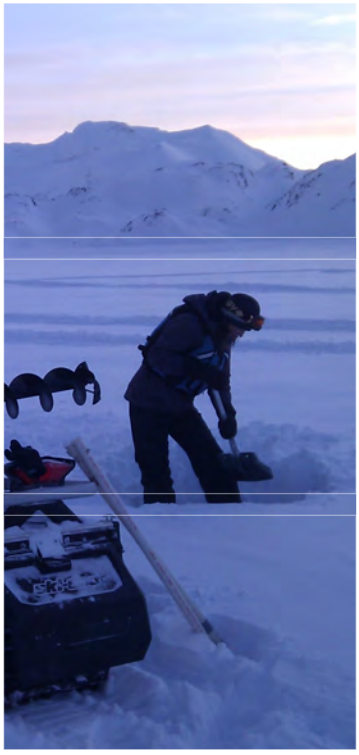
Appendix 13-A

Brucejack Gold Mine Project: Cumulative Surface Water Quality Baseline Report

ERM



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BRUCEJACK GOLD MINE PROJECT

Cumulative Surface Water Quality Baseline Report

April 2014

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Pretium Resources Inc.

BRUCEJACK GOLD MINE PROJECT
Cumulative Surface Water Quality Baseline Report

April 2014

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EXECUTIVE SUMMARY

INTRODUCTION

Report Purpose

This report describes background surface water quality conditions relevant to the Brucejack Gold Mine Project (the Project) based on both historic information collected by previous property owners [Newhawk Gold Mines Ltd. (Newhawk) from 1987 to 1999 and Silver Standard Resources Inc. (Silver Standard) from late 1999 to 2001], and recent water quality data collected from 2008 to 2013. The latter includes data collected for Pretium Resources Ltd. (Pretivm) and by Seabridge Gold Inc. (Seabridge) for their neighbouring Kerr-Sulphurets-Mitchell (KSM) Project. The purpose of this surface water quality program is to provide an in-depth understanding of surface water quality conditions within the Project Area as well as sufficient data for development of a water management plan, aquatic effects monitoring and management plan, predictive water quality modelling and environmental effects assessment for the Project.

Project Overview

The Brucejack property (56°28'20" N, 130°11'31" W) is located in the Boundary Ranges of the Coast Mountains of northwest British Columbia within the Sulphurets District in the Iskut River region, approximately 950 km northwest of Vancouver, 65 km north-northwest of Stewart, and 21 km south-southeast of the closed Eskay Creek Mine (Figure 2-1). The mine site itself will be located near Brucejack Lake, at approximately 56°27'59" N latitude by 130°11'11" W longitude (see Figure 2.1-1). The mine access road traverses (from east to west) the Wildfire Creek (tributary to Bell-Irving River); Todedada Lake and Creek (tributary to Treaty Creek, which is tributary to the Bell-Irving River); Scott Creek (tributary to Bowser River); and Bowser River (tributary to Bell-Irving River) watersheds (see Figure 2.1-1). The ~60 km road section from Highway 37 to the toe of the Knipple Glacier is generally situated in mid-elevation valley bottom locations; elevations range from ~500 masl at its lowest point along the Bowser River to ~1,400 masl west of Knipple Glacier within the Brucejack watershed. The Knipple Glacier, on which ~12 km of the access road is routed, also drains to the Bowser River. Additional operations Project infrastructure outside the Mine Site Area (Brucejack watershed) includes the Transmission Line, Knipple Lake Transfer Station and Bowser Aerodrome (see Figure 2.1-1).

Mine and Exploration History; Definition of Baseline Water Quality Conditions

Several historic and current human activities have occurred both within, and in proximity to, the proposed Project area. These include mining exploration and production, hydroelectric power generation, forestry, as well as road construction and use. The Brucejack watershed (Mine Site Area) itself is an advanced exploration site with a long history of mineral exploration. There has been exploration for decades, although the most active exploration periods have been from 1986 to 1990 (Newhawk) and from 2009 to present (Silver Standard and Pretivm). In 1999, site reclamation by Newhawk included the removal of approximately 60,000 m^3 of waste rock located on a pad adjacent Brucejack Creek and subsequent deposition in Brucejack Lake. Activities during the 2011 to present

time period have included several large surface exploration programs, as well as underground dewatering, exploration and bulk sample mining.

No pre-disturbance baseline water quality data are available for the Brucejack watershed. Water quality monitoring began in 1987 to support a Stage 1 Impact Assessment for the Sulphurets Project proposed by Newhawk Gold Mines Ltd., whereas underground development began in autumn 1986. Brucejack Creek has been affected from 1986 onward by passive drainage from the mine adit, and various watercourses within the Brucejack watershed have been periodically affected by drainage from areas disturbed through surface activities, active (dewatering), as well as reclamation activities (Newhawk 1989; Price 2005).

Assessment of data and activity records indicates that water quality data collected from 1991 to 1999 (period of relative inactivity following Newhawk mining), as well as during 2000/2001 (post-Newhawk site reclamation) and 2009/2010 (surface exploration only) are the best available approximation of pre-disturbance water quality conditions. This dataset was used as the base/ reference case and compared to the overall 2008-2013 database to provide a conservative means of identifying and removing affected data in the more recent database. Removal of affected data yields a more conservative and accurate approximation of baseline conditions within the Brucejack watershed, with lower mean values for total and dissolved metals and other water quality parameters as well as lower overall variability in the dataset. Although data from the entire period of water quality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions, constituting the curated baseline database, were used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

BASELINE STUDY AREA

The surface water quality study area reflects proposed and existing Project infrastructure and considered watersheds over a range of spatial scales from local (i.e., immediately downstream of Brucejack Lake) to regional (i.e., Unuk River at the international border; see Figure 3.1-1). Physical limnology (temperature, dissolved oxygen, conductivity profiles) and surface water quality data were collected from 11 lake/wetland sampling sites and 42 stream sampling sites within the study (see Figure 3.1-1).

The following description of the water quality characterization and monitoring study has been separated according to the watershed groupings described above due to both the differing aquatic environment characteristics as well as potential effects of Project facilities. The information is grouped according to the Brucejack watershed (Mine Site Area), Sulphurets watershed and Unuk watershed (near and far-field downstream receiving environments, respectively), and the Bowser/ Scott/Todedada/Wildfire watersheds (ancillary project infrastructure and existing access road).

BRUCEJACK, SULPHURETS, AND UNUK WATERSHEDS (MINE FACILITIES, RECEIVING WATERSHED)

Physical Limnology

Brucejack Lake and Sulphurets Lake comprised the lake sampling program within the proposed Mine Site Area and downstream receiving environment. Data indicate that Brucejack Lake is a

typical well oxygenated dimictic lake: the water column is well-mixed in the winter and stratified in the summer, with the thermocline reaching depths of 17 to 45 m. The euphotic zone is deep (11.5 m), indicating that primary production could occur deep into the water column. In contrast, Sulphurets Lake generally remains well-mixed throughout the year. The euphotic zone is less than 0.6 m due to elevated total suspended solids and turbidity. Dissolved oxygen concentrations in both lakes are within or greater than the 5.5 to 9.5 mg/L CCME guideline range for the protection of aquatic life (taxa and life-stage dependent).

Water Quality

Both the Brucejack and Sulphurets catchments are highly mineralized areas with gossans and similar geological features evident on surface. Surface water quality also varies substantially in this region based on hydrological regime, where increased sediment load and transport during high flow periods leads to increased concentrations of total suspended solids (TSS) and associated particulate-bound metals. In particular, assessment of Brucejack Creek and Camp Creek data indicates that irrespective of outputs from the existing adit, elevated levels of some total metals during freshet (Al, Cd, Cu, Pb, Ag, Fe, and Zn) is reflective of natural background conditions. Natural metals loadings in the Brucejack watershed are overwhelmed however in near and far-field receiving environments by much higher loadings in Sulphurets and Mitchell Creeks.

Brucejack Lake's baseline condition is nutrient-poor, with soft, moderately acid-sensitive water and very low TSS throughout the water column. Metals concentrations are often less than detection limits. Upper Brucejack Creek in its baseline condition has very similar water quality to Brucejack Lake; waters are soft and nutrient-poor with moderate acid sensitivity and very low TSS, turbidity, and TOC. TSS and total metal concentrations generally increase along the flow path of Brucejack Creek from the lake outlet to sample site BJ3, at which point the creek plunges beneath Sulphurets Glacier and then joins the sub-glacial flow of Sulphurets Creek. Sulphurets Creek emerges from the toe of the Sulphurets Glacier, flows into Sulphurets Lake, and then extends from the outlet of Sulphurets Lake to the creek's confluence with the Unuk River.

Water chemistry within Sulphurets Creek and Sulphurets Lake is substantially different than upstream watercourses within the Brucejack watershed. Sulphurets Lake is a highly turbid and eutrophic lake with elevated TSS, sulphate, phosphorous and metal concentrations. Sulphurets Creek, both upstream and downstream of Sulphurets Lake, has elevated levels of TSS, turbidity, total phosphorous and metals (including cadmium, chromium, cobalt, copper, selenium, and zinc). This is likely due to drainage inputs from the mineralized Kerr and Sulphurets mineral deposits (plus other mineralized zones) as well the contribution of degraded water quality from Mitchell Creek to Sulphurets Creek. Maxima of TSS as well as total metal concentrations were always associated with monitoring sites downstream of the confluence of Mitchell Creek. Further, concentrations of many water quality parameters are measurably higher in the Unuk River downstream of its confluence with Sulphurets Creek.

Water Quality Guidelines

Assessment of the curated baseline database indicated that 10 of the 29 parameters listed in the BC MOE guidelines for the protection of aquatic life had overall mean concentrations greater than guideline values within the Brucejack watershed (Brucejack Lake, Brucejack Creek and its

tributaries) including pH, nitrite, dissolved aluminum, arsenic, copper, cadmium, total iron, lead, silver and zinc. Nine of the 26 parameters with CCME guidelines had overall mean concentrations greater than guideline values within the Brucejack watershed including pH, fluoride (Camp Creek only), total aluminum, arsenic, cadmium, copper, iron total, lead, silver, and zinc. Minima in observed exceedances were always associated with Brucejack Lake (BJ) and upper Brucejack Creek monitoring sites upstream of Camp Creek (BJ U/S, BJ U/S of CC), where consistent exceedances were observed for aluminum, cadmium, copper, silver, iron, and zinc, generally in high flow periods. In lower Brucejack creek monitoring sites (BJ OF, BJ 200m D/S, BJ2 and BJ3), the factor and frequency of guideline exceedances for these parameters generally increased.

The percentage of BC MOE and CCME guideline exceedances is generally higher at downstream monitoring locations (e.g., Sulphurets Creek and Unuk River watersheds) than upstream in the Brucejack watershed. Monitoring sites within Sulphurets Creek had the greatest incidence of guideline exceedances (stream and lake sites) of those in the entire baseline study area (see Table 5.1-2). Further, the influence of contributions from Mitchell and Sulphurets creeks is evident in the Unuk River, where both the percentage of guideline exceedances and average factor of exceedances were elevated within the Unuk downstream of its confluence with Sulphurets Creek (UR1) relative to upstream monitoring site (UR1A). The greatest observed influences were for cadmium, copper and zinc guideline exceedances (see Table 5.1-2).

BOWSER/SCOTT/TODEDADA/WILDFIRE WATERSHEDS (ANCILLARY INFRASTRUCTURE AREAS)

Physical Limnology

Knipple Lake, Bowser Lake and Todedada Lake comprised the lake sampling program (see Table 3.1-3) for the off-site areas. Knipple Lake is a glacier-fed lake with very similar properties to Sulphurets Lake and likely remains unstratifed throughout the year. Dissolved oxygen in Knipple Lake was roughly 9.7 mg/L throughout the water column. Conductivity was also relatively similar throughout the water column (mean 54 uS/cm). Data indicate that Todedada Lake and Bowser Lake are dimictic and stratified. Relative to Brucejack and Sulphurets Lakes, these lakes were poorly oxygenated which may result from their comparatively shallow depths and relatively higher organic concentrations.

Water Quality

Overall mean TSS, turbidity, nutrient, and metal concentrations are variable in Bowser River, Scott Creek and Todedada Creek, likely in response to highly variable seasonal and (at times) diurnal water quality conditions in these predominantly glacially headed watersheds. These streams have elevated alkalinity and low concentrations of TOC and nitrate. Todedada Lake is the least acid sensitive of the lakes that were sampled, and has moderately hard, conductive water with elevated TSS and turbidity. TSS and turbidity levels were elevated in Knipple and Bowser Lakes compared to Todedada Lake; Knipple Lake has the highest overall TSS and turbidity of all lakes sampled as part of the monitoring program, with elevated concentrations of phosphorus and most metal elements.

In the Wildfire area, lakes and streams have neutral or slightly acidic, soft, acid-sensitive water with low TSS. Although most lakes have oligotrophic or mesotrophic concentrations of total phosphorous,

TOC, ammonia, and nitrate concentrations are elevated in low-lying areas of the Wildfire area, likely as a result of terrestrial inputs from adjacent forests. With the exception of dissolved aluminum, concentrations of metals are low in the Wildfire area relative to concentrations in other watersheds in the area.

Water Quality Guidelines

Overall mean concentrations of 12 of the 29 parameters with defined BC MOE guidelines for the protection of aquatic life were greater than guideline values in off-site monitoring locations, including pH, aluminum (dissolved), arsenic, cadmium, cobalt, copper, iron (total and dissolved), mercury, lead, silver and zinc. Eleven of the 26 parameters with CCME guidelines had overall mean concentrations greater than guideline values, including pH, aluminum (total), arsenic, cadmium, chromium, copper, total iron, mercury, lead, silver and zinc. Knipple Lake, as well as sites within the Bowser River, had the greatest incidence and factors of guideline exceedances of all monitored off-site areas. Exceedances were associated with seasonal elevation of TSS levels during high flow periods and associated increases in particulate-bound metals. Concentrations of all parameters were less than BC MOE and CCME guidelines in Todedada Lake.

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BRUCEJACK GOLD MINE PROJECT

Cumulative Surface Water Quality Baseline Report

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GLOSSARY AND ABBREVIATIONS

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

<	less than
>	larger than
≤	less than or equal to
≥	larger than or equal to
µm	micrometres
ALS	ALS Environmental Laboratories
BC	British Columbia
BC MOE	British Columbia Ministry of the Environment
BGC	BGC Engineering Inc.
$CaCO_3$	Calcium carbonate
CAEAL	Canadian Association for Environmental Analytical Laboratories
CCME	Canadian Council of Ministers of the Environment
cm^2	centimetres squared
CTD	Conductivity-Temperature-Depth (data logger)
DO	Dissolved Oxygen
D_s	Secchi Depth
ERM Rescan	ERM Consultants Canada Ltd.
K	Light Extinction Coefficient for non-turbid waters
KSM	Kerr-Sulphurets-Mitchell Project
m^2	metres squared
masl	metres above sea level
MDL	Method Detection Limit
MEND	Mine Environment Neutral Drainage Report
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
Newhawk	Newhawk Gold Mines Ltd.
NTU	Nephelometric Turbidity Units
Pretivm	Pretium Resources Inc.
QA/QC	Quality Assurance and Quality Control

Rescan	Rescan Environmental Services Ltd.
RPD	Relative Percent Difference
TDS	Total Dissolved Solids
The Project	Brucejack Gold Mine Project
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TP	Total Phosphorous
Tpd	Tonnes per day
TSS	Total Suspended Solids
WWTP	Waste Water Treatment Plant
$Z_{1\%}$	Euphotic Depth

1. INTRODUCTION

Water quality is a critical component of the biological and physical environment and is protected under both Provincial (e.g., *Environmental Management Act* [2004], *Mines Act* [1996]) and federal (e.g., Metal Mining Effluent Regulations (MMER 2012) under the *Fisheries Act* [1985]) legislation. Water quality constitutes the physical, chemical, biological and aesthetic characteristics of water which are, in turn, determined by a variety of regional and local factors including rock weathering, surface transport, biological activity, and anthropogenic influences. Further, the chemical compositions of water and sediment will co-vary, with factors such as pH and temperature driving a dynamic and reversible exchange of elements and molecules between the water column and underlying sedimentary materials. Water quality is linked to important ecosystem components including aquatic resources (primary and secondary producers), fish and fish habitat, wildlife and wildlife habitat, as well as human health.

1.1 REPORT OBJECTIVES AND ORGANIZATION

The overall objective of the Brucejack Gold Mine Project (the Project) surface water quality baseline study is to characterize the spatial and temporal background conditions of water quality in lakes and streams that comprise the aquatic receiving environments for proposed Project infrastructure and activities. This information is needed to support:

- relevant aspects of Project design, such that mitigation strategies to minimize potential effects on water quality can be incorporated into Project design where feasible;
- development of related environmental management plans;
- predictive surface water quality modelling and assessment of potential for any significant changes to surface water quality as a result of the Project; and
- future identification of any changes resulting from proposed Project activities through construction, operations, closure, and post-closure monitoring programs.

Data that are collected must also meet or exceed provincial requirements to support environmental assessment (BC MOE 2012). Baseline water quality data were collected in conjunction with and in support of baseline characterization of sediment quality and aquatic resources (primary and secondary producers) for the Project. The latter data are presented in a separate, standalone report (Rescan 2014).

The 2008 to 2013 surface water quality study design evolved with advancements to Project design. Specific objectives included:

1. Identification of waterbodies that could be directly or indirectly affected by the Project.
2. Collection of physical limnology and water quality data from selected stream/river and lake sites of potentially affected waterbodies.
3. Compilation and presentation of physical limnology and surface water quality data from sampled waterbodies within the study area.

This report documents surface water quality monitoring studies completed for the Project in 2008 through 2013, including data from the neighbouring Kerr-Sulphurets-Mitchell (KSM) Project. The report also presents historical water quality data collected by previous property owner Newhawk Ltd. from 1987 to 1999 and by Silver Standard from late 1999 to 2001 (Newhawk 1989; Price 2005). Relevant subsets of these datasets are used to define baseline conditions with the study area.

The report is organized as follows:

1. Introductory information related to the Project (Chapters 1 and 2).
2. Details of the surface water quality site selection, the sampling program, and the methodologies used (Chapters 3 and 4, Appendices 9 and 10).
3. Results of the surface water quality baseline program including: physical limnology (e.g., temperature and dissolved oxygen), general water quality parameters (e.g., pH, conductivity), and concentrations of anions, nutrients, and total and dissolved metals (Chapter 5).
4. Conclusions (Chapter 6).

Analytical results presented in Appendices 1 to 8.

1.2 REGULATORY AND POLICY FRAMEWORK

This section provides an overview of the relevant provincial and federal statutory framework, guidance documents, and policies related to potential Project-related surface water quality effects (summarized in Tables 1.2-1 and 1.2-2).

At the provincial level, the *Environmental Management Act* (EMA; 1996b) requires authorization of specified discharges to the environment, including the aquatic receiving environment. The legislation provides enforcement options to protect human health and the quality of water, land, and air in BC. Mines require authorization under the EMA to discharge mine affected effluent to receiving waters, and are required to register effluent (or have it included in the mine effluent permit) from sewage treatment facilities. Mines are also required to comply with requirements for the production, storage, treatment, recycling or discharge of prescribed quantities of hazardous waste (Table 1.2-1). Further, the Ministry of Environment (BC MOE) provides specific guidelines for field sampling (BC MOE 2004, 2012) and laboratory analyses (BC MOE 2009). There are surface water quality guidelines for the protection of aquatic life in BC (BC MOE 2006, 2013; Table 1.2-2), including some that are based on presently approved and working Canadian Council of Ministers of the Environment (CCME) guidelines.

At the federal level, surface water quality and aquatic habitat are subject to several federal legislations including the *Fisheries Act*, *Metal Mining Effluent Regulations* and the *Canadian Environmental Protection Act*. Regulations designed to protect surface water quality, and, by extension, aquatic resources and fish and fish habitat, are premised on the avoidance of deleterious impacts to water quality, quantity, sediment quality, and aquatic organisms. Specific regulations do not exist for individual contaminants; however, the CCME has developed consensus-based guidelines for the protection of aquatic life (CCME 2013a, 2013b; Table 1.2-2). These guidelines are a useful tool for water and sediment quality monitoring, although guidelines do not exist for all substances.

Table 1.2-1. Summary of Applicable Statutes and Regulations for Surface Water Quality, Brucejack Gold Mine Project

Name	Level of Government	Description
Environmental Management Act (EMA)	Provincial (MOE)	The EMA provides the authorization framework to protect human health and the quality of water, land, and air in BC. Mine activities requiring authorization or registration under EMA include discharge of effluents to the aquatic receiving environment and the production, storage, treatment and discharge of prescribed quantities of hazardous waste.
British Columbia Approved & Working Water Quality Guidelines	Provincial (MOE)	Water quality criteria are defined as maximum or minimum physical, chemical or biological characteristics of water, biota or sediment; and are applicable province-wide. The guidelines are intended to prevent detrimental effects on water quality or aquatic life, under specified environmental conditions.
Mines Act	Provincial (MEM)	The *BC Mines Act* and its associated Health, Safety and Reclamation Code for Mines in BC require mines to have programs for the environmental protection of land and watercourses throughout mine life, including plans for prediction and prevention of metal leaching and acid rock drainage, and prevention of erosion and sediment release. Watercourses are required to be reclaimed, and the Ministry of Energy and Mines has the authority to require monitoring and/or remediation programs to protect watercourses and water quality.
Canadian Council of Ministers of the Environment (CCME) Sediment Quality Guidelines for the Protection of Aquatic Life	National	Environmental Quality Guidelines (EQGs) are intended to protect, sustain, and enhance the quality of the Canadian environment. Each jurisdiction determines the degree to which it will adopt CCME recommendations and EQGs should not be regarded as blanket values for national environmental quality; users of EQGs consider local conditions and other supporting information (e.g., site-specific background concentrations of naturally occurring substances) during the implementation. Science-based site-specific criteria, guidelines, objectives, or standards may, therefore, differ from the Canadian EQGs.
Metal Mining Effluent Regulations (under the *Fisheries Act*)	National (DFO)	The MMER (SOR/2002-222) regulate the deposition of mine effluent if it is not within a defined pH range, if the concentrations of the MMER deleterious substances in the effluent do not exceed authorized limits, and if the effluent is demonstrated to be non-acutely lethal to rainbow trout. These discharge limits were established to be minimum national standards based on best available technology economically achievable at the time. To assess the adequacy of the effluent regulations for protecting the aquatic environment, the MMER include EEM requirements to evaluate the potential effects of effluent on fish, fish habitat, and the use of fisheries resources.
Other Guidance Documents	Provincial and Federal	• Policy for Metal Leaching and Acid Rock Drainage in British Columbia (BC MEM and BC MELP 1998) • Guidelines for Metal Leaching and Acid Rock Drainage at Mine sites in British Columbia (Price and Errington 1998) • Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (Price 2009) • Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (Ministry of Environment 2012)

Table 1.2-2. Provincial and Federal Water Quality Guidelines for the Protection of Freshwater Aquatic Life

Parameter	BC Water Quality Guidelines[a]	CCME Guideline for the Protection of Freshwater Aquatic Life[b]
Physical Tests		
pH	6.5 to 9.0	6.5 to 9.0
Total Suspended Solids	Dependent on background levels[k]	Dependent on background levels[c]
Turbidity (NTU)	Dependent on background levels[l]	Dependent on background levels[d]
Anions		
Chloride (Cl)	600 maximum; 150 for 30-day period	640 short-term; 120 long-term
Fluoride (F)	Hardness dependent[m]	0.12[e]
Sulfate (SO_4)	100	
Nutrients		
Ammonia, Total (as N)		pH- and temperature-dependent
Nitrate (as N)	32.8 maximum; 3.0 for 30-day period	550 short-term; 13 long-term
Nitrite (as N)	0.06 maximum; 0.02 for 30-day period	0.06
Phosphorus (P)-Total		Trigger ranges[f]
Cyanides		
Cyanide, Weak Acid Diss	0.01 maximum; 0.005 for 30-day period	
Cyanide, Total		0.005
Organic / Inorganic Carbon		
Total Organic Carbon	Dependent on background levels[n]	
Total Metals		
Aluminum (Al)		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5
Arsenic (As)	0.005	0.005
Boron (B)	1.2	29 short-term; 1.5 long-term
Cadmium (Cd)		Hardness dependent[e,g]
Chromium (Cr)		0.001 (Cr(VI)); 0.0089 (Cr(III))
Cobalt (Co)	0.11 maximum; 0.004 for 30-day period	
Copper (Cu)	Hardness dependent[o]	Hardness dependent[h]
Iron (Fe)	1	0.3
Lead (Pb)	Hardness dependent[p]	Hardness dependent[i]
Manganese (Mn)	Hardness dependent[q]	
Mercury (Hg)	0.00002 when MeHg = 0.5% THg	0.000026
Molybdenum (Mo)	2 maximum; ≤1 for 30-day period	0.073[e]
Nickel (Ni)	Hardness-dependent[r,s]	Hardness dependent[j]
Selenium (Se)	0.002	0.001
Silver (Ag)	Hardness dependent[t]	0.0001
Thallium (Tl)	0.0003[r]	0.0008
Uranium (U)	0.3[r]	0.033 short-term; 0.015 long-term
Zinc (Zn)	Hardness dependent[u]	0.03
Dissolved Metals		
Aluminum (Al)	pH-dependent[v]	
Iron (Fe)	0.35	

[a] *British Columbia guideline for the protection of freshwater aquatic life, accessed March 2013.*

[b] *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic life, Canadian Council of Ministers of the Environment, accessed March 2013; all units are in mg/L unless otherwise noted.*

[c] *TSS - in clear flow, maximum increase of 25 mg/L from background levels for short-term exposure (e.g. 24 h period). Maximum average increase of 5 mg/L from background levels for long-term exposure. In high flow, maximum increase of 25 mg/L from background levels between 25-250 mg/L. If background is ≥250 mg/L, then it should not increase more than 10% of background levels.*

[d] *Turbidity - in clear flow maximum increase of 8 NTUs from background levels for short-term exposure (e.g., 24 h period). Maximum average increase of 2 NTUs from background levels for a longer term exposure (e.g., 30 d period). In high flow maximum increase of 8 NTUs from background levels (8 to 80 NTUs); when background is > 80 NTUs, turbidity should not increase more than 10%.*

[e] *Interim guideline.*

[f] *Phosphorus trigger ranges: <0.004 mg/L ultra-oligotrophic; 0.004-0.01 mg/L oligotrophic; 0.01-0.02 mg/L mesotrophic; 0.02-0.035 mg/L meso-eutrophic; 0.035-0.1 mg/L eutrophic; >0.1 mg/L hyper-eutrophic.*

[g] *Cadmium - cadmium concentration =* $10^{0.86[\log10(hardness)]-3.2}$ */ 1000 mg/L. There is no minimum guideline.*

[h] *Copper - copper concentration =* $e^{0.8545[\ln(hardness)]-1.465}$ ** 0.0002 mg/L. Copper guideline is a minimum of 0.002 mg/L regardless of water hardness.*

[i] *Lead - lead concentration =* $e^{1.273[\ln(hardness)]-4.705}$ */ 1000 mg/L. Lead guideline is a minimum of 0.001 mg/L regardless of water hardness.*

[j] *Nickel - nickel concentration =* $e^{0.76[\ln(hardness)]+1.06}$ */ 1000 mg/L. Nickel guideline is a minimum of 0.025 mg/L regardless of water hardness.*

[k] *TSS - change from background for 24-h period is 25 mg/L and 5mg/L for 30-day period; if background is 25-100 mg/L then change from background of 10 mg/L; if background > 100 mg/L then change from background of 10%.*

[l] *Turbidity - change from background for 24-h period is 8 NTU and 2 NTU for 30-day period; if background is 8-50 NTU then change from background is 5 NTU; if background > 50 NTU then change from background of 10%.*

[m] *Fluoride - if hardness (as* $CaCO_3$*) is 10 mg/L the maximum concentration is 0.4 mg/L; otherwise* $LC_{50} = -51.73 + 92.57 \log_{10}$ *(hardness) * 0.01 mg/L.*

[n] *Total organic carbon - the 30-day median ± 20% of the median background concentration.*

[o] *Copper - if average water hardness (as* $CaCO_3$*) ≤ 50 mg/L the maximum concentration is 0.094(hardness)+2 / 1000 mg/L and the 30-day mean is ≤ 0.002 mg/L; if average water hardness is > 50 mg/L the maximum concentration is 0.094(hardness)+2 / 1000 mg/L and the 30-day mean is ≤ 0.00004 mg/L.*

[p] *Lead - if hardness (as* $CaCO_3$*) is ≤ 8 mg/L the maximum concentration is 0.003 mg/L; if hardness is > 8 mg/L the maximum concentration is* $e^{1.273\ln(hardness)-1.460}$ */ 1000 mg/L and the 30-day mean is 3.31+*$e^{1.273\ln(mean[hardness])-4.704}$ */ 1000 mg/L.*

[q] *Manganese - manganese concentration maximum = 0.01102(hardness)+0.54 mg/L and the 30-day mean concentration = 0.0044(hardness)+0.605 mg/L.*

[r] *Working guideline.*

[s] *Nickel - if hardness (as* $CaCO_3$*) is 0-60 mg/L the maximum concentration is 0.025 mg/L; if hardness 60-120 mg/L maximum concentration of 0.065 mg/L; if hardness 120-180 mg/L maximum concentration of 0.110 mg/L; if hardness >180 mg/L maximum concentration of 0.150 mg/L.*

[t] *Silver - if hardness is ≤ 100 mg/L the maximum concentration is 0.0001 mg/L and the 30-day mean is 0.00005 mg/L; if hardness > 100 mg/L the maximum concentration is 0.003 mg/L and the 30-day mean is 0.0015 mg/L.*

[u] *Zinc - 30-day mean concentration = 7.5 + 0.75(hardness - 90) / 1000 mg/L; maximum zinc concentration = 33 + 0.75(hardness - 90) / 1000 mg/L.*

[v] *Dissolved aluminum - if pH ≥ 6.5 the maximum concentration is 0.1 mg/L and the 30-day mean is 0.05 mg/L; if pH < 6.5 the maximum concentration is* $e^{(1.209 - 2.426pH + 0.286 K)}$ *mg/L where K =* $(pH)^2$ *and the 30-day mean is* $e^{1.6 - 3.327 (median\ pH) + 0.402 K)}$ *mg/L where K =* $(median\ pH)^2$*.*

2. PROJECT DESCRIPTION AND MINE HISTORY

2.1 PROJECT OVERVIEW

Pretivm proposes to develop the Project as a 2,700 tonne per day (tpd) underground gold and silver mine. The proposed Brucejack Gold Mine Project (the Project) is located at 56°28'20" N latitude by 130°11'31" W longitude, which is approximately 950 km northwest of Vancouver, 65 km north-northwest of Stewart, and 21 km south southeast of the Eskay Creek Mine (Figure 2.1-1).

The Brucejack property is within the boundary range of the Coast Mountain Physiographic Belt, along the western margin of the Intermontane Tectonic Belt. The local terrain ranges from generally steep in the western portion of the Project area in the high alpine with substantial glacier cover, to relatively subdued topography in the eastern portion of the Project area towards Wildfire Creek and the Bell-Irving River. Elevations within the project area range from 1,400 masl through the Brucejack Lake area to lower level terrain near the Wildfire Creek and Bell Irving River of 500 masl. Sparse fir, spruce and alder grow along the valley bottoms; with only scrub alpine spruce, juniper, alpine grass, moss and heather covering the steep valley walls.

The mine site itself will be located adjacent Brucejack Lake, at approximately 56°27'59" N latitude by 130°11'11" W longitude (Figure 2.1-1). A transmission line will connect the mine site to the provincial power grid. Two potential alignments have been considered, a south option and an east option, with the south option being preferred. The south transmission line option was selected in late 2013 as the only viable option based on feasibility and other studies; this route follows the Bowser River south, crossing over into the watershed of the Salmon River which flows into the Pacific Ocean at Hyder, Alaska. Vehicle access will be via an existing exploration access road from Highway 37, which may require upgrades to facilitate traffic during mine operations. The mine access road traverses (from east to west) the Wildfire Creek watershed (tributary to Bell-Irving River), Todedada Lake and Creek (tributary to Treaty Creek, which is tributary to the Bell-Irving River), Scott Creek (tributary to Bowser River), and Bowser River (tributary to Bell-Irving River) watersheds (Figure 2.1-1). The ~60 km road section from Highway 37 to the toe of the Knipple Glacier is generally situated in mid-elevation valley bottom locations; elevations range from ~500 masl at its lowest point along the Bowser River to ~1,400 masl west of Knipple Glacier within the Brucejack watershed. The Knipple Glacier, on which ~12 km of the access road is routed, also drains to the Bowser River.

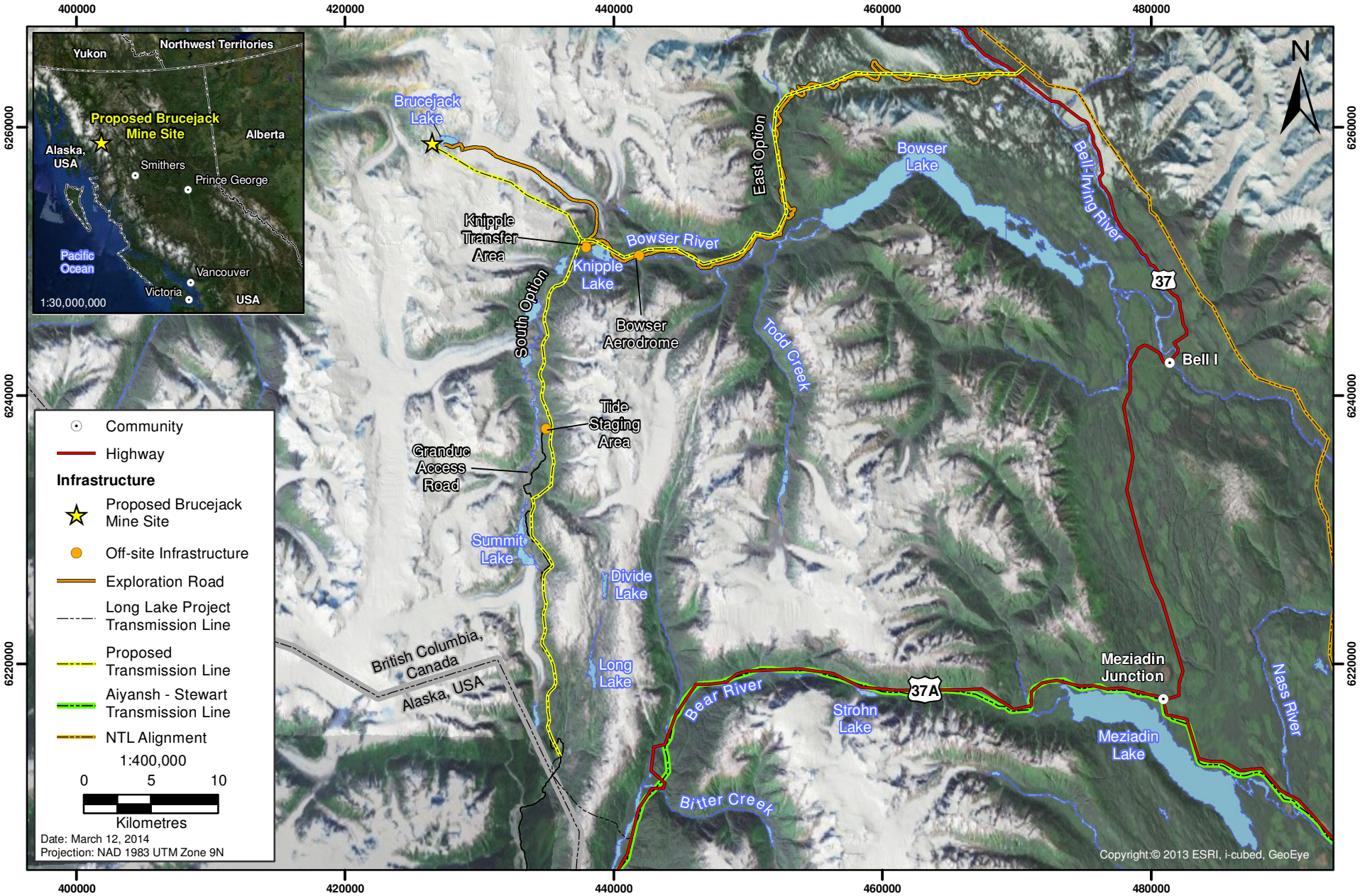
Additional operations Project infrastructure outside the Mine Site Area (Brucejack watershed and downstream receiving environment) includes the Knipple Lake Transfer Station and the Bowser Aerodrome (Figure 2.1-1).

2.2 MINE HISTORY

Several historic and current human activities have previously and/or continue to occur both within and in proximity to the proposed Project Area. These include mining exploration and production, hydroelectric power generation, and forestry.

Figure 2.1-1

Brucejack Gold Mine Project - Regional Setting



The proposed mine site, located within the Brucejack watershed, is an advanced exploration site with a long history of mineral exploration. Historic exploration activities that may have had short or long term effects on observable water quality are summarized in Table 2.2-1

Table 2.2-1. Summary of Exploration Activities within the Brucejack Watershed, 1935 to 2013

Period	Activity
1935	Discovery of Cu-Mo mineralization on the Sulphurets Property, ~6 km NW of Brucejack Lake; these claims were staked in 1960.
1935-1959	Project area inactive with respect to prospecting.
1960-1979	Granduc exploration, lithogeochemical sampling, trenching and diamond drilling north and northwest of Brucejack Lake.
1980	Esso Minerals Canada Ltd. (Esso) optioned the Property from Granduc; completed an extensive program consisting of mapping, trenching, and geochemical sampling.
1982-1983	Exploration and drilling activities confined to Au and Ag bearing vein systems in the Brucejack Lake area at the southern end of the property, including the Near Shore and West zones, located 800 m apart near Brucejack Lake. Drilling started on the Shore Zone.
1982-1985	Small-scale mining of the Catear (Goldwedge) area (Catear Creek a tributary of Brucejack Lake); included on-land and lake disposal of an un-quantified volume of waste rock and approximately 4,000 t of tailings from a small underground mine.
1986-1999	Various operators explored the Sulphurets Property; an underground program was completed on the West Zone of the Brucejack Property by the Newcana JV.; waste rock placed as shallow pad along the southern boundary of Brucejack Creek (~124,000 t).
1986-1989	Adit excavation and active de-watering of underground water.
1990	Project halted due to economic constraints, underground workings allowed to flood.
1990- May 2011	Adit passively draining into Brucejack Creek.
July 27 to Aug. 27, 1999	Waste rock and lime deposition in Brucejack Lake (~124,000 t).
May 1, 2011 to present	Current exploration and drilling program (Pretivm).
Nov. 6 to Dec. 5, 2011	Underground dewatering test, discharge to Brucejack Creek.
Sept. 1 to Dec. 31, 2012	Waste rock deposition into Brucejack Lake.
January 2013	Water treatment plant (WTP) commissioning, followed by operations through 2013.

Newhawk Gold Mines Ltd.'s Sulphurets Project was an advanced underground exploration project located at the currently proposed Brucejack Mine Site Area; it received a Certificate approving mine development through the Mine Development Assessment Process that preceded the current British Columbia *Environmental Assessment Act*. Underground workings were commenced in the fall of 1986 and continued until late 1990 as part of an advanced exploration and bulk sampling program (Newhawk 1989; Price 2005). Discharge from the existing adit (Plate 2.2-1) began in the late 1980s following the initial underground development of this program (Price 2005). The waste rock generated from the underground workings during Newhawk operations was used as a shallow pad for the foundation for camp facilities along the southern boundary of Brucejack Creek, just downstream of Brucejack Lake. Two small piles of low-grade ore were placed at the back of the pad and two small streams, Camp and Little Camp Creek, were piped under the pad. Reclamation efforts following the Newhawk advanced exploration work included deposition of waste rock and low-grade ore within

Brucejack Lake. Roughly 60,000 m^3 of waste rock was removed from the pads along lower Brucejack Creek and deposited in Brucejack Lake during July and August of 1999 (Price 2005).

Plate 2.2-1. Photograph of adit area in 2009 (post Newhawk reclamation activities).

To support its advanced exploration program, Newhawk completed the construction of a 1,050 m (3,500 ft) long industrial airstrip in the upper Bowser River Valley approximately 1,500 m east of Knipple Lake (Newhawk 1989). The historic access road in the Bowser Valley is about 22 km long and connects the western most landing on Bowser Lake with Knipple Camp near the toe of the Knipple Glacier (Newhawk 1989).

Recent exploration activities related to the proposed Brucejack Gold Mine Project commenced in May of 2011 and have included a drilling program, bulk sampling program, construction of an exploration access road from Highway 37 to the west end of Bowser Lake, and rehabilitation of the existing access road built by Newhawk from the west end of Bowser Lake to Brucejack Mine Site (Table 2.2-1).

No pre-disturbance water quality data are available for the Brucejack watershed. Water quality monitoring commenced in 1987 to support a Stage 1 Impact Assessment for the Sulphurets Project proposed by Newhawk Gold Mines Ltd., whereas underground development began in autumn 1986; from that time onward Brucejack Creek was affected by passive drainage from the adit, and various

watercourses within the Brucejack watershed (Brucejack Lake, Brucejack Creek, Camp Creek) were periodically affected by drainage from areas disturbed through surface activities, active (dewatering) or passive drainage from the adit, as well as reclamation activities (Newhawk 1989; Price 2005). Newhawk's active mining and exploration ceased in 1990. Surface water quality data from 1987 to 2001 (Price 2005; Newhawk 1989) have been included in this cumulative water quality baseline report both to define effects of the historic activities on water quality, and because data from the historic periods of relative inactivity provide the best available approximation of baseline conditions.

3. BASELINE STUDY AREA

3.1 BRUCEJACK, SULPHURETS, AND UNUK WATERSHEDS (MINE SITE AREA AND DOWNSTREAM RECEIVING ENVIRONMENT)

Existing and proposed mine facilities are situated within the Brucejack Creek watershed (11.7 km^2), a small headwater sub-basin in the Sulphurets Creek watershed (299 km^2; Figure 3.1-1). Sulphurets Creek is a tributary of the Unuk River that flows southwest, eventually discharging in to the Pacific Ocean northeast of Ketchikan, Alaska (drainage area 2,577 km^2 at mouth). No fish have been found above a 200 m long cascade in Sulphurets Creek approximately 300 m upstream of its confluence with the Unuk River; this location is approximately 20 km downstream of Brucejack Lake (Rescan 2013b).

Brucejack Lake is located on a high plateau above the tree line at an elevation of 1,365masl and is ice-bound for roughly 8 months of the year (Plate 3.1-1). The lake is fed by several small tributaries and has a maximum depth of 85 m and a total surface area of 840,965 m^2 (Friesen and Candy 2013; Figure 3.1-2). Brucejack Lake occasionally receives outflow from East Lake, located east of Brucejack Lake and adjacent to Knipple Glacier, approximately 500 m from the eastern shores of Brucejack Lake. The outflow of East Lake has been observed to flow into Brucejack Lake on some occasions and underneath Knipple Glacier on others (Newhawk 1989). However, the predominant condition is for East Lake to discharge east, below the Knipple Glacier (Newhawk 1989).

The outlet of Brucejack Lake is at the west end of the lake, where the lake discharges to Brucejack Creek (Figure 3.1-1; Plate 3.1-1). Brucejack Creek flows west for approximately 1 km, mainly in a braided channel in alluvial deposits, then pours through a bedrock-confined canyon containing several waterfalls, chutes, and rapids before plunging beneath Sulphurets Glacier, joining the sub-glacial drainage channel of Sulphurets Creek for a further 4 km (Newhawk 1989). Sulphurets Creek emerges from the toe of the Sulphurets Glacier, flows into Sulphurets Lake (drainage area 84 km^2), and then extends from the outlet of Sulphurets Lake to the creek's confluence with the Unuk River (drainage area 400 km^2), which crosses the Canada-US border. Along its flow path to its confluence with the Unuk River, Sulphurets Creek flows receives inputs from several tributaries, the largest being Mitchell Creek (Figure 3.1-1).

The Unuk River is an international waterway and flows southwest to the boundary between British Columbia and Alaska before eventually draining into the Pacific Ocean at Burroughs Bay in the Alaska Panhandle, 80 km northeast of Ketchikan, Alaska (Newhawk 1989). Glacier coverage in the Unuk River watershed (15%) is much lower than those of Sulphurets Creek (38%), Sulphurets Lake (49%), and Brucejack Lake (42%).

3.1.1 Historical Sampling Sites (1987 to 2001)

Historic mineral development and water quality monitoring activities within the Brucejack watershed and downstream watercourses are described in a Natural Resources Canada Mine Environment Neutral Drainage (Price 2005) report, in a Stage I Impact Assessment for the Sulphurets Property (Newhawk 1989), and in the Brucejack Project Feasibility Study (Tetra Tech 2013).

a) Brucejack Lake (BJ)

b) Brucejack Creek (BJ U/S of CC)

c) Camp Creek

d) Brucejack Creek near site BJ 2

e) Sulphurets Creek (SC0)

f) Sulphurets Lake (SUL)

e) Sulphurets Creek (SC2)

f) Unuk River (UR2)

Plate 3.1-1. Streams and Lakes, from upstream to downstream, within the Brucejack/Sulphurets/Unuk Area sampled as part of the 2008 to 2013 surface water quality baseline study for the Brucejack Gold Mine Project.

Figure 3.1-1

Water Quality Sampling Sites, Brucejack Gold Mine Project Study Area, 1987 - 2013

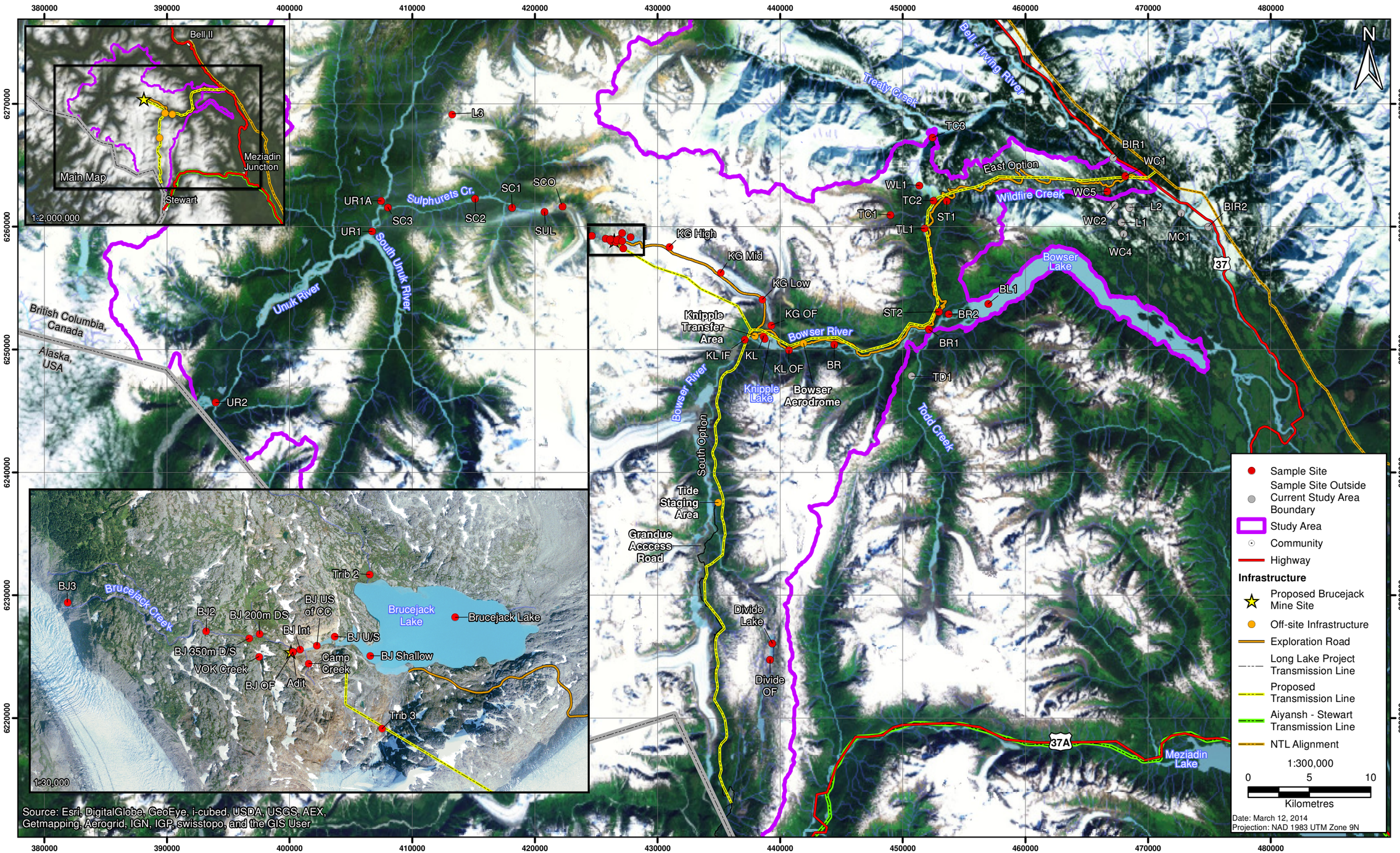
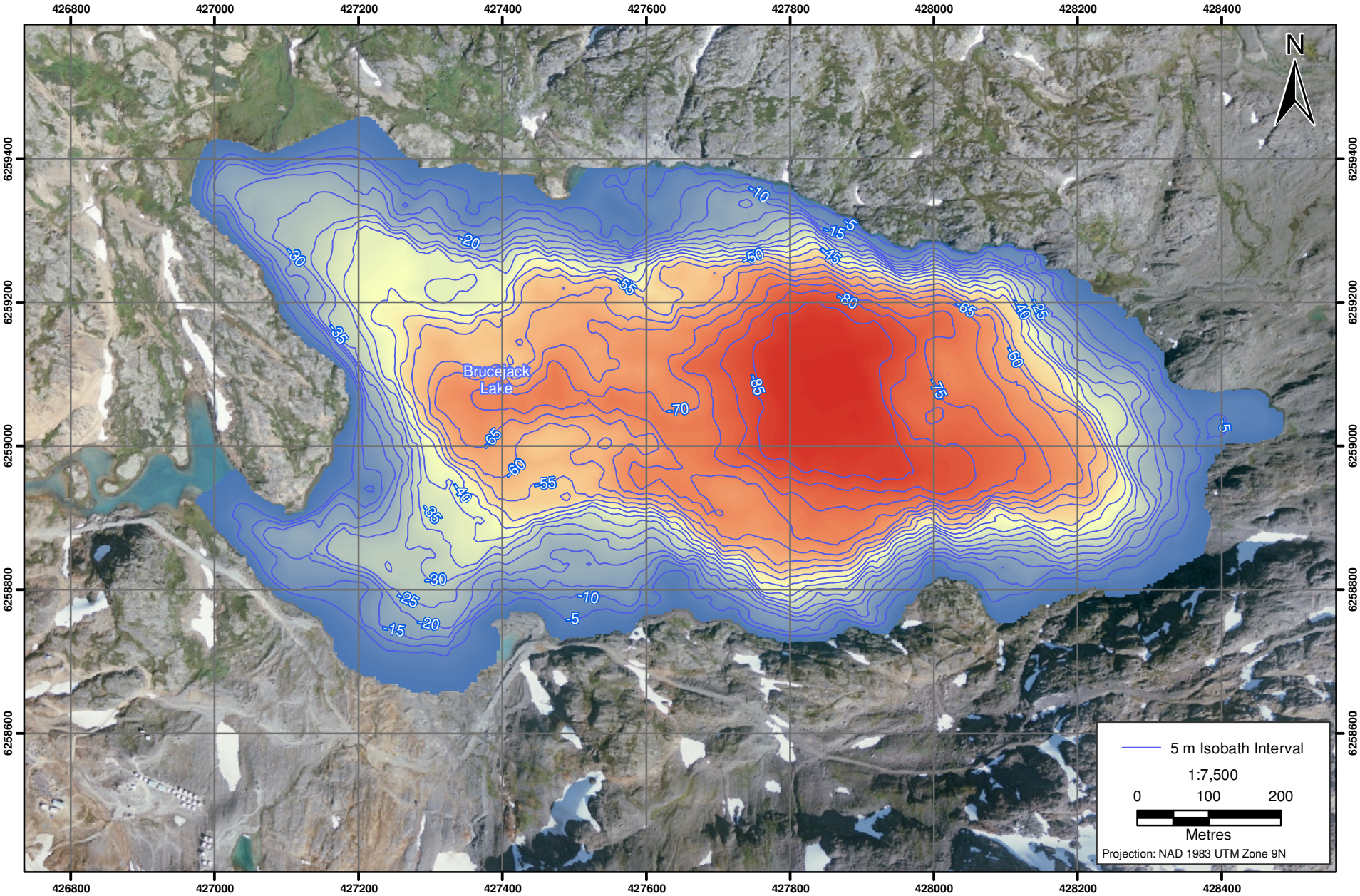


Figure 3.1-2
Brucejack Lake Bathymetry



Studies focused on Brucejack Lake, Camp Creek and along the Brucejack-Sulphurets-Unuk downstream pathway have been conducted over 1987-2001 to support environmental assessments and reclamation activities for the Sulphurets Property (Figure 3.1-1; Newhawk 1989; Price 2005). Site-specific historical monitoring data incorporated into this report are as follows (Newhawk 1989; Price 2005):

- Brucejack Lake (BJ), beginning in 1988;
- Brucejack Creek above (BJ U/S) and below (BJ 2) the historical waste rock pad and discharge from the adit, starting in 1987 (sites 2 and 3, respectively, in Newhawk 1989);
- the adit, starting in 1987 (site 1 in Newhawk 1989);
- Camp Creek immediately upstream of the historical waste rock pile, starting in 1989 (site 6 in Newhawk 1989).

