NPM-44-M_20190712	<2	<0.01	0.05	0.14	<0.01	<1	<0.01	<0.05	<0.01	0.73	10	<0.01	0.5	1.1	<0.02	<0.05	5	<0.01	0.1	0.008	<0.05	<0.2	<0.005	<0.1	17	78.91
	7/12/2019 RG_ER-NPM-45-M_20190712	<2	<0.01	0.1	0.19	<0.01	<1	<0.01	0.05	<0.01	0.77	6	<0.01	0.2	1	<0.02	<0.05	1.2	<0.01	0.8	0.015	<0.05	<0.2	<0.005	<0.1	14	76.31
	7/13/2019 RG_ER-NPM-46-M_20190713	2	<0.01	0.19	0.6	<0.01	<1	<0.01	0.06	0.02	2.2	23	0.01	0.4	1.3	<0.02	<0.05	1.3	<0.01	2.8	0.022	<0.05	<0.2	<0.005	<0.1	28	75.43
	7/15/2019 RG_ER-NPM-47-M_20190715	<2	<0.01	0.17	1	<0.01	<1	<0.01	0.07	0.02	1.6	16	<0.01	0.7	1.1	<0.02	0.12	1.2	<0.01	5.2	0.014	<0.05	<0.2	<0.005	<0.1	26	76.36
	7/16/2019 RG_ER-NPM-48-M_20190716	<2	<0.01	0.14	1.2	<0.01	<1	<0.01	<0.05	0.02	1.4	12	<0.01	0.8	1.7	<0.02	<0.05	1.3	<0.01	4.9	0.021	<0.05	<0.2	<0.005	<0.1	27	78.26
	7/26/2019 RG_ER-NPM-49-M_20190726	<2	<0.01	0.09	0.71	<0.01	<1	<0.01	0.06	0.02	1.5	15	<0.01	0.6	1.6	<0.02	<0.05	1.4	<0.01	3.6	0.014	<0.05	<0.2	<0.005	<0.1	24	77.86
Gold Creek	6/26/2019 RG_GC-NPM-01-M_20190626	<2	<0.01	0.18	0.17	<0.01	<1	<0.01	0.05	<0.01	0.84	8	<0.01	0.1	2.6	<0.02	<0.05	1.2	<0.01	0.51	0.007	<0.05	<0.2	<0.005	<0.1	12	75.39
	6/26/2019 RG_GC-NPM-02-M_20190626	<2	<0.01	0.07	0.07	<0.01	<1	<0.01	<0.05	<0.01	0.75	7	<0.01	0.1	1.5	<0.02	<0.05	1.3	<0.01	0.12	0.015	<0.05	<0.2	<0.005	<0.1	15	77.8
	6/26/2019 RG_GC-NPM-03-M_20190626	<2	<0.01	0.08	0.54	<0.01	<1	<0.01	<0.05	<0.01	0.68	7	<0.01	0.5	1.1	<0.02	<0.05	1.2	<0.01	2.3	0.01	<0.05	<0.2	<0.005	<0.1	18	77.49
	6/26/2019 RG_GC-NPM-04-M_20190626	<2	<0.01	0.06	0.6	<0.01	<1	<0.01	<0.05	<0.01	0.82	12	<0.01	0.8	1.1	<0.02	<0.05	2.4	<0.01	2.3	0.011	<0.05	<0.2	<0.005	<0.1	22	78.87
	6/26/2019 RG_GC-NPM-05-M_20190626	<2	<0.01	0.04	1.4	<0.01	<1	<0.01	<0.05	<0.01	1.8	20	0.01	1.4	1.1	<0.02	<0.05	1.7	<0.01	3.4	0.009	<0.05	<0.2	<0.005	<0.1	25	77.49

Table H.20: Muscle Selenium Concentrations in Northern Pikeminnow, Koocanusa Reservoir, 2019

Area	Sample ID	Aluminum ug/g	Antimony ug/g	Arsenic ug/g	Barium ug/g	Beryllium ug/g	Boron ug/g	Cadmium ug/g	Chromium ug/g	Cobalt ug/g	Copper ug/g	Iron ug/g	Lead ug/g	Manganese ug/g	Mercury ug/g	Molybdenum ug/g	Nickel ug/g	Selenium ug/g	Silver ug/g	Strontium ug/g	Thallium ug/g	Tin ug/g	Titanium ug/g	Uranium ug/g	Vanadium ug/g	Zinc ug/g	Moisture %
Gold Creek	6/26/2019 RG_GC-NPM-06-M_20190626	<2	<0.01	0.12	1	<0.01	<1	<0.01	<0.05	<0.01	1.7	17	<0.01	0.7	0.92	<0.02	<0.05	1.1	<0.01	3.8	0.021	<0.05	<0.2	<0.005	<0.1	22	75.9
	6/26/2019 RG_GC-NPM-07-M_20190626	<2	<0.01	0.02	1.1	<0.01	<1	<0.01	0.06	<0.01	1.3	20	0.01	1.2	1.1	<0.02	<0.05	2.1	<0.01	4.6	0.015	<0.05	<0.2	<0.005	<0.1	26	79.07
	6/27/2019 RG_GC-NPM-08-M_20190627	2	<0.01	0.1	1.4	<0.01	<1	<0.01	<0.05	<0.01	1.4	12	0.23	0.7	1.2	<0.02	<0.05	1.2	<0.01	6.6	0.022	<0.05	0.4	<0.005	<0.1	31	75.59
	6/27/2019 RG_GC-NPM-09-M_20190627	2	<0.01	0.04	0.16	<0.01	<1	<0.01	<0.05	<0.01	0.91	12	<0.01	0.2	1.5	<0.02	<0.05	1.4	<0.01	0.78	0.017	<0.05	<0.2	<0.005	<0.1	14	78.43
	6/27/2019 RG_GC-NPM-10-M_20190627	<2	<0.01	0.09	0.92	<0.01	<1	<0.01	<0.05	<0.01	1.6	13	<0.01	0.7	1.2	<0.02	<0.05	1.2	<0.01	4.8	0.022	<0.05	<0.2	<0.005	<0.1	20	75.35
	6/27/2019 RG_GC-NPM-11-M_20190627	<2	<0.01	0.09	0.16	<0.01	<1	<0.01	<0.05	<0.01	0.63	10	<0.01	0.3	1.1	<0.02	<0.05	1.8	<0.01	0.6	0.005	<0.05	<0.2	<0.005	<0.1	14	77.35
	6/27/2019 RG_GC-NPM-12-M_20190627	<2	<0.01	0.1	1.3	<0.01	<1	<0.01	<0.05	<0.01	2.2	21	<0.01	1.4	1	<0.02	<0.05	1.4	<0.01	4.6	0.01	<0.05	<0.2	<0.005	<0.1	26	78.38
	6/27/2019 RG_GC-NPM-13-M_20190627	<2	<0.01	0.02	0.13	<0.01	<1	<0.01	<0.05	<0.01	0.82	11	<0.01	0.3	1.6	<0.02	<0.05	2	<0.01	0.57	<0.005	<0.05	<0.2	<0.005	<0.1	14	78.91
	7/18/2019 RG_GC-NPM-14-M_20190718	<2	<0.01	0.11	0.78	<0.01	<1	<0.01	<0.05	<0.01	2.9	34	<0.01	0.4	1.7	<0.02	<0.05	1.5	<0.01	1.3	0.014	<0.05	<0.2	<0.005	<0.1	27	76.81
	7/19/2019 RG_GC-NPM-15-M_20190719	2	<0.01	0.04	0.44	<0.01	<1	<0.01	<0.05	<0.01	0.84	6	<0.01	0.3	2.6	<0.02	<0.05	1.4	<0.01	1.8	0.011	<0.05	<0.2	<0.005	<0.1	20	80.92
	7/25/2019 RG_GC-NPM-16-M_20190725	<2	<0.01	0.04	1.2	<0.01	<1	<0.01	<0.05	<0.01	1.2	9	<0.01	0.8	1.3	<0.02	<0.05	1.4	<0.01	5.6	0.016	<0.05	<0.2	<0.005	<0.1	27	77.46

Table H.21: Ovary Selenium Concentrations in Northern Pikeminnow, Koocanusa Reservoir, 2019

Area	Sample ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	Moisture
		ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	%
Sand Creek	6/20/2019 RG_SC-NPM-01-O_20190620	<2	<0.01	0.04	0.13	<0.01	<1	<0.01	<0.05	<0.01	3.1	56	<0.01	3.3	0.071	0.06	<0.05	8.4	<0.01	0.2	0.008	<0.05	<0.2	<0.005	<0.1	120	68.02
	6/20/2019 RG_SC-NPM-02-O_20190620	7	<0.01	0.06	0.26	<0.01	<1	<0.01	0.05	<0.01	2.6	130	0.03	1.2	0.12	0.06	<0.05	20	<0.01	0.84	0.041	<0.05	<0.2	<0.005	<0.1	490	80.46
	6/20/2019 RG_SC-NPM-03-O_20190620	<2	<0.01	0.09	0.07	<0.01	<1	<0.01	<0.05	<0.01	3	93	0.02	2.1	0.041	0.08	<0.05	11	<0.01	0.2	0.025	<0.05	<0.2	<0.005	<0.1	320	73.78
	6/20/2019 RG_SC-NPM-04-O_20190620	<2	<0.01	0.03	0.24	<0.01	<1	<0.01	<0.05	<0.01	3.6	110	0.02	3	0.098	0.09	<0.05	17	<0.01	0.72	0.012	<0.05	<0.2	<0.005	<0.1	140	69.48
	6/20/2019 RG_SC-NPM-05-O_20190620	<2	<0.01	0.1	0.33	<0.01	<1	<0.01	<0.05	0.05	3	98	<0.01	1.8	0.088	0.1	0.05	28	<0.01	0.23	0.034	<0.05	<0.2	<0.005	<0.1	360	75.91
	7/24/2019 RG_SC-NPM-06-O_20190724	<2	<0.01	0.08	0.18	<0.01	<1	<0.01	<0.05	0.05	2.5	120	<0.01	1.9	0.11	0.04	0.09	10	<0.01	0.78	0.008	<0.05	<0.2	<0.005	<0.1	250	77.04
	7/25/2019 RG_SC-NPM-07-O_20190725	<2	<0.01	0.07	0.09	<0.01	<1	<0.01	<0.05	0.04	3	100	<0.01	8.9	0.14	0.16	<0.05	21	<0.01	0.38	0.018	<0.05	<0.2	<0.005	<0.1	280	77.16
	7/25/2019 RG_SC-NPM-08-O_20190725	<2	<0.01	0.15	0.15	<0.01	<1	<0.01	<0.05	0.05	2.8	86	<0.01	5.1	0.092	0.1	<0.05	23	<0.01	0.57	0.018	<0.05	<0.2	<0.005	<0.1	200	74.33
	7/25/2019 RG_SC-NPM-09-O_20190725	<2	<0.01	0.08	0.07	<0.01	<1	<0.01	<0.05	0.05	2.7	75	<0.01	3.5	0.18	0.12	0.08	12	<0.01	0.33	0.007	<0.05	<0.2	<0.005	<0.1	220	75.9
	7/26/2019 RG_SC-NPM-10-O_20190726	3	<0.01	0.13	0.62	<0.01	<1	<0.01	0.09	0.05	3.2	100	<0.01	1.6	0.072	0.07	0.07	25	<0.01	0.28	0.023	<0.05	<0.2	<0.005	<0.1	440	75.75
	7/26/2019 RG_SC-NPM-11-O_20190726	<2	<0.01	0.12	0.15	<0.01	<1	<0.01	0.08	0.07	4.2	160	<0.01	2.8	0.12	0.05	<0.05	23	<0.01	0.62	0.028	<0.05	<0.2	<0.005	<0.1	320	80.08
Waldo Bay	6/21/2019 RG_WB-NPM-01-O_20190621	5	<0.01	0.02	0.23	<0.01	<1	<0.01	<0.05	0.04	3.6	77	0.06	4.5	0.069	0.09	0.06	7.4	<0.01	0.4	0.006	<0.05	<0.2	<0.005	<0.1	120	67.47
	6/26/2019 RG-WB-NPM-02-O_20190626	<2	<0.01	0.08	0.15	<0.01	<1	<0.01	<0.05	0.05	3	83	<0.01	4.4	0.12	0.13	<0.05	26	<0.01	0.28	0.03	<0.05	<0.2	<0.005	<0.1	260	76.76
	6/26/2019 RG-WB-NPM-03-O_20190626	<2	<0.01	0.14	0.12	<0.01	<1	<0.01	<0.05	0.03	2	65	<0.01	1.6	0.18	0.06	<0.05	9.8	<0.01	0.14	0.007	<0.05	<0.2	<0.005	<0.1	240	70.13
Elk River	6/14/2019 RG_ER-NPM-01-O_20190614	<2	<0.01	0.07	0.12	<0.01	<1	<0.01	<0.05	0.02	3.2	43	<0.01	0.6	0.1	0.05	<0.05	3.8	<0.01	0.15	0.006	<0.05	<0.2	<0.005	<0.1	97	64.38
	6/14/2019 RG_ER-NPM-02-O_20190614	<2	<0.01	0.07	0.14	<0.01	<1	<0.01	<0.05	0.03	3.1	38	<0.01	3	0.16	0.06	<0.05	2.7	0.01	0.19	0.007	<0.05	<0.2	<0.005	<0.1	110	65.57
	6/17/2019 RG_ER-NPM-03-O_20190617	<2	<0.01	0.06	0.22	<0.01	<1	<0.01	<0.05	0.03	2.8	45	0.01	1.3	0.1	0.05	<0.05	3.3	<0.01	0.17	0.006	<0.05	<0.2	<0.005	<0.1	94	65.63
	6/17/2019 RG_ER-NPM-04-O_20190617	<2	<0.01	0.09	0.13	<0.01	<1	<0.01	<0.05	0.02	2.8	41	<0.01	0.7	0.051	0.04	<0.05	3	<0.01	0.11	0.009	<0.05	<0.2	<0.005	<0.1	87	61.36
	6/18/2019 RG_ER-NPM-05-O_20190618	<2	<0.01	0.04	0.21	<0.01	<1	<0.01	<0.05	0.03	3	37	0.01	2.2	0.12	0.04	<0.05	4.9	<0.01	0.15	<0.005	<0.05	<0.2	<0.005	<0.1	78	62.62
	6/18/2019 RG_ER-NPM-06-O_20190618	<2	<0.01	0.26	0.14	<0.01	<1	<0.01	<0.05	0.03	2.6	52	<0.01	2.2	0.14	0.07	<0.05	5	<0.01	0.2	0.006	<0.05	<0.2	<0.005	<0.1	120	67.92
	6/18/2019 RG_ER-NPM-07-O_20190618	<2	<0.01	0.06	0.15	<0.01	<1	<0.01	<0.05	0.03	2.7	41	<0.01	1.3	0.11	0.04	<0.05	4.3	<0.01	0.14	0.006	<0.05	<0.2	<0.005	<0.1	87	63.03