Although data from the entire period of historic water quality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions (see Chapter 4, Methodology). The entire historical dataset, including maps of historic sampling locations (Newhawk 1989; Price 2005), are presented in Appendix 4.

3.1.2 Current Sampling Sites (2008 to 2013)

Rationale for sampling site selection within the Brucejack, Sulphurets, and Unuk watersheds is summarized in Table 3.1-1. Locations of sampling sites are shown on Figure 3.1-1; photos of key lake and stream sampling locations are provided in Plate 3.1-1; locations of all sampling locations are shown in Appendix 9. Water quality data collected as part of the current baseline program meets or exceeds environmental assessment related and permitting requirements (BC MOE 2012).

The sampling program has evolved with changes in Project design and to ensure that sampling efforts are sufficient to meet the objectives outlined in Section 1.1, including the assessment of potential Project effects on surface water quality and, by extension, sediment quality and aquatic resources (primary and secondary producers). Current surface water quality study area boundaries (Figure 3.1-1) reflect proposed and existing Project infrastructure and considered watersheds over a range of spatial scales from local (i.e., immediately downstream of Brucejack Lake) to regional (i.e., Unuk River at the international border). Within the study area, sampling sites for the current baseline program (2008 through 2013) were selected to cover areas that could potentially be affected by existing and proposed Project facilities and activities, sites upstream of Brucejack lake and the proposed discharge flow pathway, and also to align with historical sampling efforts (Figure 3.1-1).

Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions. Note, there is slight ambiguity on the sampling location of the historically monitored "lower Brucejack Creek" (Newhawk 1989; Price 2005) with respect to current monitoring sites, BJ 200m D/S and BJ2. Therefore, composite data (historical lower Brucejack Creek, BJ 200m D/S, and BJ2) has been used to inform and describe background conditions for these two monitoring locations (Table 3.1-1).

Table 3.1-1. Mine Site Area and Downstream Receiving Environment Water Quality Baseline Sampling Site Description and Rationale

Watershed	Site Name	Abbreviated Site Name	Easting	Northing	Site Description	Rationale
Brucejack Watershed	Unnamed Creek	Trib3[c]	427107	6259487	Southern tributary to Brucejack Lake	Characterize inputs into Brucejack Lake, used to inform and substaintiate predictive water quality models
	Unnamed Creek	Trib2[c]	427207	6258233	Northern tributary to Brucejack Lake, receives inputs from Catear adit	Characterize inputs into Brucejack Lake and possible loadings from historical Catear adit, used to inform and substaintiate predictive water quality models
	Brucejack Lake	BJ	427804	6259140	Centre of Brucejack Lake near the deepest point of the lake	Site of waste rock and tailings disposal
	Brucejack Lake, Shallow	BJ S	427108	6258796	Shallow Portion of Brucejack Lake, proximal to SW outflow	Proximal to waste rock disposal; proximal to south-west outflow of lake
	Brucejack Creek Upstream[a]	BJ U/S	426820	6258983	Brucejack Creek, first sampling site below Brucejack Lake outlet	Upstream of exploration adit discharge and Camp Creek confluence; historic Newhawk Site 2
	Brucejack Creek Upstream of Camp Creek	BJ U/S of CC	426587	6258883	Brucejack Creek downstream of BJ U/S, 200m upstream of Camp Creek	Upstream of exploration adit and Camp Creek confluence
	Camp Creek[a]	Camp Creek	426608	6258764	Flows through camp area into Brucejack Creek upstream of the adit, and downstream of BJ U/S of CC	Characterize inputs of Camp Creek into Brucejack Creek; historic Newhawk Site 6
	Brucejack Intermediate	BJ Inter	426538	6258877	Brucejack Creek upstream of adit, downstream of Camp Creek	Characterize Brucejack Creek immediately upstream of exploration adit input
	Adit[a]	Adit	426480	6258857	Drainage from the adit; flows into Brucejack Creek	Characterize Adit discharge into Brucejack Creek; historic Newhawk Site 1
	Brucejack Outflow	BJ OF	426426	6258919	Brucejack Creek immediately downstream of the adit and upstream of the cascades	Characterize Brucejack Creek immediately downstream of exploration adit input
	Brucejack 200m Downstream	BJ 200m D/S	426208	6259004	Brucejack Creek 200m downstream of the adit, just below the cascades	Characterize Brucejack Creek downstream of the exploration adit input, below the initial dilution zone (complete mixing)
	VOK Creek	VOK[c]	426204	6258819	Creek flowing from South into Brucejack Creek, between BJ 200m D/S and BJ 2	Drains highly minearlized VOK area, historic and recent disturbances from drilling programs
	Brucejack Creek 350m Downstream	BJ 350m D/S	426124	6258968	Brucejack Creek 350m downstream of the adit, below the confluence of VOK creek and the un-nameed northern tributary to BJ Creek	Water is not well mixed, site dropped from monitoring program
	Brucejack Creek 2[a]	BJ2	425773	6259026	Brucejack Creek downstream of the adit	Characterize Brucejack Creek below all mine related inputs, including VOK Creek; historic Newhawk Site 3
	Brucejack Creek 3	BJ3	424797	6259256	Brucejack Creek, upstream of Sulphurets Glacier, mid-field	Characterize Brucejack Creek prior to passing under Sulphurets glacier
Sulphurets Watershed	Sulphurets Creek 0	SC0	422038	6261659	Sulphurets Creek, downstream of Sulphurets Glacier, inflow to Sulphurets Lake; mid-field	Characterize Sulphurets Creek below the Brucejack Creek confluence and upstream of Sulphurets Lake
	Sulphurets Lake	SUL	420840	6261283	Sulphurets Lake; far-field	Characterize Sulphurets Lake, downstream of mine related discharges
	Sulphurets Creek 1	SC1	418143	6261557	Upper Sulphurets Creek; far-field	Characterize outflow of Sulphurets Lake
	Sulphurets Creek 2	SC2	415127	6262273	Mid Sulphurets Creek, downstream of Mitchell Creek; far-field	Characterize Sulphurets Creek after contributions of Mitchell Creek
	Sulphurets Creek 3	SC3	408001	6261574	Lower Sulphurets Creek; far-field	Characterize Sulphurets Creek prior to mixing with the Unuk River
Unuk River Watershed	Unuk River 1A	UR1A	407466	6262103	Unuk River, upstream of Sulphurets confluence; far-field	Upstream of Sulphurets-Unuk confluence and proposed discharge flow path
	Unuk River 1	UR1	406723	6259606	Unuk River, downstream of Sulphurets confluence; far-field	Characterize Unuk River after mixing with Sulphurets Creek
	Unuk River 2	UR2	393969	6245694	Unuk River, approximately 18 km downstream of the Sulphurets confluence, upstream of international boundary; far-field	Characterize Unuk River before the American border
Reference Sites[b]	Divide Lake	DIVIDE	439369	6226082	Divide lake, South of Project	Potential reference lake, outside of all proposed and exsisting Project infrastructure and activites and in a topographic and geological environment similar to water courses potentially exposed to Project activities
	Divide Lake, outflow	Divide OF	439182	6224736	Divide Lake outflow stream	Characterize outflow of Divide Lake
	Lake 3	L3	413260	6269123	Potential Reference Lake	Potential Reference Lake

Note:

Data collection may have varied slightly from co-ordinates provided.

[a] *Historical monitoring site (Newhawk 1989, Price 2005) (see text)*

[b] *Reference sites for the Project are currently under evaluation, data is presented separately within appendices 1 and 2*

[c] *Sites newly incorporated as part of the 2013 program; used to characterize potential contaminant loadings from historical upstream mining activities and to inform predictive water quality models for the Mine Site Area. Water quality from these sites show uncharacteristically highly elevated metal concentrations, are not representative of baseline conditions, do not contribute substantive proportion of flow at Brucejack Creek or Brucejack Lake; data is presented separately within Appendix 2.*

3.2 BOWSER RIVER, SCOTT CREEK, TODEDADA CREEK, AND WILDFIRE CREEK WATERSHEDS (ANCILLARY PROJECT INFRASTRUCTURE)

The Bowser Aerodrome and Knipple Transfer Area are both located within the Bowser River watershed, with the transfer station located very near to the terminus of the Knipple Glacier (Figure 3.1-1). Knipple Glacier flows in a southeastern direction and terminates at Knipple Lake, which feeds the Bowser River (Plate 3.2-1). The Bowser River originates southwest of Knipple Lake at Berendon Glacier Lake and Betty Creek, and flows through several lake sections, including the glacier terminus lake for the Frank Mackie Glacier, before reaching Knipple Lake. Downstream of Knipple Lake, the Bowser River flows east to Bowser Lake; the Bowser River confluence with the southerly flowing Scott Creek is just west of Bowser Lake. Bowser Lake has a length of 23 km and a surface area of 3,610 ha (Coombs 1988).

The existing exploration access road between Highway 37 and the proposed Mine Site Area traverses the Wildfire Creek (tributary of Bell-Irving River), Todedada Creek (tributary of Treaty Creek), Scott Creek (tributary of Bowser River) and Bowser River watersheds (Figure 3.1-1). Wildfire Creek, Bowser River, and Treaty Creek drain into the Bell-Irving River (drainage area 5,330 km^2) which eventually flows into the Nass River (21,483 km^2 at mouth) which drains into the Pacific Ocean near the southern tip of the Alaskan panhandle.

3.2.1 Current Sampling Sites (2008 to 2013)

Historical water quality data are not available for the Bowser River, Scott Creek, Todedada Creek, and Wildfire Creek watersheds.

Rationale for current sampling site selection within off-site and Ancillary Project Infrastructure areas is summarized in Table 3.2-1. Locations of sampling sites are shown above in Figure 3.1-1; photos of key lake and stream sampling locations are provided in Plate 3.2-1. Water quality data collected as part of the current baseline program meets or exceeds environmental assessment related and permitting requirements (BC MOE 2012).

The sampling program has evolved with advances in Project design and to ensure that sampling efforts are sufficient to meet the objectives outlined in Section 1.1, including the assessment of potential Project effects on surface water quality and, by extension, sediment quality and aquatic resources (primary and secondary producers). Further, additional sampling effort of Knipple Glacier melt water (along an elevation transect: KG High, KG Mid, KG Low) has been incorporated into the 2013 program as a result of consultation and feedback from the Nisga'a Nation. Monitoring conducted at select sites within the Wildfire Creek, Bell-Irving River, and Todd Creek (2008-2010) watersheds reflect previously considered Project infrastructure and are no longer pertinent to the current Project design (Figure 3.1-1; Table 3.2-1). Current baseline study area boundaries and sampling efforts within these areas reflect updated Project design and cover areas that could potentially be affected by existing and proposed Project facilities and activities (Figure 3.1-1, Table 3.2-1). Although data from the entire period of water quality monitoring (2008-2013) are included in this report, only those sites pertinent to the EA (Table 3.2-1) have been included as a basis for describing baseline or background conditions within the main report. The entire baseline dataset, including results for those sites outside the current study area boundary, are presented in Appendices 1 and 3.

a) Knipple Lake (KL)

b) Bowser River (BR1)

c) Scott Creek (ST 2)

d) Todedada Lake

e) Todedada Creek (TC2)

f) Wildfire Creek (WC1)

Plate 3.2-1. Streams and Lakes, from upstream to downstream, within the Bowser, Scott Creek, Todedada Creek and Wildfire Creek Area, sampled as part of the 2008 to 2013 surface water quality baseline study for the Brucejack Gold Mine Project.

Table 3.2-1. Off-site Ancillary Project Infrastructure Water Quality Baseline Sampling Site Description and Rationale

Watershed	Site Name	Abbreviated Site Name	Easting	Northing	Site Description	Rationale
Bowser Watershed	Knipple Glacier Run Off (High)	KG Low	430981	6258350	Glacier meltwater low at high elevation , proximal to access road	Characterize runoff from Knipple Glacier, inputs into Knipple Lake and Bowser River, Nisga'a Nation request
	Knipple Glacier Run Off (Mid)	KG Mid	435170	6256243	Glacier meltwater at mid elevation, proximal to access road	Characterize runoff from Knipple Glacier, inputs into Knipple Lake and Bowser River, Nisga'a Nation request
	Knipple Glacier Run Off (Low)	KG High	438559	6254061	Glacier meltwater at low elevation, proximal to access road	Characterize runoff from Knipple Glacier, inputs into Knipple Lake and Bowser River, Nisga'a Nation request
	Knipple Glacier Outflow	KG OF	439296	6251946	Glacier meltwater, proximal to access road	Characterize runoff from Knipple Glacier, inputs into Knipple Lake and Bowser River, Nisga'a Nation request
	Knipple Lake Inflow	KL_IF	437344	6251024	Bowser River, up stream of Knipple Lake	Characterize inflow of Knipple Lake
	Knipple Lake	KL	438656	6258819	Knipple Lake	Characterize Knipple Lake, Transfer Area
	Knipple Lake Outlflow	KL OF	440082	6250133	Bowser River, Knipple Lake Outflow	Characterize outflow of Knipple Lake
	Bowser River	BR	444428	6250403	Bowser River, downstream of Knipple Lake	Characterize Bowser river downstream of Knipple Lake, along access corridor
	Bowser River 1	BR1	452132	6251635	Bowser River; upstream of Scott Creek	Characterize Bowser River downstream of Knipple lake before confluence with Scott Creek, along access corridor
	Bowser River 2	BR2	453751	6252882	Bowser River; downstream of Scott Creek	Characterize Bowser River downstream of Knipple lake after confluence with Scott Creek, along access rcorridor
	Bowser Lake	BL1	456976	6253734	Western end of Bowser Lake, downstream of Bowser River	Downstream of access road, Knipple Transfer Station and Bowser Aerodrome
Scott Todedada and Todd Creeks	Scott Creek 1	ST1	453592	6262084	Upstream on Scott Creek	Along access road corridor
	Scott Creek 2	ST2	452955	6253069	Downstream on Scott Creek	Along access road corridor
	Todedada Lake*	TL1	451777	6259869	Todedada Lake	Downstream of access road corridor
	Todedada Creek 1	TC1	448991	6260951	Upstream on Todedada Creek	Downstream of access road corridor
	Todedada Creek 2	TC2	452499	6262125	Downstream on Todedada Creek	Downstream of access road corridor
	Wetland 1[a]	WL1	451357	6263357	Wetland along Todedada Creek	Proximal to previously considered Project infastructure
	Todedada Creek 3	TC3	452419	6267253	Downstream on Todedada Creek	Downstream of access road corridor
	Todd Creek[a]	TD1	452143	6250973	Todd Creek	Former reference for Scott Creek
Wildfire Creek and Bell Irving River Watershed	Wildfire Creek 4[a]	WC4	468025	6259429	Wildfire Creek upstream of Lake 1 (L1)	Upstream of previously considered Project infastructure
	Wildfire Creek 2[a]	WC2	467314	6261775	Wildfire Creek downstream of Lake 1 (L1)	Downstream of previously considered Project infastructure
	Wildfire Creek 5	WC5	466690	6262885	Wildfire Creek downstream of Lake 1 (L1)	Characterize ater quality proximal to road; upstream of Wildfire bridge
	Wildfire Creek 1	WC1	468159	6264118	Wildfire Creek near the mouth	Characterize water quality proximal to road; downstream of Wildfire bridge
	Lake 1[a]	L1	468497	6261553	Lake between WC4 and WC2	Proximal to previously considered Project infastructure
	Lake 2[a]	L2	467834	6260358	Lake east of WC2	Proximal to previously considered Project infastructure
	Bell Irving River 1[a]	BIR1	467158	6265602	Bell-Irving River upstream of the Wildfire Creek confluence	Receiving environment of previously considered Project infastructure
	Bell Irving River 2[a]	BIR2	474921	6259981	Bell-Irving River downstream of the Wildfire Creek confluence	Receiving environment of previously considered Project infastructure
	McInnes Creek[a]	MC1	472712	6261108	McInnes Creek near the mouth	Proximal to previously considered Project infastructure

Note:

Data collection may have varied slightly from co-ordinates provided.

**Todedada Lake was also sampled for KSM Project, but data is not included in this report.*

[a] *Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design. These sites are outside the current RSA boundary and are not considered in detail within this report; corresponding physical limnology and water quality data for these sites are reported within Appendices 1 and 2.*

4. METHODOLOGY

4.1 DATA SOURCES

This report describes background surface water quality condition relevant to the Brucejack Gold Mine Project (the Project) based on both historic information collected by previous property owners Newhawk Gold Mines Ltd. (Newhawk) from 1987 to 1999 and Silver Standard Resources Inc. (Silver Standard) from late 1999 to 2001 as well as recent Project-specific water quality data collected from 2008 to 2013.

Historical data (1987 to 2001) was accessed from the *Environmental and Socioeconomic Impact Assessment for the Sulphurets Property* (Newhawk Gold Mines LTD. 1989) as well as MEND Report 9.1c (Price 2005; *Case Studies of ML/ARD Assessment and Mitigation: Placement of the Sulphurets Waste Rock in Brucejack Lake*), collected during the Newcana Joint Venture exploration and reclamation work. Studies focused on the downstream pathway flowing west from Brucejack Lake into Brucejack Creek, Sulphurets Creek, and eventually into the Unuk River (Newhawk 1989; Price 2005). Historical surface water quality data were not available for the Bowser River, Scott Creek, Todedada Creek, and Wildfire Creek watersheds.

Pretivm has a data sharing agreement with Seabridge Gold Inc. (Seabridge) for their neighbouring proposed KSM Project; this report includes shared water quality data for sites along Sulphurets Creek and the Unuk River (2008 to 2013). This report also includes data collected by BGC Engineering in the Brucejack area during 2011 and 2012 (sites along Brucejack Creek, including tributaries).

4.2 HISTORICAL 1987 TO 2001 SAMPLING PROGRAM

As discussed above in Section 3.1.1, historical water quality monitoring activities were initiated within the Brucejack watershed and downstream watercourses in 1987; results are discussed within a Natural Resources Canada Mine Environment Neutral Drainage (Price 2005) report and in the Stage I Impact Assessment (Newhawk 1989).

Historical monitoring programs focused on Brucejack Lake, Camp Creek and along the Brucejack-Sulphurets-Unuk downstream pathway; site-specific historical monitoring data incorporated into this report are presented in Tables 4.2-1 and 4.2-2. During historical sampling campaigns, site access and weather conditions resulted in a greater sampling effort during high flow periods (June to October), with more samples taken during historical site exploration (1987-1990) activities (Price 2005; Tables 4.2-1 and 4.2-2). Overall, water quality data for 192 samples are included in this report from historical monitoring programs (Newhawk 1989; Price 2005).

Some water quality parameters were not available within the historical data set (e.g., ammonia, nitrite, aluminum, nickel, selenium, and chromium). Further, historical detection limits of some parameters were occasionally higher than those of the current sampling program, and are reported in Appendix 4.

Table 4.2-1. Number of Historical Water Quality Samples for the Mine Site Area, Brucejack Gold Mine Project, 1987-2001

Watershed	Site Name	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total
Brucejack Watershed	BJ		5	3	1	2								8	3	1	**23**
	BJ U/S	6	8	6	4	2	3	6	5	1	1	1	1	8	2	1	**55**
	Camp Creek			1		1	5	6	3				1	4	2	1	**24**
	Adit	1	6	10	5	3	3	4	5	1	1	1	1	4	3	2	**50**
	BJ2	1	4	3		2	3	6	5	1	1	1	2	8	2	1	**40**

Note:
Historical surface water quality data (1987 to 2001: Price 2005, Newhawk 1989) are incorporated to constrain effects of previous mining and explorations from the proposed Project-related activities. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions (see text).

Table 4.2-2. Monthly Historical Water Quality Samples for the Mine Site Area, Brucejack Gold Mine Project, 1987-2001

Watershed	Site Name	January	February	March	April	May	June
Brucejack Watershed	BJ		1989			1989	1988
	BJ U/S		1989	1990	1990	1989, 1988, 1993	1988, 1990, 1993, 1994, 1998
	Camp Creek					1993	1991, 1993, 1998
	Adit		1989	1988, 1990	1989, 1990	1989, 1993	1990, 1991, 1994
	BJ2		1988			1989, 1993	1993, 1994, 1998

Watershed	Site Name	July	August	September	October	November	December
Brucejack Watershed	BJ	1988, 1991, 1999	1988198919992000	1991, 1999-2001	1988	1990	
	BJ U/S	1987, 1988, 1991-1993	1987-1989, 1992-1995, 1997, 2000	1987, 1991-1994, 1996, 2000, 2001	1987-1989	1987, 1989	1987, 1989
	Camp Creek	1992-1994, 1999	1989, 1992, 1993, 1999, 2000	1992-1994, 1999-2001			
	Adit	1988, 1989, 1991-1999	1988, 1989, 1992-2000	1987, 1991-2001	1988, 1989	1988-1990	1989
	BJ2	1988, 1991-1994, 1998, 1999	1989, 1992-1995, 1997, 1999, 2000	1987, 1991-1994, 1996, 1999-2001	1988		1989

Note:
Historical surface water quality data (1987 to 2001: Price 2005, Newhawk 1989) are incorporated to constrain effects of previous mining and explorations from the proposed Project-related activities. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions (see text).

In some cases, historical detection limits were higher than current BC and CCME guidelines. These occasionally included mercury and molybdenum detection limits as well as the sampling event during the 13th of June, 1993. In these instances, data were not included in calculation of means and related summary statistics as a basis for describing guideline exceedances (Section 5.1.2.6). Samples/ sampling points excluded are presented in Appendix 4.

4.3 CURRENT SAMPLING PROGRAM (2008 TO 2013)

4.3.1 Overview

As described in Chapter 3 and Tables 3.1-1 and 3.1-2, the 2008 through 2013 sampling program has evolved with changes in Project design and to ensure that efforts meet program objectives and environmental assessment and permitting related information requirements. In general terms, sampling effort was comprehensive and included all study watersheds until 2012, after which sampling effort became focused on the Brucejack, Sulphurets, and Unuk watersheds (proposed Mine Site Area and mid- and far-field downstream receiving environments, respectively; Tables 4.3-1 and 4.3-2). Overall, there is baseline information for 11 lake/wetland sampling sites and 42 stream sampling sites within the study area (Tables 4.3-1 and 4.3-2). A minimum of two years of water quality sampling has been completed for receiving waterbodies potentially affected by Project infrastructure, and there are five or more years of data for some sites – particularly in the Mine Site Area and downstream receiving environment. Baseline water quality data were collected in conjunction with, and in support of, baseline characterization of sediment quality and aquatic resources (primary and secondary producers) for the Project. The sediment quality and aquatic resources data are presented in a separate, standalone report (Rescan 2013b).

Data collected for the KSM Project (2008 to 2013) included sites in Sulphurets Lake, and along Sulphurets Creek and the Unuk River (Table 4.3-1).

Samples were collected from Brucejack Creek and Camp Creek in 2009. Sampling sites were established in 2010 along Scott Creek, Bowser River, Todedada Creek and Todd Creek due to potential infrastructure siting for the Project in these watersheds (Table 4.3-2). Sampling of the Bell-Irving River and Wildfire Creek commenced in 2011 due to potential for Project infrastructure. In addition, the 2011 program included sampling of the adit discharge, site Brucejack Creek 2 (BJ2), as well as water quality from Sulphurets Creek, Unuk River, Bowser River, Scott Creek and Todedada Creek. The 2012 and 2013 sampling programs had an increased focus on the Brucejack watershed; water quality samples were also collected from Sulphurets Creek, Unuk River, Bell-Irving River and Wildfire Creek (Tables 4.3-1 and 4.3-2).

The hydrological regime is an especially important determinant of surface water quality, affecting water quality at study area sites in two ways: 1) increased discharge during freshet, glacial melt, and heavy rainfall events dilutes concentrations of major ions and total dissolved solids; and 2) increased sediment load and transport during high flow periods leads to increased concentrations of total suspended solids (TSS) and particle-associated metals. Study area streams typically experience a low flow period between November and April, and higher flows between May and October associated with freshet, summer glacial melt, and fall heavy rain events. As a result, water quality varies spatially and temporally; a summary of sampling frequency for the 2008-2013 program by month is shown in Tables 4.3-3 and 4.3-4. Monthly means of water quality variables are presented throughout the report to capture natural variability during both low and high flow periods.

Table 4.3-1. Number of Water Quality Samples Collected within the Mine Site Area and Downstream Receiving Environment, Brucejack Gold Mine Project, 2008 to 2013

Watershed	Site Name	2008	2009	2010	2011	2012	2013	Total
Brucejack Watershed	Trib3[b]						10	**10**
	Trib2[b]						11	**11**
	BJ		1	5	4	15	22	**47**
	BJ S					3	2	**5**
	BJ U/S		2		11	9	18	**40**
	BJ U/S of CC					11	7	**18**
	Camp Creek		1	1		5	11	**18**
	BJ Inter					1		**1**
	Adit		1	4	18	8	12	**43**
	BJ OF		1	5		5	13	**24**
	BJ 200m D/S					9	17	**26**
	VOK[b]						4	**4**
	BJ2				7	6	17	**30**
	BJ3					2	14	**16**
Sulphurets Watershed	SC0					2	16	**18**
	SUL	1	1			6	7	**15**
	SC1	12	9	12	12	11	7	**63**
	SC2	13	16	15	10	11	8	**73**
	SC3	4	6	12	11	10	7	**50**
Unuk River Watershed	UR1A	3	6	12	12	10	4	**47**
	UR1	9	4	12	13	11	5	**54**
	UR2	3	14	4	3	4	7	**35**
Reference Sites[a]	Divide Lake						4	**4**
	Divide Lake, outflow						5	**5**
	Lake 3						2	**2**

[a] *Reference sites for the Project are currently under evaluation, data is presented separately within Appendices 1 and 2.*

[b] *Sites newly incorporated as part of the 2013 program; used to characterize potential contaminant loadings from historical upstream mining activities and to inform predictive water quality models for the Mine Site Area. Water quality from these sites show uncharacteristically highly elevated metal concentrations and do not contribute substantive proportion of flow at Brucejack creek or Brucejack Lake; data is presented separately within Appendix 2.*

Table 4.3-2. Number of Water Quality Samples Collected within in Off-site Areas, Brucejack Gold Mine Project, 2008 to 2013

Watershed	Site Name	2008	2009	2010	2011	2012	2013	Total
Bowser Watershed	KG Low						1	**1**
	KG Mid						1	**1**
	KG High						1	**1**
	KG OF						3	**3**
	KL_IF						3	**3**
	KL						2	**2**
	KL OF						3	**3**
	BR						3	**3**
	BR1			10	5			**15**
	BR2			12	1			**13**
	BL1			2				**2**
Scott Todedada and Todd Creeks	ST1			6	4			**10**
	ST2			7	3			**10**
	TL1			2				**2**
	TC1			1				**1**
	TC2			11	1			**12**
	WL1			1				**1**
	TC3			9	2			**11**
	TD1					12		**12**
Wildfire Creek and Bell Irving River Watershed	WC4[a]				6	9		**15**
	WC2[a]				13	14		**27**
	WC5				1	12	2	**15**
	WC1				11	12	3	**26**
	L1[a]				6	18		**24**
	L2[a]				4			**4**
	BIR1[a]				10	4	3	**17**
	BIR2[a]				6	6	3	**15**
	MC1[a]				10	4		**14**

[a] *Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design. These sites are outside the current RSA boundary and are not considered in detail within this report; corresponding physical limnology and water quality data for these sites are reported within Appendices 1 and 2.*

Table 4.3-3. Monthly Water Quality Sampling within the Mine Site Area and Downstream Receiving Environment, Brucejack Gold Mine Project, 2008 to 2013

Watershed	Site Name	January	February	March	April	May	June	July	August	September	October	November	December
Brucejack Watershed	Trib3[c]	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	
	Trib2[c]					2013	2013	2013	2013	2013	2013	2013	
	BJ			2013			2012	2013	2010, 2011, 2013	2012	2009, 2013		2012
	BJ S								2013	2012			
	BJ U/S	2013	2013	2013	2013	2013	2012, 2013	2013	2012, 2013	2013	2009,2013	2012, 2013	2012, 2013
	BJ U/S of CC				2012		2012, 2013	2012, 2013	2013	2012, 2013	2012,2013	2012	
	Camp Creek	2013		2013	2013	2013	2012, 2013	2012, 2013	2010, 2012, 2013	2012, 2013	2009, 2012, 2013	2013	
	BJ Inter									2012			
	Adit	2012, 2013	2013	2013	2013	2013	2012, 2013	2011, 2012, 2013	2010, 2011, 2013	2010-2013	2009 - 2013	2010, 2013	2011-2013
	BJ OF	2013	2013		2012	013	2013	2013	2010, 2013	2010, 2012, 2013	2009, 2010, 2012, 2013	2010, 2012, 2013	2012
	BJ 200m D/S	2013	2013	2013	2013	2013	2012, 2013	2012, 2013	2012, 2013	2013	2012, 2013	2012, 2013	2012
	VOK[c]								2013	2013	2013	2013	
	BJ2	2013	2013	2013	2012, 2013	2013	2011- 2013	2011- 2013	2011-2013	2011-2013	2011, 2013	2013	2012
	BJ3	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2012, 2013	2012, 2013
Sulphurets Watershed	SC0	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2012, 2013	2012, 2013
	SUL			2013			2012	2013	2009, 2012, 2013	2008	2012		
	SC1	2010, 2012	2011-2013	2010-2013		2008-2013	2008, 2011-2013	2008 - 2013	2009 - 2012	2008-2012	2008, 2009, 2011, 2012	2010,2011	2008, 2009, 2010, 2012
	SC2	2010, 2012	2011-2013	2009-2013	2009	2008-2013	2008 - 2013	2008 - 2013	2009 - 2012	2008-2012	2008 - 2012	2009 - 2011	2008, 2010, 2012
	SC3	2010, 2012	2011-2013	2009-2013	2009	2010 - 2012	2008, 2011-2013	2008 - 2011	2009 - 2012	2008, 2010-2013	2010 - 2012	2009 - 2011	2008 ,2010, 2012
Unuk River Watershed	UR1A	2010, 2012	2011-2013	2009-2013		2010 - 2012	2008, 2011-2013	2009 - 2011	2009 - 2012	2008, 2010, 2011, 2012	2010 - 2012	2009 - 2011	2008, 2010
	UR1	2010, 2012	2011-2013	2009-2013		2008, 2010-2012	2008, 2011-2013	2008 - 2011	2009 - 2012	2008, 2010-2013	2010 - 2012	2009 - 2011	2008, 2010
	UR2	2012	2013	2009-2013		2009, 2010	2008, 2009, 2012, 2013	2009 - 2011	2009, 2010	2008, 2009, 2011-2013	2009	2009,2010	2008
Reference Sites[a,b]	Divide Lake							2013	2013				
	Divide Lake, outflow							2013	2013	2013	2013	2013	
	Lake 3										2013		

[a] *Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design. These sites are outside the current RSA boundary and are not considered in detail within this report; corresponding physical limnology and water quality data for these sites are reported within Appendices 1 and 2.*

[b] *Reference sites for the Project are currently under evaluation, data is presented separately within Appendices 1 and 2.*

[c] *Sites newly incorporated as part of the 2013 program; used to characterize potential contaminant loadings from historical upstream mining activities and to inform predictive water quality models for the Mine Site Area. Water quality from these sites show uncharacteristically highly elevated metal concentrations and do not contribute substantive proportion of flow at Brucejack creek or Brucejack Lake; data is presented separately within Appendix 2.*

Table 4.3-4. Monthly Water Quality Sampling of Off-site Areas, Brucejack Gold Mine Project, 2008 to 2013

Watershed	Site Name	January	February	March	April	May	June	July	August	September	October	November	December
Bowser Watershed	KG Low									2013			
	KG Mid									2013			
	KG High									2013			
	KG OF									2013	2013	2013	
	KL_IF				2013		2013		2013				
	KL								2013				
	KL OF				2013		2013		2013				
	BR				2013		2013		2013				
	BR1	2011	2011	2011	2011	2010	2010	2010	2010	2010	2010	2010	2010
	BR2				2011	2010	2010	2010	2010	2010	2010	2010	2010
	BL1								2010				
Scott Todedada and Todd Creeks	ST1	2011	2011		2011		2010	2010	2010	2010	2010	2010	2010
	ST2		2011		2011		2010	2010	2010	2010	2010	2010	2010
	TL1								2010				
	TC1						2010						
	TC2				2011	2010	2010	2010	2010	2010	2010	2010	2010
	WL1								2010				
	TC3	2011			2011	2010	2010	2010	2010	2010	2010	2010	2010
	TD1					2010	2010	2010	2010	2010	2010	2010	2010
Wildfire Creek and Bell Irving River Watershed	WC4[a]				2012	2011, 2012	2012	2011, 2012	2011, 2012	2011	2011, 2012	2011	2012
	WC2[a]				2012	2011, 2012	2011, 2012	2011, 2012	2011, 2012	2011	2011, 2012	2011, 2012	2011, 2012
	WC5			2013	2012	2012	2012, 2013	2012	2011-2013		2012	2012	
	WC1			2013	2012	2011, 2012	2011, 2012, 2013	2011, 2012	2011, 2012	2011	2011, 2012	2011, 2012	2011, 2012
	L1[a]							2012	2011	2012			2012
	L2[a]								2011				
	BIR1[a]			2013	2012	2011	2012, 2013	2011	2011, 2013	2011, 2012	2011	2011	2011, 2012
	BIR2[a]			2013	2012	2011	2012, 2013	2011	2011, 2013	2011, 2012	2011	2011	2012
	MC1[a]	2012			2012	2011	2011	2011	2011	2011, 2012	2011	2011	2011, 2012

[a] *Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design. These sites are outside the current RSA boundary and are not considered in detail within this report; corresponding physical limnology and water quality data for these sites are reported within Appendices 1 and 2.*

4.3.2 Physical Limnology

4.3.2.1 Temperature and Dissolved Oxygen

Sampling

Lake temperature and dissolved oxygen (DO) data were collected from six lake sites from 2008 to 2013 using a calibrated conductivity, temperature and depth (CTD) probe or a YSI probe. Lake profiles were sampled to a depth approximately 0.5 m above the sediment surface to avoid suspension of bottom sediments. For under-ice collection, a 25 cm diameter hole was augured through the ice and any loose snow or ice was cleared from the hole with a slotted spoon (Plate 4.3-1).

An RBR-420 CTD instrument fitted with an optical dissolved oxygen probe was used to collect data from Brucejack Lake (2010 ,2012, 2013) and Lake 1 (2012). The RBR-420 CTD logs data internally at a constant rate (~ every 3 seconds) and was lowered at a rate approximately ~0.3 m/s in order to obtain a reading every 1 m. A YSI model 85 meter and probe were used to collect data from Bowser, Todedada, and Sulphurets Lakes (2008, 2009, 2010, 2012) while Brucejack Lake, Lake 1 and Lake 2 (2011) profiles were measured with a YSI Pro ODO probe. YSI readings were taken approximately every 1 m from the lake surface to the lake bottom.

Analysis

Data from 2008 to 2013 for all lakes, both inside and outside of current study area boundaries, are presented in Appendix 1. Cumulative data for Brucejack and Sulphurets Lake are presented graphically in Figures 5.1-1 and 5.1-2. Dissolved oxygen concentrations were compared to CCME and BC MOE guidelines (CCME 2013; BC MOE 2006).

4.3.2.2 Light

Sampling

Secchi depth (D_s) – a measure of water transparency – was measured in all lakes in the study area during August and September to estimate the euphotic zone depth. Secchi depth was measured by lowering a weighted standard 20 cm black and white Secchi disk over the shaded side of the boat until it was no longer visible in the water column and then raising it slowly until it once again became visible. The depth at which the disk became visible, D_s, was recorded to the nearest 10 cm.

Analysis

D_s was used to calculate 1% euphotic depth ($Z_{1\%}$), which is the depth of the water column where 1% of the surface irradiance reaches. $Z_{1\%}$ represents the depth at which the integrated gross water column photosynthetic production is equivalent to the integrated gross water column respiration; thus, there is net photosynthesis above this depth.

$Z_{1\%}$ was calculated as follows: $Z_{1\%}\ (m^{-1}) = 4.6/k$

D_s is calculated as follows: $k\ (m^{-1}) = 1.7/D_s$

where k is the light extinction coefficient for non-turbid waters (Parsons et al. 1984).

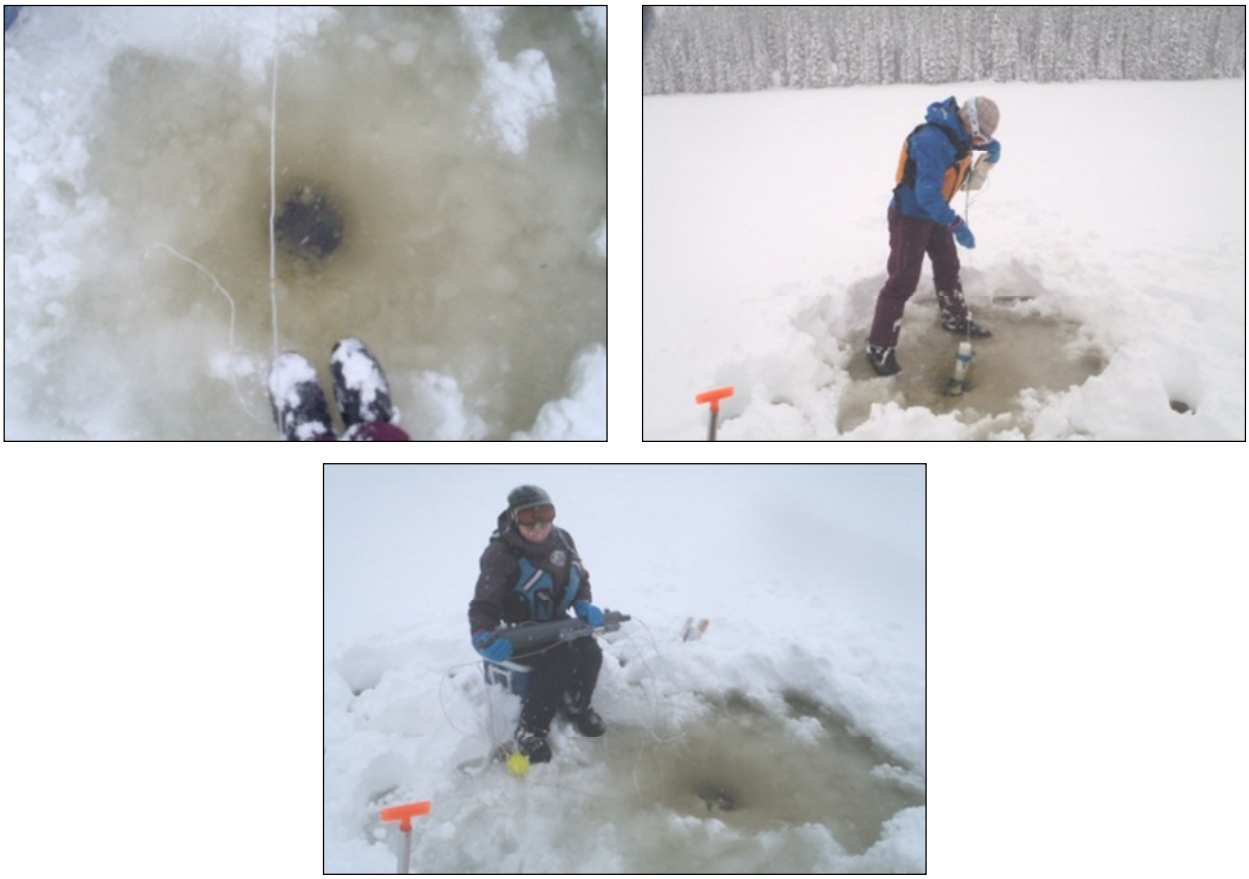


Plate 4.3-1. Under-ice sampling, December 2012. From left: auguring through the ice; collecting lake limnology readings with the CTD; and preparing a Niskin for water quality sampling.

4.3.3 Water Quality

Sampling

Stream water quality data for the 2008 through 2013 baseline program were collected from a total of 42 sites, including KSM Project sites along Sulphurets Creek and the Unuk River (Tables 4.2-1, 4.2-2).

Stream samples were collected with the scientist wading into mid-channel (when safe) while facing upstream to avoid potential contamination from sediment disturbance (Plate 4.3-2). Samples were collected by submerging bottles approximately 30 cm into the water beneath the surface layer to avoid collecting debris travelling on the surface.

Lake water quality data were collected from 10 lake sites between September 2008 and November 2013 as part of the Brucejack and KSM projects (Tables 4.2-1 and 4.2-2). From 2008-2011, lake samples were collected once per year during open water conditions (Tables 4.2-2 and 4.2-3). Seasonal sampling campaigns (i.e., open water vs. under ice) were conducted in Brucejack Lake (BJ) and Sulphurets Lake (SUL) between June and December 2012-2013; water quality data were collected from shallow and deep depths (below the thermocline if present) in each lake. Water samples were collected from multiple depths (4 to 5) in Brucejack Lake to capture any physical or chemical stratification that may have been present in this deep (> 80 m) lake.

Plate 4.3-2. Stream water quality sample collection at Wildfire Creek Area (WC1), June 2012.

Water was collected from one depth in the one wetland sampled (WL1).

Open-water water quality samples were collected by boat using an acid-washed 5 L Teflon-lined GO-FLO sampling bottle. The GO-FLO was lowered on a metred line to a depth 0.5 m below the desired sampling depth and then raised to the sampling depth and closed using a weighted messenger. The collected water was used to fill the laboratory-provided sample containers.

Under-ice water quality samples were collected from a hole augured through the ice as described above in Section 4.2.2. Water quality samples were collected from 1 m below the base of the ice layer using a modified 2.5 L "skinny" Niskin (Plate 4.3-1). Although GO-FLOs are generally preferred for sampling waters with low metal concentrations, they are prone to freezing in open in cold waters. Niskin bottles were acid-cleaned at ALS Environmental Services (ALS), Burnaby, British Columbia (BC) and contained acid-cleaned clear silicone tubing in the interior of the bottle to reduce potential metal contamination. A dual rope system was used for bottle closure and the water collected in the Niskin to fill the appropriate laboratory-provided sample containers.

Water quality samples were collected at each sampling site using laboratory-certified, clean bottle sets. The scientist wore powder-free, nitrile gloves during sample handling. Samples were preserved with the recommended preservatives at the camp laboratory and were kept refrigerated before being sent to ALS Environmental Services (ALS) in Burnaby, BC for analysis.

Analysis

During the five-year water quality baseline study (2008 to 2013), over 900 water quality samples were analyzed using industry-standard techniques at ALS Environmental Laboratories in Burnaby, British Columbia (BC), which is an accredited environmental laboratory. Sampling procedures and

data analyses followed the principles and procedures outlined in the *British Columbia Field Sampling Manual* (MWLAP 2003a). Water quality samples were analyzed for physicochemical parameters (dissolved oxygen, pH, hardness, turbidity), major anions, nutrients, cyanides (total and weak acid dissociable), total organic carbon (TOC), and total and dissolved metals at the lowest feasible method detection limit (MDL) by ALS (Table 4.3.1). Some variables could not be measured reliably below a specified detection limit and were reported by the analytical laboratory as less than that detection limit. For statistical analyses and graphing purposes, values less than analytical detection limits were replaced with half of the realized sample detection limit. The ranges of realized detection limits were occasionally greater than the MDLs.

Data from 2008 to 2013 for stream/river sites, both inside and outside of current study area boundaries, are presented in Appendices 2 and 3. Although data from the entire period of water quality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of annual and monthly means and related statistics, as a basis for describing baseline or background condition (see Sections 4.4 and 4.5) and for comparison to applicable provincial and federal level guidelines. Removal of the affected data yields a more conservative and representative approximation of baseline conditions with lower mean values for metals and other parameters as well as lower overall variability in the dataset.

Where applicable, water quality parameters were screened against available approved and working BC Guidelines (BC MOE 2006) for the Protection of Aquatic Life (Appendix 2) and CCME guidelines (CCME 2013a). Most BC guidelines include a maximum concentration as well as a 30-day, acute exposure guideline. Water quality samples in this report were compared to the applicable maximum guideline and, if no maximum guideline existed, the 30-day exposure guideline was applied (Table 1.2-2). Most of the 26 existing CCME guidelines are defined for long-term exposure, although boron, chloride, nitrate and uranium have both short-term and long-term guidelines. For this report, data were compared to both short-term and long-term guidelines. For duplicate samples, mean concentrations were used for guideline comparisons.

Cumulative data for water quality variables with existing water quality guidelines are presented graphically along with variables that show trends in water quality (Figure 5.1-3 to 5.1-36 and 5.2-2 to 5.2-19). Water quality variables were not plotted if they were typically less than the analytical detection limit. Patterns in water quality parameters were assessed in a spatial and temporal context. Data are presented graphically as monthly means to capture potential variability during both low flow and high flow periods. In the discussion, particular attention is given to the discharge pathway downstream of Brucejack Lake (Brucejack Creek → Sulphurets Lake → Sulphurets Creek → Unuk River), given the proposed mine location.

Water quality variables and sites with values greater than the provincial and federal water quality guidelines are presented in summary tables in Appendix 5 and Tables 5.1-3 and 5.2-3 the mean frequency of collected samples that were greater than guideline values and the factor by which concentrations were greater than guideline values was calculated for each variable and guideline. In some cases, the realized detection limit for cadmium and mercury was greater than the CCME and BC MOE guidelines, respectively.

Quality Assurance/Quality Control (QA/QC)

Chain of custody forms were used for all water quality samples as part of the quality assurance and quality control (QA/QC) program. To determine sources of potential contamination during water sampling, a separate set of bottles for equipment (2010, 2012, 2013), travel (2009 to 2013) and field blanks (2010 to 2013) were included as part of the field QA/QC program.

Equipment blanks were collected before each period during which lakes were sampled to assess potential contamination from the sampling equipment (GO-FLO or Niskin). The sampling equipment was triple rinsed before filling with DDW and left standing for the same duration it took to collect a field sample. The water was then collected, preserved, and analyzed identically to a field sample. Travel blanks were collected to provide an assessment of potential contamination associated with travel, storage, or the analytical laboratory. Travel blank bottles were filled with distilled deionized water (DDW) at the analytical laboratory and were stored with field-collected samples without being opened. Field blanks were collected to assess potential contamination from sources such as airborne dust, sample preservation, or sample handling. Field blank bottles were filled with DDW in the laboratory and were treated similarly to field-collected samples (i.e., exposed to the air for the same amount of time it took to collect and preserve a sample). Equipment, travel, and field blanks were analyzed by ALS for the water quality parameters identified in Table 4.3-5.

To assess the potential variability arising from the collection of field samples, duplicate samples were collected at 10% of lake and stream sites. Variability in field samples was calculated for each duplicate water quality sample as the relative percent difference (RPD) between the replicate samples:

$$RPD = 100 \times |rep1 - rep2| / [(rep1 + rep2)/2]$$

The BC Field Sampling Manual (BC MOE 2009) suggests if one or both of the replicate water quality values are less than five times the analytical detection limit, they are not to be included in the RPD calculations, as long as the difference between replicates is within a value equal to two times the minimum detection limit. This is because the RPD is more sensitive to variation as values approach the analytical detection limit. Thus, only the water quality variables with concentrations greater than five times the detection limit or with a difference of more than twice the detection limit between the replicates were considered. Overall, RPD values greater than 20% may indicate significant *in situ* variation and that more samples may be required to adequately characterize the site. Data from the water quality QA/QC programs are presented in Appendices 6 and 7.

4.4 DEFINITION OF BRUCEJACK REPRESENTATIVE BASELINE DATA PERIODS

As described in Section 2.2, historical mining and mineral exploration activities have affected lake and stream water quality within the Brucejack watershed; no pre-disturbance baseline water quality data are available. Monitoring began in 1987 to support a Stage 1 Impact Assessment for the Sulphurets Project proposed by Newhawk Gold Mines Ltd., whereas underground development began in autumn 1986; from that time onward Brucejack Creek was affected by passive drainage from the adit and various water bodies were affected by drainage from areas disturbed through surface activities, active (dewatering), and reclamation activities (Newhawk 1989; Price 2005).

Surface water quality data from 1987 to 2001 (Price 2005, Newhawk 1989) have been included in this cumulative water quality baseline report both to define effects of historic activities on water quality, and because data from the periods of relative inactivity provide the best available representation of baseline conditions.

For analyses, water quality results for watercourses within the Brucejack watershed were grouped into six distinct cohorts based on sampling year, with each period demarcated by either a significant site activity or observable water quality effect relative to years of little to no site activity:

- **1987 to 1990:** excavation of adit and active dewatering;
- **1991 to 1998:** no to little documented site activity, passive adit discharge;
- **1999:** deposition of weathered waste rock and lime into Brucejack Lake, passive adit discharge;
- **2000 to 2001 and 2009 to 2010**: no to little documented site activity; passive adit discharge;
- **2011 to 2012:** current mineral exploration, bulk sampling activities, active adit dewatering; and, sewage treatment plant (STP) operation.
- **2013:** Water Treatment Plant (WTP) operation. Analysis of TSS concentrations versus total and dissolved metals indicated that total metal concentrations in adit discharge (effluent) and in the Brucejack Creek catchment (e.g., Camp Creek) are closely linked to TSS concentrations within the 2011 to 2012 cohort. A water treatment plant was installed and began operations in January 2013 to reduce TSS and associated elevated total metals concentrations in adit discharge.

A conservative approach was used to define baseline water quality conditions of the Brucejack watershed; supplementary information on the approach used for baseline water quality characterization of watercourses within the Brucejack watershed is provided in Appendix 10. Post-mining water quality data collected from 1991 to 1998, as well as 2000/2001 and 2009/2010 are considered to be a reasonable approximation of pre-disturbance conditions. This assertion is based on assessment of adit loadings during this period, combined with documentation of no/little site presence/disturbance, as well as observed minima in incidences of guideline exceedence. Results of these analyses also confirmed that Upper Brucejack Creek (BJ U/S) remained uninfluenced by site activities within the Project area over the 1987-2001 period, as also documented in MEND Report 9.1c (Price 2005) and exhibits consistent physicochemistry as well as concentrations of nutrients, anions, as well as total metals and dissolved metals, regardless of sampling period (see Appendix 10). No data were excluded from this site.

The dataset for 1991 to 1998, as well as 2000/2001 and 2009/2010, was utilized as the reference case to statistically identify potentially affected water quality within the 2011-2013 database, and to subsequently exclude affected data from baseline definition (i.e., to produce a curated baseline dataset). As the hydrological regime is an especially important determinant of surface water quality within the study area, the reference dataset was subdivided into high and low flow periods prior to outlier identification (i.e., to identify season-specific outliers).

Table 4.3-5. Water Quality Parameters and Standard Detection Limits, 2008 to 2013

		Detection Limit				
Parameter	Units	2008	2009	2010 and 2011	2012*	2013*
Physical Tests						
Conductivity	mS/cm	2	-	2	2	2
Hardness (as $CaCO_3$)	mg/L	0.5	0.5	0.5	0.5	0.5
pH	pH units	0.01	0.1	0.1	0.01	0.1
Total Suspended Solids	mg/L	3-9	3	3	3	1-10
Total Dissolved Solids	mg/L	10-13	10	10	10	10
Turbidity	NTU	0.1	-	0.1	0.1	0.1
Anions and Nutrients						
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L		-	1	2	1-2
Alkalinity, Carbonate (as $CaCO_3$)	mg/L		-	1	2	1-2
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L		-	1	2	1-2
Alkalinity, Total (as $CaCO_3$)	mg/L	5	-	1	2	1-2
Ammonia (as N)	mg/L	0.02	0.005	0.005	0.005	0.005-0.025
Bromide (Br)	mg/L	0.5	0.05	0.05	0.05	0.05
Chloride (Cl)	mg/L	0.5	0.5	0.5	0.5	0.5
Fluoride (F)	mg/L	0.02	0.02	0.02	0.02	0.02
Nitrate (as N)	mg/L	0.005	0.005	0.005	0.005	0.005
Nitrite (as N)	mg/L	0.001	0.001	0.001	0.001	0.001
Total Kjeldahl Nitrogen	mg/L	0.05	-	0.05	0.05	0.05
Ortho Phosphate (as P)	mg/L	0.002-0.2	-	0.001	0.001	0.001
Total Phosphorus (as P)	mg/L	0.001	-	0.002	0.002	0.002-0.020
Sulphate (SO_4)	mg/L	0.5	0.5	0.5	0.2	0.5
Organic Parameters						
Total Organic Carbon	mg/L	0.5	-	0.5	0.5	0.5-1.0
Total Cyanide	mg/L	0.005	-	0.001	0.001	0.001
WAD Cyanide	mg/L	-	-	-	0.001	0.001
Total and Dissolved Metals						
Aluminum (Al)	mg/L	0.001-0.013	0.001	0.001	0.003-0.005	0.003
Antimony (Sb)	mg/L	0.0005-0.001	0.0001	0.0001	0.0001-0.0005	0.0001
Arsenic (As)	mg/L	0.005-0.0001	0.0001	0.0001	0.0001-0.0005	0.00005
Barium (Ba)	mg/L	0.00025-0.00005	0.00005	0.00005	0.00005-0.02	0.00005
Beryllium (Be)	mg/L	0.0025-0.0005	0.0005	0.0005	0.0001-0.001	0.0001
Bismuth (Bi)	mg/L	0.0025-0.0005	0.0005	0.0005	0.0005-0.2	0.0005
Boron (B)	mg/L	0.01-0.05	0.01	0.01	0.01-0.1	0.01
Cadmium (Cd)	mg/L	0.000017-0.000085	0.00001	0.00001	0.00001-0.000017	0.00001
Calcium (Ca)	mg/L	0.02-0.01	0.02	0.02	0.02-0.1	0.02
Chromium (Cr)	mg/L	0.0005-0.0025	0.0005	0.0001	0.0001-0.001	0.0001-0.0009
Cobalt (Co)	mg/L	0.0001-0.0005	0.0001	0.0001	0.0001-0.0003	0.0001
Copper (Cu)	mg/L	0.0001-0.0012	0.0001	0.0001	0.0005-0.001	0.0001-0.0005
Iron (Fe)	mg/L	0.03	0.03	0.03	0.03	0.03
Lead (Pb)	mg/L	0.00005-0.00025	0.00005	0.00005	0.00005-0.0005	0.00005
Lithium (Li)	mg/L	0.005-0.0025	0.005	0.005	0.0005-0.005	0.0005
Magnesium (Mg)	mg/L	0.005-0.01	0.005	0.005	0.005-0.1	0.005
Manganese (Mn)	mg/L	0.00001	0.00005	0.00005	0.00005-0.0003	0.00005
Mercury (Hg)	mg/L	0.00005-0.00025	0.00001	0.00001	0.00001	0.00001-0.000050
Molybdenum (Mo)	mg/L	-	0.00005	0.00005	0.00005-0.001	0.00005-0.00050
Nickel (Ni)	mg/L	0.0005-0.0025	0.0005	0.0005	0.0005-0.001	0.0005
Phosphorus (P)	mg/L	0.3	0.3	0.002	0.3	0.3
Potassium (K)	mg/L	0.05-2	0.05	0.05	0.05-2	0.05
Selenium (Se)	mg/L	0.001-0.0001	0.0001	0.0001	0.0001-0.001	0.0001
Silicon (Si)	mg/L	0.05	0.05	0.05	0.05	0.05
Silver (Ag)	mg/L	0.0001-0.0005	0.00001	0.00001	0.00001-0.00002	0.00001
Sodium (Na)	mg/L	2	2	0.01	2	2
Strontium (Sr)	mg/L	0.0001-0.0005	0.0001	0.0001	0.0001-0.005	0.0002
Thallium (Tl)	mg/L	0.0001-0.0005	0.0001	0.0001	0.00001-0.0002	0.00001
Tin (Sn)	mg/L	0.0001-0.0005	0.0001	0.0001	0.0001-0.0005	0.0001
Titanium (Ti)	mg/L	0.01	0.01	0.01	0.01	0.01
Uranium (U)	mg/L	0.00001-0.00005	0.00001	0.00001	0.00001-0.0002	0.00001
Vanadium (V)	mg/L	0.001-0.005	0.001	0.001	0.001	0.001
Zinc (Zn)	mg/L	0.001-0.01	0.001	0.001	0.003-0.005	0.003

Note:

Other than 2008 detection limits, detection limits for parameters collected under the KSM project are not included here.

** Range for 2012 and 2013 includes both BGC and Rescan Detection Limits.*

However, during historical sampling campaigns, site access and weather conditions resulted in a greater sampling effort during high flow periods (June to October), in particular within lower Brucejack Creek (Figure 4A-1, Appendix 4). In this case, water quality of upper Brucejack Creek (BJ U/S) informed the reference case for lower Brucejack Creek. During cohorts of no/little site presence and passive adit discharge, lower and upper Brucejack Creek exhibit statistically identical concentrations of nutrients, anions, total metals and dissolved metals.

There is slight ambiguity on the sampling location of the historically monitored "lower Brucejack Creek" (Figure 4A-1, Appendix 4) with respect to current monitoring sites, BJ 200m D/S and BJ2. Therefore, composite data (historical lower Brucejack Creek, BJ 200m D/S, BJ2) has been used to inform and describe background conditions for these monitoring locations (Lower Brucejack Creek (LBJ); Table 3.1-1).

Subsequent selective data removal was site-specific and utilized modified Z-scores to statistically identify outliers for monitoring sites within the Brucejack watershed (Iglewicz and Hoaglin 1993). The modified Z-score applies the median computation technique to measure the deviation of the median, and in many cases provides more robust statistical detection of outliers (as opposed to the standard deviation of the mean). Mathematically, the modified Z-score (Mi) is calculated as:

$$Mi = 0.6745 \times (Xi - Median(Xi)) / MAD$$

where MAD stands for Median Absolute Deviation, and Xi is the observation.

Identified outliers that coincided with a recordable event were removed from baseline definition; individual samples/sampling points categorized as "baseline" versus "excluded" are presented in Appendix 2. These data largely corresponded to effects from the underground dewatering trial (November 2011), active surface mineral exploration (initiated mid-2012), and incidences of WTP bypass events post-January 2013. Removal of the affected data and subsequent creation of the curated baseline database yields a more conservative and realistic approximation of baseline conditions with lower mean values for metals and other parameters as well as lower overall variability in the dataset. Within the curated dataset, nitrogen-species data (nitrate, nitrite, ammonia) remained elevated in lower Brucejack and Camp creeks. These (2013) data were also classified as uncharacteristic of baseline conditions (see Appendix 10) and are not used to inform the approximation of pre-disturbance water quality conditions within the Brucejack watershed.

Water quality data calculations and interpretations presented in the following section for baseline conditions of watercourses within the Brucejack watershed therefore include only the above referenced data (e.g., the curated dataset). The complete raw dataset for the Brucejack watershed, including historical data (1987 to 2001), is included in Appendices 2 and 4.

5. RESULTS AND INTERPRETATION

Results of the surface water quality characterization and monitoring study have been separated according to the watershed groupings described in Chapter 3 due to both the differing aquatic environment characteristics as well as potential effects of Project facilities. Section 5.1 presents the results of the Brucejack watershed (Mine Site Area), and Sulphurets and Unuk watersheds (mid and far-field downstream receiving environments). Section 5.2 presents the results of the Bowser/ Scott/Todedada/Wildfire watersheds (ancillary project infrastructure and existing access road).

5.1 MINE SITE AREA AND DOWNSTREAM RECEIVING ENVIRONMENT

Water quality parameters for the Brucejack, Sulphurets, and Unuk watersheds, including physical characteristics, anions, nutrients, cyanides, total organic carbon, and total and dissolved metals, are presented with provincial or federal guidelines in Figures 5.1-1 and 5.1-2 (physical limnology), 5.1-3 to 5.1-19 (streams along the proposed discharge flow pathway), and 5.1-20 to 5.1-36 (lakes). Two tributaries upstream of Brucejack Lake (Trib. 2 and Trib. 3, see Table 3.1-1) were also sampled as part of the 2013 program; data for these are presented separately in Appendix 2.

5.1.1 Physical Limnology

Brucejack Lake and Sulphurets Lake constituted the lake sampling program within the proposed Mine Site Area and downstream receiving environment (see Table 3.1-1). Physical limnology parameters are graphed and presented in Figures 5.1-1 and 5.1-2. Data are available in Appendix 1.

5.1.1.1 Temperature, Dissolved Oxygen and Conductivity

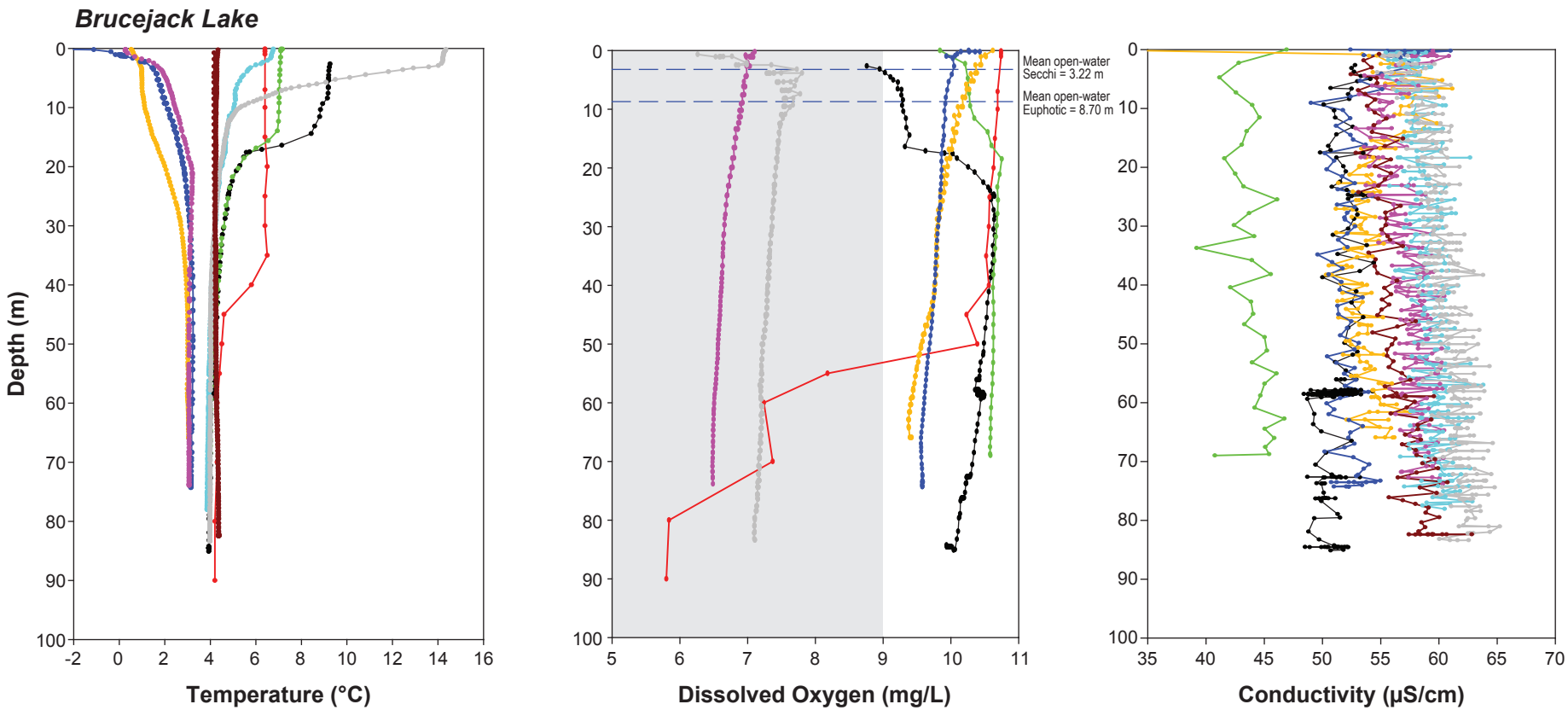
<u>Brucejack Lake</u>

Brucejack Lake is a dimictic lake that is ice-covered part of the year (usually November to June), and in general experiences two mixing periods, in the spring and fall. Data from 2010 to 2013 are consistent with observations in Lewis (1982) that Brucejack Lake is dimictic, although Newhawk (1989) and Price (2005) concluded that the lake behaved as a typical sub-polar lake, likely experiencing frequent mixing throughout the whole open water period. The lake is deep, clear, and well-oxygenated with a stratified water column in the summer and inverse stratification under ice (Figure 5.1-1).

Summer stratification generally occurs in July through September and inverse winter stratification in December through March, although the thermocline can be poorly developed (Figure 5.1-1). The highest temperatures recorded were in August 2013, where surface temperatures exceeded 14°C, although hypolimnetic temperatures remained at ~4° C, consistent with other summer stratification periods monitored during the baseline study. In cooler summers (e.g., July of 2012, Figure 5.1-1) when surface temperatures of the lake water did not reach 4°C, the lake only circulated once very briefly. Conductivity in Brucejack Lake in open water season was generally consistent throughout the water column, with mean conductivity ranging from 44 µS/cm in September 2012 to 54 µS/cm in July 2012.

Figure 5.1-1

Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake, 2010 to 2013



Notes: Data collected with a CTD (RBR XR-420), with the exception of Aug 2011, collected with YSI
There was no in situ conductivity data collected in 2011
Ice/snow depth in July and December 2012 was 120 cm and 75 cm, respectively

Shaded zone contains minimum dissolved oxygen thresholds:

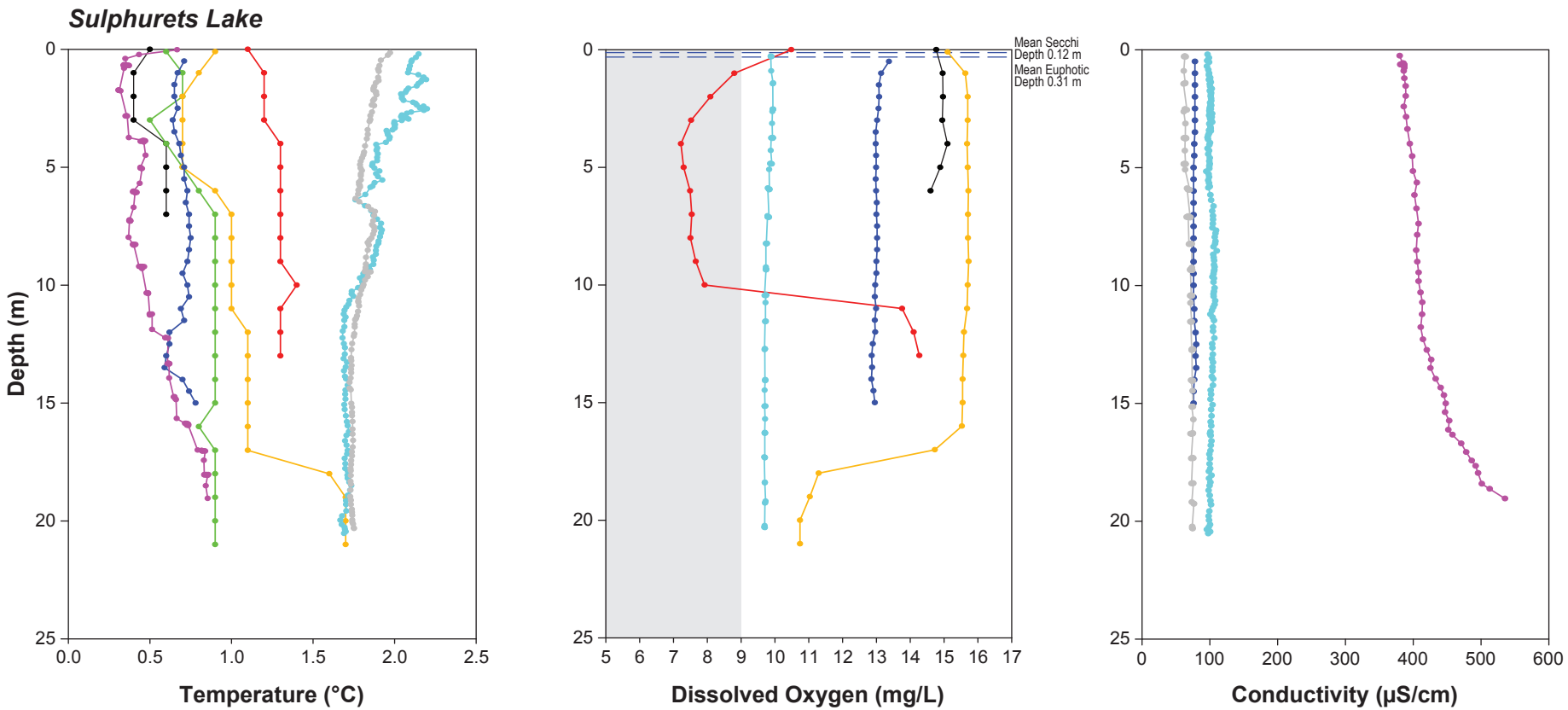
CCME guidelines are dependent on biota and life stage:
Lowest acceptable dissolved oxygen concentration:
for warm water biota: early life stages = 6 mg/L
for warm water biota: other life stages = 5.5 mg/L
for cold water biota: early life stages = 9.5 mg/L
for cold water biota: other life stages = 6.5 mg/L

Instantaneous BC guidelines are dependent on life stage:
all lifestages other than buried embryo and alevin = 5 mg/L
buried embryo and alevin lifestages = 9 mg/L

- Aug 2010 (open-water)
- Aug 2011 (open-water)
- July 2012 (under-ice)
- Sept 2012 (open-water)
- Dec 2012 (under-ice)
- March 2013 (under-ice)
- July 2013 (open-water)
- August 2013 (open-water)
- October 2013 (open-water)

Figure 5.1-2

Temperature, Dissolved Oxygen and Conductivity Profiles from Sulphurets Lake, 2008, 2009, 2012 and 2013



Notes: Data collected with a YSI
No under-ice data exists for Sulphurets Lake
Sulphurets Lake was sampled for the KSM project

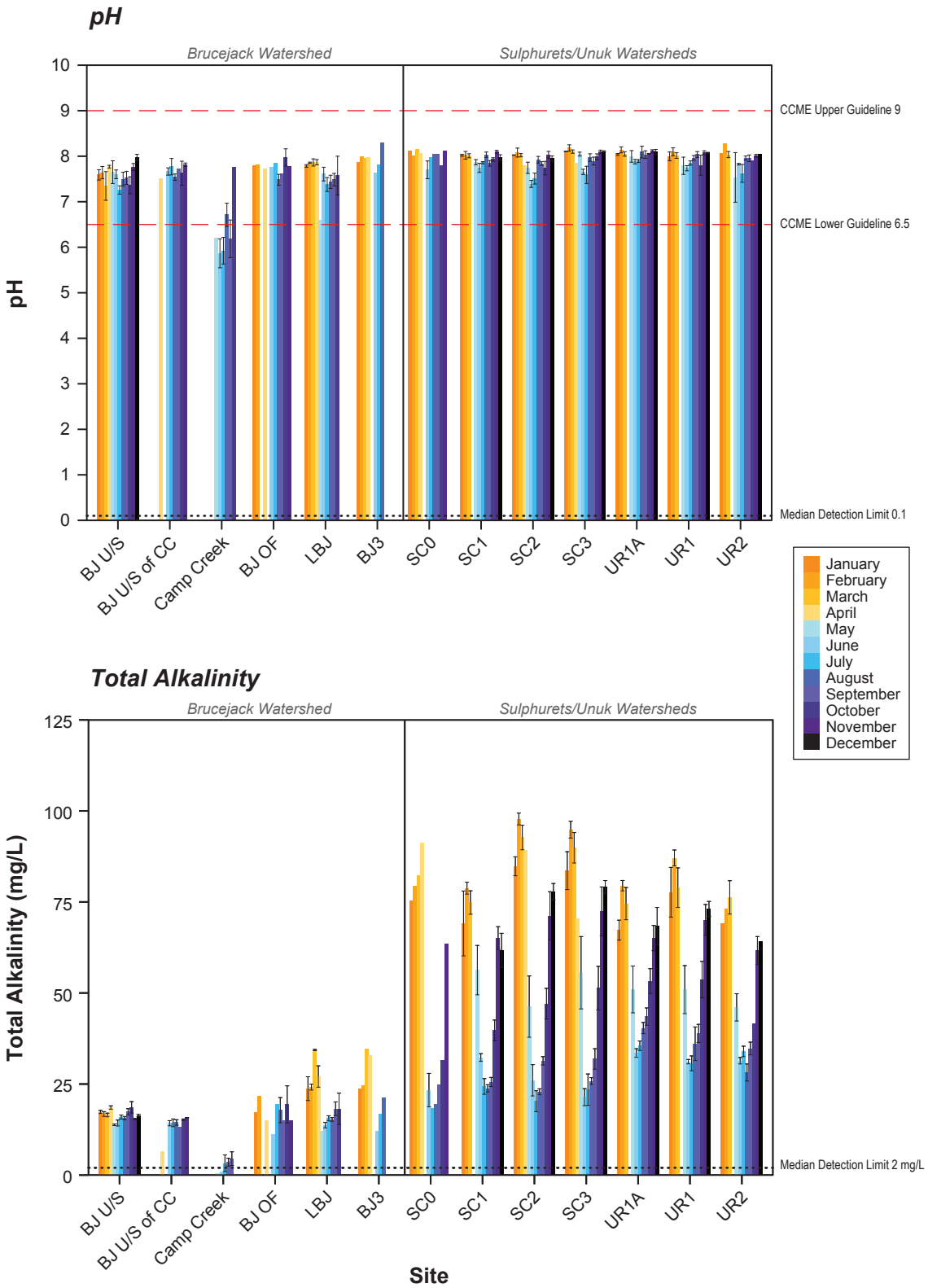
Shaded zone contains the minimum dissolved oxygen thresholds:

CCME guidelines are dependent on biota and life stage:
Lowest acceptable dissolved oxygen concentration:
for warm water biota: early life stages = 6 mg/L
for warm water biota: other life stages = 5.5 mg/L
for cold water biota: early life stages = 9.5 mg/L
for cold water biota: other life stages = 6.5 mg/L

Instantaneous BC guidelines are dependent on life stage:
all lifestages other than buried embryo and alevin = 5 mg/L
buried embryo and alevin lifestages = 9 mg/L

Figure 5.1-3

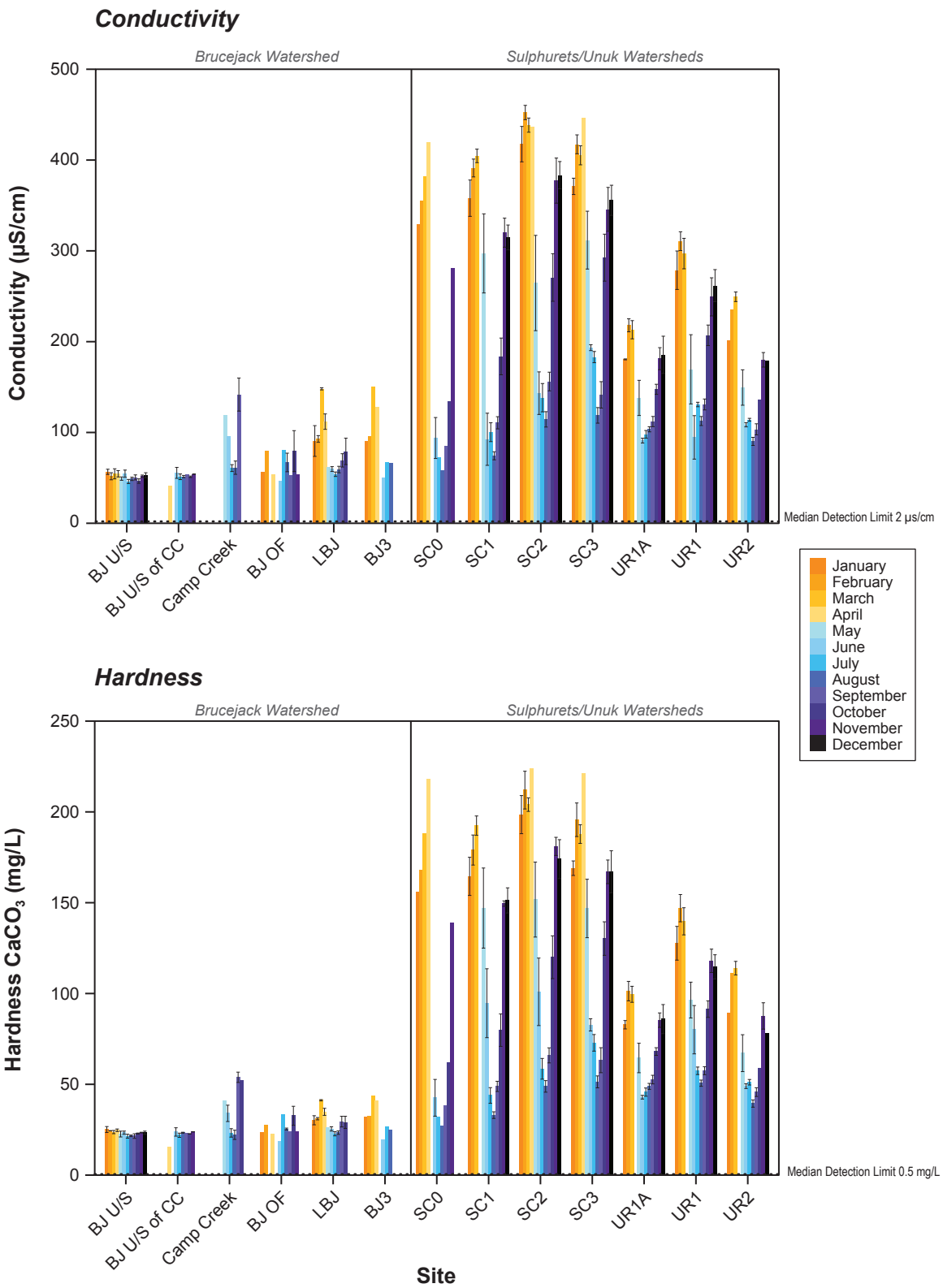
pH and Alkalinity of Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.1-4

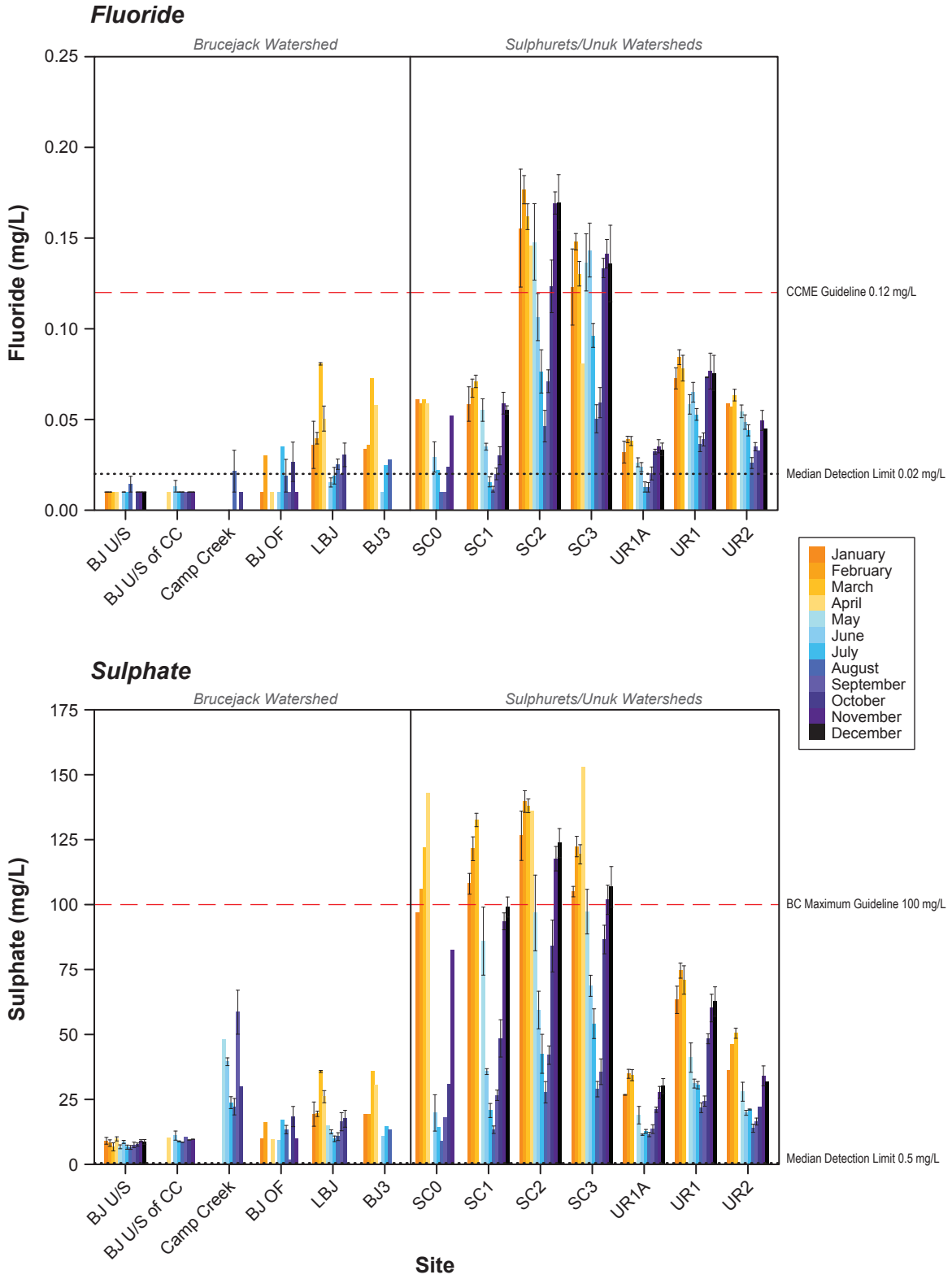
Conductivity and Hardness in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.1-5

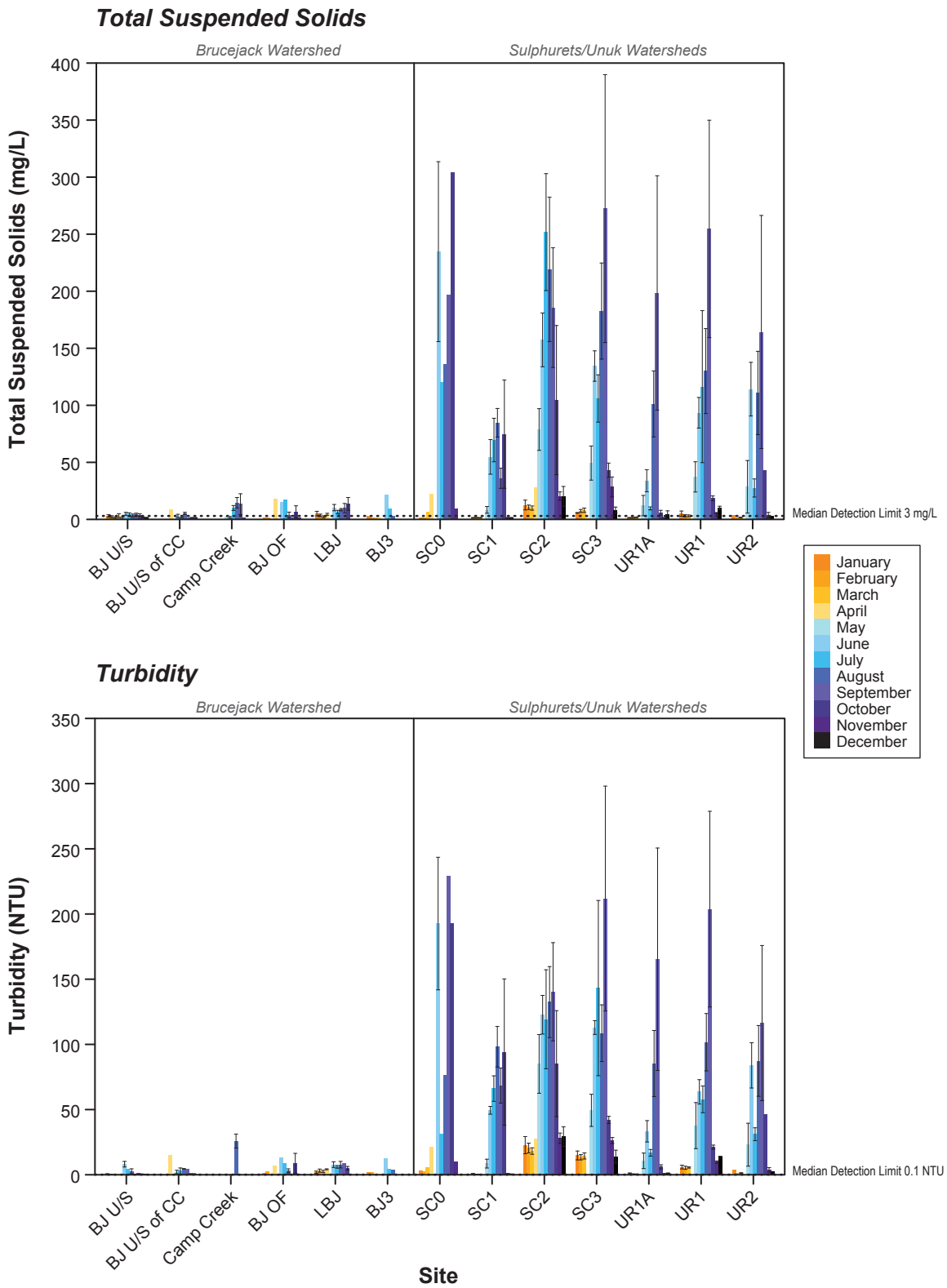
Fluoride and Sulphate in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
Fluoride CCME guideline is an interim guideline.
BC fluoride and BC sulphate guidelines are hardness−dependent, see appendix.

Figure 5.1-6

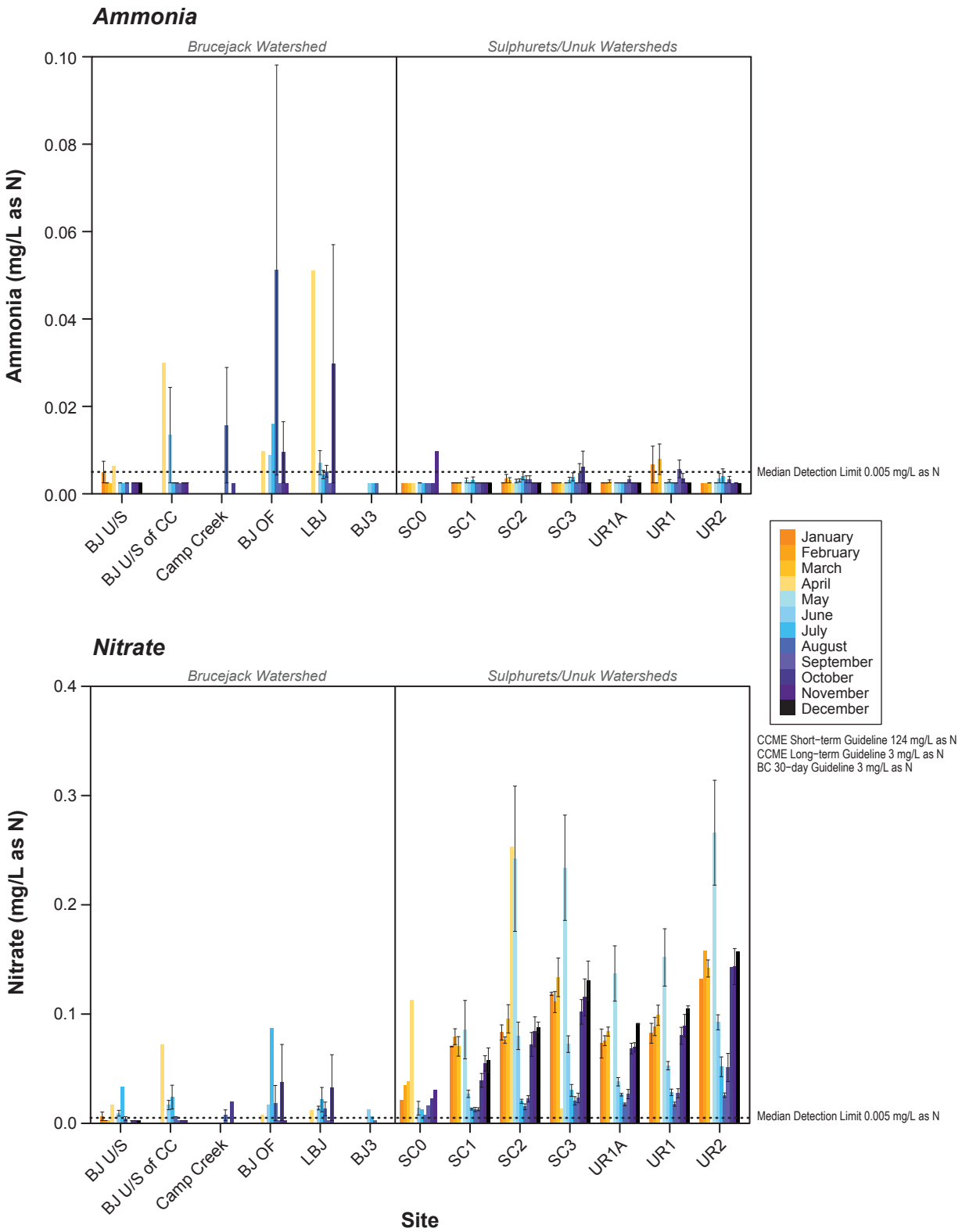
Total Suspended Solids and Turbidity in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME and BC guidelines for total suspended solids are dependent on background levels, see appendix.
CCME and BC guidelines for turbidity are dependent on background levels, see appendix.

Figure 5.1-7

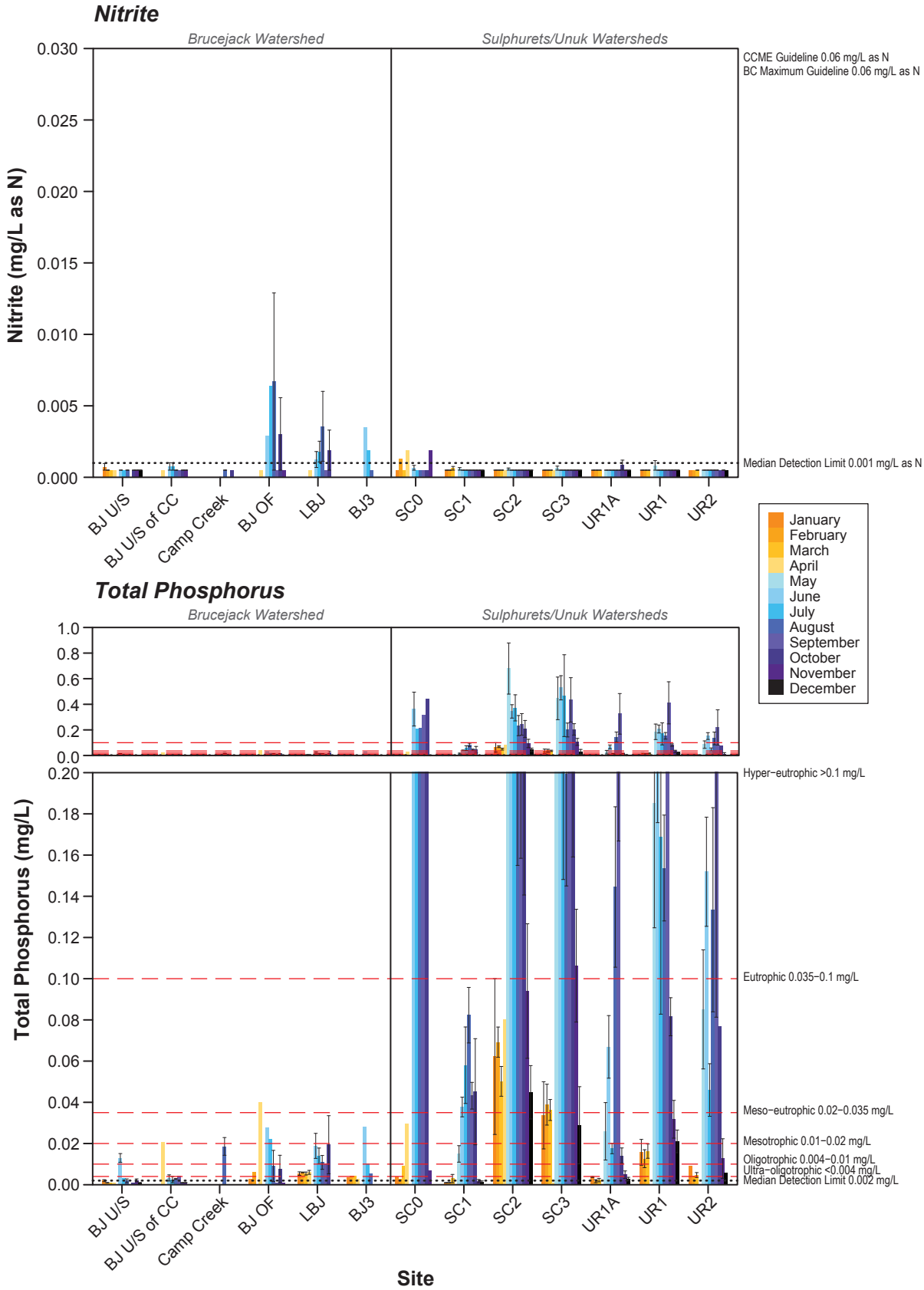
Ammonia and Nitrate in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME and BC guidelines for ammonia are pH− and temperature−dependent, see appendix.

Figure 5.1-8

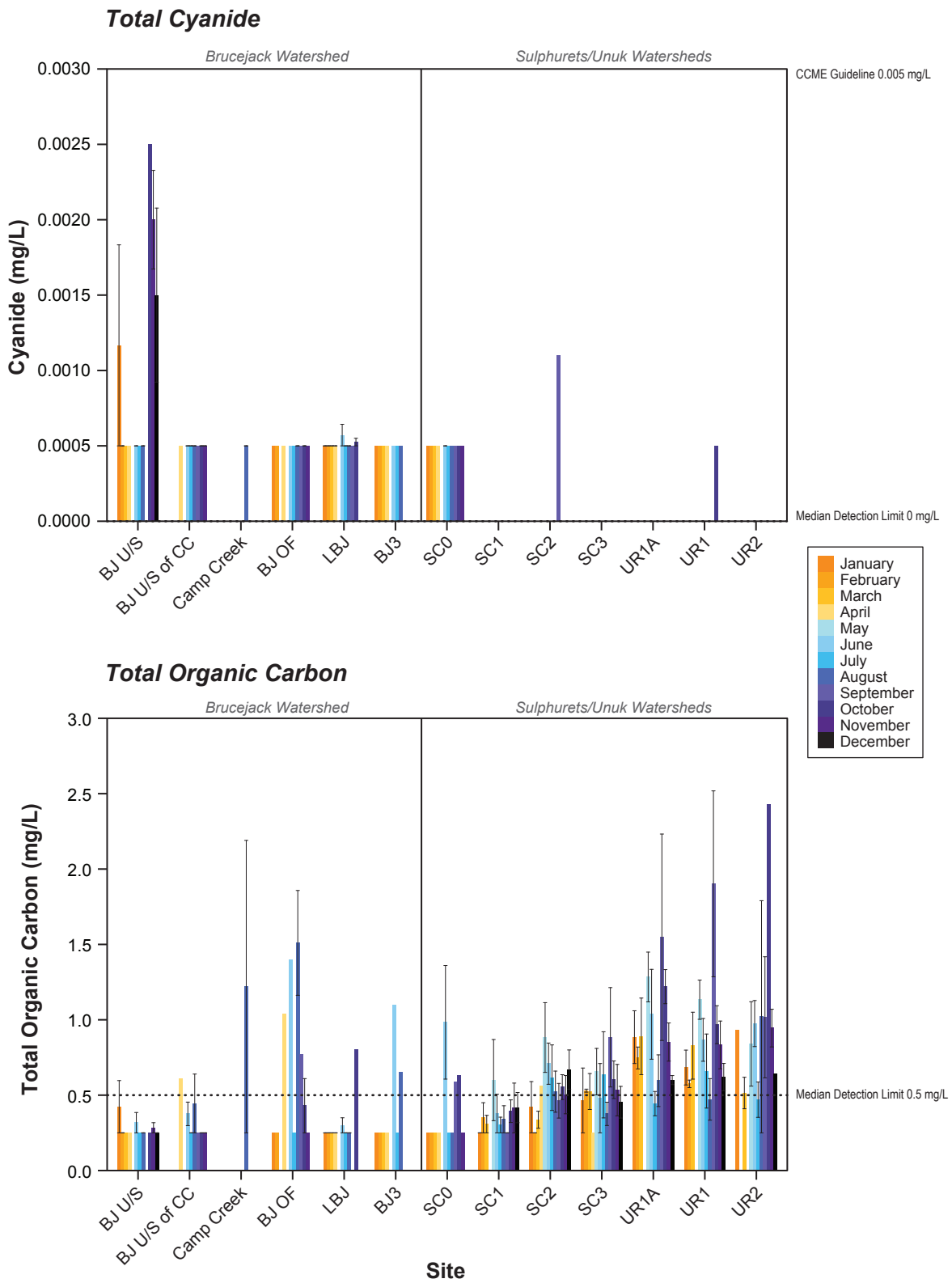
Nitrite and Phosphorus in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC nitrite guideline is chloride−dependent, see appendix.

Figure 5.1-9

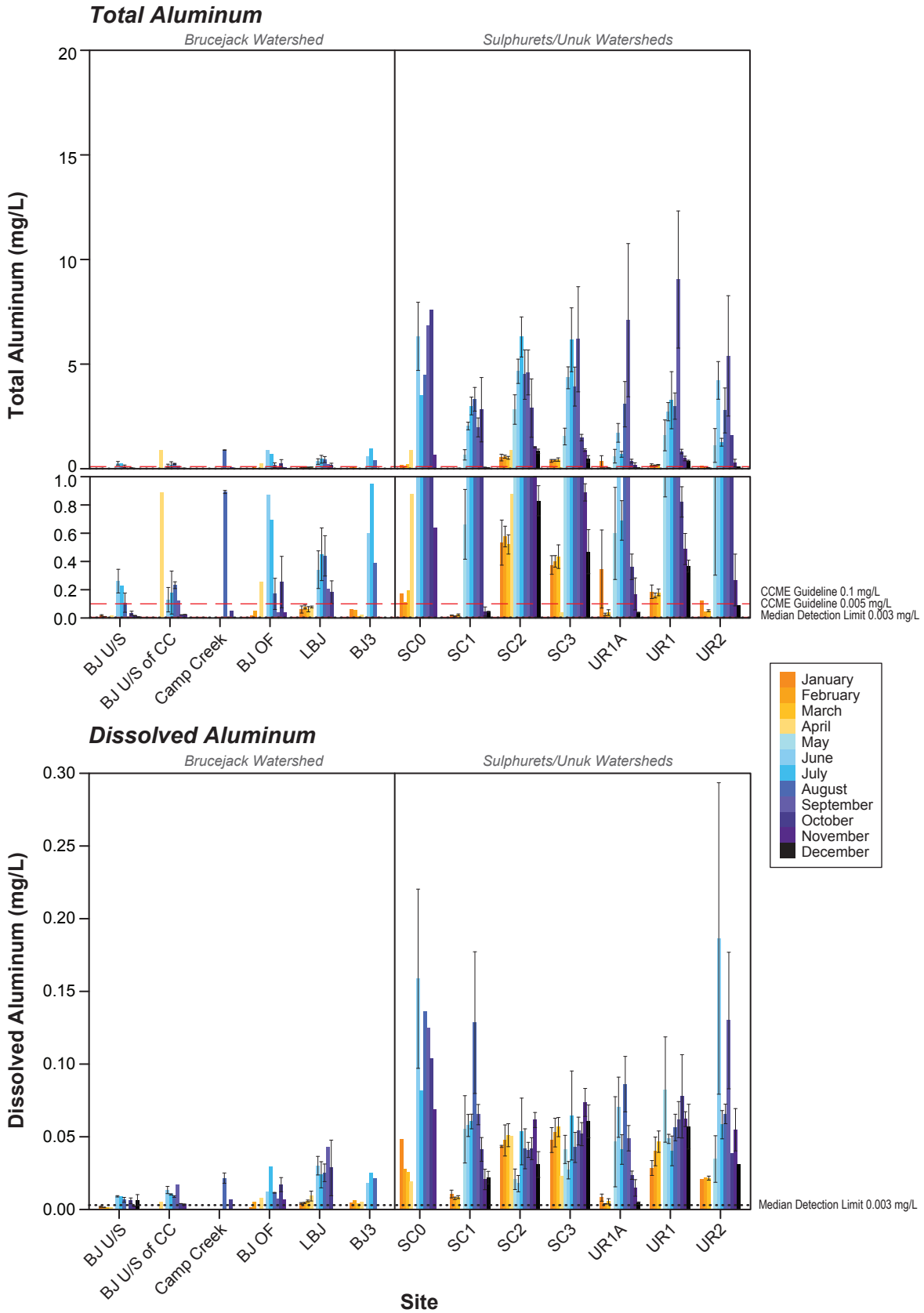
Cyanide and Total Organic Carbon in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC guideline for total organic carbon is dependent on background levels, see appendix.