	6/18/2019 RG_ER-NPM-08-O_20190618	<2	<0.01	0.06	0.24	<0.01	<1	<0.01	<0.05	0.03	2.3	91	0.01	2.6	0.13	0.08	<0.05	4.2	<0.01	0.27	0.009	<0.05	<0.2	<0.005	<0.1	120	67.65
	6/19/2019 RG_ER-NPM-09-O_20190619	3	<0.01	0.06	0.16	<0.01	<1	<0.01	<0.05	0.03	2.8	60	0.18	2.2	0.054	0.07	<0.05	7.2	<0.01	0.23	0.015	<0.05	<0.2	<0.005	<0.1	140	68.24
	6/19/2019 RG_ER-NPM-10-O_20190619	2	<0.01	0.04	0.26	<0.01	<1	<0.01	0.21	0.05	2.8	96	0.13	3.4	0.17	0.14	<0.05	9.9	<0.01	0.32	0.023	<0.05	<0.2	<0.005	<0.1	260	76.39
	6/19/2019 RG_ER-NPM-11-O_20190619	4	<0.01	0.06	0.32	<0.01	<1	0.01	0.11	0.06	4.1	130	0.18	2.7	0.096	0.12	0.06	17	<0.01	0.41	0.049	<0.05	<0.2	<0.005	<0.1	500	79.4
	6/20/2019 RG_ER-NPM-12-O_20190620	<2	<0.01	0.07	0.15	<0.01	<1	<0.01	<0.05	0.02	3	33	<0.01	0.5	0.081	0.04	<0.05	2.4	<0.01	0.14	0.006	<0.05	<0.2	<0.005	<0.1	84	63.59
	6/20/2019 RG_ER-NPM-13-O_20190620	<2	<0.01	0.06	0.14	<0.01	<1	<0.01	<0.05	0.03	2.4	54	<0.01	1.9	0.23	0.06	<0.05	3.6	<0.01	0.22	0.008	<0.05	<0.2	<0.005	<0.1	120	71.25
	6/20/2019 RG_ER-NPM-14-O_20190620	<2	<0.01	0.06	0.12	<0.01	<1	<0.01	<0.05	0.04	2.6	60	<0.01	1.8	0.21	0.08	<0.05	7.6	<0.01	0.23	0.015	<0.05	<0.2	<0.005	<0.1	140	72.31
	6/20/2019 RG_ER-NPM-15-O_20190620	<2	<0.01	0.04	0.36	<0.01	<1	<0.01	<0.05	0.05	2.9	95	<0.01	5.5	0.078	0.1	<0.05	8.6	<0.01	0.24	0.009	<0.05	<0.2	<0.005	<0.1	150	70.05
	6/20/2019 RG_ER-NPM-16-O_20190620	2	<0.01	0.08	0.35	<0.01	<1	0.01	0.09	0.07	3.6	150	0.02	2.5	0.13	0.12	0.06	17	<0.01	0.26	0.033	<0.05	<0.2	<0.005	<0.1	520	83.66
	6/20/2019 RG_ER-NPM-17-O_20190620	<2	<0.01	0.07	0.2	<0.01	<1	<0.01	<0.05	0.02	2.5	38	<0.01	2.3	0.085	0.04	<0.05	4.5	<0.01	0.16	0.005	<0.05	<0.2	<0.005	<0.1	74	65.19
	6/20/2019 RG_ER-NPM-18-O_20190620	<2	<0.01	0.05	0.22	<0.01	<1	<0.01	<0.05	0.02	1.8	32	<0.01	2.5	0.14	0.04	<0.05	4.1	<0.01	0.17	<0.005	<0.05	<0.2	<0.005	<0.1	80	65.88
	6/25/2019 RG_ER-NPM-19-O_20190625	<2	<0.01	0.08	0.38	<0.01	<1	<0.01	<0.05	0.04	2.6	66	<0.01	8.3	0.024	0.07	<0.05	7.9	<0.01	0.17	0.018	<0.05	<0.2	<0.005	<0.1	120	66.61
	6/25/2019 RG_ER-NPM-20-O_20190625	<2	<0.01	0.04	0.08	<0.01	<1	<0.01	<0.05	0.06	3.2	110	<0.01	2.6	0.12	0.08	<0.05	6.3	<0.01	0.21	0.03	<0.05	<0.2	<0.005	<0.1	180	75.96
	6/27/2019 RG_ER-NPM-21-O_20190627	<2	<0.01	0.03	0.11	<0.01	<1	<0.01	<0.05	0.02	2.7	49	<0.01	2.3	0.039	0.03	<0.05	13	<0.01	0.18	<0.005	<0.05	<0.2	<0.005	<0.1	80	60.36
	6/28/2019 RG_ER-NPM-22-O_20190628	<2	<0.01	0.05	0.17	<0.01	<1	<0.01	<0.05	0.02	2.2	37	<0.01	2.5	0.021	0.03	<0.05	7.1	<0.01	0.09	0.008	<0.05	<0.2	<0.005	<0.1	79	61.41
	6/28/2019 RG_ER-NPM-23-O_20190628	<2	<0.01	0.01	0.32	<0.01	<1	<0.01	<0.05	0.03	2.7	44	<0.01	4.1	0.12	0.04	<0.05	9.8	0.02	0.14	0.006	<0.05	<0.2	<0.005	<0.1	100	65.42
	6/28/2019 RG_ER-NPM-24-O_20190628	<2	<0.01	0.05	0.19	<0.01	<1	<0.01	<0.05	0.04	3.1	55	<0.01	1.5	0.12	0.05	<0.05	7.8	<0.01	0.15	0.006	<0.05	<0.2	<0.005	<0.1	120	67.86
	6/28/2019 RG_ER-NPM-25-O_20190628	<2	<0.01	0.02	0.22	<0.01	<1	<0.01	<0.05	0.03	3.3	51	<0.01	4.7	0.05	0.06	<0.05	8.3	<0.01	0.14	0.006	<0.05	<0.2	<0.005	<0.1	97	63.2
	6/28/2019 RG_ER-NPM-26-O_20190628	<2	<0.01	0.02	0.13	<0.01	<1	<0.01	<0.05	0.02	3	54	<0.01	2.1	0.037	0.04	<0.05	4	<0.01	0.15	<0.005	<0.05	<0.2	<0.005	<0.1	77	62.47
	6/28/2019 RG_ER-NPM-27-O_20190628	<2	<0.01	0.86	1.5	<0.01	<1	0.1	0.06	0.06	1.5	47	0.07	0.4	0.023	<0.02	0.06	14.6	<0.01	0.1	0.021	<0.05	<0.2	<0.005	<0.1	300	56.47
	7/3/2019 RG_ER-NPM-28-O_20190703	4	<0.01	0.03	0.2	<0.01	<1	0.01	<0.05	0.04	2.8	170	0.06	2.8	0.088	0.08	<0.05	34.5	<0.01	0.27	0.018	<0.05	<0.2	<0.005	<0.1	180	77.6
	7/4/2019 RG_ER-NPM-29-O_20190704	6	<0.01	0.05	0.39	<0.01	<1	0.04	0.22	0.07	3.9	150	0.06	2.8	0.097	0.15	0.1	19.4	<0.01	0.57	0.034	<0.05	0.3	<0.005	<0.1	330	77.92