Figure 5.1-10

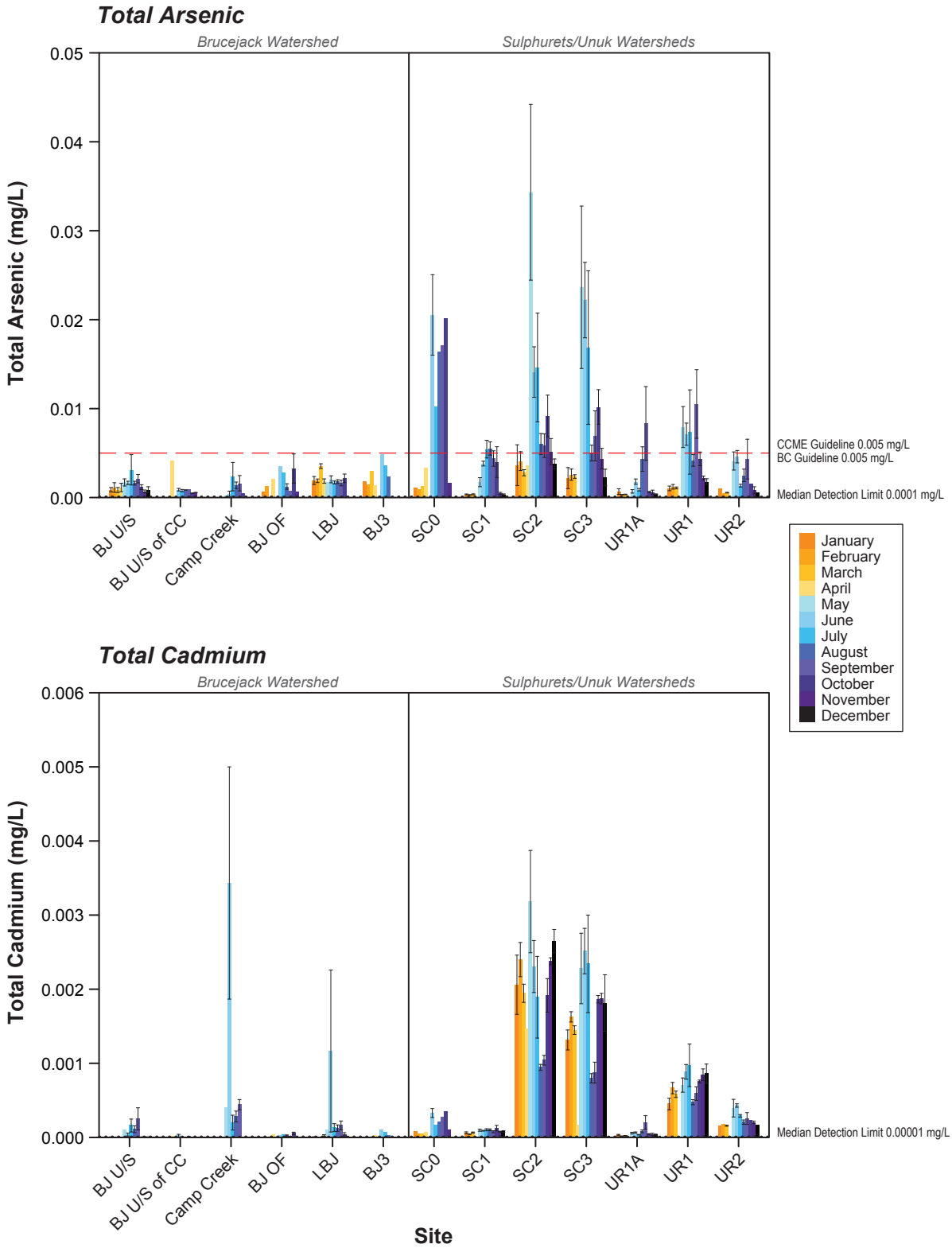
Total and Dissolved Aluminum in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME guideline for alumninum is pH−dependent: if pH < 6.5, then guideline = 0.005 mg/L; if pH ≥ then guideline = 0.1 mg/L.
BC dissolved aluminum guideline is pH−dependent, see appendix.

Figure 5.1-11

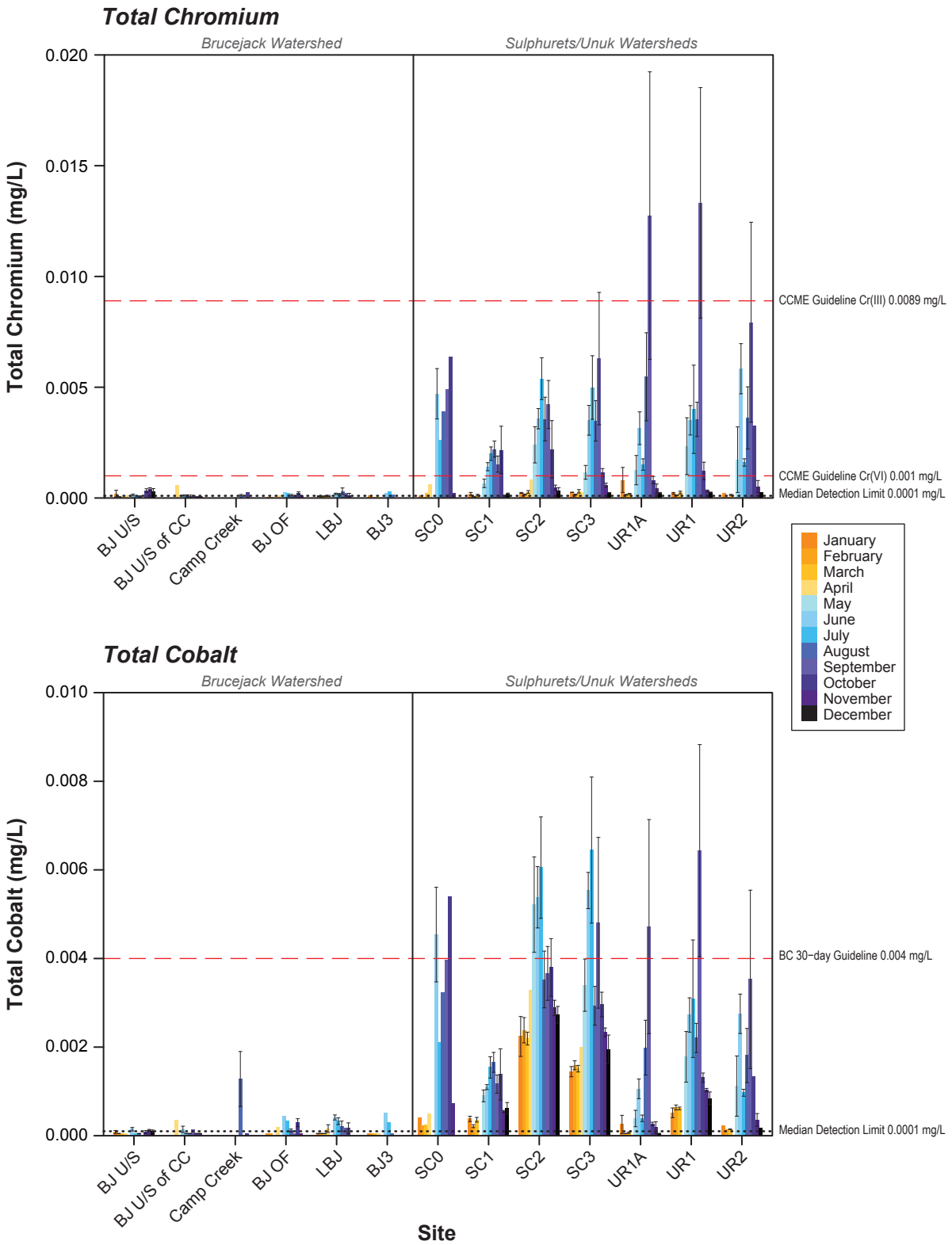
Total Arsenic and Cadmium in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME interim cadmium guideline is an hardness−dependent, see appendix.

Figure 5.1-12

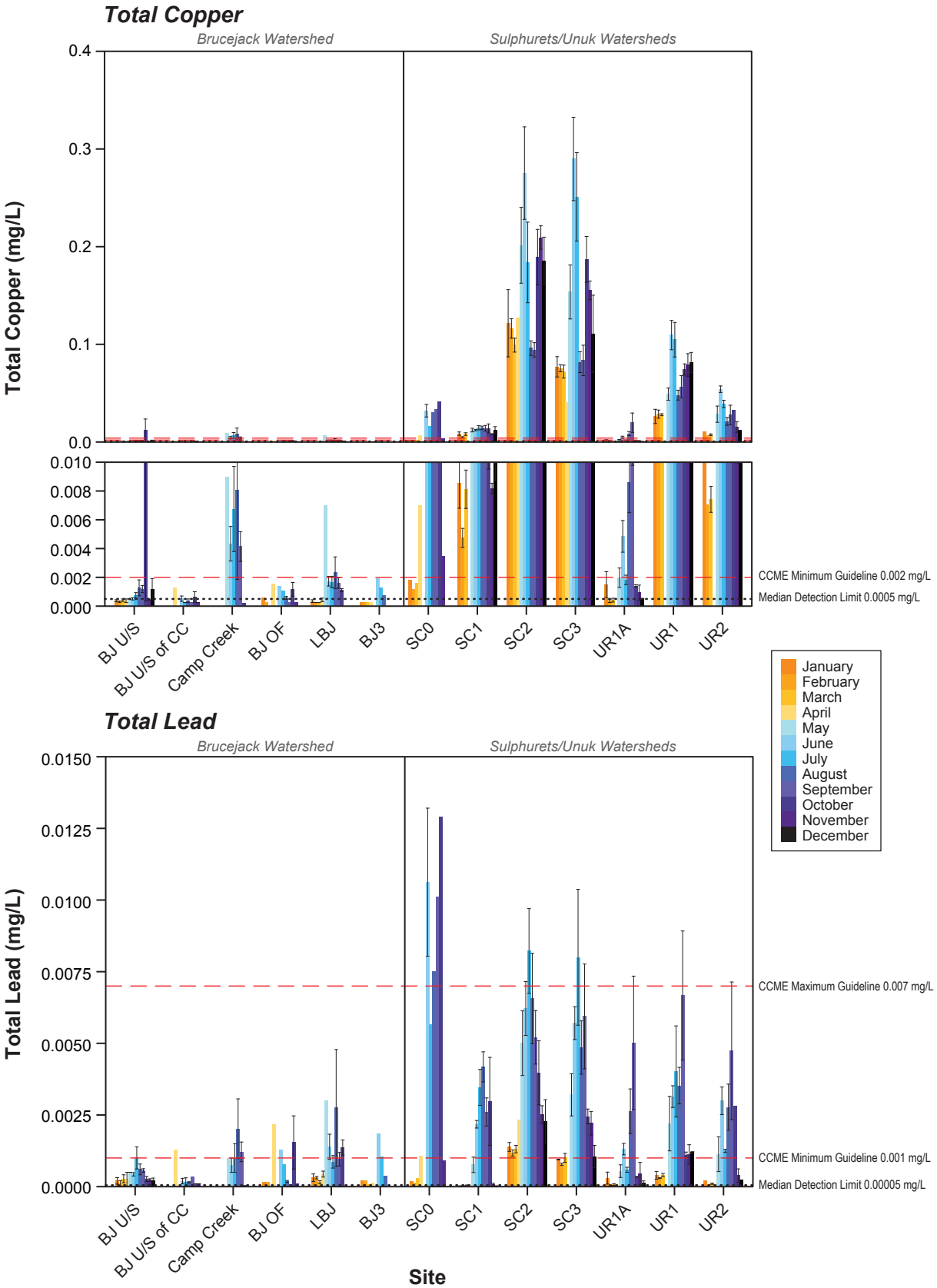
Total Chromium and Cobalt in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.1-13

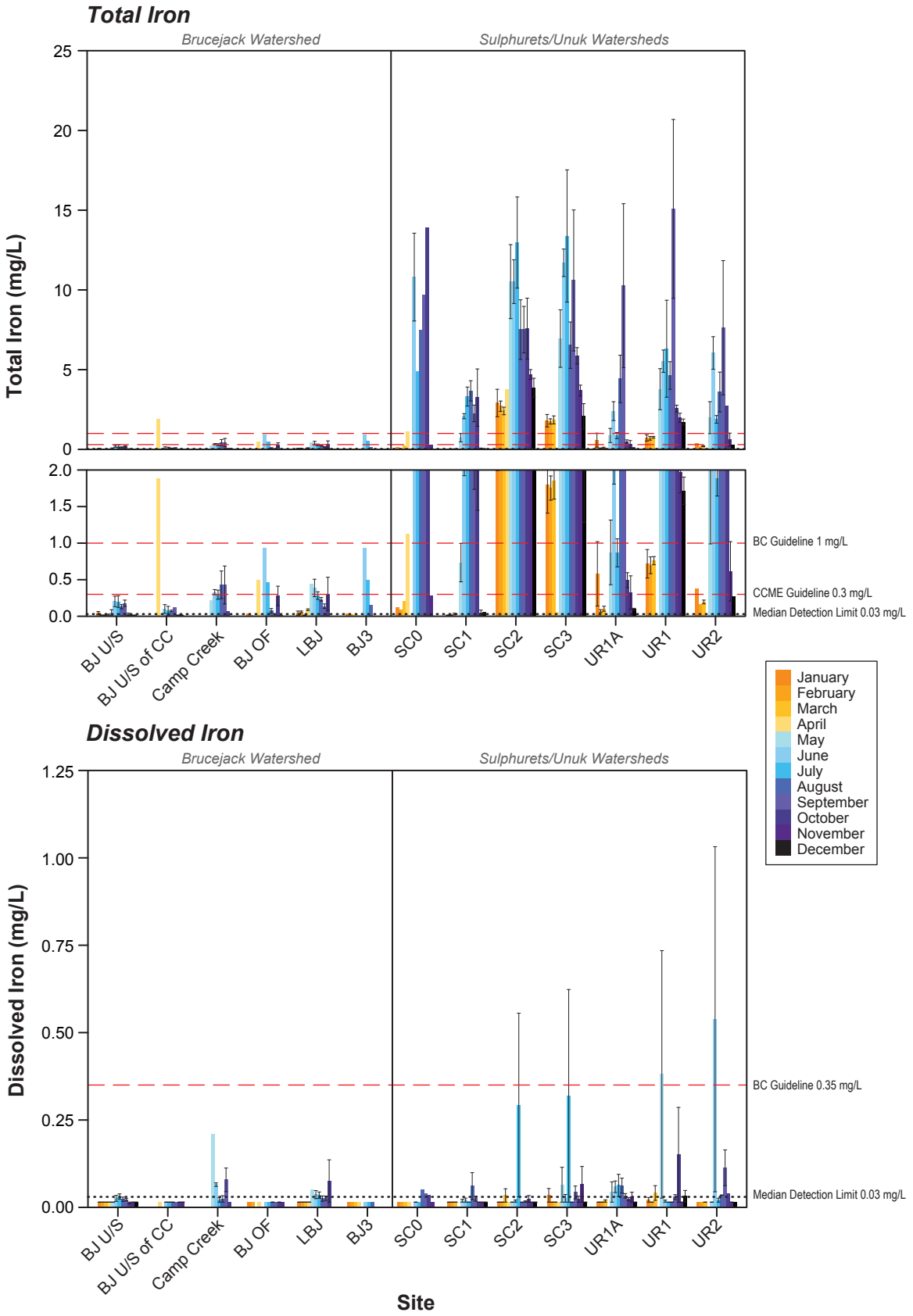
Total Copper and Lead in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME and BC copper and lead guidelines are hardness−dependent, see appendix.

Figure 5.1-14

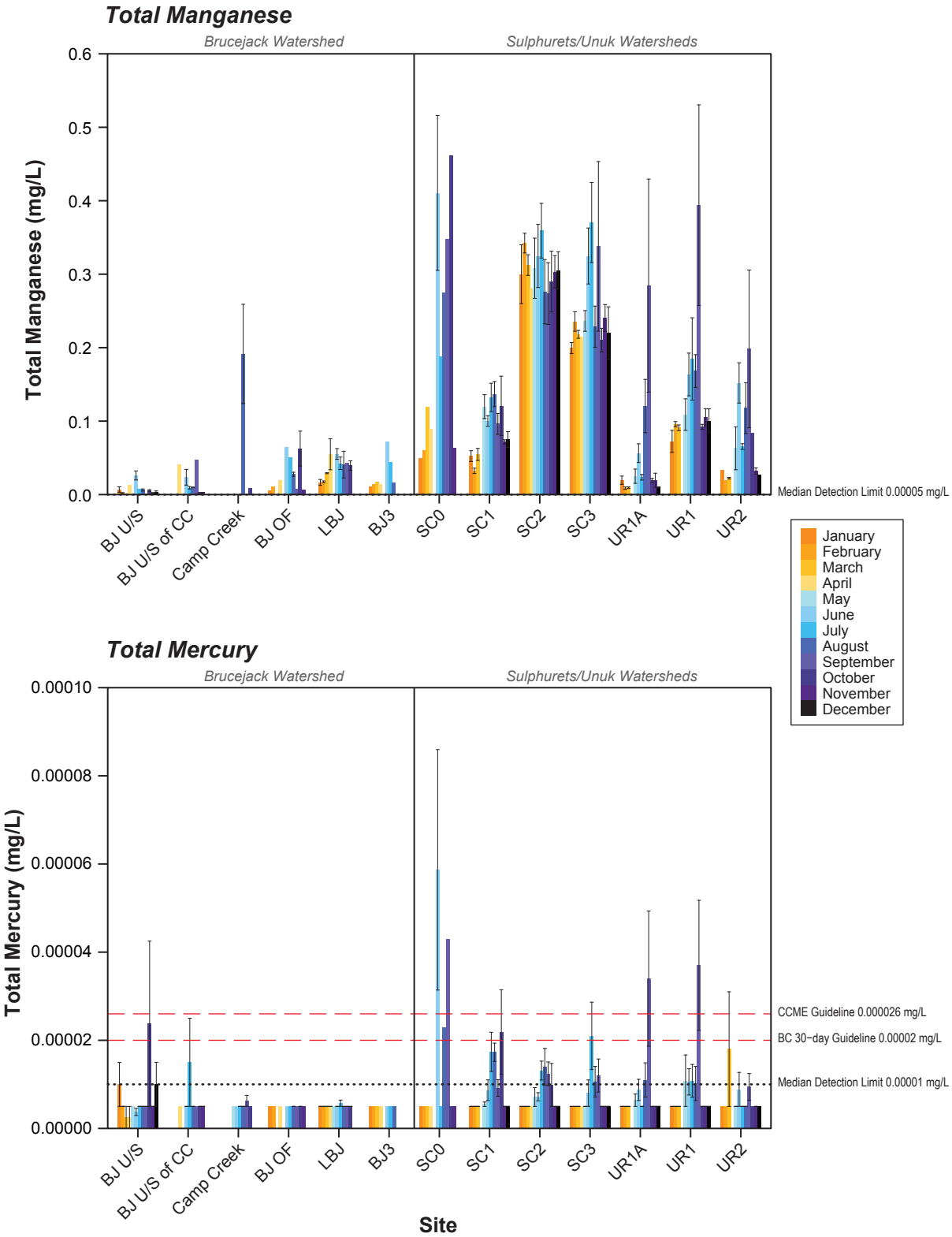
Total and Dissolved Iron in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.1-15

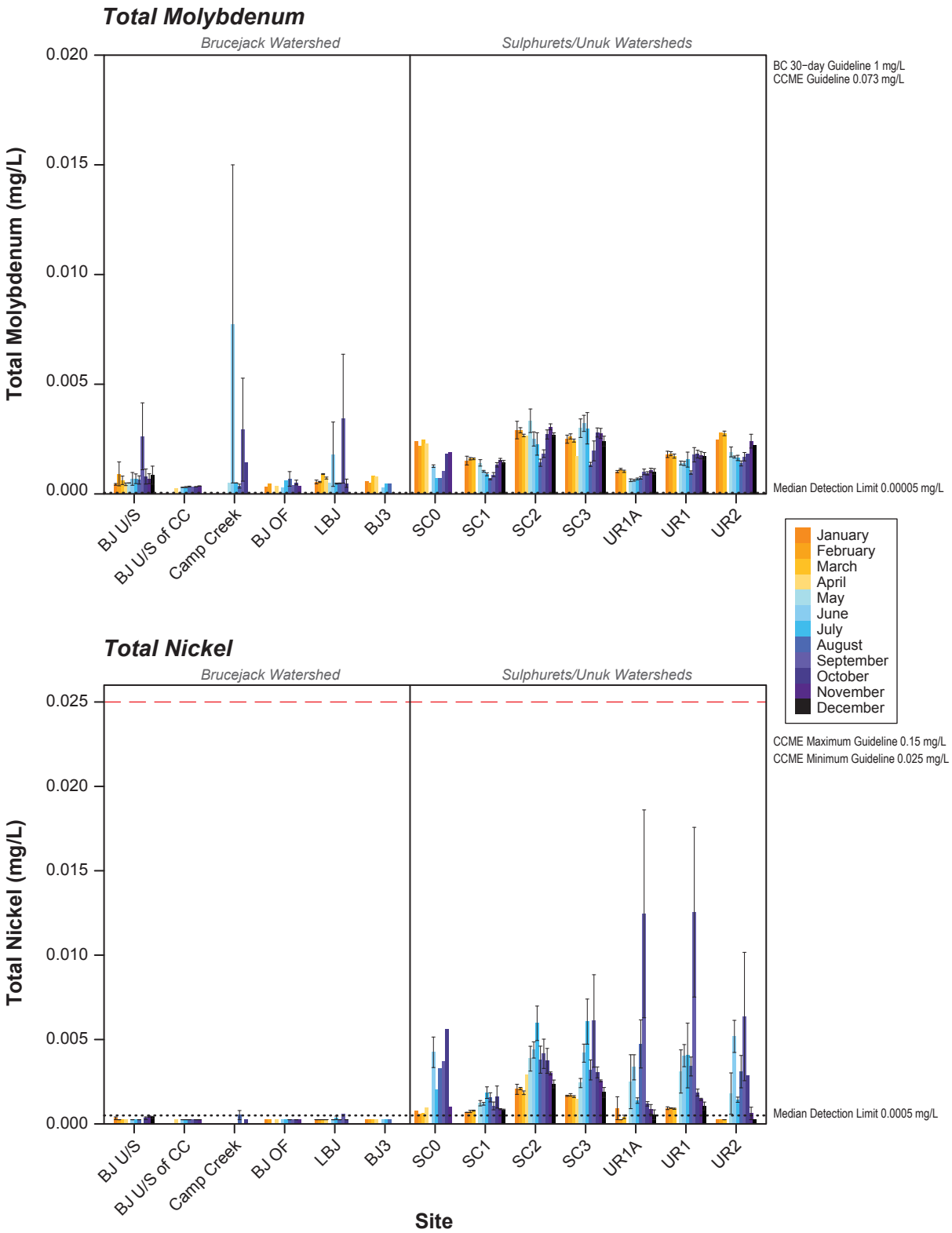
Total Manganese and Mercury in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC manganese guidelines are hardness−dependent, see appendix.
BC guideline assumes a methylmercury concentration of 0.5% of the total mercury.

Figure 5.1-16

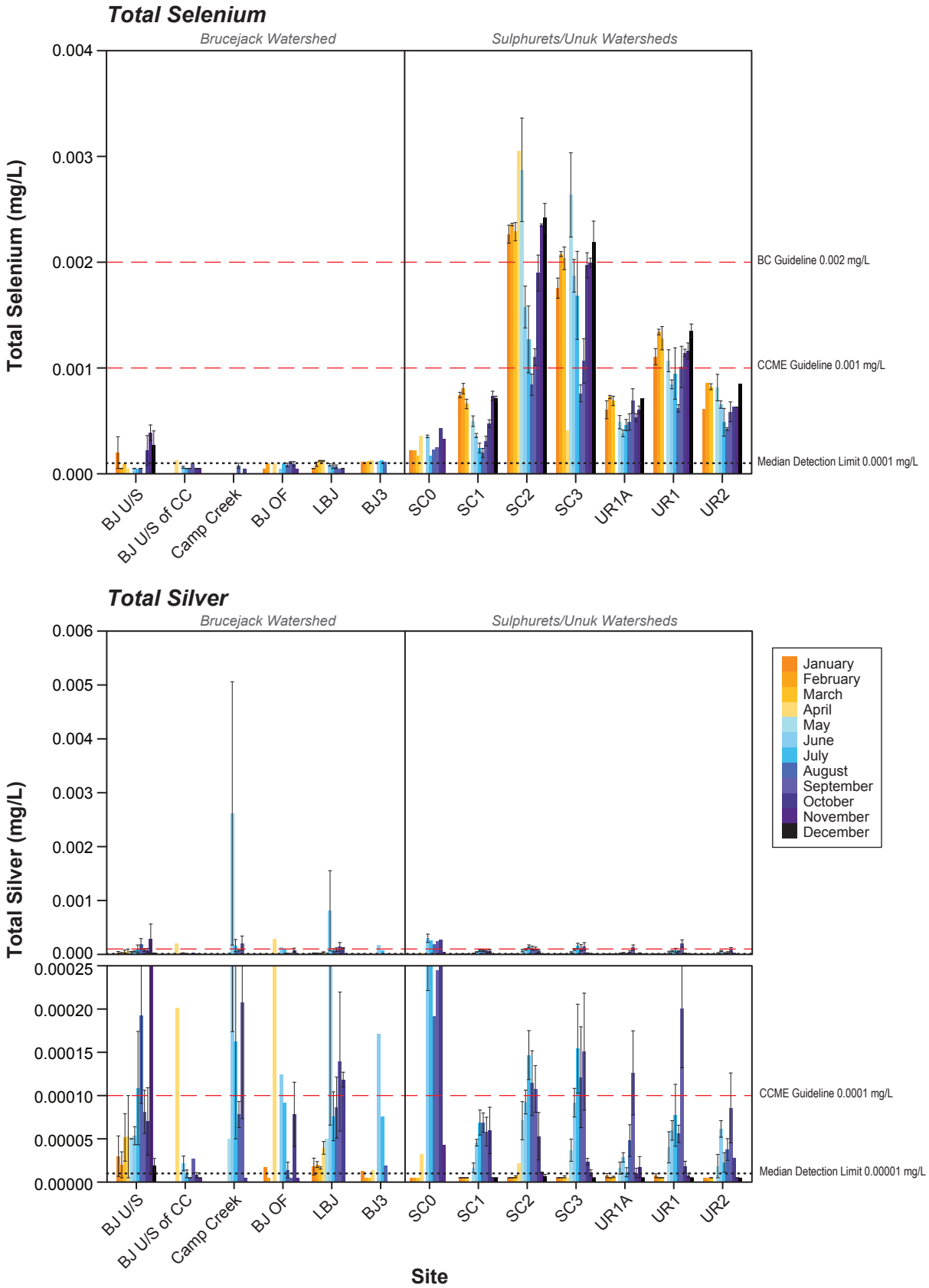
Total Molybdeum and Nickel in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
Molybdenum CCME guideline is an interim guideline.
CCME and BC nickel guidelines are hardness−dependent, see appendix.

Figure 5.1-17

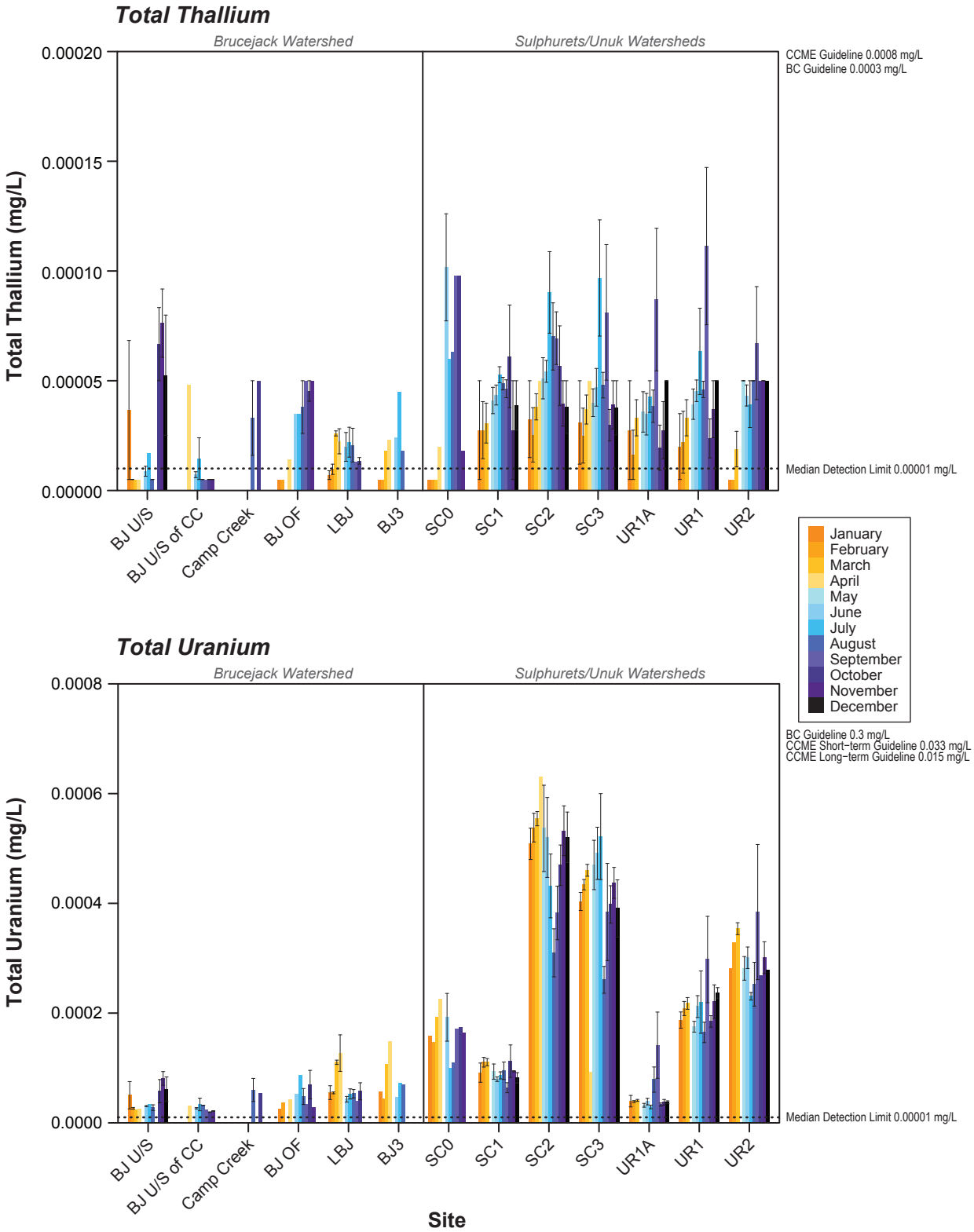
Total Selenium and Silver in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC silver guideline is hardness−dependent, see appendix.

Figure 5.1-18

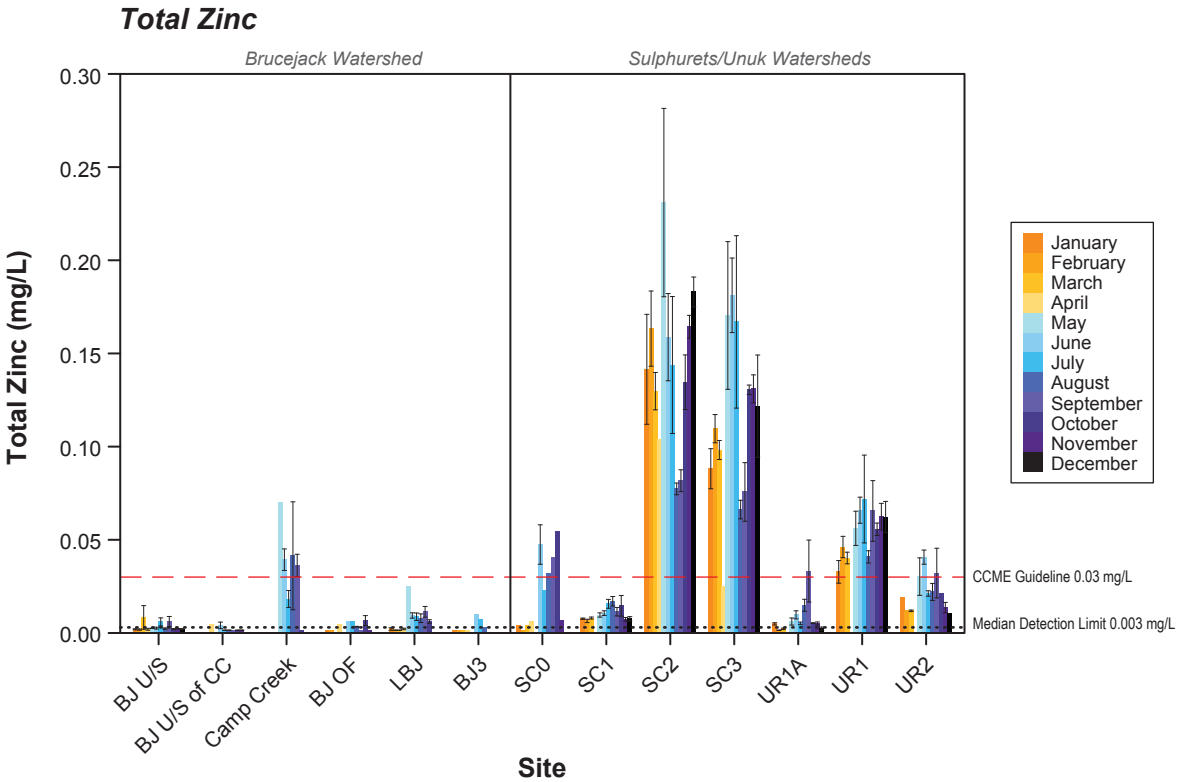
Total Thallium and Uranium in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC guideline is an interim guideline.

Figure 5.1-19

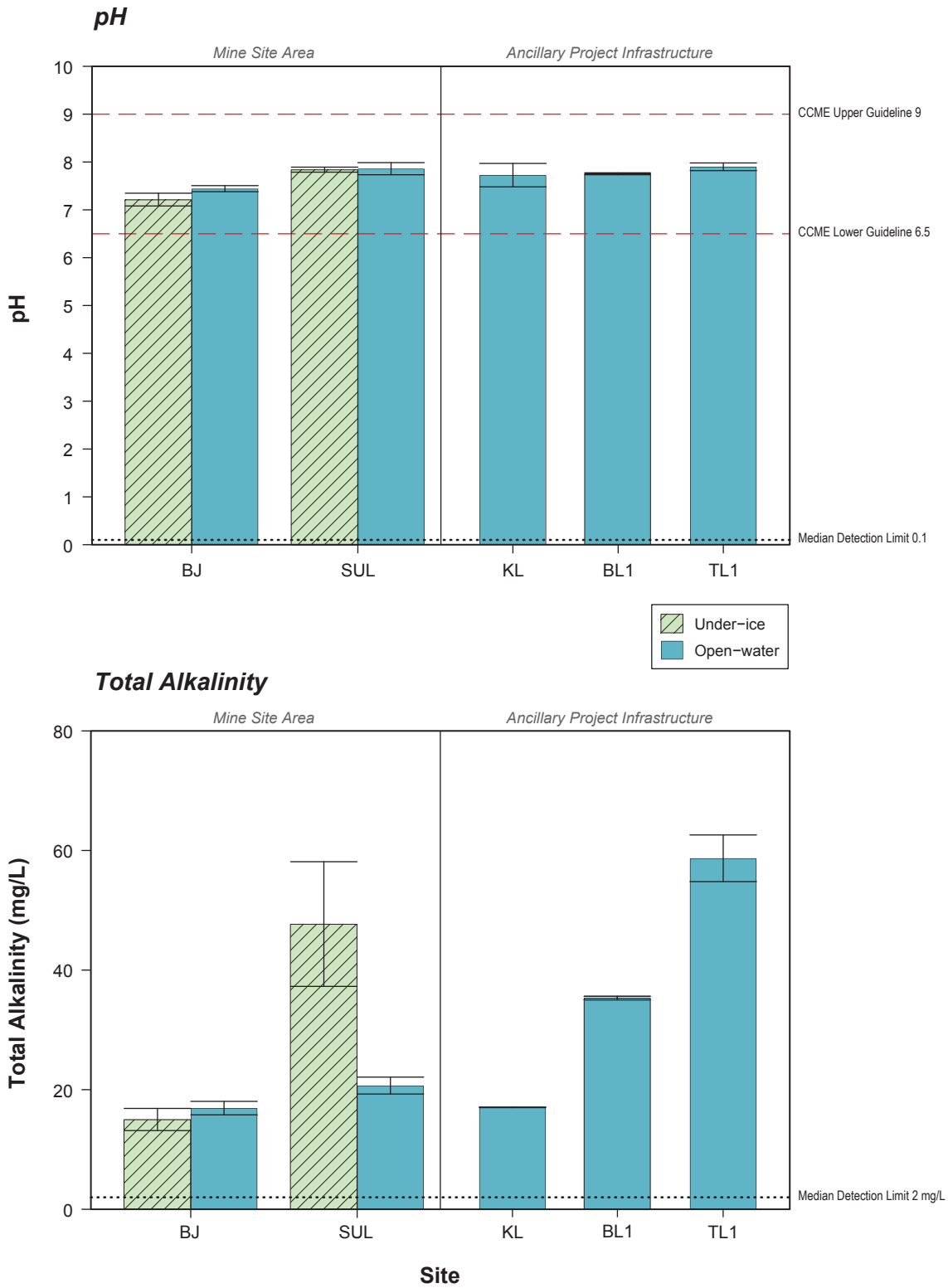
Total Zinc in Mine Site Area and Downstream Receiving Environment Streams, Brucejack Gold Mine Project (1991 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC zinc guideline is hardness−dependent, see appendix.

Figure 5.1-20

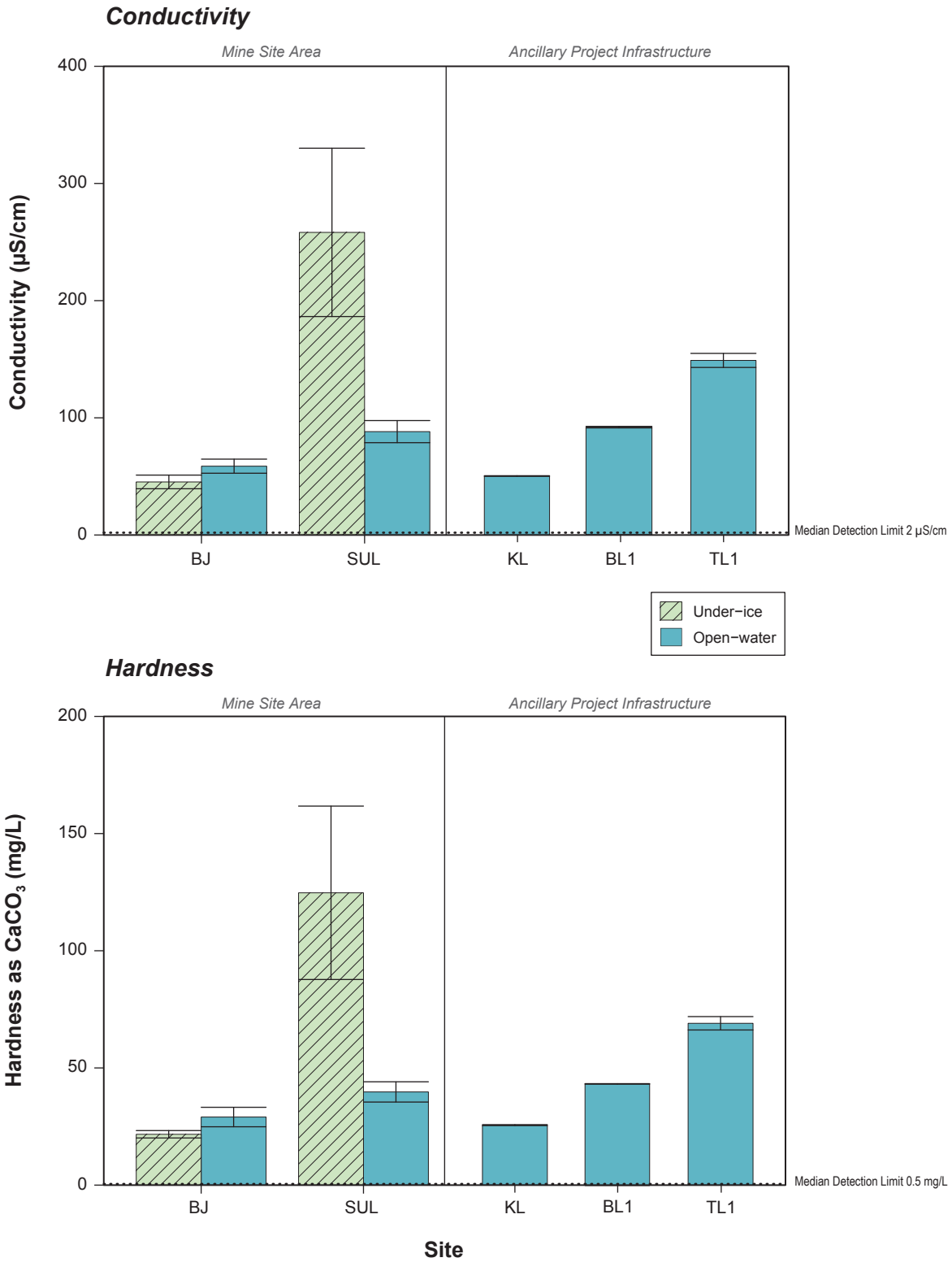
pH and Alkalinity in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.1-21

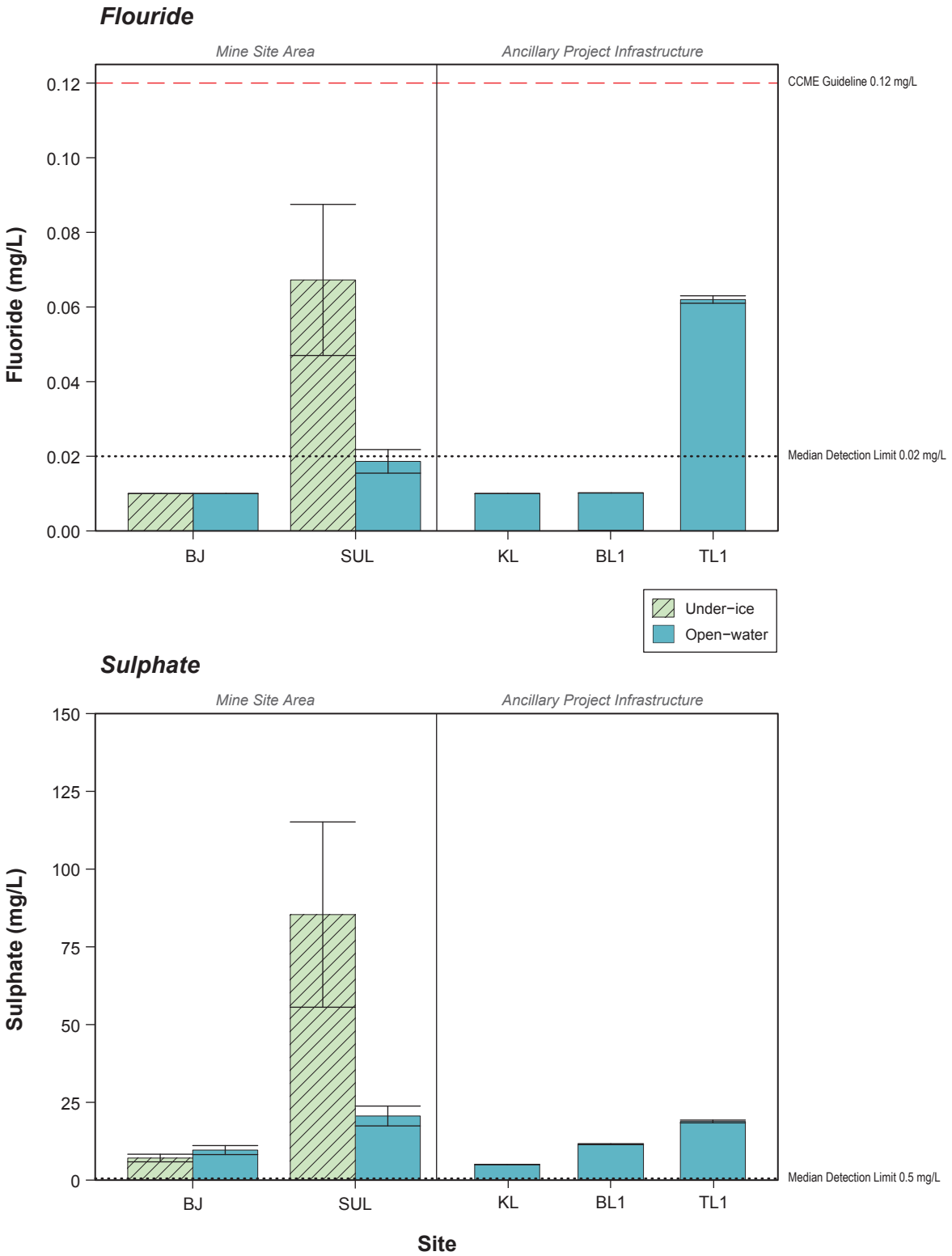
Conductivity and Hardness in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.1-22

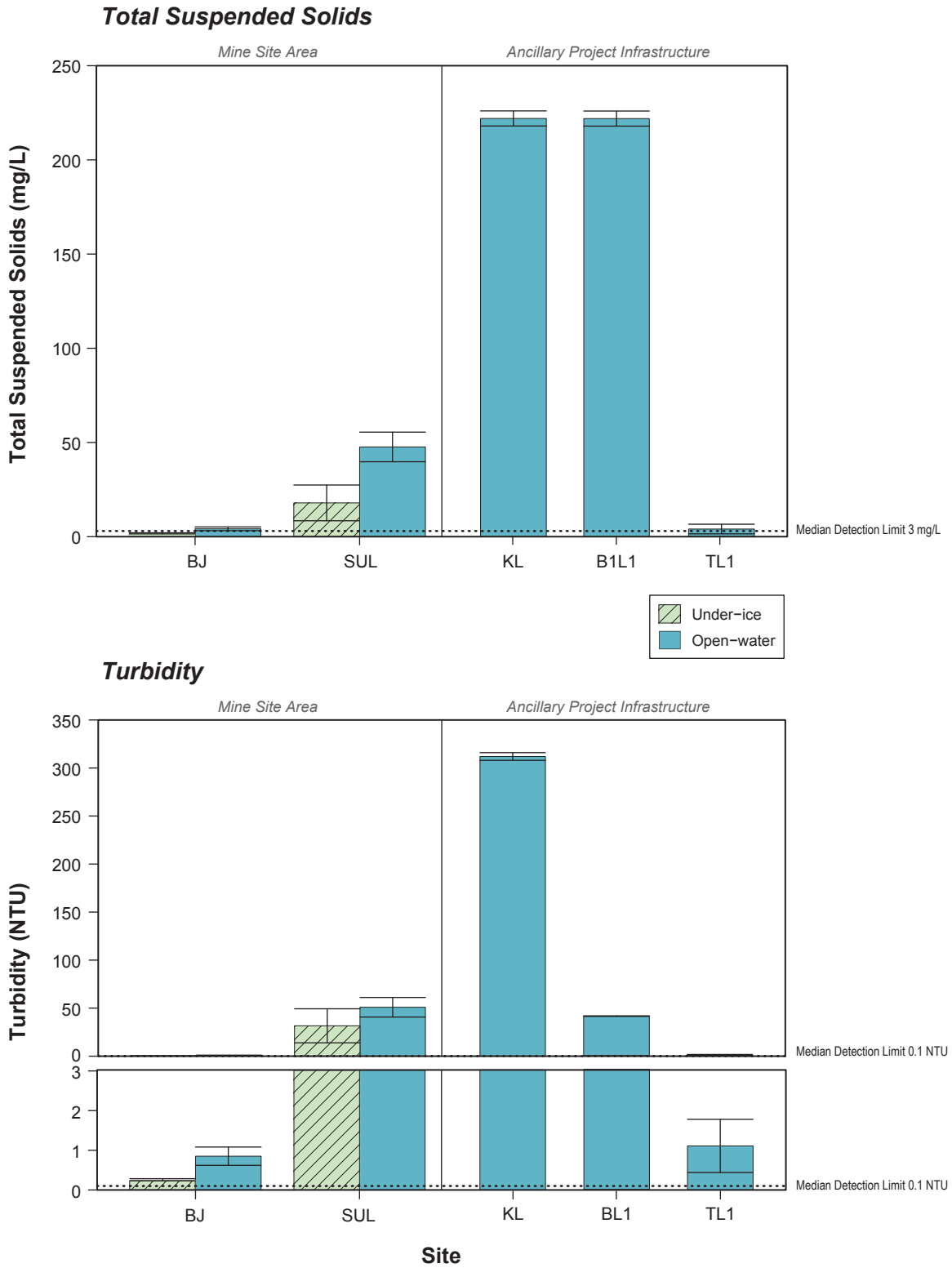
Fluoride and Sulphate in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
Fluoride CCME guideline is an interim guideline.
BC fluoride and BC sulphate guidelines are hardness−dependent, see appendix.

Figure 5.1-23

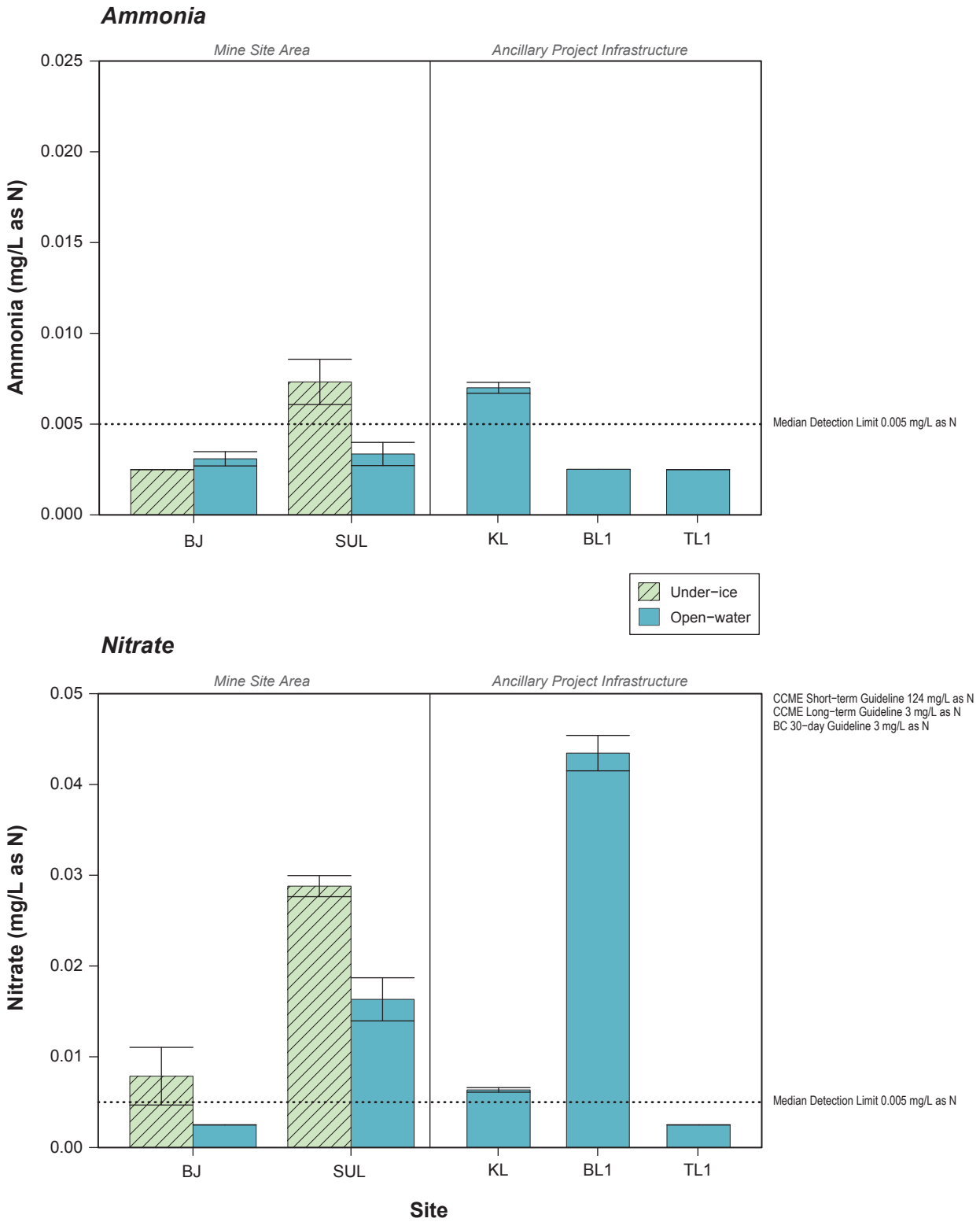
Total Suspended Solids and Turbidity in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME and BC guidelines for total suspended solids and turbidity are dependent on background levels, see appendix.

Figure 5.1-24

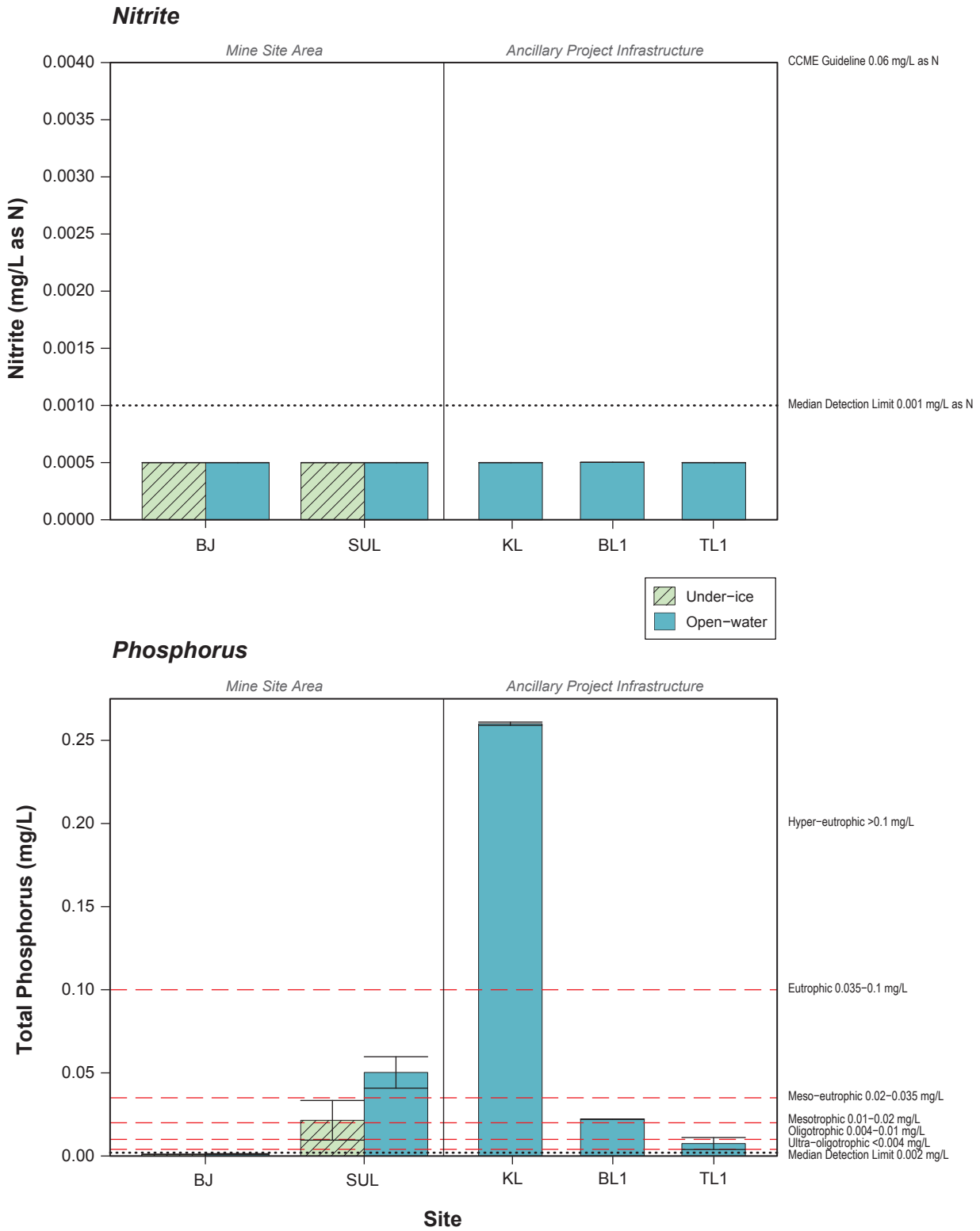
Ammonia and Nitrate in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME guideline for ammonia is pH− and temperature−dependent, see appendix.

Figure 5.1-25

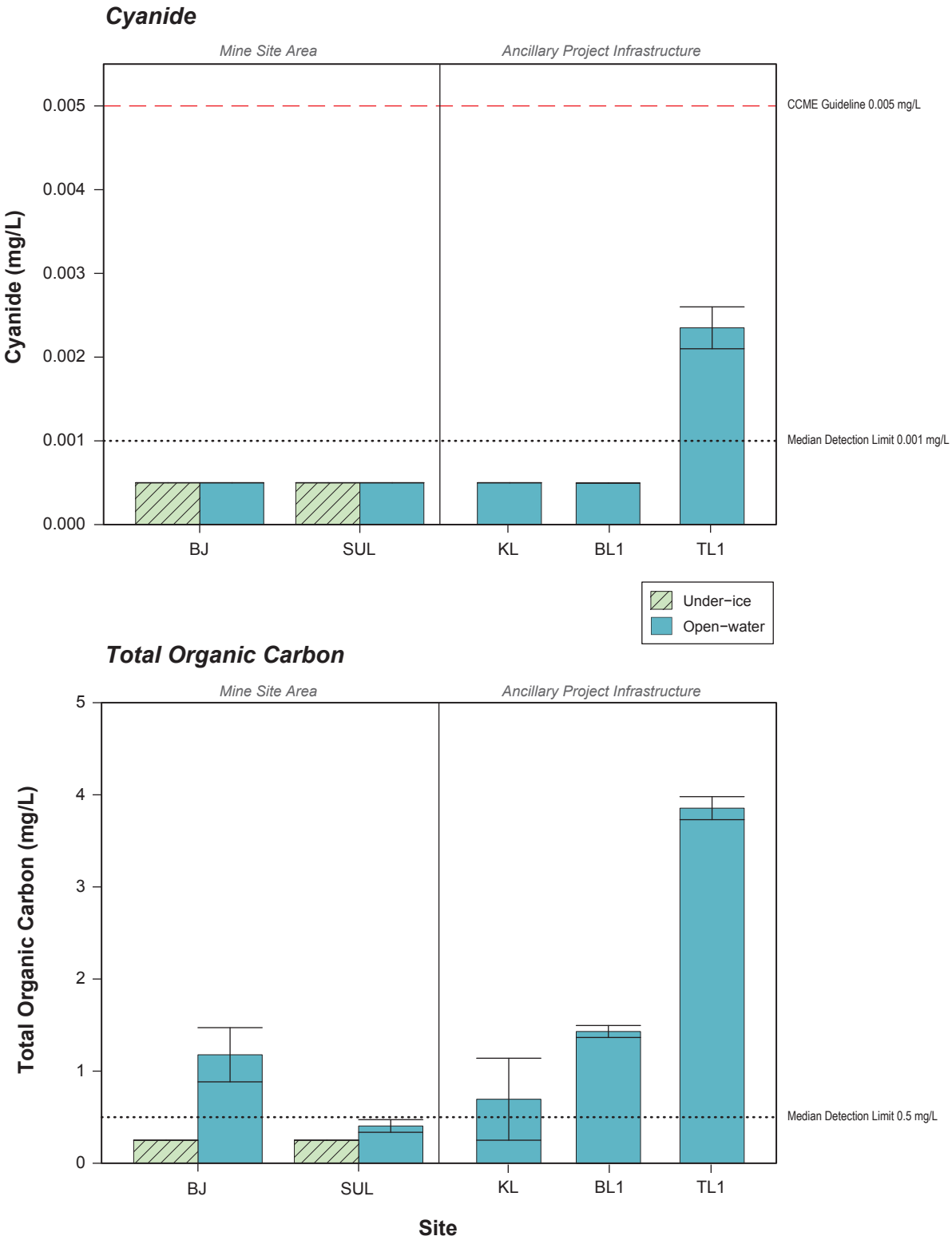
Nitrite and Total Phosphorus in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC nitrite guideline is chloride−dependent, see appendix.

Figure 5.1-26

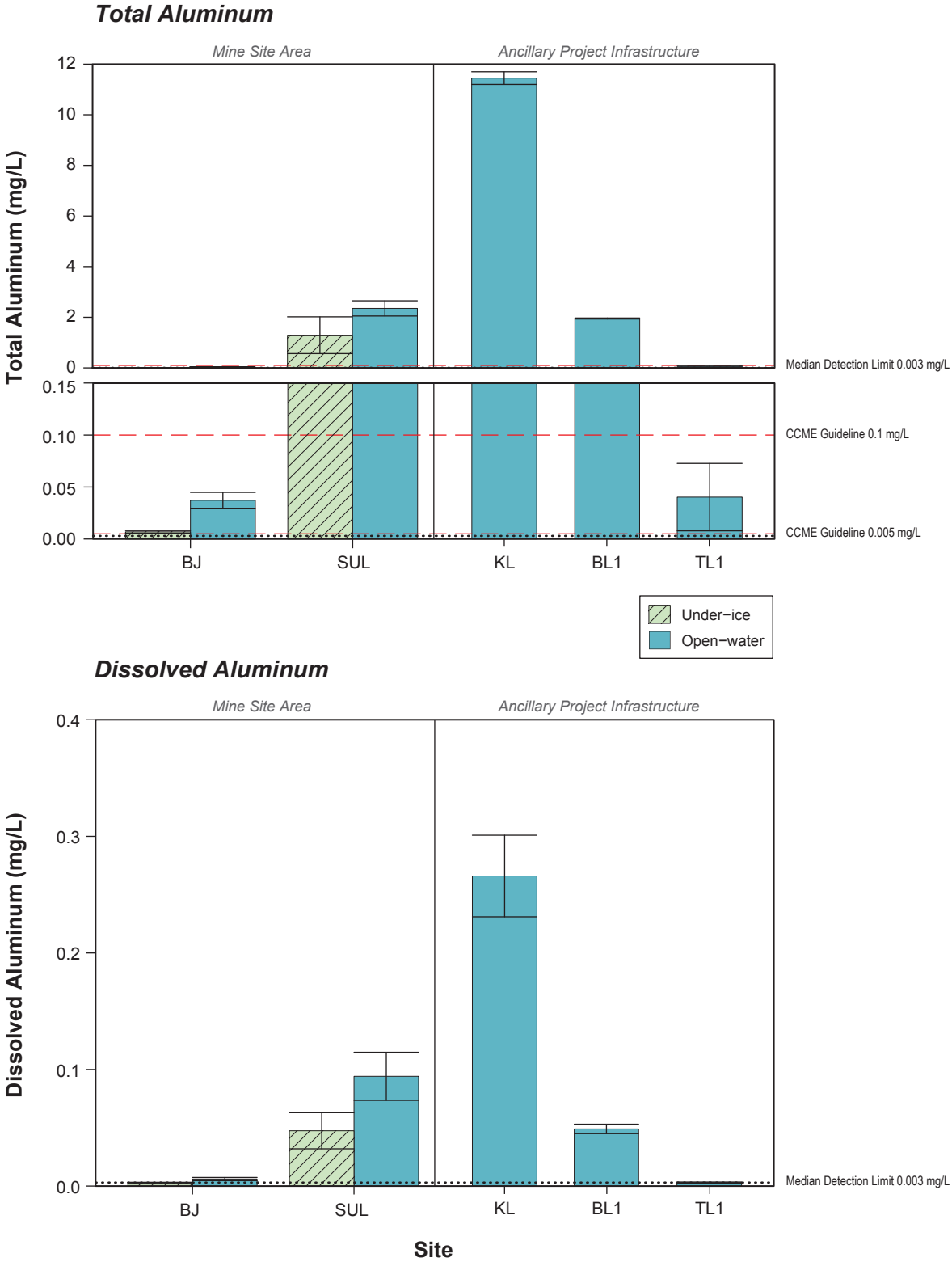
Cyanide and Total Organic Carbon in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC guideline for total organic carbon is dependent on background levels, see appendix.

Figure 5.1-27

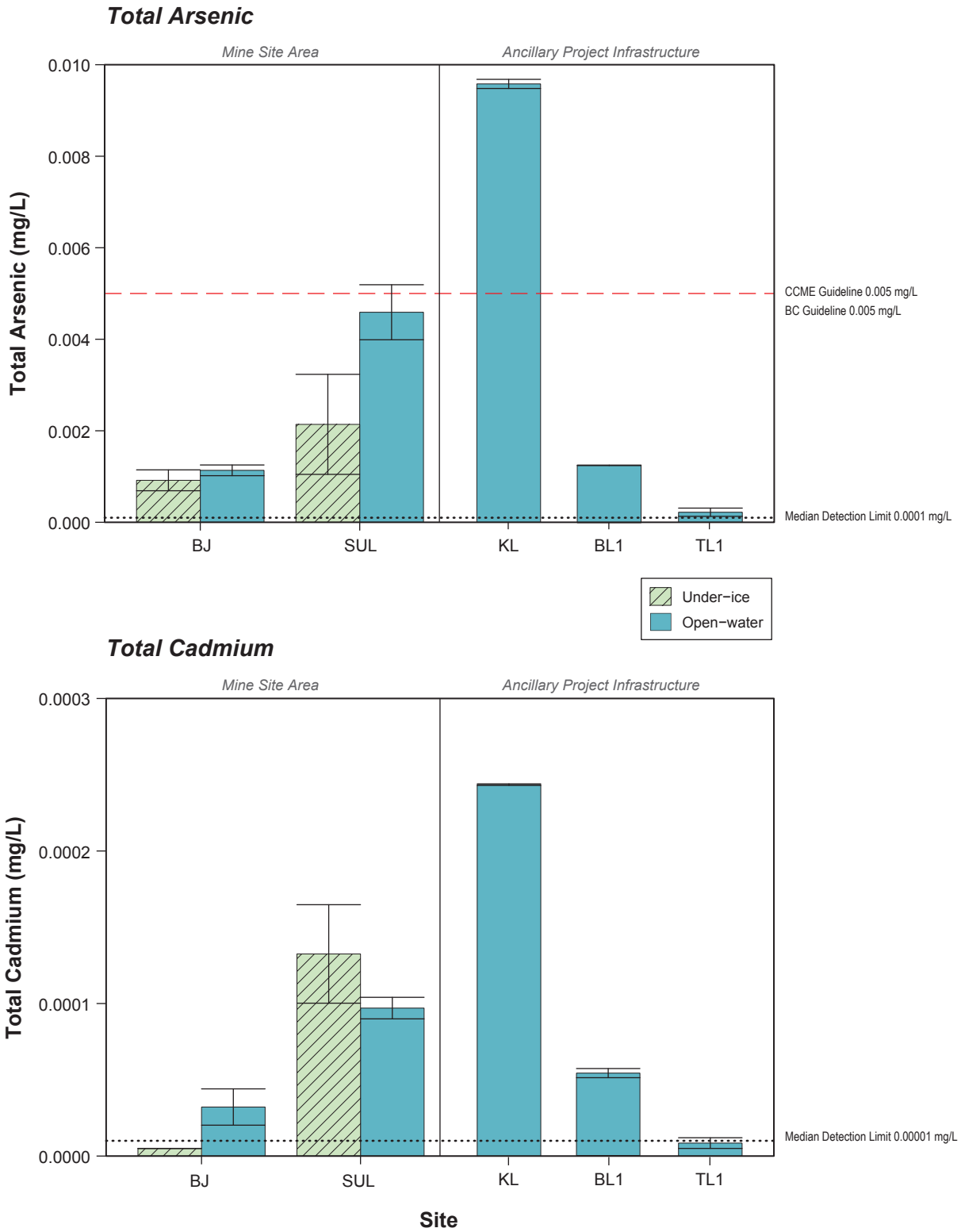
Total and Dissolved Aluminum in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME guideline for alumninum is pH−dependent: if pH < 6.5, then guideline = 0.005 mg/L; if pH ≥ 6.5 then guideline = 0.1 mg/L.
BC dissolved aluminum guideline is pH−dependent, see appendix.

Figure 5.1-28

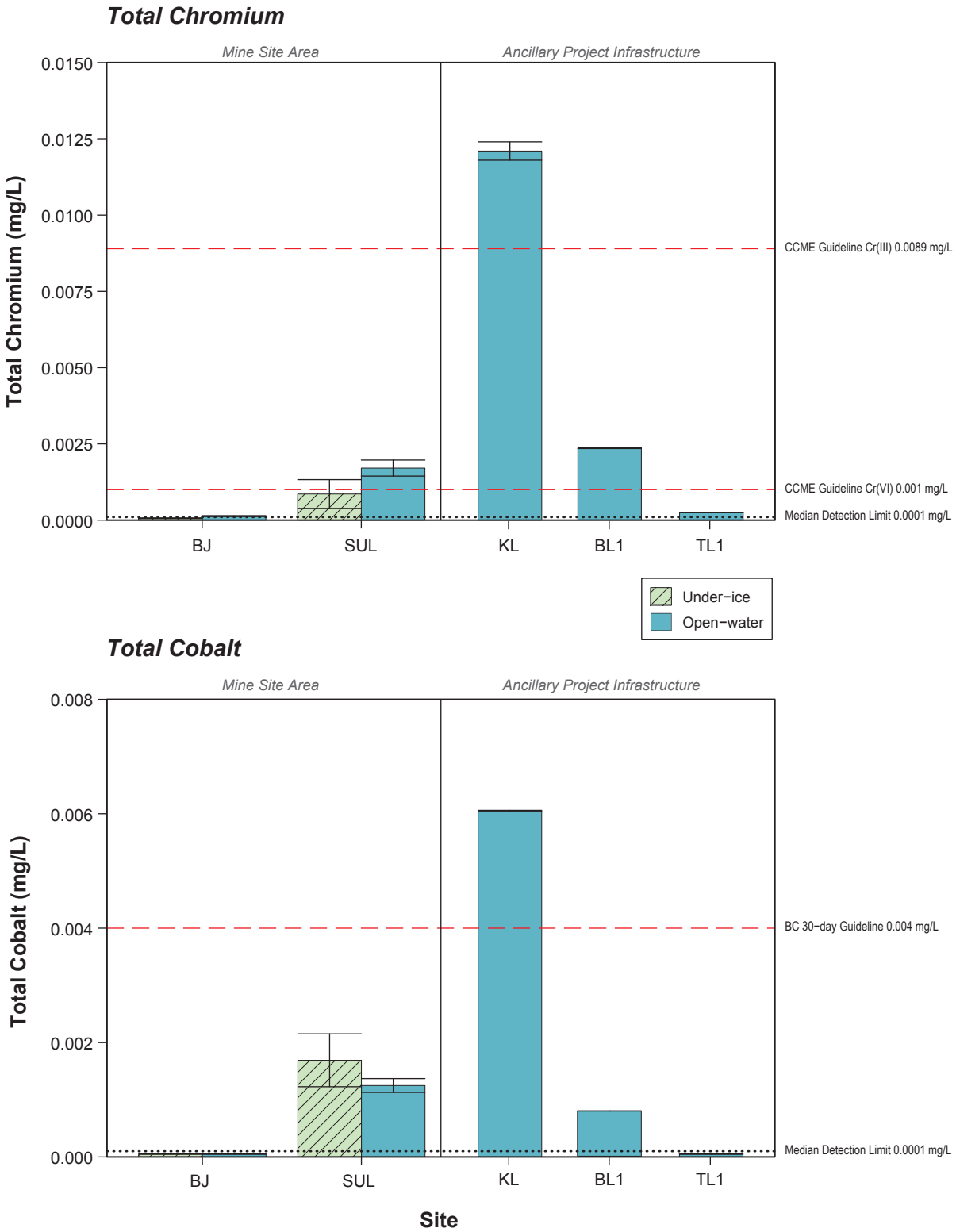
Total Arsenic and Total Cadmium of Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME interim cadmium guideline is an hardness−dependent, see appendix.

Figure 5.1-29

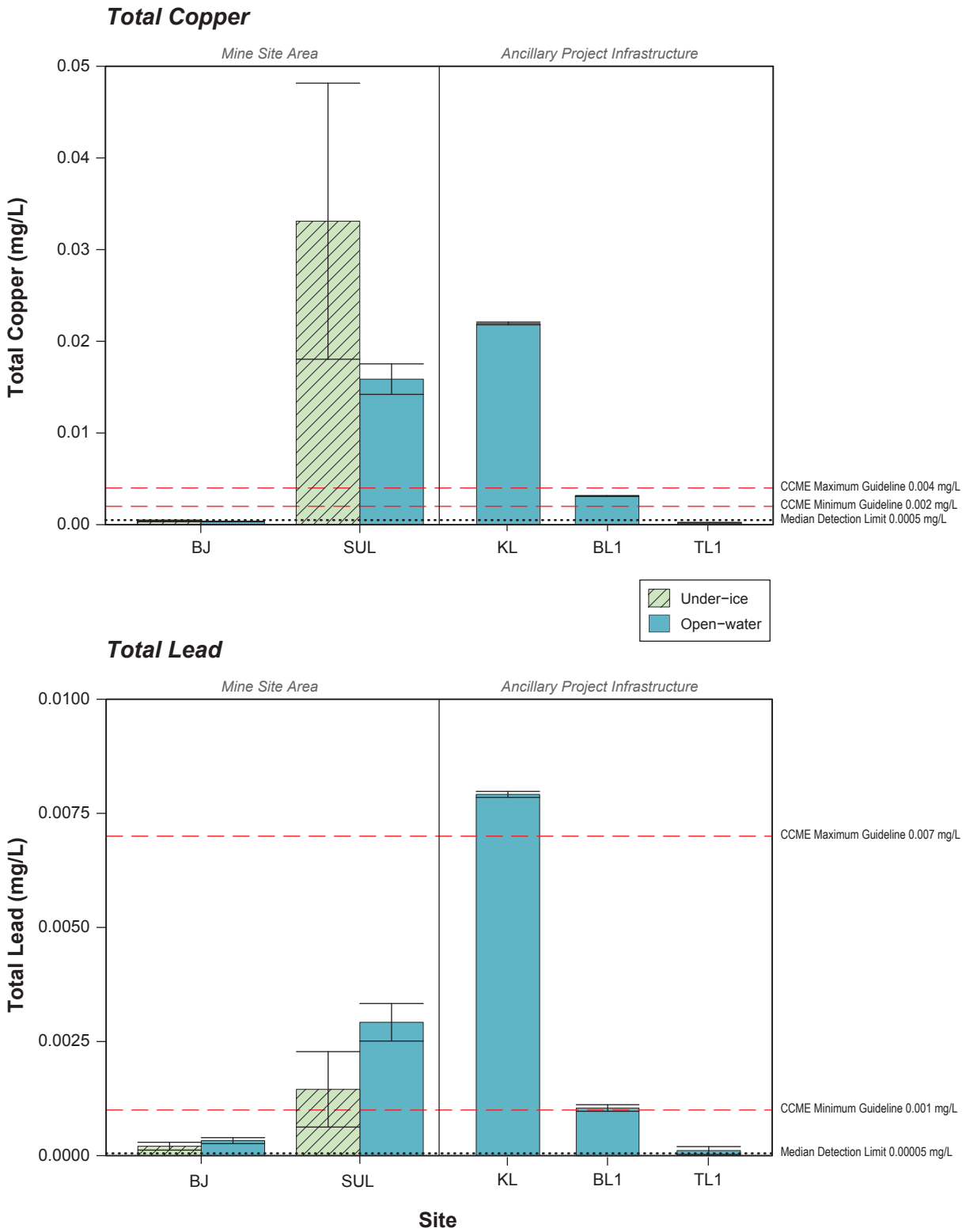
Total Chromium and Total Cobalt in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.1-30

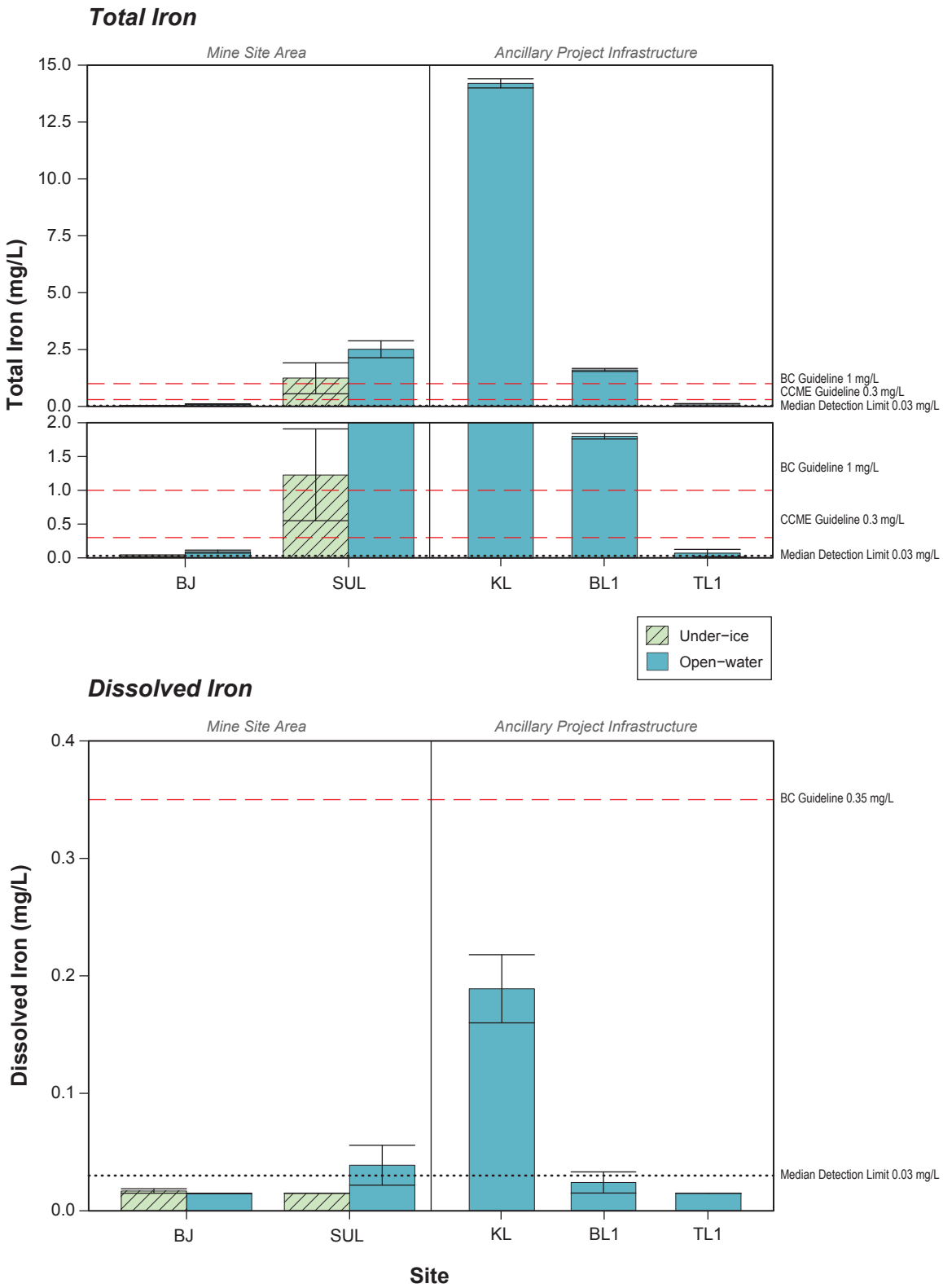
Total Copper and Total Lead in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME, BC copper and BC lead guidelines are hardness−dependent, see appendix.

Figure 5.1-31

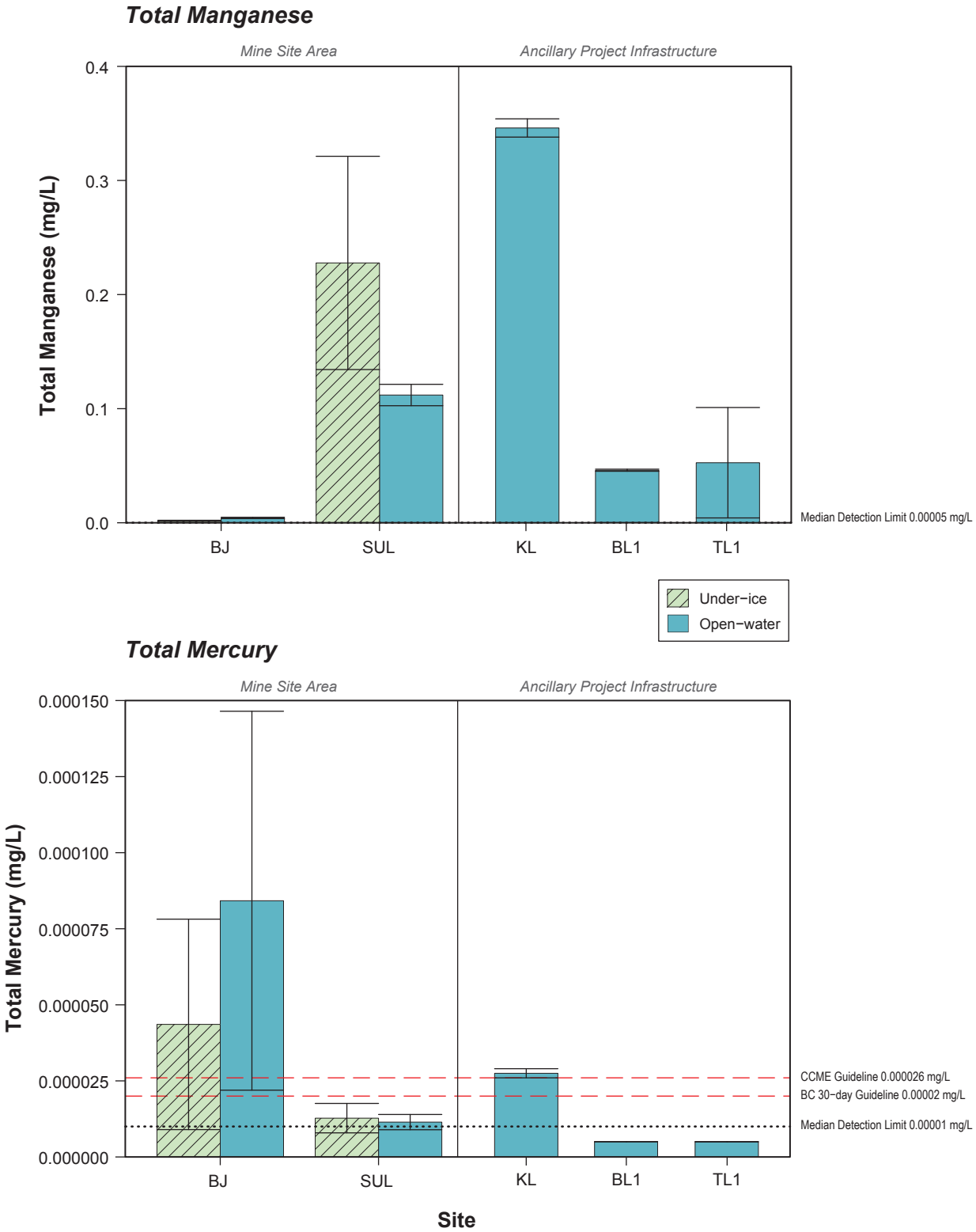
Total and Dissolved Iron in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.1-32

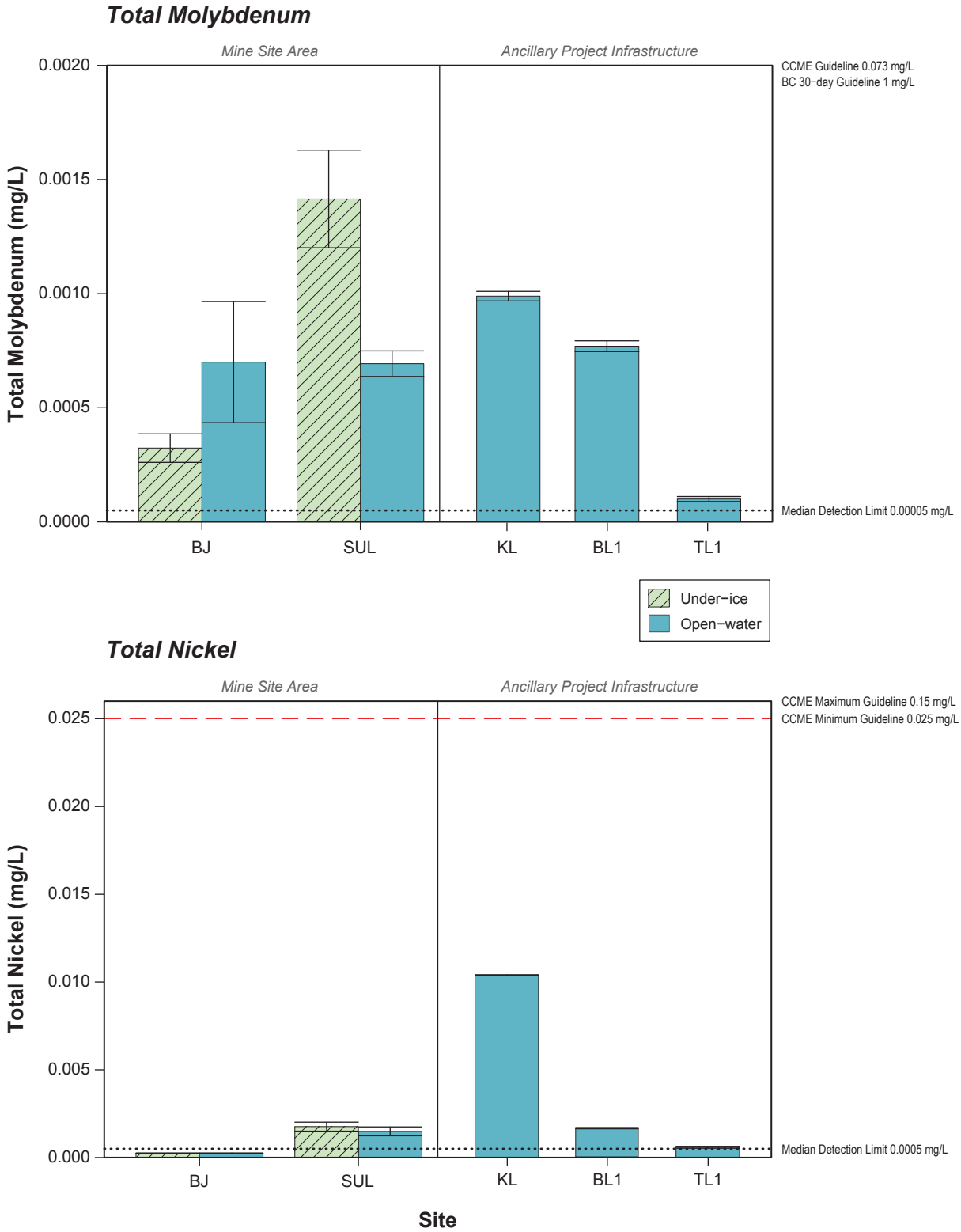
Total Manganese and Total Mercury in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC manganese guidelines are hardness−dependent, see appendix.
For Brucejack Lake (BJ), elevated mean total mercury concentrations and standard error reflect instances of high historical detection limits and were not used to calculate guideline exceedence factors (see text).
BC guideline assumes a methylmercury concentration of 0.5% of the total mercury.

Figure 5.1-33

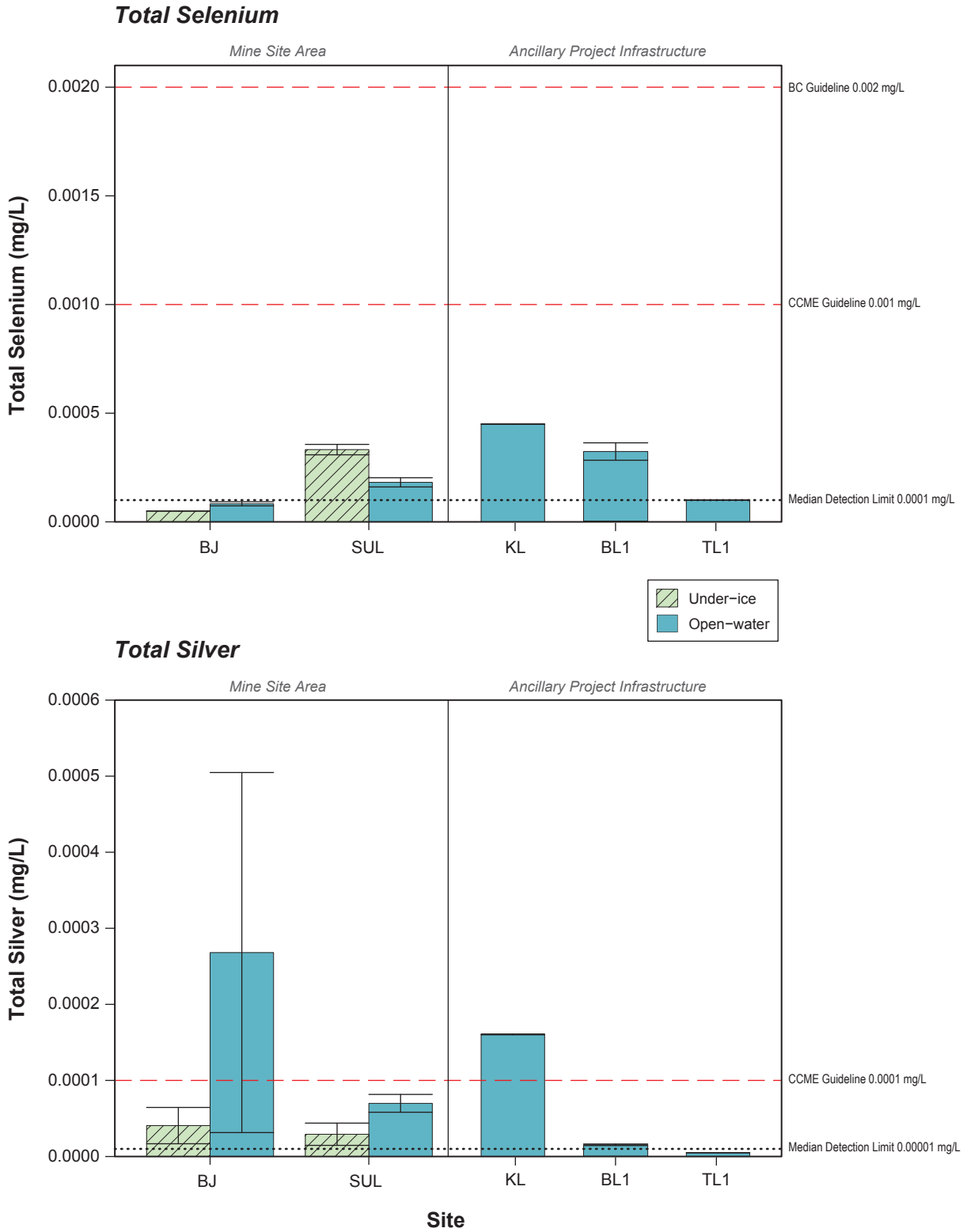
Total Molybdenum and Total Nickel in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
Molybdenum CCME guideline is an interim guideline.
CCME and BC nickel guidelines are hardness−dependent, see appendix.

Figure 5.1-34

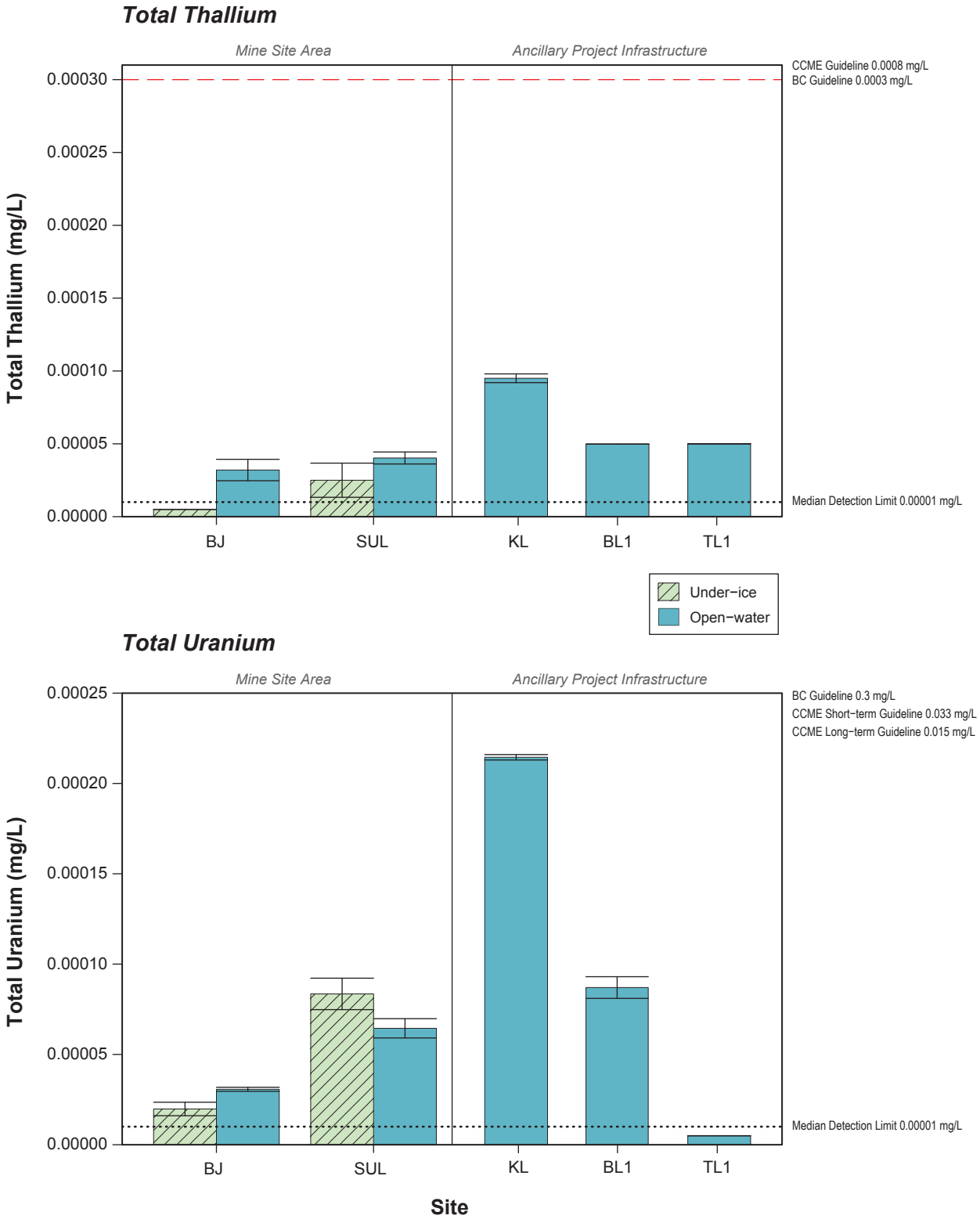
Total Selenium and Total Silver in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC silver guideline is hardness−dependent, see appendix.

Figure 5.1-35

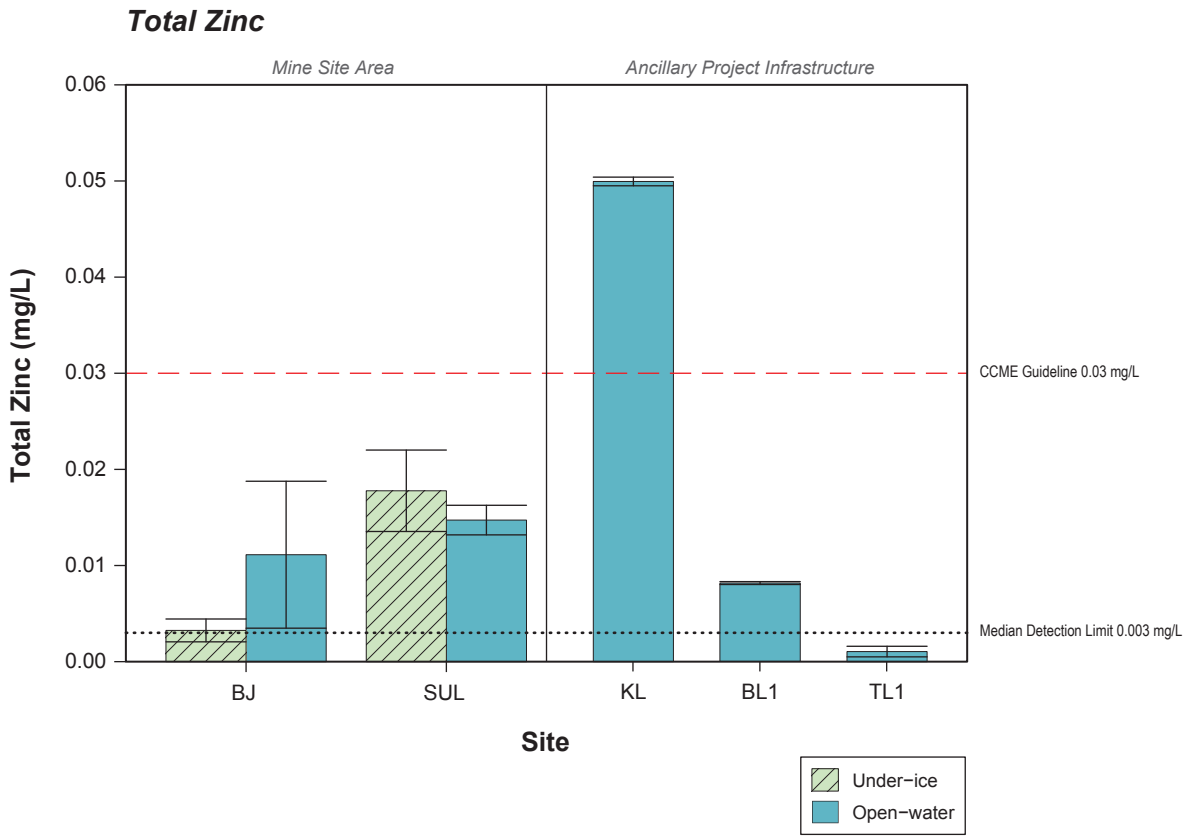
Total Thallium and Total Uranium in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC guideline is an interim guideline.

Figure 5.1-36

Total Zinc in Project Area Lakes, Brucejack Gold Mine Project (1987 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC zinc guideline is hardness−dependent, see appendix.

Dissolved oxygen concentrations (DO, mg/L) during open water sampling periods were highly variable. In general, clinograde DO profiles were observed with oxygen concentrations ranging from 10.7 to 6.3 mg/l in surface waters to 10.5 to 5.8 mg/L at depth. Surface waters of Brucejack Lake above 17 m were warmer (7 to 9˚C) in August 2010, August 2011, and September 2012 and had lower dissolved oxygen (DO; mean: 9.6 mg/L) compared to below the thermocline, where hypolimnetic temperatures were a typical 4˚C and mean DO was 10.4 mg/L. Lower DO concentrations at the surface likely reflect the decreased solubility of oxygen in warm water, limited primary productivity within the lake (Brucejack Gold Mine Aquatics Baseline, *in preparation*) or increased oxygen consumption (e.g., heterotrophic respiration) in surface waters. August 2011 had similar temperature patterns and ranges, but the thermocline began at ~35 m. DO concentrations in August 2011 decreased with depth and dropped sharply below 50 m, decreasing to 5.8 mg/L near the bottom (~80 m). This discrepancy in DO profiles between years may result from temporal variation in weather and lake turn-over events. DO concentrations were less than the CCME guideline range of 5.5 to 9.5 mg/L for the protection of freshwater aquatic life in August of 2013 and at depth in August of 2011 (Figure 5.1-1).

Brucejack Lake was fairly well-mixed during ice-covered months, with slight, gradual increases in temperature (range: 0 to 3.7˚C), and consistent conductivity throughout the water column (Figure 5.1-1). Oxygen concentrations were also generally consistent down the water column and ranged from 10.7 to 7.1 m/L in surface waters to 9.5 to 6.5 mg/L at depth, with lower overall concentrations in March of 2013 (mean 6.7 mg/L) than in other sampling years. DO concentrations were less than the CCME guideline range of 5.5 to 9.5 mg/L for the protection of freshwater aquatic life in March 2013 (Figure 5.1-1).

Sulphurets Lake

The data indicate that Sulphurets Lake behaves as a typical sub-polar lake; temperatures do not exceed 4 ° C (ranging from 0.4˚C to 2.0˚C, Figure 5.1-2). Consequently, the lake does not stratify and thus likely experiences frequent mixing throughout the whole open water period (Figure 5.1-2). The highest temperatures recorded (2008-2013) were in 2013, where surface temperatures reached 2°C; summer temperatures throughout the water column were generally 0.5°C higher in 2013 compared to temperatures collected in 2008, 2009 and 2012.

DO was homogenous throughout the water column and across open water and winter sampling periods (Figure 5.1-2). However, unusual increases in DO at depths beyond 11 m were observed in August 2009, which might be due to sampling error (Figure 5.1-2). In June 2012, DO was elevated (16 mg/L) in the surface layer above 16 m, but dropped to 11 mg/L near the bottom (21 m). DO within Sulphurets Lake is very low in winter months (under ice, March 2013), falling below guidelines (CCME: 9.5 to 6.5 mg/L) throughout the water column.

Conductivity in Sulphurets Lake was generally consistent throughout the water column during open water and winter sampling periods (Figure 5.1-2). However, water is much more dilute in open-water months for Sulphurets Lake, likely due to contributions of glacial melt (Figure 5.1-2). Conductivity increases four times in March (mean 258.3 uS/cm) compared to July and August of 2013 (means of 102 and 69 uS/cm, respectively).

5.1.1.2 Light

Secchi depth is extremely shallow for Sulphurets Lake (D_s = 0.10 m) and primary production is likely limited to the surface waters (Table 5.1-1). In contrast, D_s and $Z_{1\%}$ were much greater in Brucejack Lake (D_s = 4.3 m; $Z_{1\%}$ = 11.5 m) and primary production likely extends well into the water column. The reduced water clarity in Sulphurets Lake (glacial-headed lake) is a result of high total suspended solids and turbidity loads (Section 5.1.2).

Table 5.1-1. Secchi and Euphotic Depth in Brucejack and Sulphurets Lake, Brucejack Gold Mine Project, 2008 to 2013

	Secchi Depth, D_s (m)						
Lake	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Mean**
Brucejack Lake (BJ)	-	-	4.5	-	4.0	1.15	4.25
Sulphurets Lake (SUL)	0.01	0.2	-	-	0.1	0.15	0.1
	Euphotic Depth, $Z_{1\%}$ (m)						
Lake	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Mean**
Brucejack Lake (BJ)	-	-	12.2	-	10.8	3.11	11.5
Sulphurets Lake (SUL)	0.03	0.54	-	-	0.27	0.41	0.28

Note:
$Z_{1\%}$ was calculated as follows: $Z_{1\%} = 4.6/k$
where k is the light extinction coefficient for non-turbid waters (Parsons et al. 1984)
where k = 1.7/Ds and Ds = Secchi depth

5.1.2 Water Quality

Water quality results for Brucejack watershed (Mine Site Area) and Sulphurets and Unuk watersheds (mid and far-field downstream receiving environments) are presented in Figures 5.1-3 to 5.1-19 (streams along the proposed discharge flow pathway) and Figures 5.1-20 to 5.1-36 (lakes). Two tributaries upstream of Brucejack Lake (Trib. 2 and Trib. 3, see Table 3.1-1) were also sampled as part of the 2013 sampling program; data are presented separately (Appendix 2).

Streams within the study area typically experience a low flow period between November and April and higher flows between May and October associated with freshet, summer glacial melt, and fall heavy rain events. As a result, water quality varies spatially and temporally; monthly means of water quality variables are presented throughout the report to capture potential variability during both low flow and high flow periods.

Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions within the main report (see Chapter 4, Methodology). The entire baseline dataset for Brucejack, Sulphurets and Unuk watersheds are presented in Appendices 1, 2, and 4.