	7/4/2019 RG_ER-NPM-30-O_20190704	14	<0.01	0.04	0.44	<0.01	<1	0.02	0.05	0.05	4.2	110	0.15	3.7	0.11	0.07	<0.05	7.1	<0.01	0.36	0.014	<0.05	0.3	<0.005	0.1	200	76.76
	7/8/2019 RG_ER-NPM-31-O_20190708	<2	<0.01	0.04	0.2	<0.01	<1	<0.01	0.09	0.03	3.3	64	<0.01	3.5	0.068	0.05	<0.05	10.9	<0.01	0.13	0.01	<0.05	<0.2	<0.005	<0.1	100	65.74
	7/9/2019 RG_ER-NPM-32-O_20190709	<2	<0.01	0.08	0.13	<0.01	<1	<0.01	0.1	0.04	3.3	81	0.01	1.2	0.13	0.08	<0.05	4.1	<0.01	0.36	0.016	<0.05	<0.2	<0.005	<0.1	160	74.41
	7/9/2019 RG_ER-NPM-33-O_20190709	<2	<0.01	0.08	0.2	<0.01	<1	<0.01	<0.05	0.02	2.6	47	<0.01	0.9	0.03	<0.02	<0.05	3.5	<0.01	0.18	0.01	<0.05	<0.2	<0.005	<0.1	97	63.66
	7/9/2019 RG_ER-NPM-34-O_20190709	3	<0.01	0.07	0.13	<0.01	<1	0.01	<0.05	0.05	3.2	77	<0.01	3.1	0.21	0.08	<0.05	5.4	<0.01	0.24	0.029	<0.05	<0.2	<0.005	0.1	260	76.24
	7/9/2019 RG_ER-NPM-35-O_20190709	<2	<0.01	0.06	0.24	<0.01	<1	<0.01	<0.05	0.02	2.4	57	<0.01	1.1	0.056	0.04	<0.05	3.8	<0.01	0.17	0.006	<0.05	<0.2	<0.005	<0.1	82	65.42
	7/9/2019 RG_ER-NPM-36-O_20190709	<2	<0.01	0.03	0.24	<0.01	<1	<0.01	<0.05	0.02	3	43	<0.01	2.4	0.12	0.04	<0.05	9.3	0.01	0.1	0.006	<0.05	<0.2	<0.005	<0.1	78	62.62
	7/9/2019 RG_ER-NPM-37-O_20190709	<2	<0.01	0.06	0.23	<0.01	<1	<0.01	0.21	0.03	3.1	48	<0.01	1.5	0.05	0.05	<0.05	5.4	<0.01	0.24	<0.005	<0.05	<0.2	<0.005	<0.1	92	63.31
	7/10/2019 RG_ER-NPM-38-O_20190710	3	<0.01	0.04	0.19	<0.01	<1	<0.01	<0.05	0.04	3.6	57	<0.01	5.9	0.071	0.08	<0.05	12	0.01	0.28	0.007	<0.05	<0.2	<0.005	<0.1	130	69.92
	7/10/2019 RG_ER-NPM-39-O_20190710	<2	<0.01	0.06	0.17	<0.01	<1	<0.01	<0.05	0.02	3.3	48	<0.01	2	0.038	0.04	<0.05	2.7	0.01	0.14	0.01	<0.05	<0.2	<0.005	<0.1	110	62.3
	7/10/2019 RG_ER-NPM-40-O_20190710	5	<0.01	0.06	0.35	<0.01	<1	0.02	0.12	0.04	4	110	0.07	1.4	0.06	0.07	0.06	18.4	<0.01	0.24	0.036	<0.05	0.2	<0.005	<0.1	540	79.88
	7/10/2019 RG_ER-NPM-41-O_20190710	<2	<0.01	0.07	0.17	<0.01	<1	<0.01	<0.05	0.02	2.6	52	<0.01	1.3	0.03	0.05	<0.05	3.4	<0.01	0.13	0.015	<0.05	<0.2	<0.005	<0.1	110	64.12
	7/10/2019 RG_ER-NPM-42-O_20190710	<2	<0.01	0.03	0.18	<0.01	<1	<0.01	<0.05	0.03	3.2	55	<0.01	5.1	0.079	0.07	<0.05	11	0.01	0.18	<0.005	<0.05	<0.2	<0.005	<0.1	100	65.47
	7/11/2019 RG_ER-NPM-43-O_20190711	<2	<0.01	0.06	0.17	<0.01	<1	<0.01	<0.05	0.03	3	42	<0.01	2.5	0.049	0.04	<0.05	12	0.01	0.12	0.007	<0.05	<0.2	<0.005	<0.1	78	64.3
	7/12/2019 RG_ER-NPM-44-O_20190712	3	<0.01	0.05	0.15	<0.01	<1	0.01	0.11	0.06	3.6	110	0.02	2.9	0.068	0.14	<0.05	36	<0.01	0.34	0.032	<0.05	<0.2	<0.005	<0.1	410	78.06
	7/12/2019 RG_ER-NPM-45-O_20190712	<2	<0.01	0.09	0.22	<0.01	<1	<0.01	<0.05	0.02	2.7	33	<0.01	0.5	0.049	0.04	<0.05	2.2	<0.01	0.13	0.01	<0.05	<0.2	<0.005	<0.1	91	62.46
	7/13/2019 RG_ER-NPM-46-O_20190713	<2	<0.01	0.12	0.07	<0.01	<1	<0.01	<0.05	0.04	3.3	91	<0.01	0.6	0.17	0.09	<0.05	2.4	<0.01	0.22	0.046	<0.05	<0.2	<0.005	<0.1	210	75.9
	7/15/2019 RG_ER-NPM-47-O_20190715	<2	<0.01	0.12	0.14	<0.01	<1	<0.01	<0.05	0.02	2.5	31	<0.01	0.7	0.091	0.03	<0.05	2.1	<0.01	0.12	0.011	<0.05	<0.2	<0.005	<0.1	99	66.82
	7/16/2019 RG_ER-NPM-48-O_20190716	<2	<0.01	0.11	0.06	<0.01	<1	0.01	<0.05	0.05	3.7	69	<0.01	1.4	0.37	0.11	<0.05	2.3	<0.01	0.33	0.059	<0.05	<0.2	<0.005	<0.1	230	81.71
	7/26/2019 RG_ER-NPM-49-O_20190726	2	<0.01	0.15	0.32	<0.01	<1	0.02	0.06	0.05	3.7	240	<0.01	1.2	0.23	0.07	<0.05	3.4	<0.01	0.43	0.051	<0.05	<0.2	0.008	0.1	380	82.16
	7/13/2019 RG_ER-NPM-47-O_20190713	<2	<0.01	0.08	0.15	<0.01	<1	<0.01	<0.05	0.03	2.7	45	<0.01	0.9	0.045	0.03	<0.05	3.5	<0.01	0.1	0.009	<0.05	<0.2	<0.005	<0.1	94	64.1
Gold Creek	6/26/2019 RG_GC-NPM-01-O_20190626	<2	<0.01	0.08	0.2	<0.01	<1	<0.01	<0.05	0.02	2.5	41	<0.01	0.6	0.14	0.05	<0.05	2.4	<0.01	0.17	0.005	<0.05	<0.2	<0.005	<0.1	100	64.51
	6/26/2019 RG_GC-NPM-02-O_20190626	<2	<0.01	0.08	0.15	<0.01	<1	<0.01	<0.05	0.02	2.5	38	<0.01	0.6	0.096	0.06	<0.05	2.1	<0.01	0.14	0.012	<0.05	<0.2	<0.005	<0.1	110	65.08

Table H.21: Ovary Selenium Concentrations in Northern Pikeminnow, Koocanusa Reservoir, 2019

Area	Sample ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	Moisture
		ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	%
Gold Creek	6/26/2019 RG_GC-NPM-03-O_20190626	2	<0.01	0.05	0.18	<0.01	<1	<0.01	0.4	0.04	3.1	47	<0.01	0.6	0.049	0.04	<0.05	2.1	<0.01	0.12	0.006	<0.05	<0.2	<0.005	<0.1	77	63.05
	6/26/2019 RG_GC-NPM-04-O_20190626	<2	<0.01	0.17	0.19	<0.01	<1	<0.01	0.07	<0.01	2.5	75	0.01	1.1	0.096	0.04	<0.05	20	<0.01	0.21	0.032	<0.05	<0.2	<0.005	<0.1	360	72.82
	6/26/2019 RG_GC-NPM-05-O_20190626	<2	<0.01	0.03	0.26	<0.01	<1	<0.01	<0.05	<0.01	2.2	46	<0.01	1.9	0.076	0.03	<0.05	3.9	<0.01	0.16	<0.005	<0.05	<0.2	<0.005	<0.1	83	63.49
	6/26/2019 RG_GC-NPM-06-O_20190626	<2	<0.01	0.06	0.18	<0.01	<1	<0.01	<0.05	<0.01	2.7	40	<0.01	1.9	0.048	0.04	<0.05	2.4	<0.01	0.12	0.012	<0.05	<0.2	<0.005	<0.1	100	63.02
	6/26/2019 RG_GC-NPM-07-O_20190626	<2	<0.01	0.11	0.13	<0.01	<1	0.01	0.12	<0.01	3.2	120	0.01	1.4	0.082	0.08	<0.05	11	<0.01	0.19	0.047	<0.05	<0.2	<0.005	<0.1	360	77.7
	6/27/2019 RG_GC-NPM-08-O_20190627	<2	<0.01	0.15	0.14	<0.01	<1	<0.01	<0.05	<0.01	2.4	30	<0.01	0.4	0.078	0.03	<0.05	2.2	<0.01	0.11	0.012	<0.05	<0.2	<0.005	<0.1	100	62.9
	6/27/2019 RG_GC-NPM-09-O_20190627	<2	<0.01	0.1	0.06	<0.01	<1	<0.01	<0.05	<0.01	3.8	68	<0.01	1.5	0.25	0.1	<0.05	2.2	<0.01	0.3	0.036	<0.05	<0.2	<0.005	<0.1	180	77.62
	6/27/2019 RG_GC-NPM-10-O_20190627	<2	<0.01	0.1	0.14	<0.01	<1	<0.01	<0.05	<0.01	2.4	40	<0.01	1.1	0.093	0.04	<0.05	2.7	<0.01	0.11	0.01	<0.05	<0.2	<0.005	<0.1	90	61.14
	6/27/2019 RG_GC-NPM-11-O_20190627	<2	<0.01	0.04	0.12	<0.01	<1	<0.01	0.11	0.01	2.8	92	<0.01	2.4	0.13	0.1	<0.05	12	<0.01	0.29	0.018	<0.05	<0.2	<0.005	<0.1	340	78.1
	6/27/2019 RG_GC-NPM-12-O_20190627	<2	<0.01	0.04	0.25	<0.01	<1	<0.01	<0.05	<0.01	2.3	47	<0.01	3.3	0.07	0.03	<0.05	3.9	<0.01	0.12	<0.005	<0.05	<0.2	<0.005	<0.1	95	64.74
	6/27/2019 RG_GC-NPM-13-O_20190627	<2	<0.01	0.12	0.18	<0.01	<1	<0.01	<0.05	<0.01	2.1	33	<0.01	1.3	0.078	0.03	<0.05	3.3	<0.01	0.16	<0.005	<0.05	<0.2	<0.005	<0.1	65	61.68
	7/18/2019 RG_GC-NPM-14-O_20190718	7	<0.01	0.09	0.18	<0.01	<1	0.02	<0.05	<0.01	3.3	140	0.02	1.5	0.28	0.08	<0.05	9.6	<0.01	0.27	0.045	<0.05	0.2	<0.005	0.1	430	79.54
	7/19/2019 RG_GC-NPM-15-O_20190719	2	<0.01	0.1	0.21	<0.01	<1	<0.01	<0.05	<0.01	2.2	37	<0.01	0.5	0.27	0.04	<0.05	3.9	<0.01	0.11	0.008	<0.05	<0.2	<0.005	<0.1	120	67.63
	7/25/2019 RG_GC-NPM-16-O_20190725	<2	<0.01	0.12	0.18	<0.01	<1	<0.01	<0.05	<0.01	2.8	39	<0.01	1.1	0.083	0.03	<0.05	2.7	<0.01	0.11	0.011	<0.05	0.4	<0.005	<0.1	91	64.09

APPENDIX I
SUPPORTING FISH PLOTS

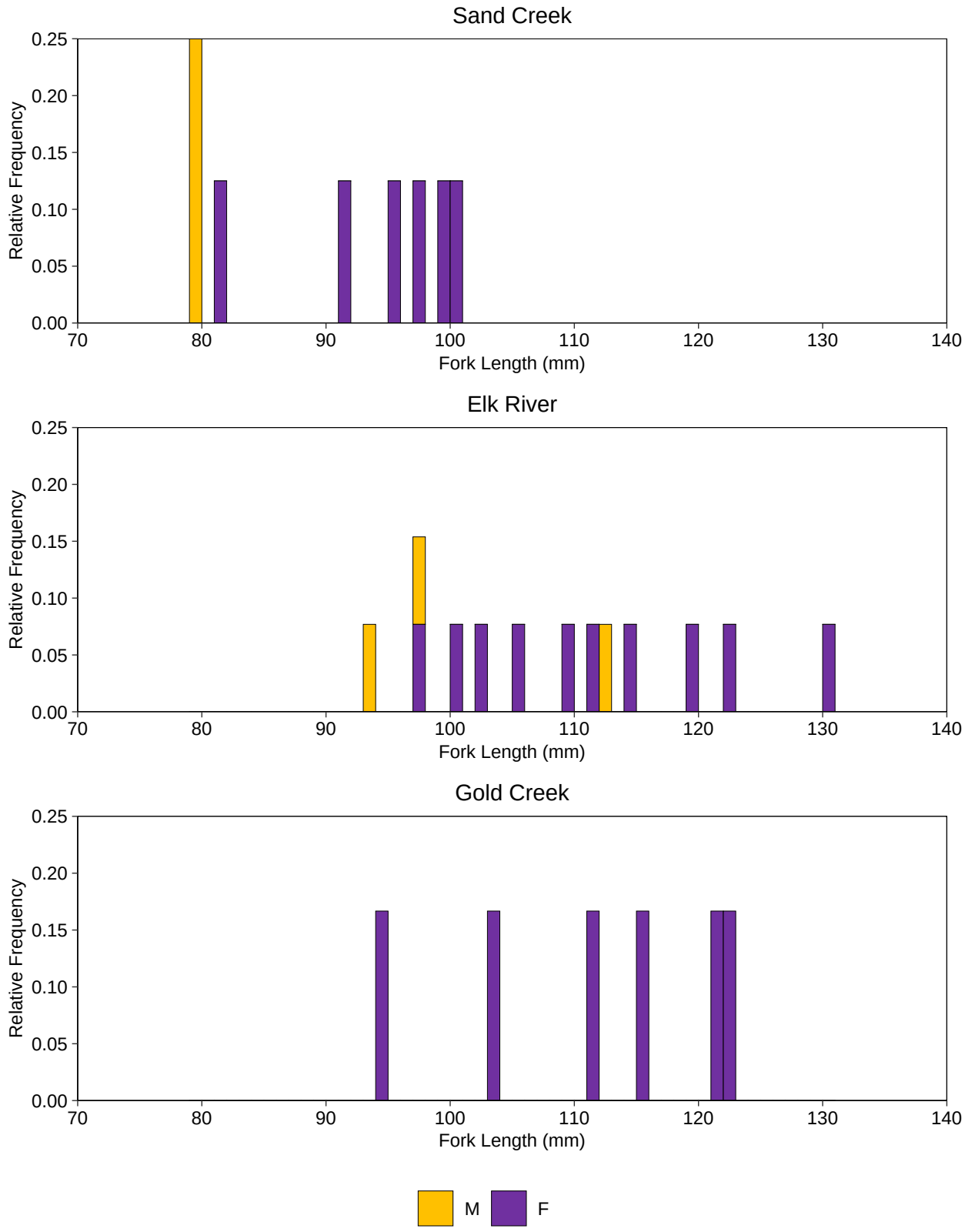


Figure I.1: Length−Frequency Distributions for Redside Shiner in Reference (Sand Creek), and Mine−Exposed Areas in the Koocanusa Reservoir, 2015