5.1.2.1 General Parameters

Brucejack Watershed

Watercourses within the Brucejack watershed (from upstream to downstream) include Brucejack Lake, Brucejack Creek, and Camp Creek; within Brucejack Creek sampling was conducted upstream (BJ U/S, BJ U/S of CC) and downstream (BJ OF, LBJ (*BJ 200m D/S, BJ2*) and BJ3) of the existing adit (Figure 3.1-1; Table 3.1-1).

During both open water and under-ice sampling periods, the waters of Brucejack Lake are soft (mean hardness: 21.7 to 29.1 mg/L), of circumneutral pH (mean: 7.21 to 7.44), intermediate conductivity (mean: 45.3 to 58.7 µS/cm) with low total alkalinity and moderate sensitivity to acidic inputs (mean total alkalinity: 15.0 to 16.0 mg/L; Figures 5.1-20 and 5.1-21). In general, there were no significant differences in these parameters with depth or between open and ice-cover sampling events. Maxima of general parameters (conductivity = 149.0 µS/cm; hardness = 88.0 mg/L; pH = 8.0; total alkalinity = 34.0 mg/L) were associated with sampling events in autumn of 2000 and 2001 (i.e., within the historical dataset in the two years following the historical waste rock deposition of 1999).

The waters of upper Brucejack Creek monitoring locations (BJ U/S and BJ U/S of CC) are of similar chemistry to Brucejack Lake (Figures 5.1-3, 5.1-4). Upper Brucejack Creek is soft (mean hardness: 23.1 to 23.3 mg/L), of circumneutral pH (mean: 7.55 to 7.67), with low total alkalinity (median: 14.0 to 16.1 mg/L) and intermediate conductivity (mean 51.2 to 52.6 µS/cm). The hydrological regime does not strongly influence general parameters of upper Brucejack creek monitoring sites; monthly means of pH, total alkalinity, conductivity and hardness are similar (Figures 5.1-3 and 5.1-4).

Camp Creek flows through the current camp area into Brucejack Creek, upstream of the existing adit, and downstream of upper Brucejack Creek. General parameters are distinct in Camp Creek as compared to upper Brucejack Creek, and exhibit greater variation (Figures 5.1-3 and 5.1-4). Overall, waters of Camp Creek were of circumneutral pH (mean: 6.29), soft (mean 41.5 mg/L), with very low alkalinity (mean: 8.6 mg/L) and elevated conductivity (mean: 108.2 mg/L). Further, although overall mean pH was circumneutral, pH was highly variable and at times slightly acidic (pH = 4.40 to 8.20). Variable pH levels observed in Camp Creek from 1991-1998 and 2000-2010 were the result of a significant natural contaminant source upstream of the historical waste rock pad location (Price 2005).

The waters of lower Brucejack Creek monitoring locations, downstream of Camp Creek and the existing adit (BJ OF, LBJ (*BJ 200m D/S, BJ2*), and BJ3) have similar chemistries and exhibit greater seasonal variation than their upstream counterparts (Figures 5.1-3 and 5.1-4). General water quality parameters are also slightly elevated compared to Brucejack Lake and upper Brucejack Creek. Lower Brucejack Creek sites are soft (mean hardness: 24.9 to 31.1 mg/L), of circumneutral pH (mean: 7.57 to 7.92), with low total alkalinity (median: 15.0 to 23.1 mg/L) and intermediate conductivity (mean: 56.9 to 90.5 µS/cm). Overall maxima of general parameters in Brucejack Creek (conductivity = 150.0 µS/cm; hardness = 46.0 mg/L; pH = 8.13; total alkalinity = 36.4 mg/L) were always associated with either BJ 200m D/S (alkalinity), or BJ2 (hardness, pH, conductivity) sites. Further, hydrological regime had a stronger influence on concentrations of general parameters in lower Brucejack Creek sites as compared to upstream sites; in general maxima of total alkalinity, hardness, pH and

conductivity of were associated with low flow periods, and minima in high flow periods (Figures 5.1-3 and 5.1-4). This likely reflects increased discharge of tributaries between lower and upper Brucejack Creek during freshet, as well as glacial/snow melt, and heavy rainfall events which dilute concentrations of major ions and total dissolved solids.

Sulphurets and Unuk Watersheds

Baseline water quality monitoring (2008-2013) was conducted downstream of the Sulphurets Glacier, upstream of Sulphurets Lake (SC0), within Sulphurets Lake (SUL) as well as along Sulphurets creek, downstream of Sulphurets Lake (SC1, SC2, and SC3; Figure 3.1-1; Table 3.1-1). The Unuk River was sampled upstream (UR1A) and downstream (UR1) of its confluence with Sulphurets Creek, as well at the international border (UR2).

Water chemistry changes substantially as Brucejack Creek passes under Sulphurets Glacier and joins the existing sub-glacial flow of Sulphurets Creek (Figures 5.1-3 and 5.1-4). Concentrations of alkalinity, hardness and conductivity are elevated in Sulphurets Creek relative to upstream monitoring sites along Brucejack Creek, but are similar at sites upstream and downstream of Sulphurets Lake (mean alkalinity = 45.5 to 48.9 mg/L; mean hardness = 92.7 to 124.3 mg/L; and mean conductivity = 193.0 to 235.5 µS/cm). Maxima of general parameters were always associated with SC3, reflecting mineralized inputs from Mitchell Creek, the largest tributary of Sulphurets Creek below Sulphurets Lake. Further, the hydrological regime influenced concentrations of general parameters of Sulphurets Creek monitoring sites much more strongly than it does sites within the Brucejack watershed; maxima of total alkalinity, hardness and conductivity for Sulphurets Creek were consistently associated with low flow periods whereas minima were consistently associated with high flow periods (Figures 5.1-3 and 5.1-4). This reflects increased discharge during freshet, glacial melt, and heavy rainfall events which dilute concentrations of major ions and total dissolved solids.

Water quality monitoring results indicate that the waters of Sulphurets Lake are similar to that of Sulphurets Creek and, further, that lake chemistry exhibits pronounced variation across open water and under-ice sampling periods and with depth (Figures 5.1-20 and 5.1-21). During under-ice sampling periods, the waters of Sulphurets Lake were hard (mean hardness: 124.7 mg/L), of circumneutral pH (mean: 7.84), high conductivity (mean: 258.3 µS/cm) with moderate total alkalinity and low sensitivity to acidic inputs (mean total alkalinity: 47.7 mg/L; Figures 5.1-20 and 5.1-21). Maxima of these parameters were generally associated with samples collected at depth and during March of 2013. In contrast, concentrations of general parameters were significantly reduced during open water periods; waters of SUL were soft (mean hardness: 39.8 mg/L), of circumneutral pH (mean: 7.89), intermediate conductivity (mean: 88.2 µS/cm) with low total alkalinity and moderate sensitivity to acidic inputs (mean total alkalinity: 20.7 mg/L; Figures 5.1-20 and 5.1-21).

Waters of the Unuk River were on average of circumneutral to alkaline pH (6.89 to 8.55) with lower monthly averages of total alkalinity, conductivity and hardness compared to Sulphurets Creek (Figures 5.1-3 and 5.1-4). Hardness and conductivity increased between UR1A and UR1 sites, reflecting inputs from Sulphurets Creek, although this is more apparent during low flow periods (Figures 5.1-3 and 5.1-4). However, alkalinity in the Unuk River (overall mean of 53.5 mg/L as $CaCO_3$) was similar to levels observed in Sulphurets Creek.

5.1.2.2 Total Suspended Solids and Turbidity

Brucejack Watershed

Brucejack Lake has the lowest levels of TSS and turbidity of all lakes within the study area (Figure 5.1-23). During both open water and under-ice sampling periods, TSS levels were in general less than the detection limit throughout the water column; an exception occurred in two samples collected in August of 2011 from the surface (15.6 mg/L) and from 80 m (4 mg/L). Turbidity in Brucejack Lake was also generally low and consistent across open water and under-ice sampling periods (mean: 0.3 to 0.9 NTU). This result indicates a high capacity of light penetration through the water column during open water season.

Levels of TSS and turbidity generally increase along Brucejack Creek from the lake outlet to BJ 3, and are highest during high flow periods (May to September). TSS and turbidity of upper Brucejack Creek monitoring locations (BJ U/S and BJ U/S of CC) are similar to those of Brucejack Lake and ranged from below the detection limits (median detection limit = 3.0 mg/L) to 14.0 mg/L (Figure 5.1-6). Turbidity within upper Brucejack Creek was also low (mean: 2.5 to 3.1 NTU) with the highest values generally associated with high flow periods (May to June: 11.1 to 15.3 NTU; Figure 5.1-6). Levels of TSS and turbidity were elevated in Camp Creek as compared to upper Brucejack Creek monitoring locations, and exhibit greater overall variation (Figures 5.1-6). Overall, TSS ranged from 0.5 to 67.0 mg/L and 1.6 to 31.2 NTU) with the highest values associated with freshet (May to June; Figure 5.1-6). The waters of lower Brucejack Creek monitoring locations, downstream of Camp Creek and the existing adit (BJ OF, BJ 200m D/S, BJ2 and BJ3) have similar levels of TSS and turbidity, which, in turn, are elevated relative to their upstream counterparts (mean: 8.7 to 14.9 mg/L; 7.2 to 9.0 NTU), likely reflecting inputs from Camp Creek and other tributaries to Brucejack Creek (including VOK tributary; Figures 5.1-6).

Sulphurets and Unuk Watersheds

Similar to general water quality parameters, levels of TSS and turbidity change substantially as Brucejack Creek passes under Sulphurets Glacier and joins the existing sub-glacial flow of Sulphurets Creek (Figure 5.1-6). Levels of TSS and turbidity were much higher in Sulphurets Creek relative to upstream monitoring sites along Brucejack Creek. Elevated levels of TSS decrease between SC0 and SC1, suggesting that suspended particulate loads settle out within the water column of Sulphurets Lake. TSS and turbidity increase again along SC1, SC2, and SC3, likely reflecting inputs from tributaries, including Mitchell Creek, to Sulphurets Creek (Figure 5.1-6). The hydrological regime much more strongly influenced levels of TSS and turbidity along Sulphurets Creek monitoring sites relative to sites within the Brucejack watershed; maxima were consistently associated with high flow periods whereas minima were consistently associated with low flow periods (Figure 5.1-6). Similar patterns were discernible in metal concentrations and for phosphorus (presented below).

TSS and turbidity were greatest in Sulphurets Lake out of all study area lakes, and were highest during open-water seasons (mean 47.6 mg/L and 50.9 NTU, respectively). Knipple Lake had higher levels of TSS and turbidity, but was only sampled once (August 2013).

The Unuk River had overall levels and patterns of TSS and turbidity similar to Sulphurets Creek (Figure 5.1-6). However, the influence of contributions from Mitchell/Sulphurets Creek is evident in the Unuk River: both TSS and turbidity levels were lower in the Unuk River upstream of Sulphurets Creek (mean: 34.2 mg/L and 29.7 NTU at UR1A) compared to levels observed immediately downstream of the Sulphurets Creek confluence (mean: 73.2 mg/L and 56.2 NTU at UR1). Near the international border (UR2), TSS and turbidity levels in the Unuk River were similar to UR1; overall means of 71.9 mg/L and 53.5 NTU, respectively.

5.1.2.3 Nutrients and Anions

Brucejack Watershed

Nutrients and anions measured as part of the baseline study for the Project include ammonia, nitrate, nitrite, sulphate and fluoride (Figures 5.1-5, 5.1-7, 5.1-8 (streams); 5.1-22, 5.1-24, 5.1-25 (lakes)).

During both open water and under-ice sampling periods, the waters of Brucejack Lake are nutrient poor, ultra-oligotrophic (phosphorous < 0.004 mg/l) with low sulphate levels (range: 0.7 mg/L to 33.0 mg/L; Figures 5.1-22, 5.1-24, and 5.1-25). In general, there were no substantial differences in these parameters with depth or between open and ice-cover sampling events. Concentrations of fluoride, ammonia, nitrate, nitrite and phosphorus were consistently below detection limits (median DL = 0.02 mg/l, 0.05 mg/L, 0.005 mg/L, 0.001 mg/L, and 0.002 mg/L, respectively). Exceptions were restricted to nitrate concentrations, which were slightly elevated under ice (range: below detection limits to 0.02 mg/L).

Similar to Brucejack Lake, the waters of upper Brucejack Creek monitoring locations (BJ U/S and BJ U/S of CC) are nutrient poor, ultra-oligotrophic (mean phosphorous < 0.004 mg/l) with low sulphate levels (range: 7.10 to 7.89 mg/L; Figures 5.1-5, 5.1-7, and 5.1-8). Fluoride concentrations were always below detection limits (medial DL = 0.02 mg/L). Maxima concentrations of nutrients and anions were generally associated with low flow periods (Figures 5.1-7 and 5.1-8), with the exception of sulphate concentrations, where monthly means did not significantly vary (Figure 5.1-5).

Concentrations of nutrients and anions were generally elevated in Camp Creek relative to upstream monitoring locations during high flow period; no nutrient and anion data are available for Camp Creek from December to May in the curated baseline dataset (Figures 5.1-3 and 5.1-4). Fluoride concentrations were elevated in Camp Creek, and approached concentrations similar to those observed within the Sulphurets and Unuk watersheds (Figure 5.1-5) with values ranging from below detection limits (median DL = 0.02 mg/L) to 0.199 mg/L (Figure 5.1-5). Sulphate concentrations were also elevated compared to upper Brucejack Creek and Brucejack Lake, and ranged from 9.86 mg/L to 104 mg/L, with maxima associated with low flow periods (November). Nitrate, nitrite, ammonia concentrations were often below detection limits, with low overall means of 0.0093 mg/L, 0.0005 mg/L, 0.0140 mg/L for , nitrate, nitrite and ammonia values, respectively.

The waters of lower Brucejack Creek monitoring locations, downstream of Camp Creek and the existing adit (BJ OF, LBJ (*BJ 200m D/S, BJ2*) and BJ3), have similar chemistries and exhibit greater seasonal variation than their upstream counterparts (Figures 5.1-3 and 5.1-4). General water quality parameters are also elevated compared to Brucejack Lake and upper Brucejack Creek, in particular phosphorus concentrations (Figure 5.1-8). Lower Brucejack Creek sites are in general mesotrophic to meso-eutrophic with highest values associated with highest TSS values (mean phosphorus = 0.0139 to

0.0210 mg/L). While elevated with respect to upstream monitoring locations, phosphorus concentrations in lower Brucejack Creek follow seasonal patterns similar to those of other study area sites, including Sulphurets Creek (Figure 5.1-8) as well as off-site areas (discussed below; Figure 5.2-8). Elevated concentrations may reflect inputs from VOK and other tributaries. Fluoride concentrations were also elevated relative to upstream monitoring locations, possibly due to contributions of Camp Creek or the existing adit (note: only periods of passive adit discharge were included in baseline characterization; Figure 5.1-5). Nitrate, nitrite, and ammonia concentrations were similar to upper Brucejack monitoring locations and were often below detection limits, exhibiting low overall means. Maxima of nutrient and anions in lower Brucejack Creek were generally associated with BJ2 (sulphate) and BJ3 (ammonia, nitrate) sites in low flow months (January to April).

Sulphurets and Unuk Watersheds

Concentrations of nutrients and anions change substantially as Brucejack Creek passes under Sulphurets Glacier and joins the existing sub-glacial flow of Sulphurets Creek (Figures 5.1-5, 5.1-7, 5.1-8, 5.1-22, 5.1-24, and 5.1-25). Concentrations of sulphate, phosphorus and fluoride were much higher in Sulphurets Creek relative to upstream monitoring sites along Brucejack Creek. While sulphate concentrations are fairly consistent along Sulphurets Creek, elevated levels of phosphorus decrease between SC0 and SC1, suggesting that, similar to TSS loads (discussed above), phosphorus loads are settling out within the water column of Sulphurets Lake. Total phosphorus concentrations increase again along SC1, SC2 and SC3, reaching hyper-eutrophic levels (> 0.1 mg/L) during high flow periods (Figure 5.1-8). This likely due to both elevated TSS during high flow periods as well as inputs from tributaries, including Mitchell Creek, along the Sulphurets Creek flow pathway. Similarly, fluoride concentrations exhibit distinct seasonal patterns and are highest at SC2 and SC3 (Figure 5.1-5). Concentrations of ammonia, nitrate and nitrite were generally below detection limits within Sulphurets Creek (Figures 5.1-7 and 5.1-8)

Sulphate concentrations were greatest in Sulphurets Lake of all study area lakes, with relatively greater concentrations observed under-ice than during open-water sampling (overall mean = 47.7 mg/L vs. 20.7 mg/L; Figure 5.1-22). Fluoride, ammonia and nitrate concentrations were also elevated in Sulphurets Lake compared to other study area lakes and were also highest under ice (Figures 5.1-24). Phosphorus concentrations ranged from mesotrophic to meso-eutrophic levels and were highest during open water sampling (Figure 5.1-25). Nitrite concentrations were always below detection limits (Median DL = 0.001 mg/L).

Concentrations of nutrients and anions were generally lower within the Unuk River than within Sulphurets Creek. Sites in the Unuk River were generally eutrophic (overall mean of 0.1 mg/L) and N-species (ammonia, nitrate, and nitrite) were generally below detection limits. Sulphate concentrations were intermediate (range: 8.82 mg/L to 85.9 mg/L), and were higher at UR1 compared to UR1A, reflecting loadings from Sulphurets Creek (Figure 5.1-5).

5.1.2.4 Organic Carbon and Cyanides

Brucejack, Sulphurets and Unuk Watersheds

Throughout the Mine Site area and downstream receiving environment, TOC was generally less than 1 mg/L, and often less than detection limits (0.05 mg/L; Figures 5.1-9 and 5.1-26). TOC

concentrations were generally less than detection limits (0.5 mg/L) in Brucejack Lake, but were somewhat elevated in 2010, at which time concentrations were approximately 2 mg/L throughout the water column. Further, slight observed increases at BJ OF site are likely due to contributions from Camp Creek (Figure 5.1-9). In contrast, cyanide concentrations were generally at or less than detection limits along the discharge pathway (Brucejack-Sulphurets-Unuk).

5.1.2.5 Total and Dissolved Metals

Both the Brucejack and Sulphurets catchments are highly mineralized areas with gossans and similar geological features evident on the surface. Surface water quality also varies substantially in this region based on the hydrological regime where increased sediment load and transport during high flow periods leads to increased concentrations of total suspended solids (TSS) and associated particulate-bound metals (Figure 5.1-6). In particular, within Brucejack Creek, assessment indicates that irrespective of inputs from the existing adit, elevated levels of some total metals during freshet (Al, Cd, Cu, Pb, Ag, and Zn) is reflective of natural background conditions.

<u>Brucejack Watershed</u>

Concentrations of total and dissolved metals in Brucejack Lake are low and generally less than or close to detection limits (Figures 5.1-27 to 5.1-36). These include dissolved aluminum, dissolved cadmium, chromium, cobalt, copper, dissolved iron, manganese, mercury, nickel, selenium, thallium and uranium (Figures 5.1-27 to 5.1-36). Mercury concentrations are generally below detection limits; elevated seasonal averages reflect elevated historical detection limits (historical DL; mean = 0.000030 mg/L) as well as high observations in July of 1991 (0.000006 mg/L) and October of 1988 (0.0012 mg/L; Figure 5.1-32). In general, there were no significant differences in these parameters with depth or between open and ice-cover sampling events.

Concentrations of total aluminum, arsenic, cadmium, iron, molybdenum, silver and zinc were detected in the water column of Brucejack Lake; in general, there were no significant differences in these parameters with depth. However, concentrations of total aluminum, cadmium, molybdenum, zinc and silver were higher during open water sampling (Figures 5.1-27, 5.1-28, 5.1-33, 5.1-34, and 5.1-37). Maxima of these parameters (0.0949 mg/L, 0.0010 mg/L, 0.006 mg/L, 0.0050 mg/L, and 0.170 mg/L, respectively) were not consistently associated with a particular sampling year or sampling depth. In contrast, concentrations of total arsenic and total iron, while consistently detectible within the water column of Brucejack Lake, showed no significant differences with depth or between open and ice-cover sampling events (Figures 5.1-28 and 5.1-31).

Metal concentrations within Brucejack Creek are generally lower than those of other watercourses within the baseline study area; observed trends are element specific. In general, concentrations of total chromium, cobalt, mercury, nickel, selenium, mercury as well as dissolved aluminum, iron and cadmium consistently remained near or below detection limits (Figures 5.1-10, 5.1-12, 5.1-14 to 5.1-17, and 5.1-19). In contrast, concentrations of total aluminum, cadmium, copper, iron, lead, manganese, silver and zinc were consistently above detection limits and exhibited distinct seasonality, with highest concentrations corresponding to highest concentrations of TSS in high flow periods (Figures 5.1-10, 5.1-11, 5.1-13 to 5.1-15, and 5.1-17). Of these, iron, lead and manganese generally increased along Brucejack Creek, from the lake outlet to BJ 3; maxima were usually

associated with lower Brucejack Creek (LBJ) during high flow (Figures 5.1-13 to 5.1-15). This may be due to inputs from the Camp Creek (lead and manganese at BJ OF and BJ 200m D/S), the existing adit, or VOK Creek (Figures 5.1-13 to 5.1-15). Concentrations of aluminum, cadmium, copper, arsenic, silver and molybdenum were generally consistent from upstream to downstream in Brucejack Creek and likely reflect natural mineralization of the catchment.

Sulphurets and Unuk Watersheds

Concentrations of metal elements measured are substantially elevated within Sulphurets and Unuk watersheds relative to the Brucejack watershed and show distinct seasonality, with highest observed concentrations corresponding with high flow periods (Figures 5.1-3 to 5.1-19). This is likely related to both its role in draining the mineralized Kerr and Sulphurets mineral deposits (plus other mineralized zones) as well the contribution of degraded water quality from Mitchell Creek to Sulphurets Creek. An exception was observed for total silver concentrations, which, while showing similar seasonal trends, were generally higher within the Brucejack watershed relative to Sulphurets (in particular Camp Creek, range: 0.00001 to 0.00750 mg/L) and persisted beneath Sulphurets Glacier to SC0 (Figure 5.1-17). Total silver concentrations subsequently decrease between SC0 and SC1, suggesting that bound-silver settles out with suspended particulates loads (discussed above) within the water column of Sulphurets Lake. Silver concentrations increase again along SC1, SC2 and SC3, likely reflecting inputs from tributaries, including Mitchell Creek, to Sulphurets Creek (Figure 5.1-17).

Along the flow path of Sulphurets creek, the majority of other metal elements generally follow similar patterns to that which was observed for silver: decreasing between SC0 and SC1, and subsequently increasing from SC1 to SC2 and SC3 (Figures 5.1-3 to 5.1-19).

Concentrations of many metals (total) were greatest in Sulphurets Lake, likely as a consequence of elevated TSS concentrations. For example, the overall means of total arsenic (0.0046 mg/L), copper (0.0159 mg/L), iron (2.51 mg/L), lead (0.0029 mg/L) and silver (0.000070 mg/L) were greatest in Sulphurets Lake. Concentrations of aluminum (2.35 mg/L), cadmium (0.000097 mg/L), chromium (0.0017 mg/L), uranium (0.00006 mg/L) and zinc (0.0147 mg/L), were also relatively elevated in Sulphurets Lake compared to other study area lakes.

The Unuk River had similar overall trends in metal concentrations to Sulphurets Creek. However, the influence of contributions from Mitchell/Sulphurets Creek is evident in the Unuk River: concentrations of aluminum, arsenic, cadmium, cobalt, copper, manganese, selenium, uranium and zinc increase in the Unuk River downstream of its confluence with Sulphurets Creek compared to levels observed immediately upstream.

5.1.3 Comparison to Water Quality Guidelines

The mean frequency of collected samples that were greater than BC MOE and CCME water quality guidelines and the factor by which mean overall concentrations were greater than guideline values are presented in Table 5.1-2. Frequencies and factors by which concentrations were greater than guideline values are presented for each year in Appendix 6 (2008-2013) and Appendix 7 (historical monitoring data: 1987-2001).

Table 5.1-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project

		Parameter	pH		Fluoride		Nitrite						Total Phosphorus	Cyanide, Weak Acid Diss.	
		Guideline	CCME = BC		CCME		BC				CCME		CCME	BC	
			6.5 to 9.0		Hardness Dependent*		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		Trigger ranges	30-day 0.005	
Watershed	Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent		Factor	Percent
Brucejack	BJ	29	1	3%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic	-	0%
	BJ U/S	71	1.02	1%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Mesotrophic	-	0%
	BJ U/S of CC	15	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Meso-eutrophic	-	0%
	Camp Creek	22	1.12	68%	-	0%	-	0%	-	0%	-	0%	Mesotrophic - Meso-eutrophic	-	0%
	BJ OF	13	-	0%	-	0%	1.02	8%	-	0%	-	0%	Ultra-oligotrophic - Eutrophic	-	0%
	LBJ	52	1.00	4%	-	0%	2.58	29%	1.30	11%	1.30	11%	Ultra-oligotrophic - Eutrophic	-	0%
	BJ3	7	-	0%	-	0%	1.94	14%	-	0%	-	0%	Ultra-oligotrophic - Meso-eutrophic	-	0%
Sulphurets/Unuk	SC0	12	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	SUL	15	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	SC1	64	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	SC2	72	-	0%	1.33	53%	-	0%	-	0%	-	0%	Oligotrophic - Hyper-eutrophic	-	0%
	SC3	53	-	0%	1.21	51%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	UR1A	47	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	UR1	54	-	0%	-	0%	-	0%	-	0%	-	0%	Oligotrophic - Hyper-eutrophic	-	0%
	UR2	35	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%

(continued)

Table 5.1-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project (continued)

		Parameter	Aluminum, Dissolved		Aluminum, Total		Arsenic		Cadmium						Cobalt		Chromium			
		Guideline	BC		CCME		CCME = BC		BC		CCME				BC		CCME			
			Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.005		Hardness Dependent*		Short-term Hardness Dependent		Long-term Hardness Dependent		30-day 0.004		Cr(III) 0.0089*		Cr(IV) 0.001*	
Watershed	Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Brucejack	BJ	29	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
	BJ U/S	71	-	0%	2.98	17%	3.00	1%	82.64	33%	3.51	2%	25.00	3%	-	0%	-	0%	-	0%
	BJ U/S of CC	15	-	0%	3.80	40%	-	0%	3.45	80%	-	0%	1.54	7%	-	0%	-	0%	-	0%
	Camp Creek	22	-	0%	92.62	67%	1.30	9%	51.88	92%	6.20	6%	10.47	92%	-	0%	-	0%	-	0%
	BJ OF	13	-	0%	5.67	38%	1.25	8%	3.33	83%	-	0%	1.04	8%	-	0%	-	0%	-	0%
	LBJ	52	-	0%	3.57	57%	-	0%	55.84	72%	20.60	2%	22.85	33%	-	0%	-	0%	-	0%
	BJ3	7	-	0%	6.46	43%	-	0%	5.67	57%	-	0%	1.89	29%	-	0%	-	0%	-	0%
Sulphurets/Unuk	SC0	12	1.52	42%	36.13	100%	3.59	58%	14.40	83%	-	0%	4.03	58%	1.38	25%	-	0%	4.56	58%
	SUL	15	1.57	27%	22.15	93%	1.28	33%	6.10	100%	-	0%	1.71	47%	-	0%	-	0%	2.05	60%
	SC1	64	2.23	6%	25.06	63%	1.50	22%	4.55	81%	-	0%	1.76	28%	1.07	2%	-	0%	2.37	42%
	SC2	72	1.57	3%	32.55	100%	3.56	54%	54.96	100%	1.66	22%	11.63	99%	1.58	40%	1.14	4%	3.97	63%
	SC3	53	2.15	2%	27.93	98%	3.62	43%	47.70	100%	1.60	21%	10.14	98%	1.75	25%	1.86	4%	4.17	53%
	UR1A	47	1.30	11%	21.34	60%	2.19	9%	3.97	66%	-	0%	2.07	13%	2.13	4%	2.14	6%	5.04	45%
	UR1	54	2.12	4%	20.87	94%	2.38	28%	25.62	100%	1.94	2%	5.31	100%	2.13	11%	2.37	8%	6.23	47%
	UR2	35	3.94	11%	33.53	71%	1.66	14%	13.40	100%	-	0%	3.21	80%	2.49	6%	2.00	9%	5.60	60%

(continued)

Table 5.1-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project (continued)

		Parameter	Copper						Iron, Total				Mercury				Manganese	
		Guideline	BC				CCME		BC		CCME		BC		CCME		BC	
			30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		30-day Hardness Dependent	
Watershed	Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Brucejack	BJ	29	-	0%	-	0%	-	0%	-	0%	1.30	3%	-	0%	-	0%	-	0%
	BJ U/S	71	13.52	4%	9.23	3%	13.52	4%	-	0%	1.61	8%	-	0%	-	0%	-	0%
	BJ U/S of CC	15	-	0%	-	0%	-	0%	1.89	7%	3.69	13%	-	0%	-	0%	-	0%
	Camp Creek	22	4.54	55%	2.68	32%	4.62	55%	1.53	9%	2.65	32%	-	0%	-	0%	-	0%
	BJ OF	13	-	0%	-	0%	-	0%	-	0%	1.81	38%	-	0%	-	0%	-	0%
	LBJ	52	2.29	17%	2.30	4%	2.29	17%	1.15	2%	1.93	19%	-	0%	-	0%	-	0%
	BJ3	7	-	0%	-	0%	-	0%	-	0%	2.40	29%	-	0%	-	0%	-	0%
Sulphurets/Unuk	SC0	12	14.66	58%	5.53	58%	12.38	75%	8.68	67%	28.94	67%	2.96	33%	2.74	25%	-	0%
	SUL	15	7.39	100%	2.75	100%	8.60	100%	2.63	80%	8.30	87%	1.27	20%	1.04	7%	-	0%
	SC1	64	5.12	75%	2.40	48%	5.27	95%	3.44	48%	9.97	58%	1.81	13%	1.89	6%	-	0%
	SC2	72	40.91	99%	14.52	96%	63.55	99%	7.63	100%	25.44	100%	1.34	11%	1.24	6%	-	0%
	SC3	53	35.95	100%	12.29	100%	55.03	100%	6.78	96%	22.22	98%	1.59	10%	1.33	8%	1.08	2%
	UR1A	47	4.38	36%	2.75	13%	4.16	40%	4.27	40%	10.53	57%	2.40	6%	2.31	4%	-	0%
	UR1	54	20.88	100%	6.92	98%	27.82	100%	5.85	74%	14.99	100%	2.24	13%	2.31	8%	-	0%
	UR2	35	12.46	100%	4.95	77%	13.42	100%	5.17	66%	15.47	74%	3.20	6%	2.46	6%	1.02	3%

(continued)

Table 5.1-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project (continued)

		Parameter	Nickel				Lead						Selenium			
		Guideline	BC		CCME		BC				CCME		BC		CCME	
			Hardness Dependent*		Hardness Dependent		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001	
Watershed	Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Brucejack	BJ	29	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
	BJ U/S	71	-	0%	-	0%	-	0%	-	0%	3.00	3%	-	0%	-	0%
	BJ U/S of CC	15	-	0%	-	0%	-	0%	-	0%	1.29	7%	-	0%	-	0%
	Camp Creek	22	-	0%	-	0%	1.78	6%	-	0%	3.67	30%	-	0%	-	0%
	BJ OF	13	-	0%	-	0%	-	0%	-	0%	1.99	31%	-	0%	-	0%
	LBJ	52	-	0%	-	0%	3.43	4%	1.77	2%	4.06	26%	-	0%	-	0%
	BJ3	7	-	0%	-	0%	-	0%	-	0%	1.45	29%	-	0%	-	0%
Sulphurets/Unuk	SC0	12	-	0%	-	0%	2.26	58%	-	0%	8.60	58%	-	0%	-	0%
	SUL	15	-	0%	-	0%	1.44	7%	-	0%	3.14	73%	-	0%	-	0%
	SC1	64	-	0%	-	0%	1.48	14%	-	0%	3.72	42%	-	0%	-	0%
	SC2	72	-	0%	-	0%	1.74	29%	-	0%	3.88	58%	1.28	49%	2.12	79%
	SC3	53	-	0%	-	0%	1.80	19%	-	0%	3.63	45%	1.23	34%	2.05	77%
	UR1A	47	1.13	2%	1.13	2%	1.89	4%	-	0%	2.99	28%	-	0%	-	0%
	UR1	54	1.10	4%	1.10	4%	2.06	9%	-	0%	3.91	43%	-	0%	1.31	55%
	UR2	35	1.16	3%	1.16	3%	2.09	9%	-	0%	3.22	63%	-	0%	1.06	3%

(continued)

Table 5.1-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project (completed)

		Parameter	Silver						Zn					
		Guideline	BC				CCME		BC				CCME	
			30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Watershed	Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Brucejack	BJ	29	1.7	7%	–	0%	–	0%	–	0%	–	0%	–	0%
	BJ U/S	71	5.19	28%	7.00	8%	7.00	8%	2.27	4%	-	0%	-	0%
	BJ U/S of CC	15	4.02	7%	2.01	7%	2.01	7%	1.45	7%	-	0%	-	0%
	Camp Creek	22	24.60	80%	16.05	60%	16.05	60%	5.05	91%	1.92	41%	2.11	41%
	BJ OF	13	2.91	38%	1.59	31%	1.59	31%	1.23	17%	-	0%	-	0%
	LBJ	52	14.22	42%	11.85	24%	11.85	24%	2.14	27%	-	0%	-	0%
	BJ3	7	2.47	29%	1.71	14%	1.71	14%	1.29	14%	-	0%	-	0%
Sulphurets/Unuk	SC0	12	5.33	58%	2.67	58%	2.67	58%	5.57	58%	1.60	33%	1.62	42%
	SUL	15	1.78	53%	1.32	13%	1.32	13%	1.95	87%	-	0%	1.01	7%
	SC1	64	1.88	27%	1.41	9%	1.41	9%	2.25	41%	1.21	3%	1.33	3%
	SC2	72	2.95	37%	1.81	25%	1.74	29%	9.20	96%	2.91	88%	4.90	96%
	SC3	53	3.08	36%	2.87	13%	2.87	13%	8.69	94%	2.97	74%	4.03	98%
	UR1A	47	2.38	13%	1.99	4%	1.99	4%	2.94	23%	1.77	4%	1.95	4%
	UR1	54	2.75	28%	2.40	11%	2.22	13%	6.03	79%	1.78	62%	1.91	92%
	UR2	35	2.03	26%	3.19	3%	3.19	3%	3.84	77%	1.62	20%	1.63	26%

Notes:
All units in mg/L unless otherwise noted.
** Interim/working guideline.*
Half the detection limit was substituted for values below the detection limit.
Samples below the detection limit but above the guideline concentration were excluded from all calculations.
Factor represents the average factor by which sample concentrations exceeded guideline concentrations.
Percent represents the percentage of samples collected at each site that were greater than guidelines.

5.1.3.1 BC MOE

Brucejack Watershed

Ten of the 29 parameters with BC MOE guidelines for the protection of aquatic life had overall mean concentrations greater than guideline values within the Brucejack watershed (Brucejack Lake, Brucejack Creek and its tributaries) including pH, nitrite, dissolved aluminum, arsenic, copper, cadmium, total iron, lead, silver and zinc (Table 5.1-3). Minima in observed exceedances were always associated with Brucejack Lake (BJ) and Brucejack Creek monitoring sites upstream of Camp Creek (BJ U/S, BJ U/S of CC), where consistent exceedances were only observe for pH, cadmium, copper, silver and zinc (Table 5.1-2), generally in high flow periods. In lower Brucejack creek monitoring sites (BJ OF, BJ 200m D/S, BJ2 and BJ3), the factor and frequency of guideline exceedances for these parameters generally increased.

Sulphurets and Unuk Watersheds

The percentage of BC MOE guideline exceedances and average factor of exceedances of water quality samples generally increased within the Sulphurets and Unuk watersheds relative to upstream monitoring sites within the Brucejack watershed (Table 5.1-2). Monitoring sites within Sulphurets Creek had the greatest incidence of guideline exceedances (stream and lake sites) of those in the entire baseline study are (Table 5.1-2). Thirteen of the 29 parameters had overall mean concentrations greater than guideline values within the Sulphurets watershed including dissolved aluminum, arsenic, cadmium, cobalt, copper, iron (total and dissolved), mercury, manganese, lead, selenium, silver and zinc. However, metal concentrations were relatively lower immediately downstream of Sulphurets Lake (SC1), increasing downstream of the Mitchell Creek confluence (SC2 and SC3). For example, mean overall copper concentrations were 5.1 and 40.5 times greater than the BC MOE guidelines (30-day, hardness dependent) at sites SC1 and SC2, respectively. Similarly, mean overall dissolved iron concentrations were less than the BC MOE guideline (< 0.35 mg/L) at SC1, but were 6.1 times greater than the guideline at site SC2 (Table 5.1-2).

The influence of contributions from Mitchell/Sulphurets Creek is evident in the Unuk River, where both the percentage of guideline exceedances and average factor of exceedances were elevated within the Unuk downstream of its confluence with Sulphurets Creek (UR1) relative to upstream monitoring site (UR1A). Greatest influences observed for cadmium, copper and zinc guideline exceedances (Table 5.1-2).

5.1.3.2 CCME

Brucejack Watershed

Nine of the 26 parameters with CCME guidelines had overall mean concentrations greater than guideline values within the Brucejack watershed (Brucejack Lake, Brucejack Creek and its tributaries) including pH, fluoride (Camp Creek only), total aluminum, arsenic, cadmium, copper, iron total, lead, silver and zinc (Table 5.1-2). Minima in observed exceedances were always associated with Brucejack Lake (BJ) and Brucejack Creek monitoring sites upstream of Camp Creek (BJ U/S, BJ U/S of CC), where were only observe for pH, cadmium, copper, silver and zinc (Table 5.1-2), generally in high flow periods. In lower Brucejack Creek monitoring sites (BJ OF, BJ

200m D/S, BJ2 and BJ3), the factor and frequency of guideline exceedances for these parameters generally increased.

Sulphurets and Unuk Watersheds

The percentage of CMME guideline exceedances and average factor of exceedances of water quality samples generally increased within the Sulphurets and Unuk watersheds relative to upstream monitoring sites within the Brucejack watershed (Table 5.1-2). Monitoring sites along Sulphurets Creek had the greatest incidence of guideline exceedances (stream and lake sites) of those in the entire baseline study are (Table 5.1-2). Twelve of the 26 parameters had overall mean concentrations greater than guideline values within the Sulphurets watershed, including fluoride, total aluminum, arsenic, cadmium, cobalt, chromium, copper, total iron, mercury, nickel, lead, selenium, silver and zinc (Table 5.1-2). However, metal concentrations were relatively lower immediately downstream of Sulphurets Lake (SC1), increasing downstream of the Mitchell Creek confluence (SC2 and SC3). For example, mean overall total aluminum concentrations were 25.1 (62%) and 32.2 (100%) times greater than the CCME guidelines (pH dependent) at sites SC1 and SC2, respectively. Similarly, mean overall dissolve copper concentrations were 5.3 times greater than the CCME guideline hardness-dependent) at SC1, but were 63 times greater than the guideline at site SC2 (Table 5.1-2).

The influence of contributions from Mitchell/Sulphurets Creek is evident in the Unuk River, where both the percentage of guideline exceedances and average factor of exceedances were generally elevated within the Unuk downstream of its confluence with Sulphurets Creek (UR1) relative to upstream monitoring site (UR1A), particularly for total iron and cadmium (Table 5.1-2).

5.1.4 Quality Assurance and Quality Control

5.1.4.1 Blanks

A total of 53 field blanks were collected from 2009 to 2013 (Appendix 7). Concentrations of most variables were usually less than detection limits. Exceptions included sporadic, occasional detections of turbidity, ammonia, nitrate, total Kjeldahl nitrogen (TKN), total nitrogen, TOC, total barium, total cadmium, total calcium, total chromium, and total manganese. Concentrations of TOC, turbidity, TKN, nitrogen, nitrate, barium, and manganese were two times greater than detection limits in a field blank collected on September 21, 2010.

A total of 55 travel blanks were collected from 2009 to 2013, in which concentrations of ammonia, nitrate, TKN, total nitrogen, TOC, total barium, total calcium, and total molybdenum were occasionally greater than detection limits (Appendix 7). The concentration of ammonia, nitrate, total organic carbon, calcium and barium were occasionally two times greater than detection limits. Conductivity, hardness, sulphate, total aluminum, total cadmium, total copper, total lead, total magnesium, total manganese, total molybdenum, total potassium, total sodium, total strontium, and total tin had concentrations greater than detection limits in travel blanks collected on January 17 and May 28, 2012. Together, results of travel blank analyses indicate the presence of some sample contamination during transit or laboratory analysis. However, concentrations of all variables in field blanks collected at the same time were less than detection limits.

Equipment blanks collected in 2010 and 2012 had concentrations of turbidity, aluminum (total and dissolved), barium (total and dissolved), total calcium, manganese (total and dissolved), tin (total and dissolved), and dissolved titanium that were greater than detection limits. In general, concentrations were less than twice the detection limit. However, concentrations of aluminum and tin were within the range of values observed in the study area and could have potentially influenced results. As such, results for these parameters should be interpreted with caution.

5.1.4.2 Duplicates

From 2008 to 2013, 70 duplicate samples were collected, and 94 variables were recorded (95 variables in 2012; Appendix 8). RPD was calculated for 32% (1804/5661) of duplicate concentrations, where concentrations were at least five times greater than the detection limit (BC MOE 2004). Of these, only 5% had RPD between 20% and 50% and only and 2% had RPD greater than 50%. Large RPD differences were sporadic, with the exception of two sets of duplicates collected from: 1) TC2 on July 22, 2010, in which RPD was between 20 and 50% for 11 variables and greater than 50% for six parameters; and 2) UR2 on June 13, 2009, in which RPD was between 20 and 50% for eight variables and greater than 50% for six variables. Elevated values may be related to environmental heterogeneity in streams with increased TSS.

5.2 BOWSER, SCOTT CREEK, TODEDADA CREEK, AND WILDFIRE CREEK WATERSHEDS (ANCILLARY PROJECT INFRASTRUCTURE)

Water quality results including physical characteristics, anions, nutrients, cyanides, total organic carbon and metals with provincial or federal guidelines for watercourses along the eastern extent of the Project (off-site ancillary Project infrastructure sampling sites), are presented in Figures 5.2-1 and 5.2-2 (physical limnology), 5.2-4 to 5.2-20 (streams), and 5.1-20 to 5.1-36 (lakes, presented in conjunction with Sulphurets and Brucejack Lakes). Although data from the entire period of water equality monitoring (2008-2013) are included in this report, only those sites pertinent to the EA (see Table 3.1-2) have been included as a basis for describing baseline or background conditions within the main report. The entire baseline dataset, including results for those sites outside the current study area boundary, are presented in Appendices 1 and 3.

5.2.1 Physical Limnology

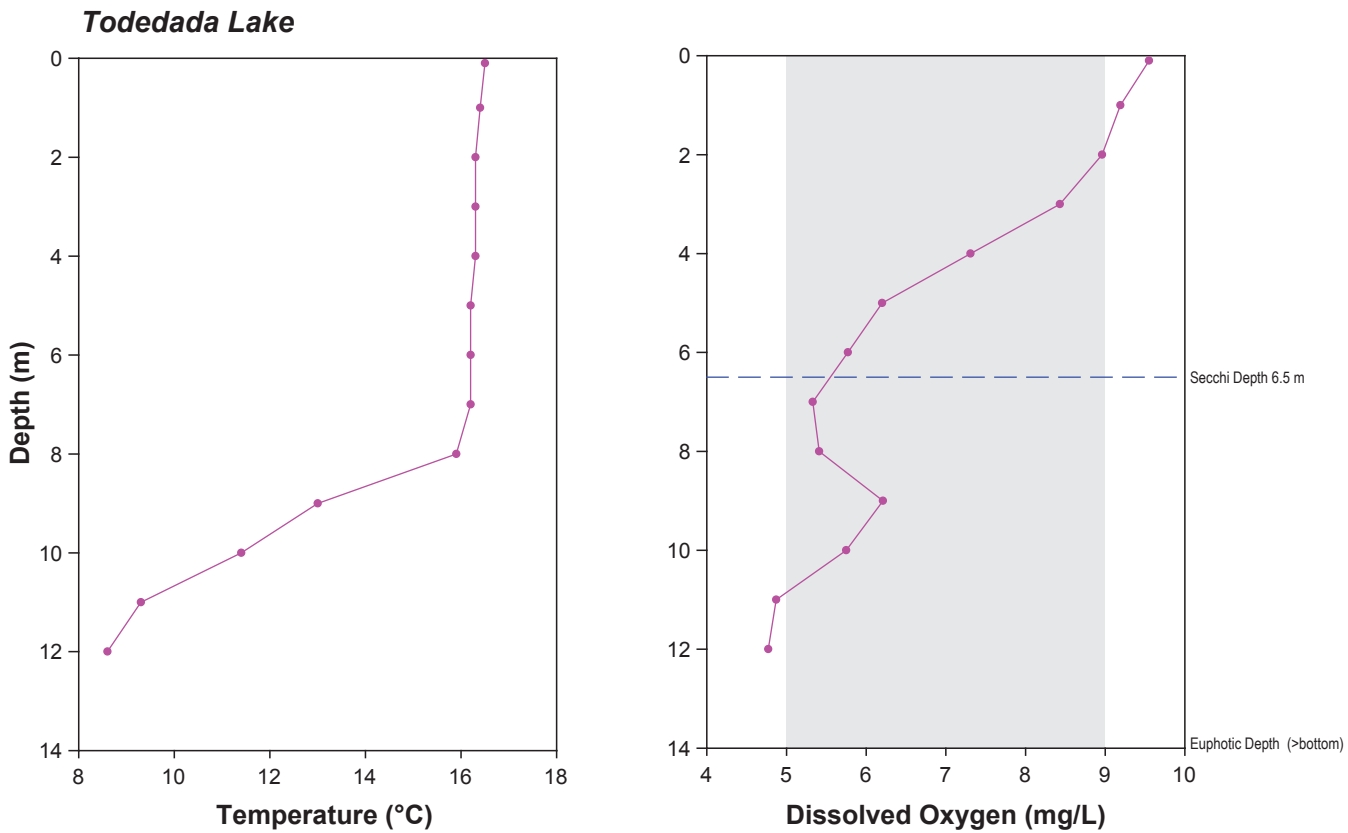
Within the off-site areas, Knipple Lake, Bowser Lake and Todedada Lake constituted the lake sampling program (see Table 3.1-3). Physical limnology parameters are graphed and presented in Figures 5.2-1 to 5.2-3. Data is available in Appendix 1.

5.2.1.1 Temperature, Dissolved Oxygen, and Conductivity

Knipple Lake is a glacier fed lake and was included in the 2013 program; sampling occurred once in August 2013. During this period, the water column was unstratifed with temperatures ranging from 2.5°C in surface waters to 1.8°C at depth (Figure 5.2-1). This result is likely due to the cold water inputs from the Knipple Glacier and glacier-fed Bowser River and suggests that, similar to glacier-fed Sulphurets Lake, Knipple Lake may remain unstratifed throughout the year. Dissolved oxygen in Knipple Lake was roughly 9.7 mg/L throughout the water column. Conductivity was also relatively similar throughout the water column (mean 54 uS/cm).

Figure 5.2-1

Temperature and Dissolved Oxygen Profiles from Todedada Lake (TL1), 2010



Notes: Data collected with a YSI

Shaded zone contains the minimum dissolved oxygen thresholds:

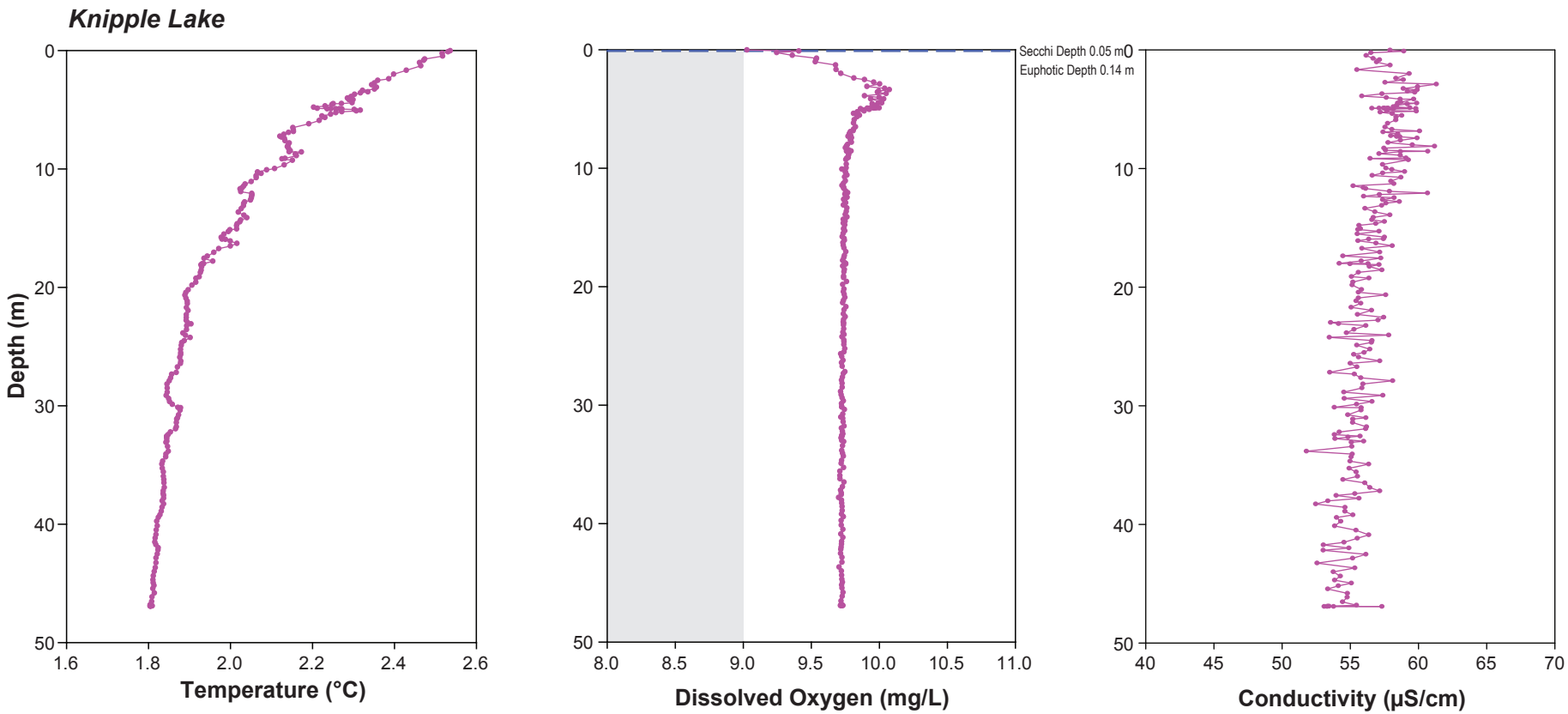
CCME guidelines are dependent on biota and life stage:
Lowest acceptable dissolved oxygen concentration:
for warm water biota: early life stages = 6 mg/L
for warm water biota: other life stages = 5.5 mg/L
for cold water biota: early life stages = 9.5 mg/L
for cold water biota: other life stages = 6.5 mg/L

Instantaneous BC guidelines are dependent on life stage:
all lifestages other than buried embryo and alevin = 5 mg/L
buried embryo and alevin lifestages = 9 mg/L

August 2010

Figure 5.2-2

Temperature, Dissolved Oxygen and Conductivity Profiles from Knipple Lake (KL), 2013



Notes: Data collected with a YSI

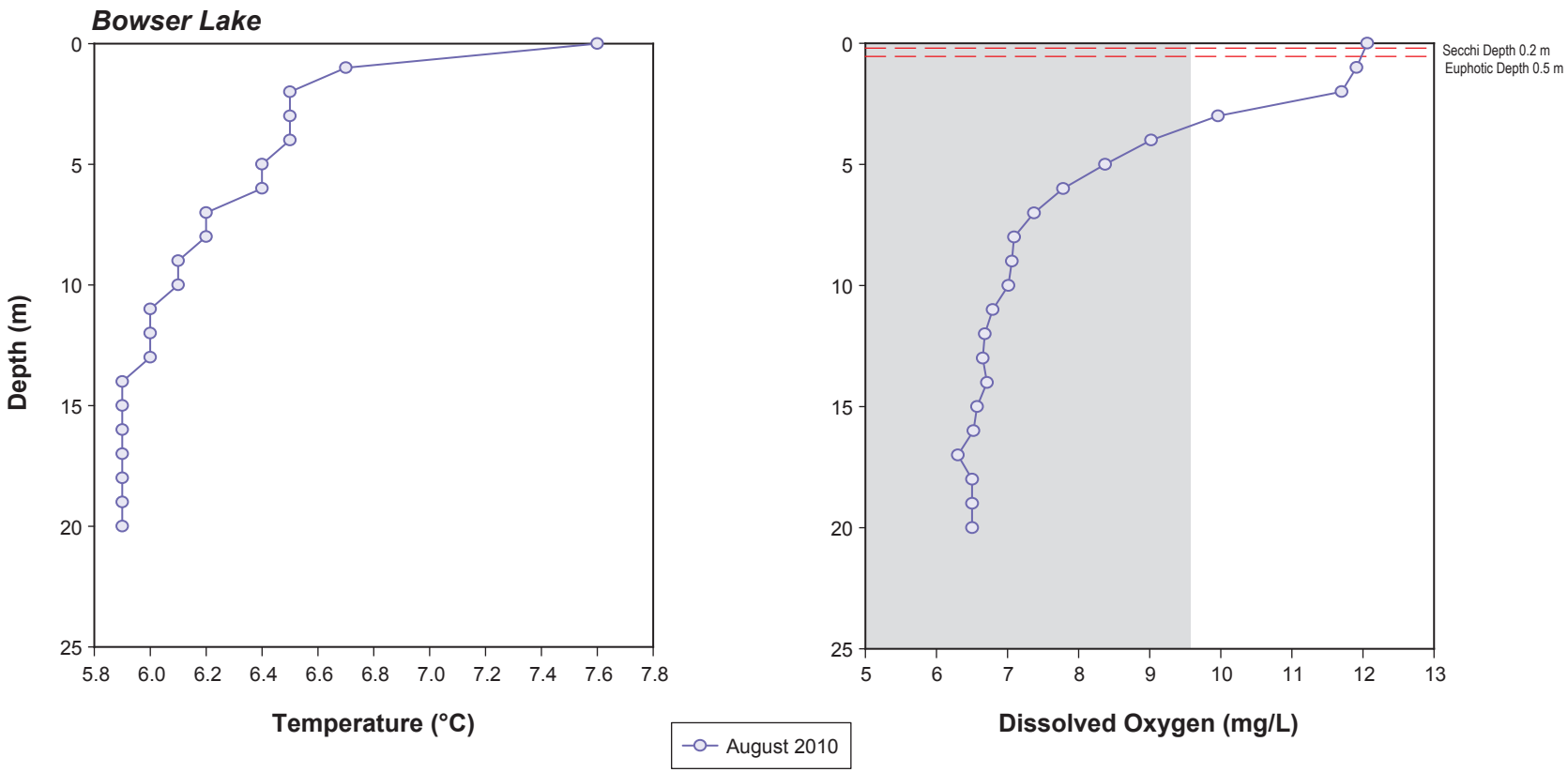
Shaded zone contains the minimum dissolved oxygen thresholds:

CCME guidelines are dependent on biota and life stage:
Lowest acceptable dissolved oxygen concentration:
for warm water biota: early life stages = 6 mg/L
for warm water biota: other life stages = 5.5 mg/L
for cold water biota: early life stages = 9.5 mg/L
for cold water biota: other life stages = 6.5 mg/L

Instantaneous BC guidelines are dependent on life stage:
all lifestages other than buried embryo and alevin = 5 mg/L
buried embryo and alevin lifestages = 9 mg/L

Figure 5.2-3

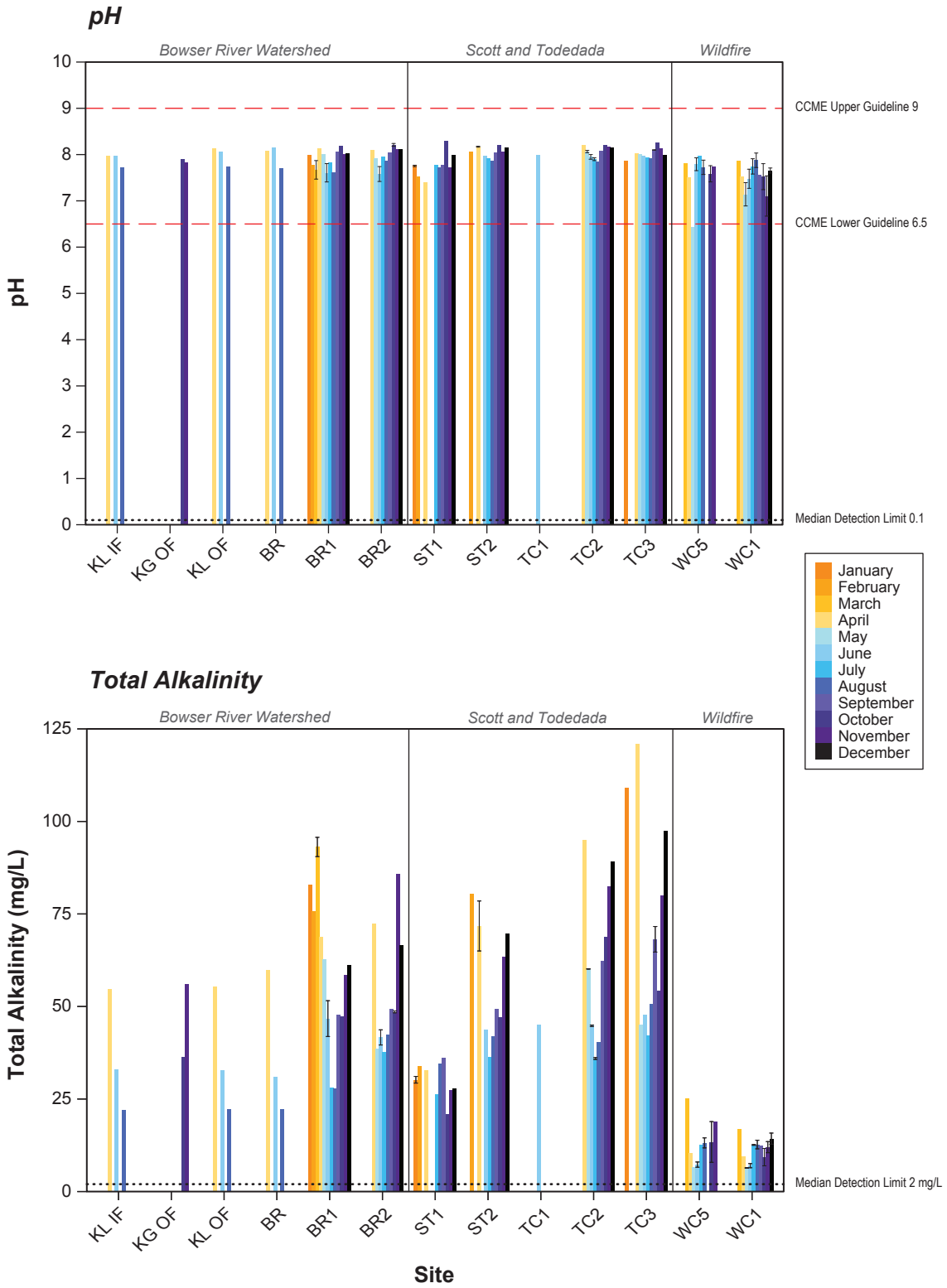
Temperature and Dissolved Oxygen Profiles from Bowser Lake (BL1), 2010



Notes: Data collected with a YSI.
Shaded zone contains the minimum dissolved oxygen thresholds.
CCME guidelines are dependant on biota and life stage.
Lowest acceptable dissolved oxygen concentration:
for warm water biota, early life stages = 6 mg/L;
for warm water biota, other life stages = 5.5 mg/L;
for cold water biota, early life stages = 9.5 mg/L;
for cold water biota, other life stages = 6.5 mg/L.
Instantaneous BC guidelines are dependent on life stage:
all lifestages other than buried embryo and alevin = 5 mg/L;
buried embryo and alevin lifestages = 9 mg/L.

Figure 5.2-4

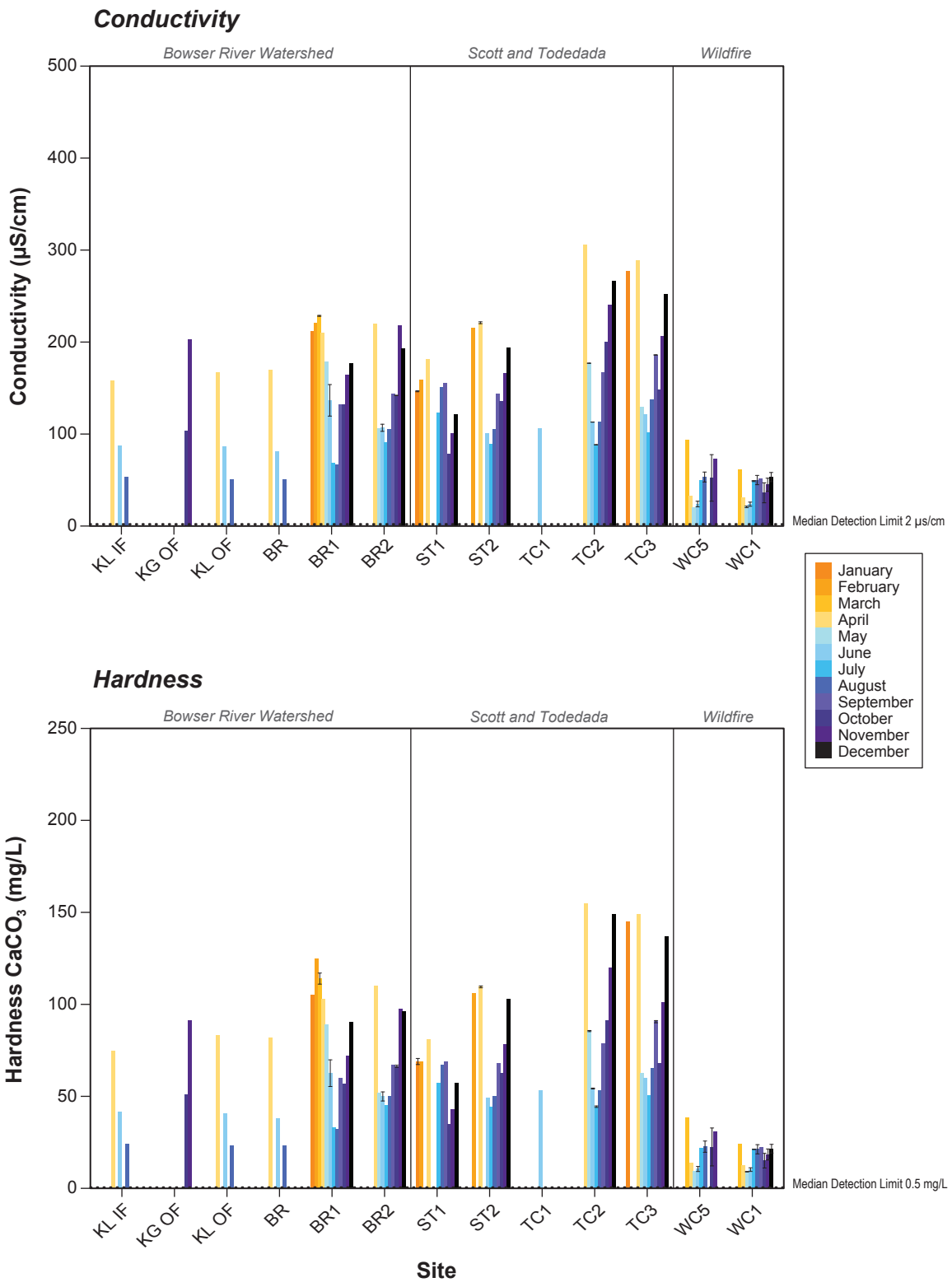
pH and Alkalinity in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.2-5

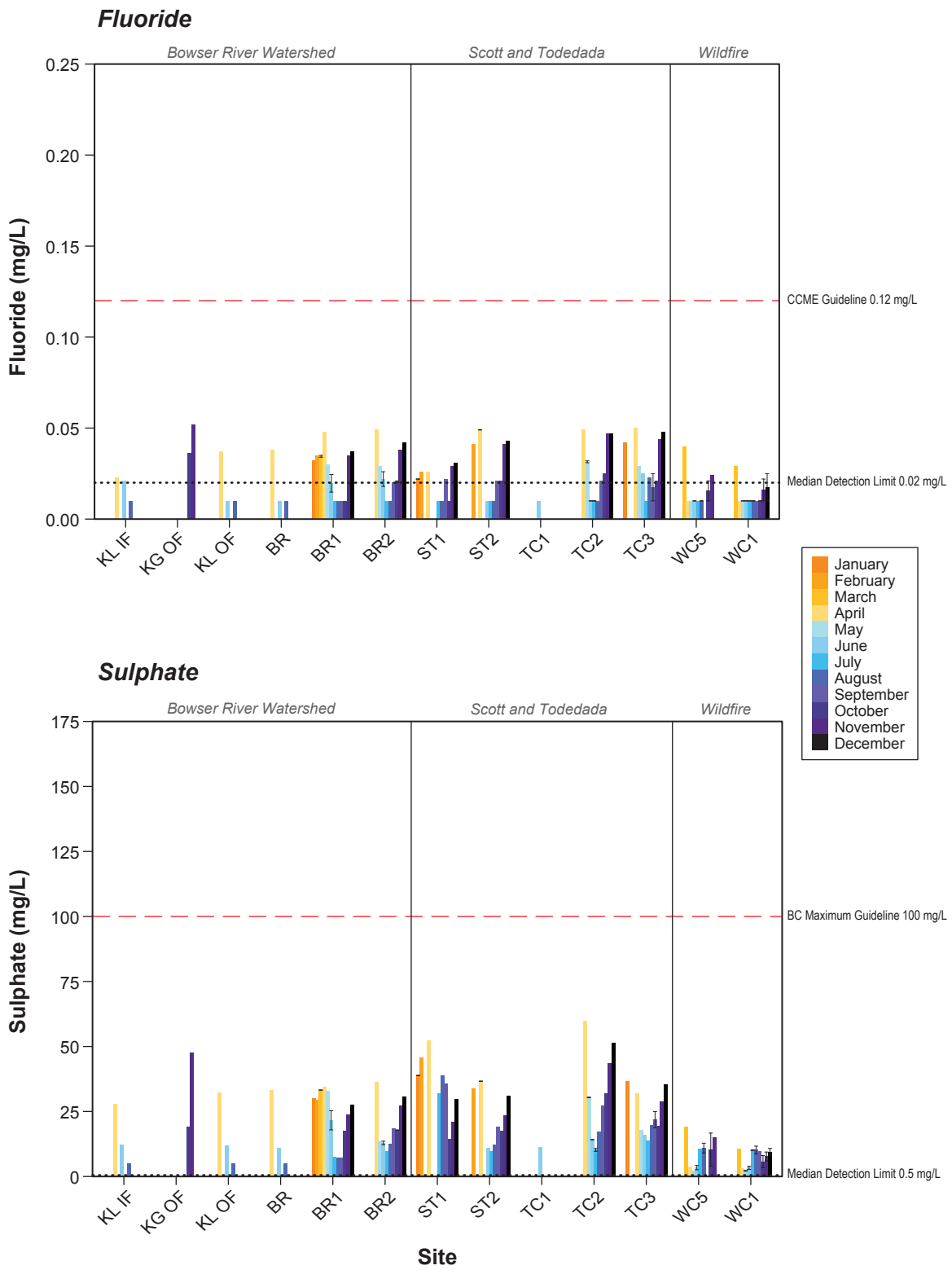
Conductivity and Hardness in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.2-6

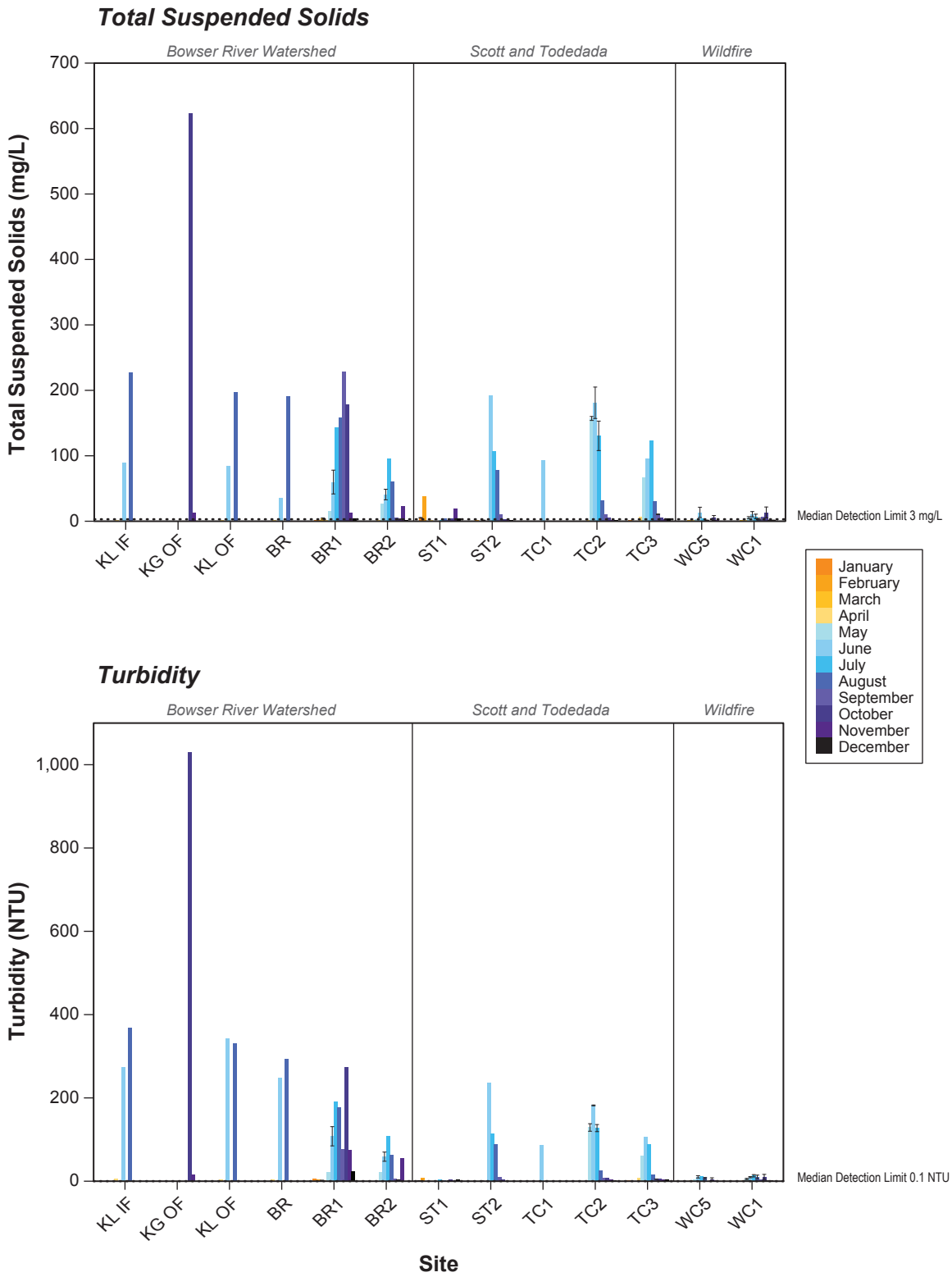
Fluoride and Sulphate in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
Fluoride CCME guideline is an interim guideline.
BC fluoride and BC sulphate guidelines are hardness−dependent, see appendix.

Figure 5.2-7

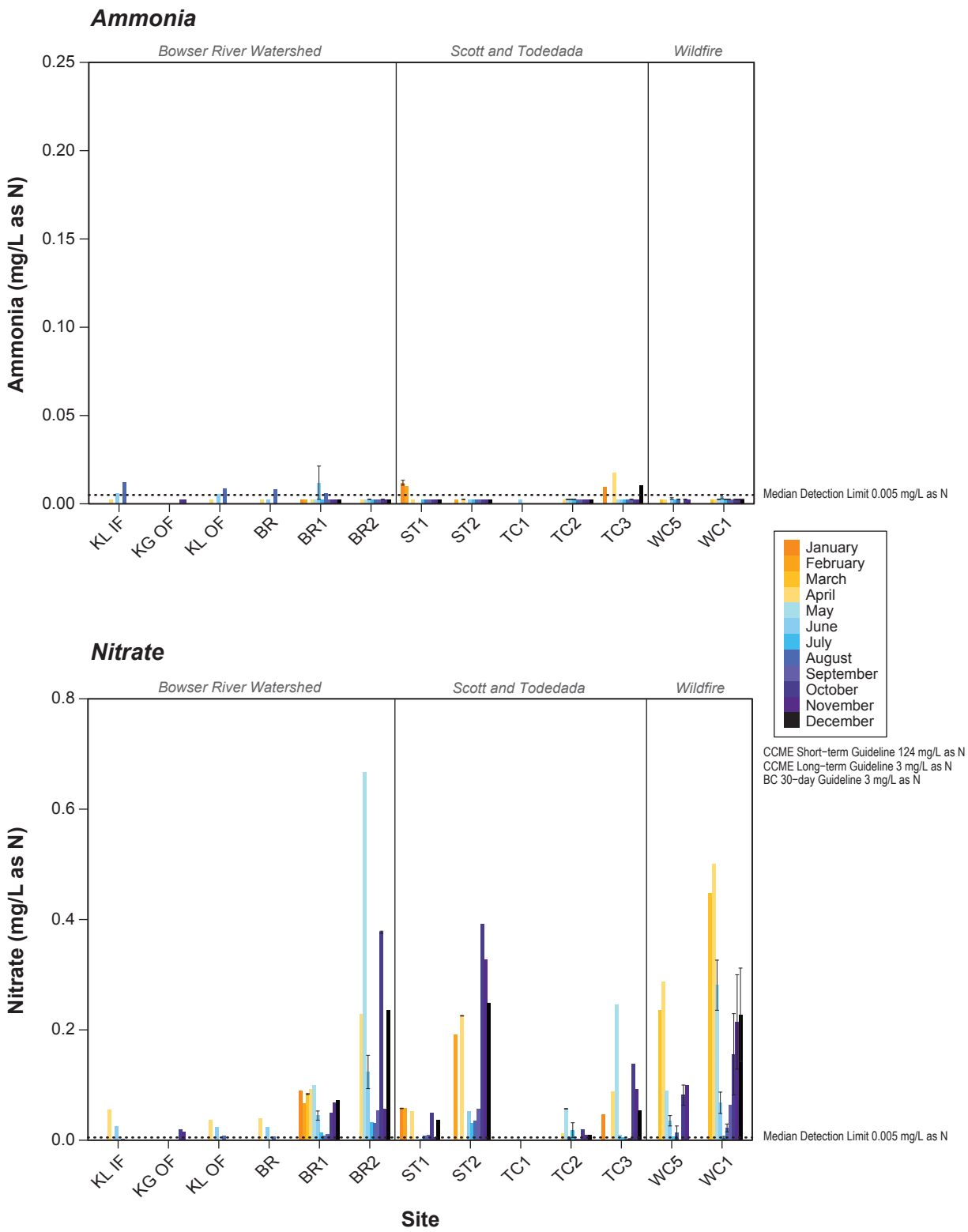
Total Suspended Solids and Turbidity in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME and BC guidelines for turbidity and total suspended solids are dependent on background levels, see appendix.

Figure 5.2-8

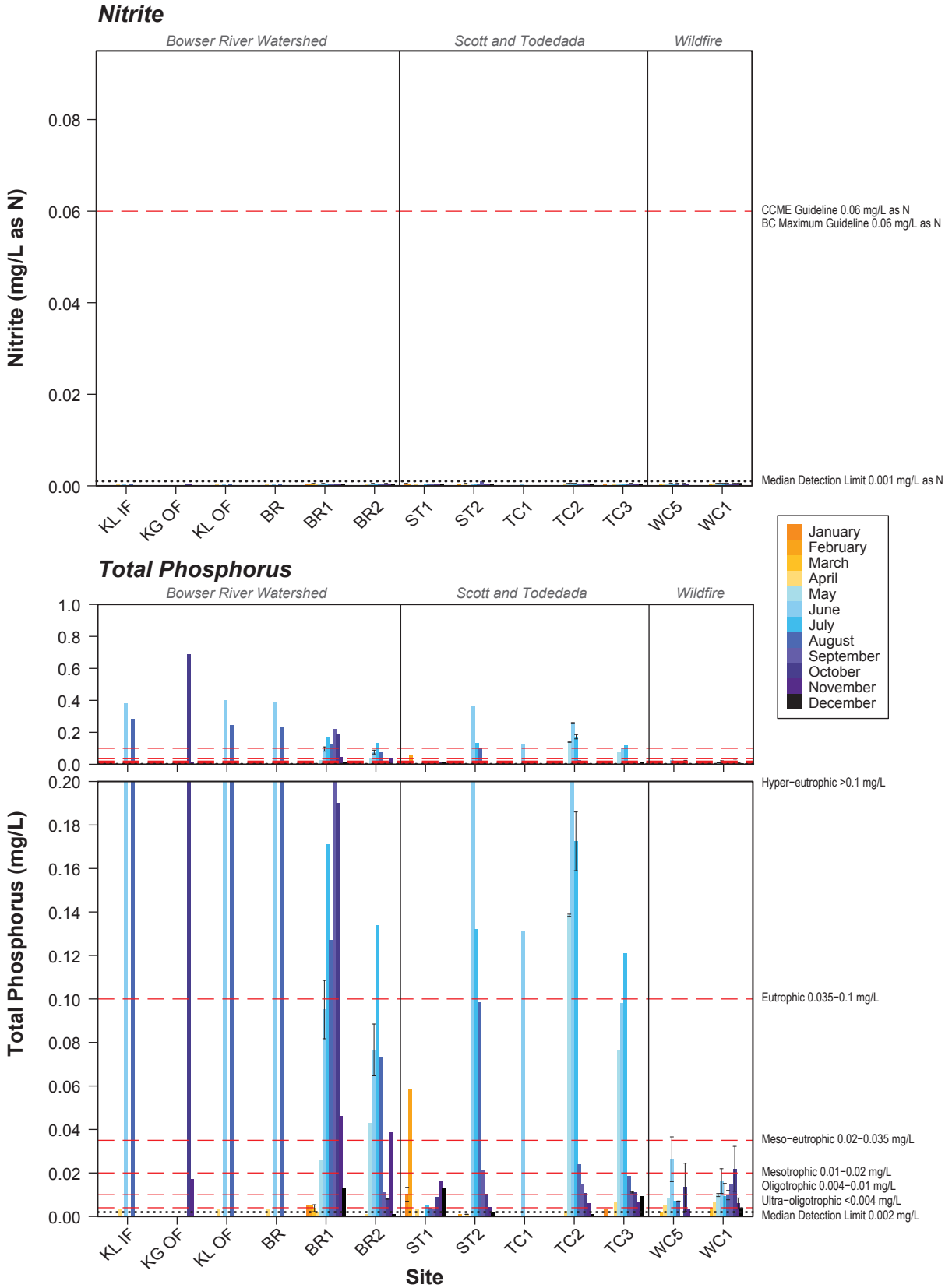
Ammonia and Nitrate in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME and BC guidelines for ammonia are pH− and temperature−dependent, see appendix.

Figure 5.2-9

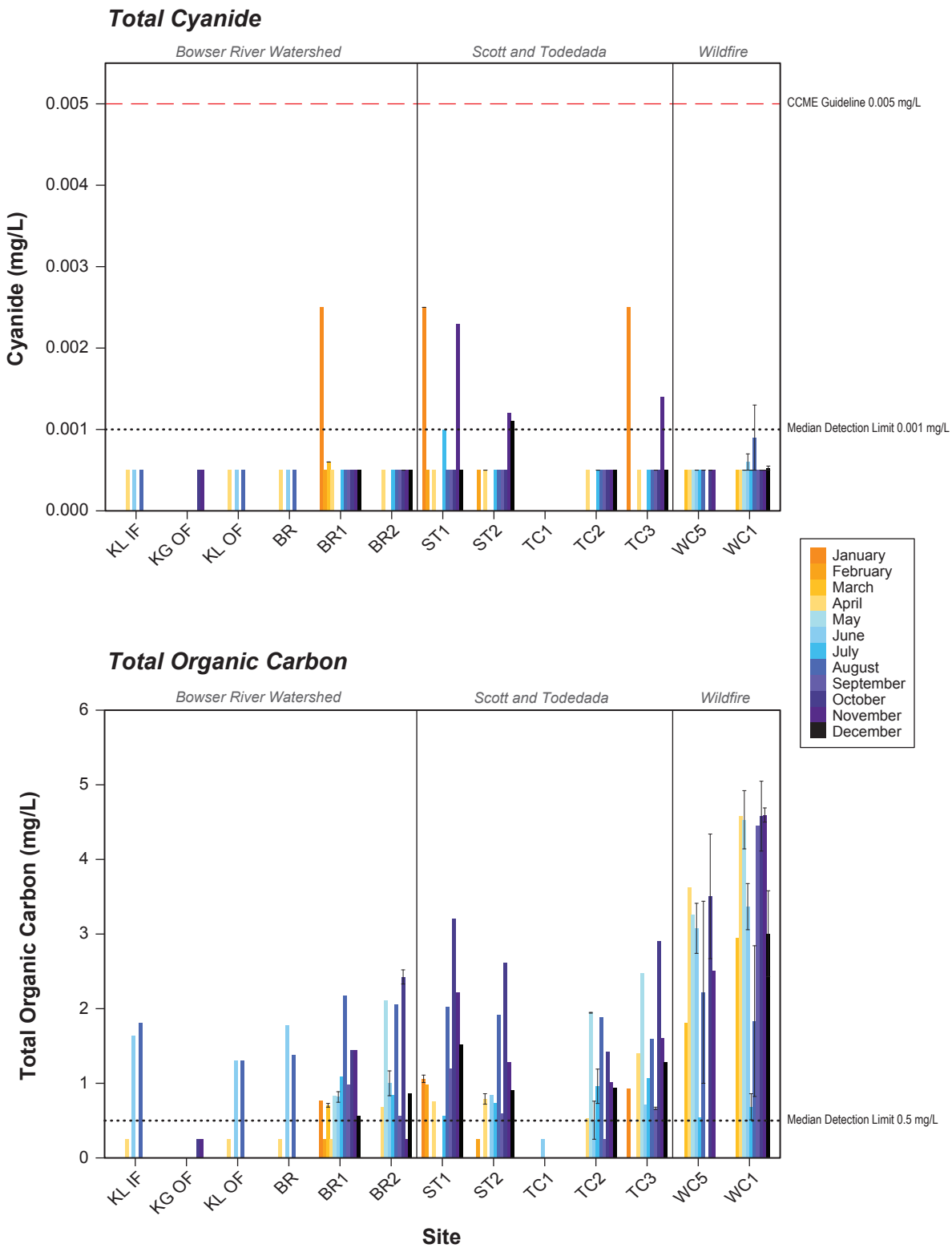
Nitrite and Total Phosphorus in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC nitrite guideline is chloride−dependent, see appendix.

Figure 5.2-10

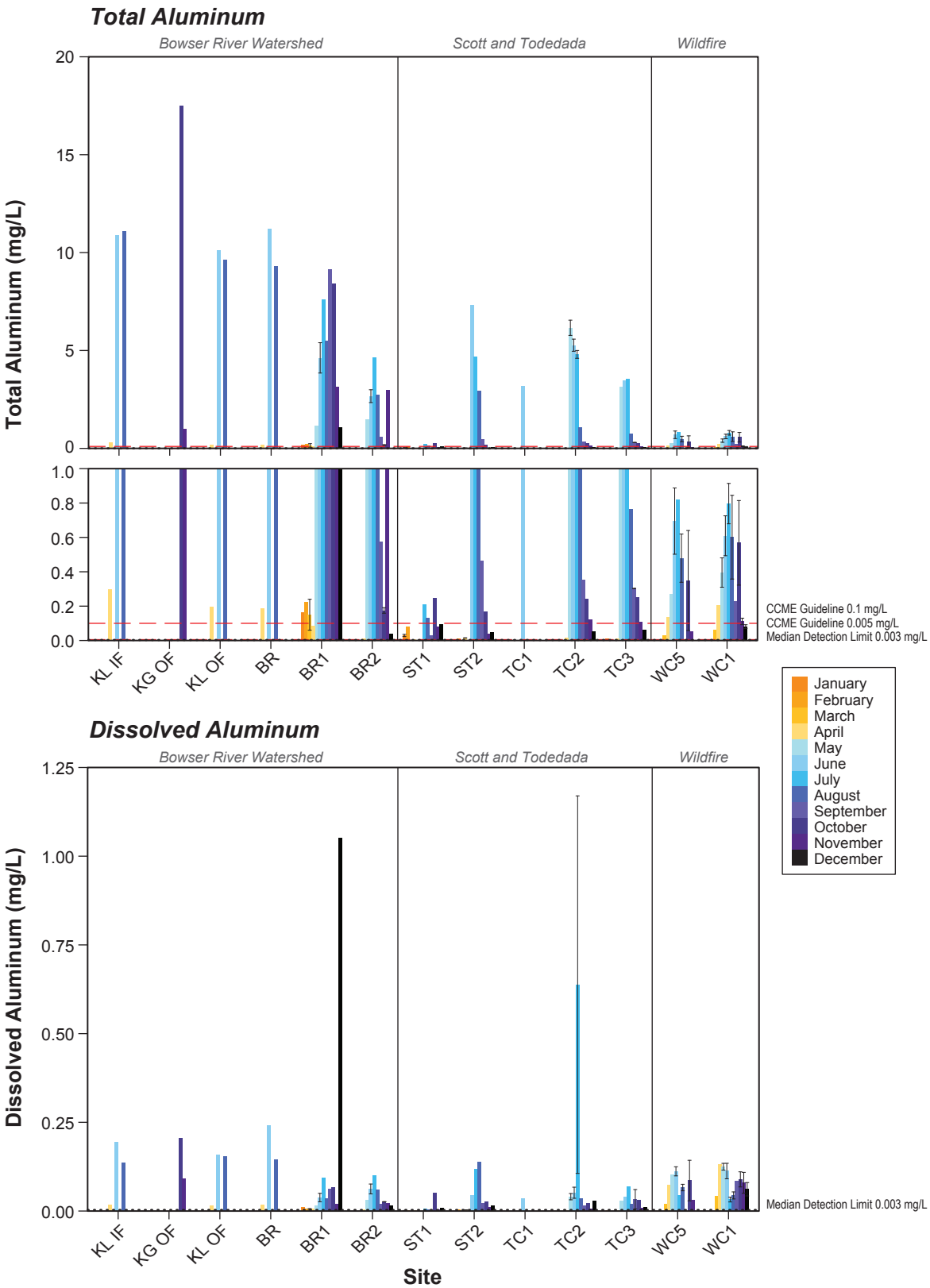
Total Cyanide and Total Organic Carbon in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC guideline for total organic carbon is dependent on background levels, see appendix.

Figure 5.2-11

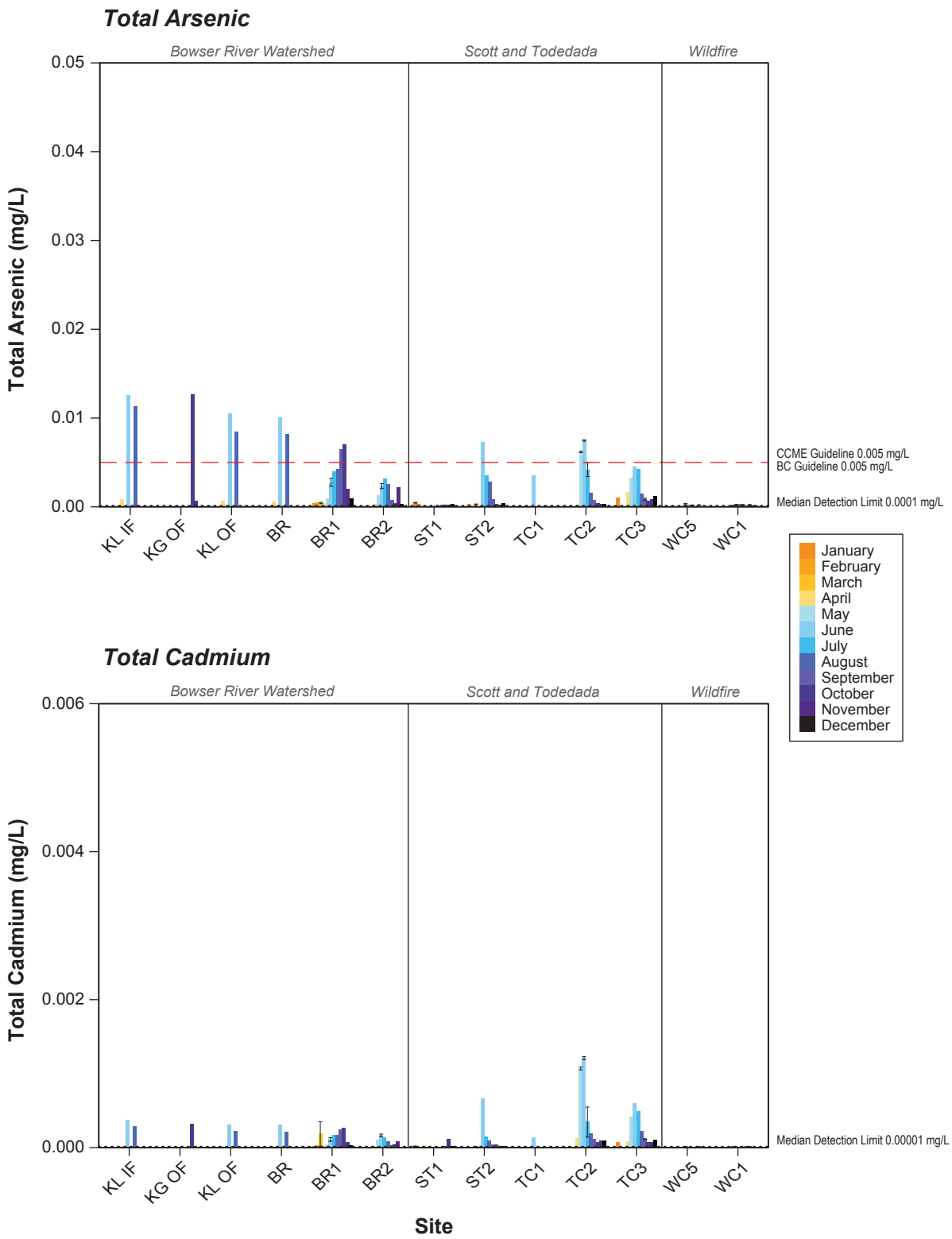
Total and Dissolved Aluminum in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME guideline for alumninum is pH−dependent: if pH < 6.5, then guideline = 0.005 mg/L; if pH ≥ 6.5 then guideline = 0.1 mg/L.
BC dissolved aluminum guideline is pH−dependent, see appendix.

Figure 5.2-12

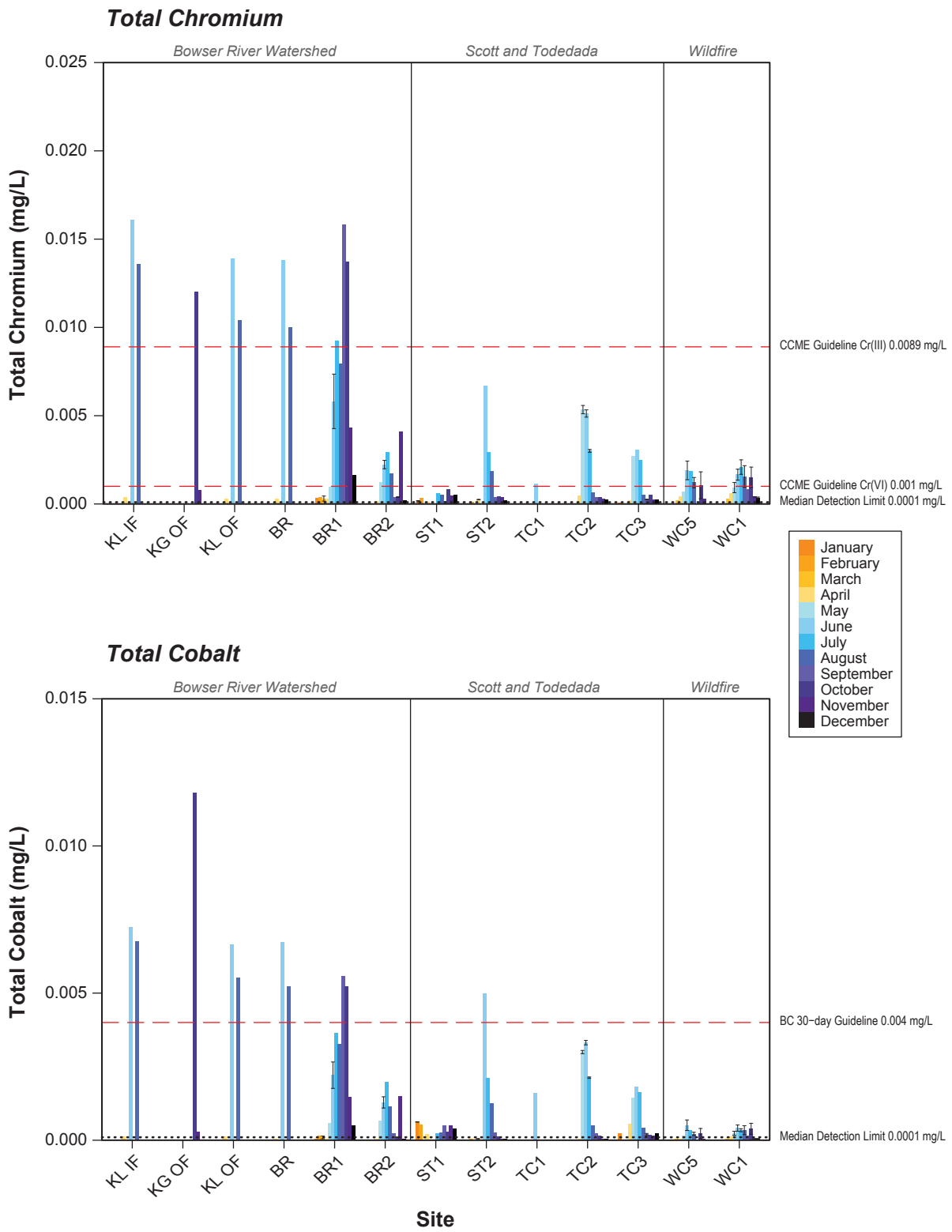
Total Arsenic and Total Cadmium in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME interim cadmium guideline is an hardness−dependent, see appendix.

Figure 5.2-13

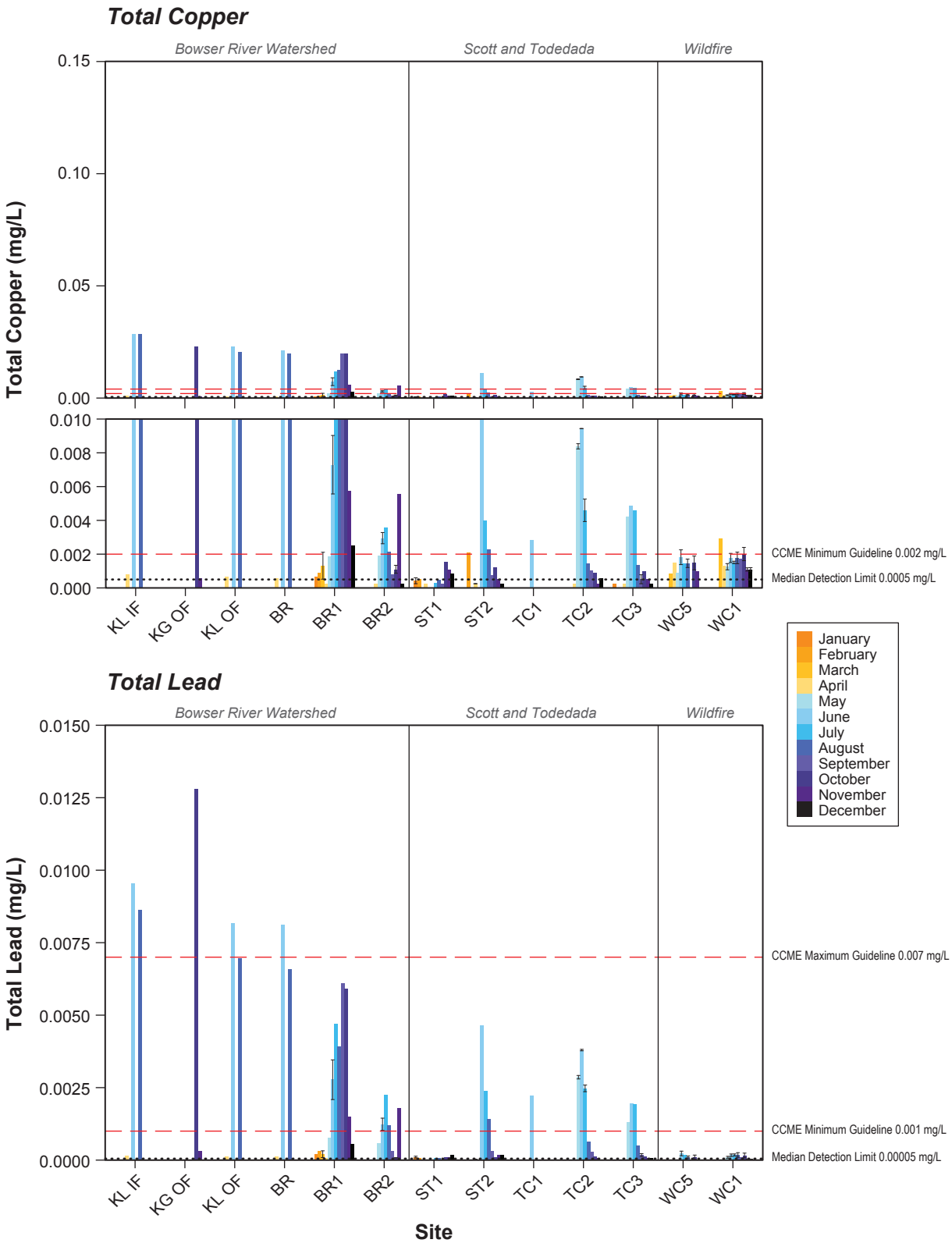
Total Chromium and Total Cobalt in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.2-14

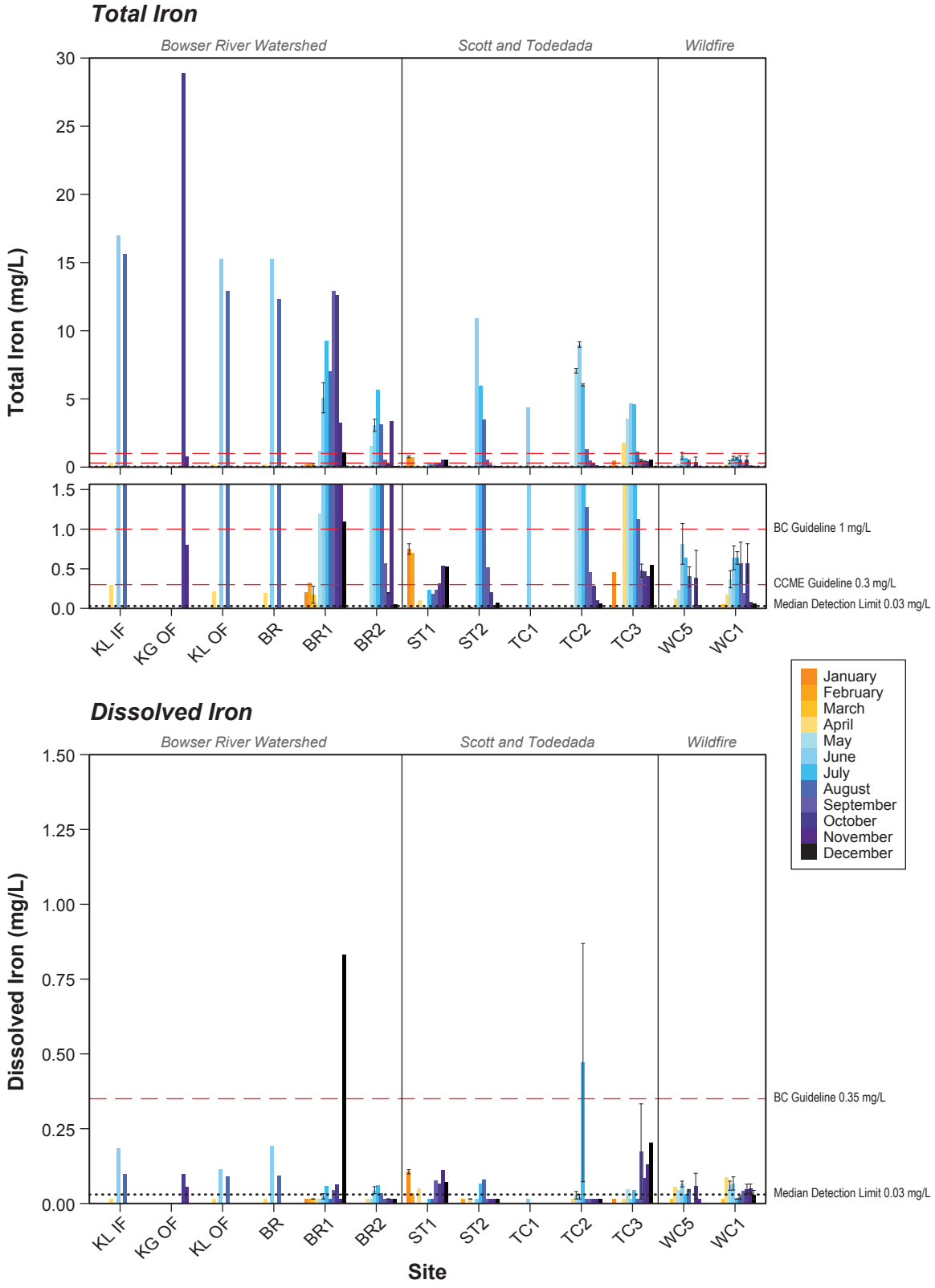
Total Copper and Total Lead in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
CCME, BC copper and BC lead guidelines are hardness−dependent, see appendix.