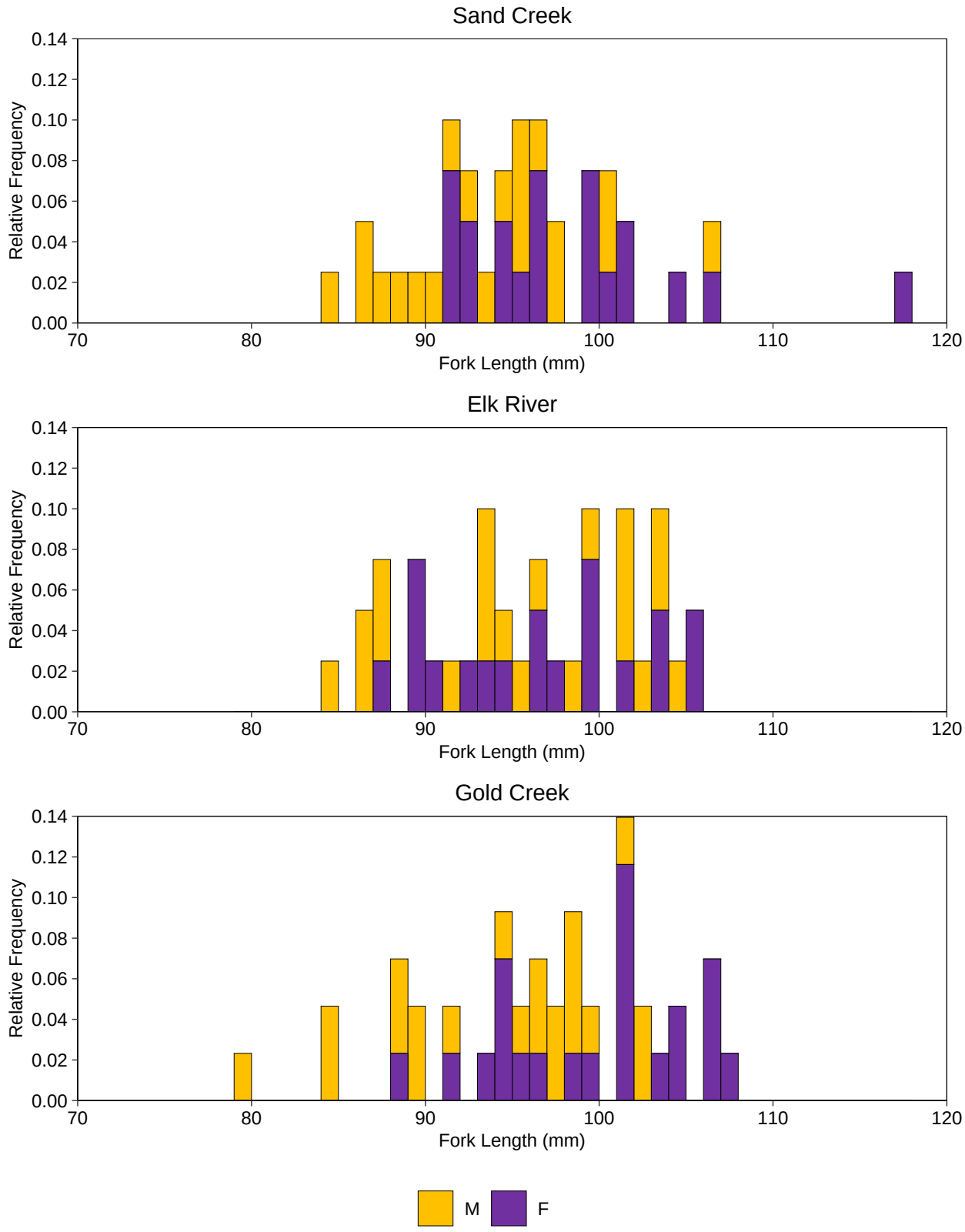


Figure I.2: Length−Frequency Distributions for Redside Shiner in Reference (Sand Creek), and Mine−Exposed Areas in the Koocanusa Reservoir, 2016

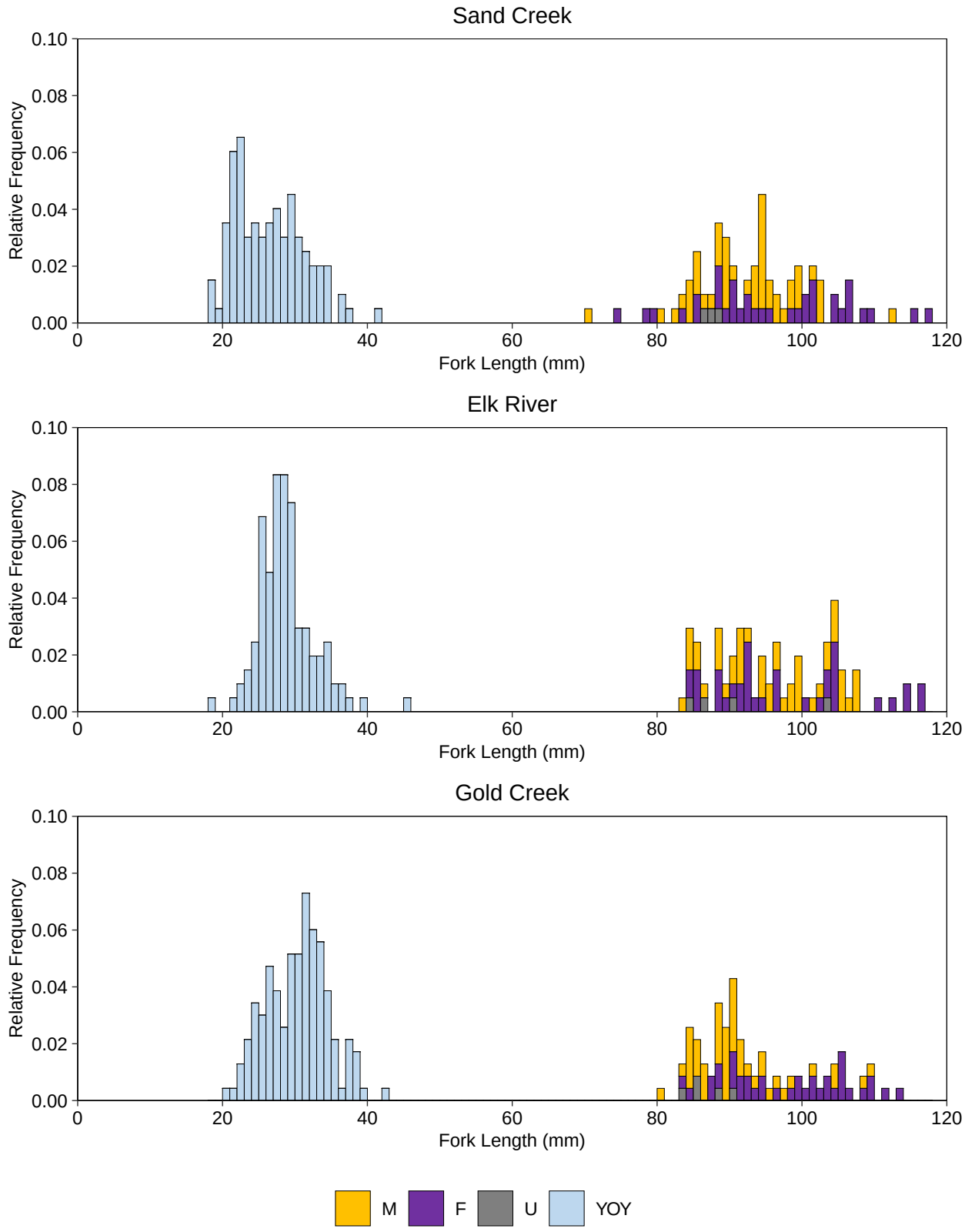


Figure I.3: Length−Frequency Distributions for Redside Shiner in Reference (Sand Creek), and Mine−Exposed Areas in the Koocanusa Reservoir, 2018

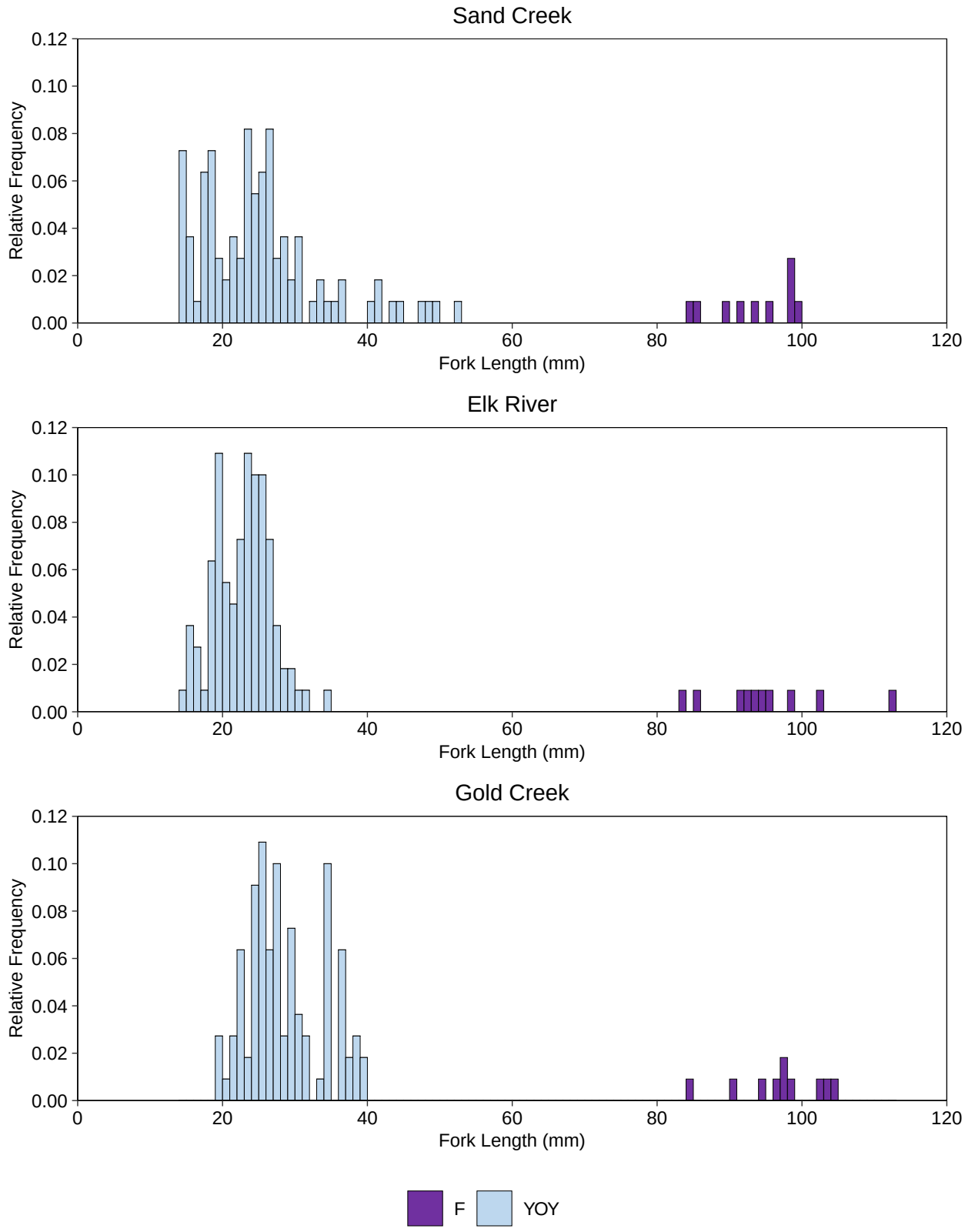


Figure I.4: Length−Frequency Distributions for Redside Shiner in Reference (Sand Creek), and Mine−Exposed Areas in the Koocanusa Reservoir, 2019

Summary figures showing fish tissue selenium concentrations in Lake Koocanusa

The following is a series of box-&-whisker plots of selenium concentrations in fish collected from sites in Lake Koocanusa in British Columbia and Montana between 2008 and 2018. Data are from the "Koocanusa Reservoir Data Compilation Report" (Lotic Environmental 2018), the Water Quality Portal (https://www.waterqualitydata.us/portal; last accessed November 19,2018), the U.S Fish and Wildlife Service (USFWS Koocanusa Selenium Data MASTER 2008-2018.xlsx), Teck (18-07 Table 2 and 3 Koocanusa Reservoir Tissue Concentrations (Zooplankton, Benthic Invertebrates, Fish) 2018.xlsx), and MTeWQX_LK-KOOCANUSA-BIO_SED_WQ_20190123.xlsx.

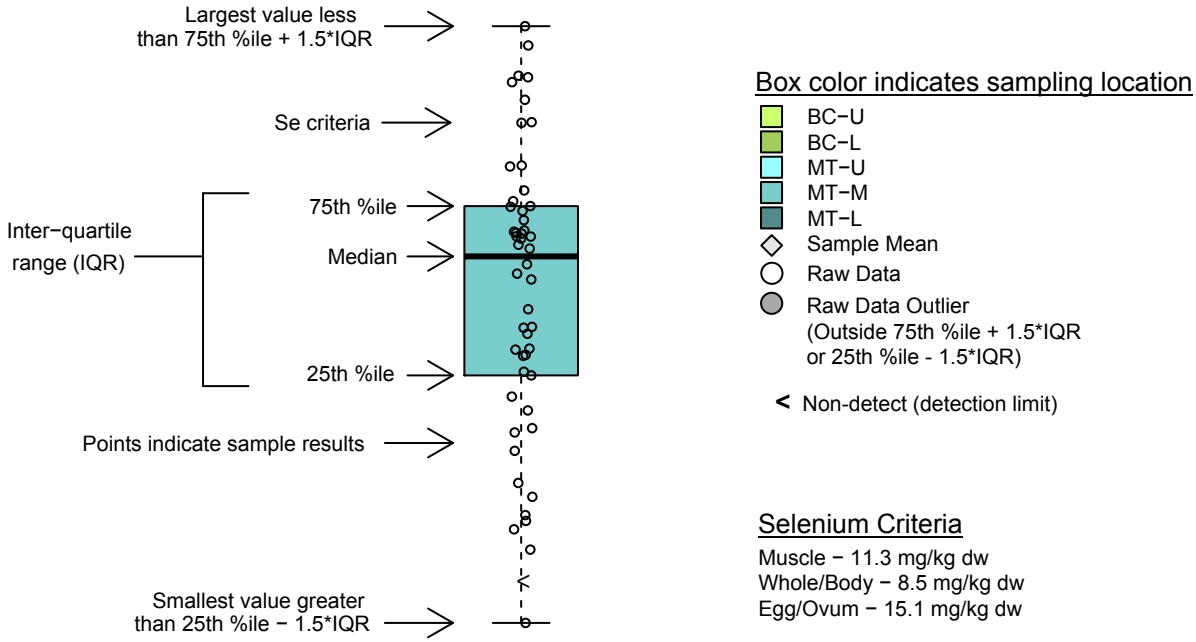
Data shown on the plots are ordered from upper to lower locations within Lake Koocanusa.

BC-Upper – Lake Koocanusa upstream of the mouth of Elk River, British Columbia
552 samples collected from 12 species and 3 tissue types
BC-Lower – Lake Koocanusa at and downstream of the mouth of Elk River, British Columbia
868 samples collected from 12 species and 3 tissue types
MT-Upper – Upper third of Lake Koocanusa (>latitude 48.808), Montana
478 samples collected from 12 species and 3 tissue types MT-
Middle – Middle third of Lake Koocanusa, Montana
16 samples collected from 1 species and 2 tissue types
MT-Lower – Lower third of Lake Koocanusa (<latitude 48.606), Montana
257 samples collected from 11 species and 2 tissue types

Tissue categories include muscle or muscle plug, egg/ovum, and whole body.

Tissue selenium concentrations are on a dry weight (dw) basis. US EPA's selenium criteria are shown as horizontal dashed lines.

LEGEND



Selenium Criteria

Muscle − 11.3 mg/kg dw
Whole/Body − 8.5 mg/kg dw
Egg/Ovum − 15.1 mg/kg dw

Catostomus catostomus (Longnose sucker)

Selenium (mg/kg dw)

15
10
5
0

Location	MT−U	MT−L	MT−U	MT−L	MT−U	MT−U	MT−L	BC−U	BC−L	MT−U	MT−L	−−−
Year	2008	2013	2018		2008	2013		2018				−−−
Tissue	Egg/ Ovum				Muscle							Whole Body

No Data

Catostomus macrocheilus (Largescale sucker)

Selenium (mg/kg dw)

0
5
10
15

Location	BC−U	BC−L	BC−U	BC−L	MT−U	MT−L	BC−U	BC−L	BC−U	BC−L	BC−U	BC−L	BC−U	BC−L	MT−U	MT−L	−−−
Year	2015		2016		2018		2014		2015		2016		2018				−−−
Tissue	Egg/ Ovum						Muscle										Whole Body

No Data

Mylocheilus caurinus (Peamouth chub)

Selenium (mg/kg dw)

0
5
10
15
20
25
30

Location: MT−U | MT−U MT−L | BC−U BC−L | BC−U BC−L | BC−U BC−L | BC−U BC−L MT−U MT−L | MT−U | BC−U MT−U MT−L | BC−U BC−L | BC−U BC−L | BC−U BC−L | BC−U BC−L MT−U MT−L | BC−U BC−L | BC−U BC−L | BC−U BC−L

Year: 2008 | 2013 | 2014 | 2015 | 2016 | 2018 | 2008 | 2013 | 2014 | 2015 | 2016 | 2018 | 2014 | 2015 | 2016

Tissue: Egg/Ovum | Muscle | Whole Body

Ptychocheilus oregonensis (Northern pikeminnow)

Selenium (mg/kg dw)

0
10
20
30
40

Location	MT−U	MT−U	MT−L	BC−U	BC−L	BC−U	BC−L	BC−U	BC−L	BC−U	BC−L	MT−U	MT−L	MT−U	BC−U	MT−U	MT−L	BC−U	BC−L	BC−U	BC−L	BC−U	BC−L	BC−U	BC−L	MT−U	MT−L	----
Year	2008	2013		2014		2015		2016		2018				2008	2013			2014		2015		2016		2018				----
Tissue	Egg/ Ovum													Muscle														Whole Body

No Data

Richardsonius balteatus (Redside shiner)

Selenium (mg/kg dw)

0
20
40
60
80

Location: BC−U | BC−L | BC−U | BC−L | BC−U | BC−L | MT−L | BC−U | BC−L | BC−U | BC−L | BC−U | BC−L | MT−U | MT−L | BC−U | BC−L | BC−U | BC−L

Year: 2015 | 2016 | 2018 | 2015 | 2016 | 2018 | 2015 | 2016

Tissue: Egg/ Ovum | Muscle | Whole Body

Oncorhynchus clarkii lewisi (Westslope cutthroat trout)

Selenium (mg/kg dw)

0
5
10
15

Location	MT−U	BC−U	MT−U	BC−U	BC−U	BC−L	MT−U	BC−U	BC−L	MT−U	BC−U	BC−L	MT−U	MT−L	−−−
Year	2013	2013		2015	2016			2017			2018				−−−
Tissue	Egg/ Ovum	Muscle													Whole Body

No Data

Oncorhynchus mykiss (Rainbow trout)

Selenium (mg/kg dw)

0
5
10
15
20

Location	MT−U	BC−U	BC−L	BC−U	BC−L	MT−U	BC−U	MT−U	MT−L	BC−U	BC−L	BC−L	BC−U	BC−L	MT−U	MT−U	BC−U	BC−L	MT−U	MT−L	−−−
Year	2013	2014		2016		2008	2013			2014		2015	2016			2017	2018				−−−
Tissue	Egg/ Ovum					Muscle															Whole Body

Oncorhynchus nerka (Kokanee)

Selenium (mg/kg dw)

15
10
5
0

Location	MT−U	BC−U	MT−U	BC−U	BC−L	BC−U	BC−L	MT−U	MT−L	MT−U	BC−U	MT−U	MT−L	BC−U	BC−L	BC−U	BC−L	BC−U	BC−L	BC−U	BC−L	MT−U	MT−L	−−−
Year	2008	2013		2014		2018				2008	2013			2014		2015		2016		2018				−−−
Tissue	Egg/ Ovum									Muscle														Whole Body

No Data

Prosopium williamsoni (Mountain whitefish)

Selenium (mg/kg dw)

15
10
5
0

Location	MT−L	MT−U	BC−L	BC−U	BC−L	BC−U	BC−L	MT−L	−−−
Year	2018	2008	2015	2016			2018		−−−
Tissue	Egg/ Ovum			Muscle					Whole Body

No Data

Lota lota (Burbot)

Selenium (mg/kg dw)

0
5
10
15

Location	BC−U	MT−U	MT−M	MT−L	MT−U	MT−M	MT−L	BC−U	BC−L	BC−U	BC−L	MT−M	MT−L	BC−U	BC−L	MT−U	MT−M	MT−L	–––
Year	2014	2012			2013			2014		2015				2016					–––
Tissue	Egg/ Ovum	Muscle																	Whole Body

No Data

Perca flavescens (Yellow perch)

Selenium (mg/kg dw)

15
10
5
0

Location: BC−U | BC−L | BC−U | BC−L | BC−U | BC−L | BC−U | BC−L | BC−U | BC−L | BC−U | BC−L | MT−U | BC−U | BC−L | MT−U

Year: 2015 | 2016 | 2018 | 2014 | 2015 | 2016 | 2018 | 2016

Tissue: Egg/ Ovum | Muscle | Whole Body

Salvelinus confluentus (Bull trout)

Selenium (mg/kg dw)

15
10
5
0

Location	BC−L	MT−U	BC−U	MT−U	MT−L	BC−U	BC−L	BC−U	BC−L	BC−U	BC−L	BC−U	BC−L	MT−U	MT−L	−−−
Year	2016	2008	2013			2014		2015		2016		2018				−−−
Tissue	Egg/ Ovum	Muscle														Whole Body

No Data