Figure 5.2-15

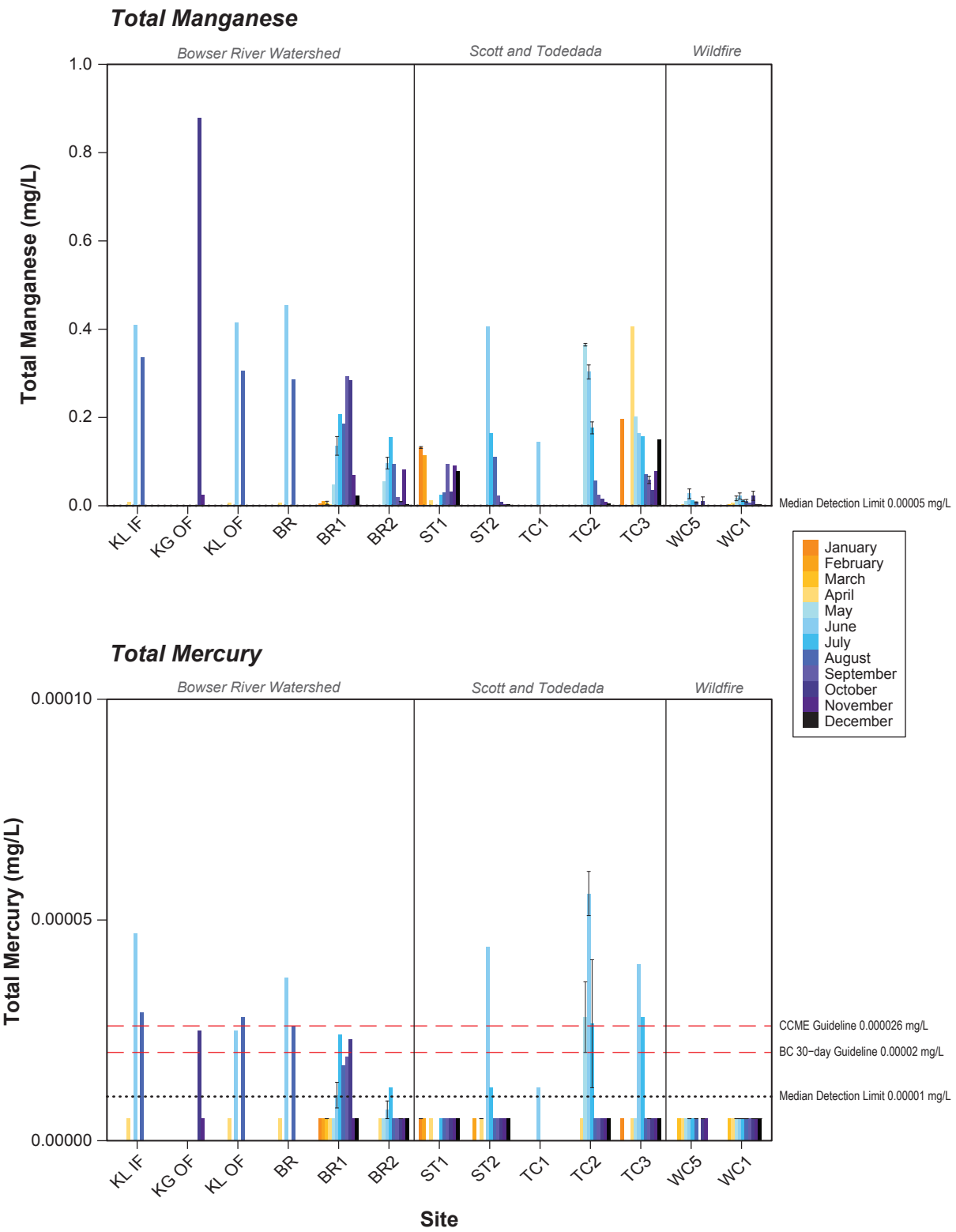
Total and Dissolved Iron in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.

Figure 5.2-16

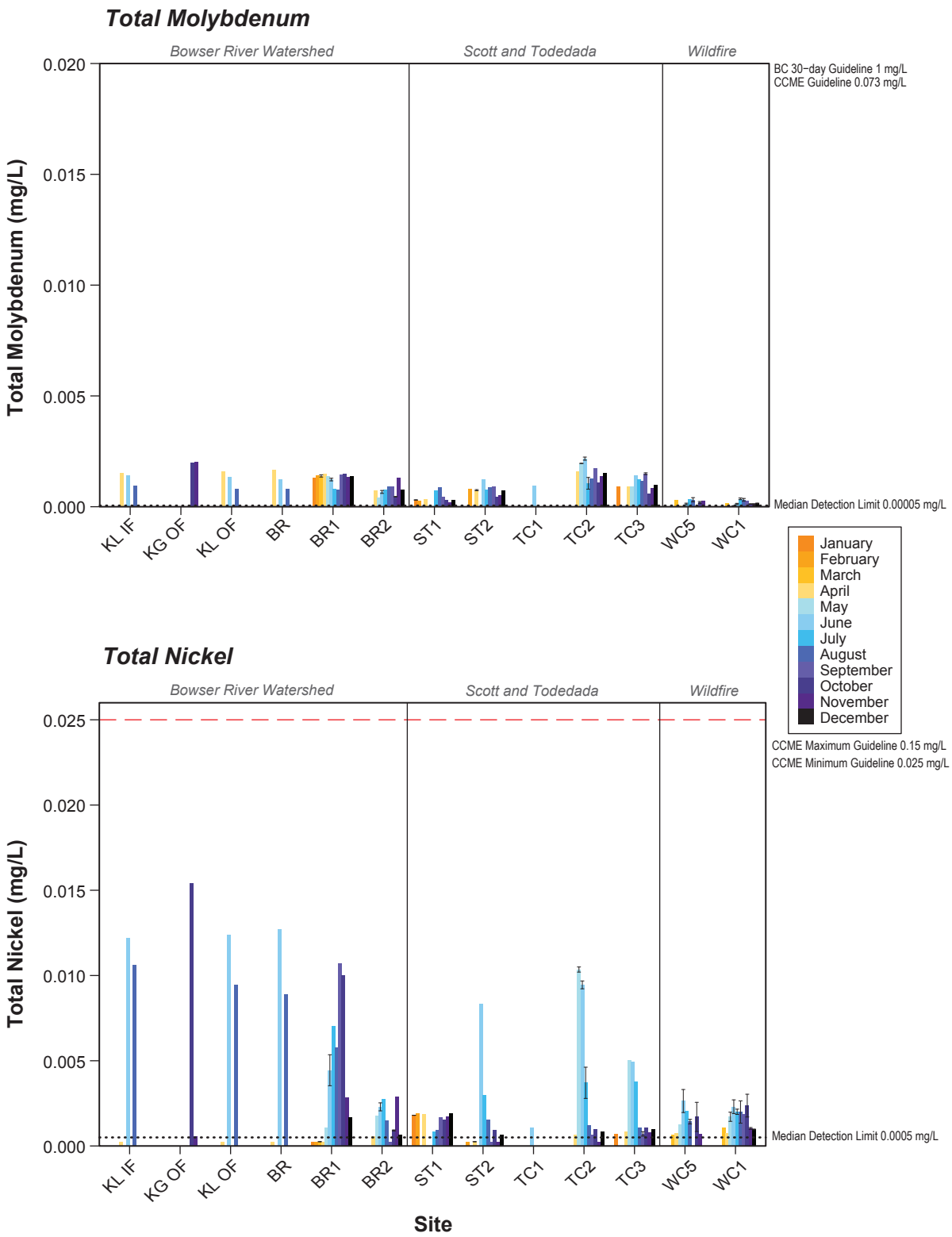
Total Manganese and Total Mercury in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC guideline assumes a methylmercury concentration of 0.5% of the total mercury.
BC manganese guidelines are hardness−dependent, see appendix.

Figure 5.2-17

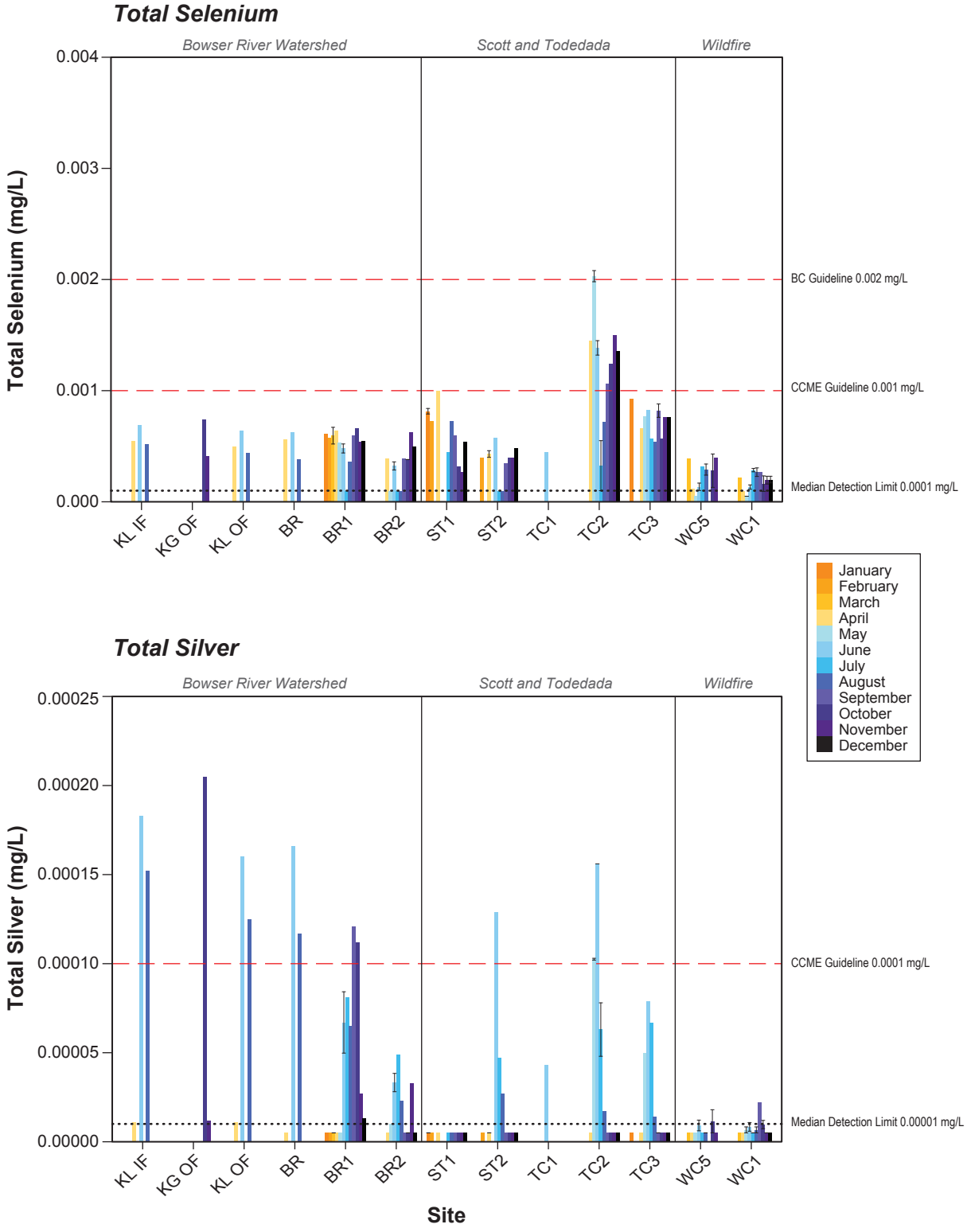
Total Molybdenum and Total Nickel in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
Molybdenum CCME guideline is an interim guideline.
CCME and BC nickel guidelines are hardness−dependent, see appendix.

Figure 5.2-18

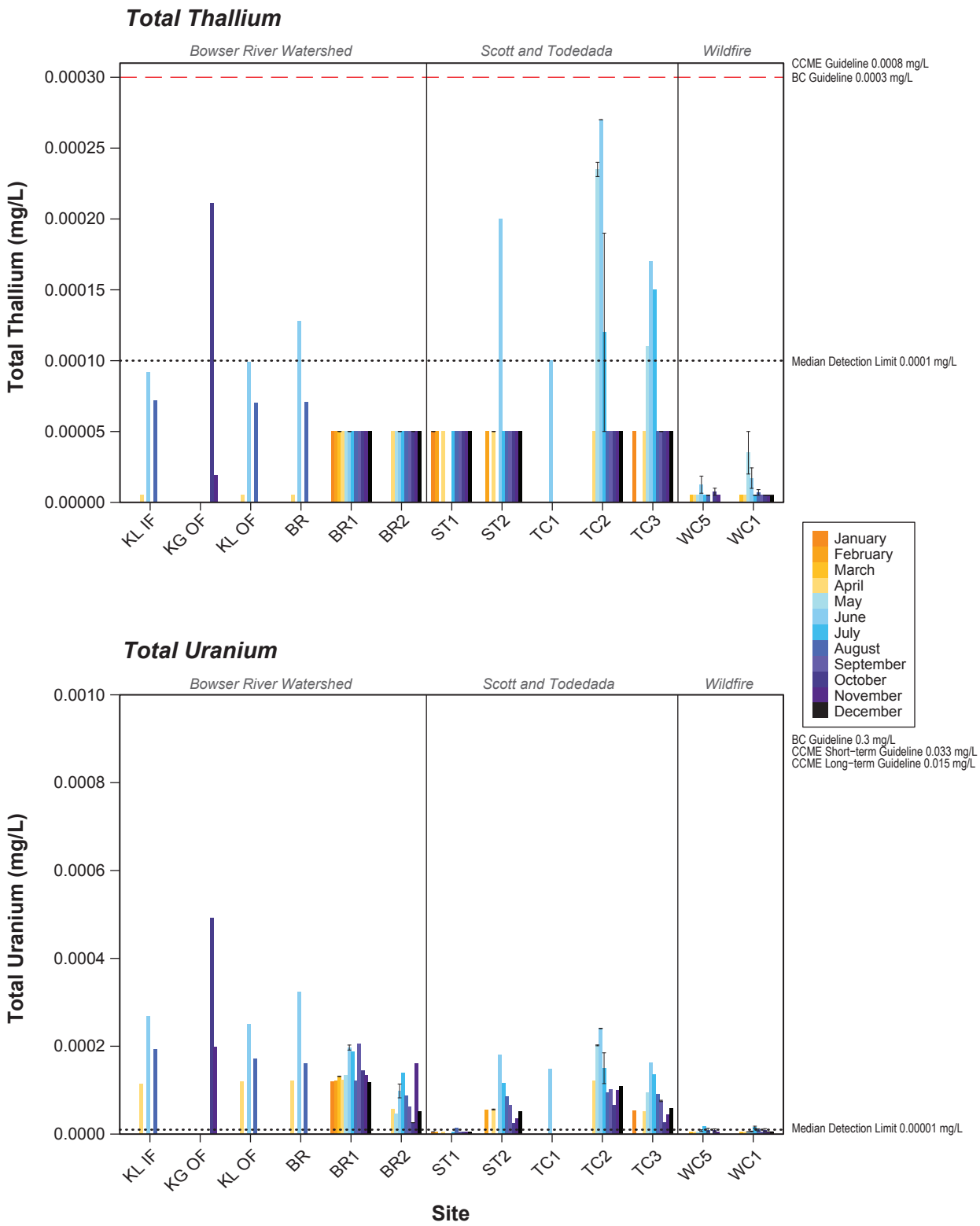
Total Selenium and Total Silver in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC silver guideline is hardness−dependent, see appendix.

Figure 5.2-19

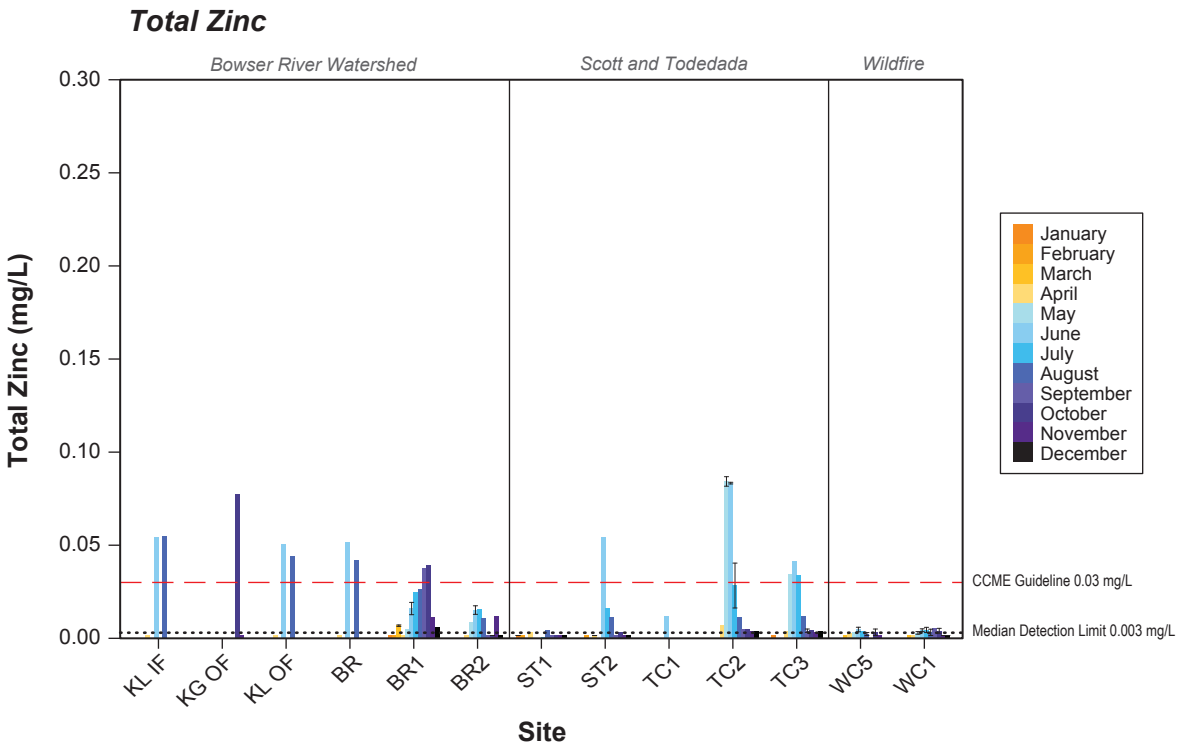
Total Thallium and Total Uranium in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC guideline is an interim guideline.

Figure 5.2-20

Total Zinc in Off-Site Areas (Ancillary Project Infrastructure), Brucejack Gold Mine Project (2008 to 2013)



Notes: Error bars represent the standard error of the mean.
Dotted line represents the analytical detection limit; values below the detection limit were plotted as half the detection limit.
BC zinc guideline is hardness−dependent, see appendix.

In contrast to Knipple Lake, Todedada and Bowser Lakes are dimictic and stratified. In these lakes, temperature and DO were greater at the surface and decreased toward the sediments, a pattern that likely reflects surface warming and photosynthetic activity in the upper layer. Stratification occurred at 8 m in Todedada Lake and between 1 and 2 m in Bowser Lake. Relative to Knipple, Bowser, Brucejack and Sulphurets lakes, Todedada Lake is poorly oxygenated, likely a result of the comparatively shallow depth and higher organic concentrations of Todedada Lake (Figures 5.2-2 and 5.2-3). In both Todedada and Bowser lakes, temperature and DO were substantially greater at the surface and decreased toward the sediments, a pattern that likely reflects surface warming and photosynthetic activity in the upper layer. DO concentrations were less than the CCME guideline range for the protection of aquatic life throughout the entire water column in Todedada Lake.

5.2.1.2 Light

The greatest mean D_s and $Z_{1\%}$ in the baseline study area were recorded in Todedada Lake (D_s = 6.5 m; $Z_{1\%}$ = 17.6 m; Table 5.2-1). In contrast, similar to Sulphurets Lake, Secchi depth is extremely shallow for both Knipple (also glacial-headed lake; D_s = 5.0 cm) and Bowser Lakes (D_s=0.2m), resulting in poor light penetration and a very shallow euphotic zone (Table 5.2-1). Primary producers, generally dependent on solar radiation for growth, would have difficulty surviving in these low light conditions.

Table 5.2-1. Secchi and Euphotic Depth in Brucejack and Sulphurets Lake, Brucejack Gold Mine Project, 2008 to 2013

	Secchi Depth, D_s (m)						
Lake	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Mean**
Knipple Lake (KL)	-	-	-	-	-	0.05	0.05
Bowser Lake (BL1)	-	-	0.2	-	-	-	0.2
Todedada Lake (TL1)	-	-	6.5	-	-	-	6.5
	Euphotic Depth, $Z_{1\%}$ (m)						
Lake	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Mean**
Knipple Lake (KL)	-	-	0.54	-	-	0.14	0.34
Bowser Lake (BL1)	-	-	0.54	-	-	-	0.54
Todedada Lake (TL1)	-	-	17.59	-	-	-	17.59

Note:
$Z_{1\%}$ was calculated as follows: $Z_{1\%} = 4.6/k$
where k is the light extinction coefficient for non-turbid waters (Parsons et al. 1984)
where k = 1.7/Ds and Ds = Secchi depth

5.2.2 Water Quality

Water quality results including physical characteristics, anions, nutrients, cyanides, total organic carbon and metals with provincial or federal guidelines for watercourses along the eastern extent of the Project (off-site ancillary Project infrastructure sampling sites), are presented in Figures 5.2-1 and 5.2-2 (physical limnology), 5.2-4 to 5.2-20 (streams), and 5.1-20 to 5.1-36 (lakes, presented in conjunction with Sulphurets and Brucejack Lakes).

Within the study area, streams typically experience a low flow period between November and April and higher flows between May and October associated with freshet, summer glacial melt, and fall heavy rain events. As a result, water quality varies spatially and temporally; monthly means of water quality variables are presented throughout the report to capture potential variability during both low flow and high flow periods.

5.2.2.1 General Parameters

Knipple, Bowser and Todedada lakes were only sampled during open-water seasons. Knipple Lake has similar chemistry to Sulphurets Lake; waters are soft (mean hardness = 25.4 to 25.8 mg/L), and of circumneutral pH (7.58 to 7.97) with low total alkalinity (17.0 to 17.1 mg/L). Conductivity of Knipple Lake was generally lower than any other lake in the baseline study area (50.1 to 50.6 µS/cm; Figures 5.1-20 and 5.1-21). Conductivity, hardness, total alkalinity are elevated in Bowser and Todedada Lakes compared to Knipple Lake (range: conductivity= 91 to 155 µS/cm; hardness = 43 to 71 mg/L; alkalinity 35 to 62 mg/L; Figures 5.1-20 and 5.1-21). In general, there were no significant differences in these parameters with depth in either Knipple, Bowser or Todedada Lakes.

In general, streams within off-site areas were soft to moderately hard (mean: 15.3 to 89.2 mg/L), circumneutral to slightly alkaline (mean: pH 7.52 to 8.06), with low to moderate alkalinity (mean: 9.9 to 71.3 mg/L) and wide ranging conductivities (mean: 36.5 to 184.2 µS/cm). Sites WC1 and WC5 within the Wildfire Creek watershed were the most acid-sensitive and had the lowest alkalinity, hardness, pH and conductivity of all stream sites in off-site areas. Effects of the hydrological regime were evident in off-site areas with minima of conductivity, hardness and alkalinity generally associated with low flow periods (Figures 5.2-4 and 5.2-5).

5.2.2.2 Total Suspended Solids and Turbidity

The hydrological regime was a major driver of TSS and turbidity in off-site areas, with the highest levels associated with high flow months and spring freshet in glacial-headed systems and thus decrease from east (i.e., at Knipple Glacier and Bowser River watershed) to west (Wildfire Creek watershed; Figure 5.2-7).

TSS and turbidity were generally greatest within the Bowser River watershed, ranging from > 3.0 to 228 mg/L and 0.54 to 368 NTU (Figure 5.2-7). Similarly, Knipple Lake had the highest TSS and turbidity of all study area lakes (218 to 226 mg/L; 308 to 316 NTU; Figure 5.1-23). TSS and turbidity levels were similar in Bowser and Todedada Lake (TSS range < 3.0 to 18 mg/L, turbidity 72 to 95 NTU).

Wildfire Creek watershed is much lower elevation with few glacier contributions and correspondingly decrease in TSS and turbidity (range: > 3.0 to 53 mg/L; 0.54 to 22 NTU) and associated particulate-bound metals.

5.2.2.3 Nutrients and Anions

Nutrients and anions measured as part of the baseline study for the off-site Project areas include ammonia, nitrate, nitrite, sulphate and fluoride (Figures 5.2-6, 5.2-8, 5.2-9 (streams); 5.1-22, 5.1-24, 5.1-25 (lakes)).

Nutrient concentrations were generally higher in off-site area monitoring locations than within the Brucejack/Sulphurets/Unuk watersheds. Off-site areas are at lower elevation and likely have higher allocthonous carbon and nutrient inputs (Plate 3.2-1). Phosphorous concentrations were particularly elevated in Knipple Lake (glacial-headed; hyper-eutrophic, 0.259 to 0.261 mg/L), likely associated with elevated TSS loads (Figure 5.1-23). Ammonia and nitrate concentrations were similar to Sulphurets and Brucejack Lake, respectively. Nitrite concentrations were always below detection limits off-site area Lakes (Median DL = 0.001 mg/L).

Within monitored stream sites in off-site areas, nutrient concentrations were generally consistent along the Bowser River from KL IF to BR2 and within the Scott/Todedada/Wildfire areas. Ammonia and nitrite concentrations were generally at or below detection limits in all off-site area monitoring locations. Phosphorus levels were generally eutrophic to hyper-eutrophic (0.035 to > 0.1 mg/L), with minima observed in the Wildfire watershed (oligotrophic to meso-eutrophic) and ST1 sites (oligotrophic). Nitrate concentrations generally increased along Bowser River (range: 0.0025 to 0.055 mg/L KL_IF to a 0.0303 to 0.666 mg/L at BR2) and were highest within the Wildfire Creek area (range: 0.0025 to 0.501 mg/L).

5.2.2.4 Organic Carbon and Cyanides

Throughout the off-site areas, TOC was elevated compared to sites within the Brucejack/ Sulphurets/Unuk watersheds (Figures 5.2-9 and 5.1-26). In stream sites, maxima concentrations were associated with high flow periods and the overall highest values were observed within the Wildfire Creek area, where small, low elevation streams were surrounded by overhanging vegetation (range: 0.54 to 5.50 mg/L). Cyanide concentrations generally emailed below detection limits (Figure 5.2-9).

5.2.2.5 Total and Dissolved Metals

Surface water quality varies substantially in this region based on hydrological regime where increased sediment load and transport during high flow periods leads to increased concentrations of total suspended solids (TSS) and associated particulate-bound metals (Figure 5.2-7). In particular, within off-site areas, assessment indicates that elevated levels of some total metals during freshet (Al, Cd, Cu, Pb, Ag, and Zn) are reflective of natural background conditions.

The greatest concentrations of total metals, similar to TSS and turbidity, were associated with high flow months and spring freshet in glacial-headed systems and thus decrease from west (i.e., at Knipple Glacier and Bowser River watershed) to east (Wildfire Creek watershed); Figures 5.1-27 to 5.1-36 (lakes), and 5.2-4 to 5.2-20 (streams)). This is likely reflective of corresponding higher sediment loads in Bowser watershed and associated particulate-bound metals.

Within Knipple Lake, concentrations of total and dissolved metals were elevated, likely as a consequence of elevated TSS concentrations and glacial inputs; most metal parameters measured were at higher concentrations in Knipple Lake than any other lake within the baseline study area (Figures 5.1-27 to 5.1-36). These include aluminum (total and dissolved), arsenic, cadmium, chromium, cobalt, lead, iron (total and dissolved), nickel, selenium, thallium, uranium, and zinc. Similarly, overall mean concentrations of chromium (0.002 mg/L) and uranium (0.000087 mg/L)

were elevated in Bowser Lake, which also had relatively higher concentrations of TSS. In contrast, the majority of metals were below detection limit downstream at Todedada Lake, which was more similar in chemistry to Brucejack Lake (Figures 5.1-27 to 5.1-36).

Total and dissolved metal concentrations of stream sites within the Bowser River, Scott/Todedada and Wildfire Creek Area were low and in general remained less than or close to detection limits, particularly within Scott Creek and Wildfire Creek Areas (Figures 5.2-4 to 5.2-20). These included cadmium, iron (dissolved), mercury, molybdenum, thallium, and zinc. Concentrations of aluminum (total and dissolved), arsenic, chromium, cobalt, copper, lead, total iron, manganese, mercury, and silver were elevated, in particular within the Bowser River watershed (KL-IF, KG_OF, KL-OF, BR, BR1, BR2). Selenium concentrations were slightly elevated in off-site monitoring locations (range 0.00010 0.00208), particularly within Treaty Creek sites (TC2 and TC3; overall mean: 0.00073 to 0.00123 mg/L).

5.2.3 Comparison to Water Quality Guidelines

The mean frequency of collected samples that were greater than BC MOE and CCME water quality guidelines and the factor by which mean overall concentrations were greater than guideline values are presented in Table 5.2-2. Frequencies and factors by which concentrations were greater than guideline values are presented for each year in Appendix 6.

5.2.3.1 BC MOE

Fifteen of the 29 parameters with BC MOE guidelines for the protection of aquatic life had overall mean concentrations greater than guideline value in off-site monitoring locations (Table 5.2-2). These included pH (Wildfire Creek Area only), WAD cyanides (Wildfire Creek Area only), dissolved aluminum, arsenic, cadmium, cobalt, copper, iron (total and dissolved), mercury, manganese, lead, selenium, silver, and zinc.

Maxima of percentage of guideline exceedances and average factors of exceedances of water quality samples were always associated with stream and lake sites within the Bowser River watershed (KL, KL_IF, KG_OF, KL_OF, BR, BR1, BR2, and BL1). For example, exceedances factors for iron concentrations ranged from 1.8 to 28.9 within the Bowser River watershed to 1.3 to 6.8 within Scott/ Todedada and Wildfire Creek Area (Table 5.2-2). Similarly exceedances factors for copper concentrations ranged from 1.6 to 14.2 within the Bowser River watershed to 1.3 to 3.0 within Scott/ Todedada and Wildfire Creek Area (Table 5.2-2). The frequency and factor of guideline exceedances were always greater in stream sites than lake sites.

Downstream of Bowser River and Bowser Lake, in Scott, Todedada and Wildfire sites, concentrations of iron (total), mercury, lead, zinc and dissolved aluminum were frequently or occasionally greater than BC MOE guidelines. Concentrations of variables were less than guideline values in upper Scott Creek (SC1) and for Todedada Lake (TL1).

5.2.3.2 CCME

Twelve of the 26 parameters with CCME guidelines for the protection of aquatic life had overall mean concentrations greater than guideline value in off-site monitoring locations (Table 5.2-2). These

included pH (Wildfire only), total aluminum, arsenic, cadmium, chromium, copper, total iron, mercury, lead, selenium, silver, and zinc.

Maxima of percentages of guideline exceedances and average factors of exceedances of water quality samples were associated with stream and lake sites within the Bowser River watershed (KL, KL-IF, KG_OF, KL_OF, BR, BR1, BR2, and BL1). For example, exceedances factors for total aluminum concentrations ranged from 19.40 to 114.5 within the Bowser River watershed to 2.0 to 34.3 within Scott/Todedada and Wildfire Creek Area (Table 5.2-2). Similarly, exceedance factors for total iron concentrations ranged from 3.8 to 54.3 mg/L within the Bowser River watershed to 2.0 to 19.1 within Scott/Todedada and Wildfire Creek Area (Table 5.2-2). The frequency and factor of guideline exceedances were always greater in stream sites than lake sites.

Downstream of Bowser River, in Scott, Todedada and Wildfire sites, guideline exceedances were observed for cadmium, chromium, copper, iron, lead, selenium (TC2 only, by an average factor of 1.2) and aluminum. Similar to other study areas, aluminum, cadmium and iron levels were greater than guidelines at all sites (by an average factor of 1.1 to 24 for aluminum, 1.7 to 22 for cadmium and 1.4 to 14.5 for iron). Concentrations of all variables were always less than guideline values in upper Scott Creek (SR1) and for Todedada Lake (TL1).

5.2.4 Quality Assurance and Quality Control

Results of quality assurance and quality control are as described above in Section 5.1.4.

Table 5.2-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary and Off-site Areas, Brucejack Project

		Parameter	pH		Fluoride		Nitrite						Total Phosphorus	Cyanide, Weak Acid Diss.	
		Guideline	CCME = BC		CCME		BC				CCME		CCME	BC	
			6.5 to 9.0		Hardness Dependent*		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		Trigger ranges	30-day 0.005	
Watershed	Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent		Factor	Percent
Ancillary Project Infrastructure															
Bowser	KL	2	-	0%	-	0%	-	0%	-	0%	-	0%	Hyper-eutrophic	-	0%
	KL IF	3	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	KG OF	2	-	0%	-	0%	-	0%	-	0%	-	0%	Mesotrophic - Hyper-eutrophic	-	0%
	KL OF	3	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	BR	3	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	BR1	15	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	BR2	13	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	BL1	2	-	0%	-	0%	-	0%	-	0%	-	0%	Meso-eutrophic	-	0%
Scott and Todedada	ST1	10	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Eutrophic	-	0%
	ST2	10	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	TC1	1	-	0%	-	0%	-	0%	-	0%	-	0%	Hyper-eutrophic	-	0%
	TC2	12	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
	TC3	11	-	0%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Hyper-eutrophic	-	0%
Wildfire	TL1	2	-	0%			-	0%	-	0%	-	0%	Ultra-oligotrophic - Mesotrophic	-	0%
	WC5	15	1.01	7%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Eutrophic	-	0%
	WC1	26	1.00	4%	-	0%	-	0%	-	0%	-	0%	Ultra-oligotrophic - Eutrophic	1.36	8%

(continued)

Table 5.2-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary and Off-site Areas, Brucejack Project (continued)

		Parameter	Aluminum, Dissolved		Aluminum, Total		Arsenic		Cadmium						Cobalt		Chromium			
		Guideline	BC		CCME		CCME = BC		BC		CCME				BC		CCME			
			Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.005		Hardness Dependent*		Short-term Hardness Dependent		Long-term Hardness Dependent		30-day 0.004		Cr(III) 0.0089*		Cr(IV) 0.001*	
Watershed	Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Ancillary Project Infrastructure																				
Bowser	KL	2	2.66	100%	114.50	100%	1.92	100%	23.74	100%	-	0%	4.76	100%	1.51	100%	1.36	100%	12.10	100%
	KL IF	3	1.66	67%	74.33	100%	2.39	67%	26.57	67%	-	0%	5.36	67%	1.75	67%	1.67	67%	14.85	67%
	KG OF	2	2.06	50%	92.48	100%	2.54	50%	16.92	50%	-	0%	3.46	50%	2.95	50%	1.35	50%	12.00	50%
	KL OF	3	1.57	67%	66.49	100%	1.90	67%	21.86	67%	-	0%	4.40	67%	1.52	67%	1.37	67%	12.15	67%
	BR	3	1.92	67%	68.98	100%	1.83	67%	21.84	67%	-	0%	4.40	67%	1.50	67%	1.34	67%	11.90	67%
	BR1	15	10.50	7%	38.88	87%	1.35	13%	7.30	73%	-	0%	2.33	40%	1.35	13%	1.45	20%	7.79	60%
	BR2	13	-	0%	21.34	85%	-	0%	5.55	85%	-	0%	1.68	46%	-	0%	-	0%	2.36	62%
	BL1	2	-	0%	19.40	100%	-	0%	3.34	100%	-	0%	-	0%	-	0%	-	0%	2.35	100%
Scott and Todedada	ST1	10	-	0%	1.97	30%	-	0%	4.00	20%	-	0%	1.42	10%	-	0%	-	0%	-	0%
	ST2	10	1.28	20%	31.19	50%	1.46	10%	10.86	50%	-	0%	3.47	30%	1.25	10%	-	0%	3.84	30%
	TC1	1	-	0%	32.00	100%	-	0%	6.89	100%	-	0%	1.41	100%	-	0%	-	0%	1.15	100%
	TC2	12	6.38	17%	34.26	83%	1.37	33%	21.88	100%	1.07	17%	7.32	58%	-	0%	-	0%	4.49	50%
	TC3	11	-	0%	14.86	73%	-	0%	9.21	100%	-	0%	4.25	36%	-	0%	-	0%	2.76	27%
Wildfire	TL1	2	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
	WC5	15	1.32	40%	10.11	80%	-	0%	3.55	50%	-	0%	-	0%	-	0%	-	0%	1.96	53%
	WC1	26	1.35	38%	8.22	81%	-	0%	2.81	90%	-	0%	-	0%	-	0%	-	0%	2.01	46%

(continued)

Table 5.2-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary and Off-site Areas, Brucejack Project (continued)

		Parameter	Copper						Iron, Total				Mercury				Manganese	
		Guideline	BC				CCME		BC		CCME		BC		CCME		BC	
			30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		30-day Hardness Dependent	
Watershed	Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Ancillary Project Infrastructure																		
Bowser	KL	2	10.98	100%	4.98	100%	10.98	100%	14.20	100%	47.33	100%	1.38	100%	1.12	50%	-	0%
	KL IF	3	14.20	67%	5.74	67%	14.20	67%	16.30	67%	54.33	67%	1.90	67%	1.46	67%	-	0%
	KG OF	2	11.23	50%	3.37	50%	11.45	50%	28.90	50%	49.49	100%	-	0%	-	0%	1.06	50%
	KL OF	3	10.85	67%	4.43	67%	10.85	67%	14.10	67%	47.00	67%	1.33	67%	1.08	33%	-	0%
	BR	3	10.23	67%	4.25	67%	10.23	67%	13.80	67%	46.00	67%	1.58	67%	1.42	33%	-	0%
	BR1	15	5.07	53%	2.35	33%	5.22	60%	6.26	67%	19.07	73%	1.18	13%	-	0%	-	0%
	BR2	13	1.42	54%	-	0%	1.60	54%	3.25	62%	9.83	69%	-	0%	-	0%	-	0%
	BL1	2	1.56	100%	-	0%	1.56	100%	1.80	100%	6.00	100%	-	0%	-	0%	-	0%
Scott and Todedada	ST1	10	-	0%	-	0%	-	0%	-	0%	1.99	60%	-	0%	-	0%	-	0%
	ST2	10	2.86	30%	1.65	10%	2.86	30%	6.78	30%	17.37	40%	2.20	10%	1.69	10%	-	0%
	TC1	1	1.32	100%	-	0%	1.41	100%	4.35	100%	14.50	100%	-	0%	-	0%	-	0%
	TC2	12	3.03	50%	1.33	17%	3.69	50%	6.49	58%	19.12	67%	2.36	33%	1.82	33%	-	0%
	TC3	11	2.01	27%	-	0%	2.29	27%	3.14	45%	5.61	100%	1.70	18%	1.31	18%	-	0%
Wildfire	TL1	2	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
	WC5	15	1.58	13%	1.28	7%	1.58	13%	1.58	13%	2.70	53%	-	0%	-	0%	-	0%
	WC1	26	1.28	27%	1.12	4%	1.28	27%	1.31	8%	2.57	46%	-	0%	-	0%	-	0%

(continued)

Table 5.2-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary and Off-site Areas, Brucejack Project (continued)

		Parameter	Nickel				Lead						Selenium			
		Guideline	BC		CCME		BC				CCME		BC		CCME	
			Hardness Dependent*		Hardness Dependent		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001	
Watershed	Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Ancillary Project Infrastructure																
Bowser	KL	2	-	0%	-	0%	2.04	100%	-	0%	7.92	100%	-	0%	-	0%
	KL IF	3	-	0%	-	0%	2.22	67%	-	0%	9.09	67%	-	0%	-	0%
	KG OF	2	-	0%	-	0%	2.75	50%	-	0%	12.80	50%	-	0%	-	0%
	KL OF	3	-	0%	-	0%	1.86	67%	-	0%	7.58	67%	-	0%	-	0%
	BR	3	-	0%	-	0%	1.82	67%	-	0%	7.34	67%	-	0%	-	0%
	BR1	15	-	0%	-	0%	1.20	20%	-	0%	4.33	40%	-	0%	-	0%
	BR2	13	-	0%	-	0%	-	0%	-	0%	1.50	38%	-	0%	-	0%
	BL1	2	-	0%	-	0%	-	0%	-	0%	1.12	50%	-	0%	-	0%
Scott and Todedada	ST1	10	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
	ST2	10	-	0%	-	0%	1.01	10%	-	0%	2.82	30%	-	0%	-	0%
	TC1	1	-	0%	-	0%	-	0%	-	0%	2.23	100%	-	0%	-	0%
	TC2	12	-	0%	-	0%	-	0%	-	0%	2.46	50%	1.04	8%	1.49	75%
	TC3	11	-	0%	-	0%	-	0%	-	0%	1.95	18%	-	0%	-	0%
Wildfire	TL1	2	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
	WC5	15	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
	WC1	26	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%

(continued)

Table 5.2-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary and Off-site Areas, Brucejack Project (completed)

		Parameter	Silver						Zn					
		Guideline	BC				CCME		BC				CCME	
			30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Watershed	Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
Ancillary Project Infrastructure														
Bowser	KL	2	3.21	100%	1.61	100%	1.61	100%	6.66	100%	1.51	100%	1.67	100%
	KL IF	3	3.35	67%	1.68	67%	1.68	67%	7.27	67%	1.65	67%	1.82	67%
	KG OF	2	4.10	50%	2.05	50%	2.05	50%	10.29	50%	2.34	50%	2.57	50%
	KL OF	3	2.85	67%	1.43	67%	1.43	67%	6.34	67%	1.44	67%	1.59	67%
	BR	3	2.83	67%	1.42	67%	1.42	67%	6.21	67%	1.41	67%	1.55	67%
	BR1	15	1.80	40%	1.17	13%	1.17	13%	3.12	53%	1.16	13%	1.28	13%
	BR2	13	-	0%	-	0%	-	0%	1.83	54%	-	0%	-	0%
	BL1	2	-	0%	-	0%	-	0%	1.09	100%	-	0%	-	0%
Scott and Todedada	ST1	10	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
	ST2	10	2.58	10%	1.29	10%	1.29	10%	3.65	30%	1.64	10%	1.81	10%
	TC1	1	-	0%	-	0%	-	0%	1.59	100%	-	0%	-	0%
	TC2	12	2.38	42%	1.29	33%	1.29	33%	7.69	58%	2.28	42%	2.50	42%
	TC3	11	1.46	18%	-	0%	-	0%	4.08	36%	1.12	27%	1.23	27%
Wildfire	TL1	2	-	0%	-	0%	-	0%	-	0%	-	0%	-	0%
	WC5	15	-	0%	-	0%	-	0%	1.36	7%	-	0%	-	0%
	WC1	26	-	0%	-	0%	-	0%	1.20	4%	-	0%	-	0%

Notes:
All units in mg/L unless otherwise noted.
** Interim/working guideline.*
Half the detection limit was substituted for values below the detection limit.
Samples below the detection limit but above the guideline concentration were excluded from all calculations.
Factor represents the average factor by which sample concentrations exceeded guideline concentrations.
Percent represents the percentage of samples collected at each site that were greater than guidelines.

6. CONCLUSIONS

The purpose of this cumulative baseline surface water quality report is to characterize background surface water quality of the Brucejack Gold Mine Project area, and to provide sufficient data to support development of a water management plan, aquatic effects monitoring and management plan, predictive water quality modelling, and environmental effects assessment for the Project.

Mine Site Area and Downstream Receiving Environment

No pre-disturbance baseline water quality data are available for the Brucejack watershed. Water quality monitoring began in 1987 to support a Stage 1 Impact Assessment for the Sulphurets Project proposed by Newhawk Gold Mines Ltd., whereas underground development began in autumn 1986; from that time onward Brucejack Creek was affected by passive drainage from the adit, and various watercourses within the Brucejack watershed were periodically affected by drainage from areas disturbed through surface activities, active (dewatering) or reclamation activities (Newhawk 1989; Price 2005).

Assessment of data and activity records indicates that water quality data collected from 1991 to 1999 (period of relative inactivity following Newhawk mining), and during 2000/2001 (post-Newhawk site reclamation) and 2009/2010 (surface exploration only) are the best available approximation of pre-disturbance water quality conditions. This dataset was used as the base/reference case and compared to the overall 2008-2013 database to provide a conservative means of identifying affected data for removal from the more recent database. Removal of affected data yields a more conservative and accurate approximation of baseline conditions, with lower mean values for metals and other parameters as well as lower overall variability in the dataset. Although data from the entire period of water quality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions were used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Brucejack Lake and Sulphurets Lake comprised the lake sampling program within the proposed Mine Site Area and downstream receiving environment (Brucejack watershed). Data indicate that Brucejack Lake is a typical well oxygenated dimictic lake: the water column is stratified in the summer, with the thermocline reaching depths of 17 to 45 m. The euphotic zone is deep (11.5 m), indicating that primary production could occur deep into the water column. In contrast, Sulphurets Lake generally remains well-mixed throughout the year. The euphotic zone is less than 0.6 m due to elevated total suspended solids and turbidity. Dissolved oxygen concentrations in both lakes are within or greater than the 5.5 to 9.5 mg/L CCME guideline range for the protection of aquatic life (taxa and life-stage dependent).

Both the Brucejack and Sulphurets catchments are highly mineralized areas with gossans and similar geological features evident on the surface. Surface water quality also varies substantially in the Project region based on hydrological regime, where increased sediment load and transport during high flow periods leads to increased concentrations of total suspended solids (TSS) and associated particulate-bound metals. In particular, within Brucejack Creek and Camp Creek, assessment

indicates that irrespective of inputs from the existing adit, elevated levels of some total metals during freshet (Al, Cd, Cu, Pb, Ag, and Zn) is reflective of natural background conditions. Within near and far-field receiving environments, natural metals loadings in Brucejack Creek are overwhelmed however, by much higher loadings in Sulphurets and Mitchell Creeks.

Ten of the 29 parameters with BC MOE guidelines for the protection of aquatic life had overall mean concentrations greater than guideline values within the Brucejack watershed (Brucejack Lake, Brucejack Creek and its tributaries) including pH, nitrite, dissolved aluminum, arsenic, copper, cadmium, total iron, lead, silver and zinc. Nine of the 26 parameters with CCME guidelines had overall mean concentrations greater than guideline values within the Brucejack watershed including pH, fluoride (Camp Creek only), total aluminum, arsenic, cadmium, copper, iron total, lead, silver and zinc. Minima in observed exceedances were always associated with Brucejack Lake (BJ) and upper Brucejack Creek monitoring sites upstream of Camp Creek (BJ U/S, BJ U/S of CC), where consistent exceedances were observe for pH, cadmium, copper, silver and zinc, generally in high flow periods. In lower Brucejack creek monitoring sites (BJ OF, BJ 200m D/S, BJ2 and BJ3), the factor and frequency of guideline exceedances for these parameters generally increased.

The percentage of BC MOE and CCME guideline exceedances and average factors of exceedance of water quality samples generally increased within the Sulphurets and Unuk watersheds relative to upstream monitoring sites within the Brucejack watershed. Monitoring sites within Sulphurets Creek had the greatest incidence of guideline exceedances (stream and lake sites) of those in the entire baseline study area (Table 5.1-2). Further, the influence of contributions from Mitchell/ Sulphurets Creek is evident in the Unuk River, where both the percentage of guideline exceedances and average factor of exceedances were elevated within the Unuk downstream of its confluence with Sulphurets Creek (UR1) relative to upstream monitoring site (UR1A). Greatest influences observed for cadmium, copper and zinc guideline exceedances (Table 5.1-2).

Bowser/Scott/Todedada/Wildfire Watersheds (Access Road/Aerodrome/Transfer Station Watersheds)

Baseline study area boundaries and sampling efforts have changed with evolving Project design to cover areas that could potentially be affected by existing and proposed Project facilities. Only those sites pertinent to the EA (Table 3.1-2; i.e., relevant to infrastructure now proposed in the EA) have been included in the main report as a basis for describing baseline or background conditions.

Knipple Lake, Bowser Lake, and Todedada Lake constituted the lake sampling program for the off-site areas (see Table 3.1-3). Knipple Lake is a glacier-fed lake with very similar properties and chemistry to Sulphurets Lake and likely remains unstratifed throughout the year. Dissolved oxygen in Knipple Lake was roughly 9.7 mg/L throughout the water column. Conductivity was also relatively similar throughout the water column (mean: 54 uS/cm). Todedada Lake is dimictic and stratified. The lake is overall warmer; stratification occurred at 8 m. Todedada Lake is poorly oxygenated, likely a result of the comparatively shallow depth and relatively high organic concentrations.

Within off-site areas, maxima of percentage of guideline exceedances and average factors of exceedances of water quality samples were always associated with stream and lake sites within the Bowser River watershed (KL, KL-IF, KG_OF, KL_OF, BR, BR1, BR2 and BBL1). Fifteen of the

29 parameters with BC MOE guidelines for the protection of aquatic life had overall mean concentrations greater than guideline values (Table 5.2-2). These included pH (wildfire only), WAD cyanides (wildfire only), dissolved aluminum, arsenic, cadmium, cobalt, copper, iron (total and dissolved), mercury, manganese, lead, selenium, silver and zinc. Twelve of the 26 parameters with CCME guidelines for the protection of aquatic life had overall mean concentrations greater than guideline value in off-site monitoring locations (Table 5.2-2). These included pH (wildfire only), total aluminum, arsenic, cadmium, chromium, copper, total iron, mercury, lead, selenium, silver, and zinc. Concentrations of variables were less than guideline values in upper Scott Creek (SC1) and for Todedada Lake (TL1).

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Appendix 1

Physical Limnology of Brucejack Gold Mine Project Area Lakes, 2008-2013

Table A1-1. Mine Site Area: Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2010 to 2013

Table A1-2. Mine Site Area: Temperature, Dissolved Oxygen and Conductivity Profiles from Sulphurets Lake (SUL), 2008, 2009 to 2013

Table A1-3. Off-site Area: Temperature and Dissolved Oxygen Profiles from Todedada Lake (TL1), 2010

Table A1-4. Off-site Area: Temperature and Dissolved Oxygen Profiles from Knipple Lake (KL), 2013

Table A1-5. Outside of Current Study Area: Temperature, Dissolved Oxygen and Conductivity Profiles from Lake 1 (L1), 2011 to 2012

Table A1-6. Temperature and Dissolved Oxygen Profiles from Lake 2 (L2), 2011

Table A1-7. Temperature and Dissolved Oxygen Profiles from Bowser Lake (BL1), 2010

Table A1-1a. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2010

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		August 30, 2010 (Open-water)		
2.6	9.3	52.80	8.76	76.36
3.2	9.2	52.50	8.95	77.95
3.8	9.2	52.70	9.03	78.59
4.5	9.2	53.30	9.11	79.29
5.0	9.2	54.10	9.15	79.63
5.4	9.2	53.00	9.22	80.24
6.5	9.2	50.70	9.21	80.18
6.7	9.2	52.50	9.27	80.67
7.6	9.2	52.20	9.27	80.63
8.4	9.1	52.30	9.29	80.78
9.3	8.9	50.10	9.28	80.27
10.3	8.8	51.00	9.30	80.24
11.5	8.8	51.10	9.34	80.50
13.1	8.6	52.60	9.34	80.13
14.4	8.4	51.20	9.39	80.23
16.4	7.1	50.50	9.32	77.18
17.1	6.3	50.70	9.63	77.96
17.5	5.7	49.80	9.90	79.14
17.6	5.6	53.50	10.03	79.81
18.4	5.5	51.20	10.09	80.08
19.8	5.3	51.80	10.25	81.03
20.7	5.1	52.00	10.35	81.46
22.4	5.0	51.50	10.48	82.10
23.3	4.9	50.80	10.55	82.50
23.9	4.8	52.10	10.58	82.62
24.5	4.8	53.30	10.63	82.99
24.7	4.8	52.20	10.61	82.81
24.7	4.8	53.50	10.62	82.82
24.8	4.8	53.90	10.64	83.02
24.9	4.8	52.50	10.60	82.68
25.4	4.8	52.20	10.59	82.60
27.2	4.7	52.90	10.63	82.82
28.0	4.7	53.00	10.65	82.84
28.8	4.6	52.70	10.64	82.68
30.4	4.6	52.20	10.63	82.43
31.5	4.5	50.90	10.65	82.47
33.3	4.5	53.80	10.62	82.20
34.8	4.5	51.30	10.62	82.13
36.2	4.4	54.40	10.62	82.04
37.7	4.4	53.20	10.59	81.77
38.7	4.4	50.00	10.59	81.69
41.1	4.3	52.90	10.56	81.41
43.0	4.3	52.50	10.54	81.20
45.5	4.3	53.50	10.53	81.07
47.3	4.3	52.20	10.51	80.84
49.9	4.2	51.90	10.49	80.60
51.3	4.2	53.00	10.48	80.50
51.9	4.2	52.60	10.48	80.45
53.1	4.2	51.10	10.44	80.14
54.5	4.2	52.00	10.43	80.02
55.5	4.2	52.80	10.42	79.98
56.0	4.2	52.90	10.41	79.87
56.1	4.2	51.90	10.42	79.94
56.0	4.2	51.20	10.42	79.94
56.1	4.2	51.60	10.39	79.75

Notes:

Maximum depth 80 m

Data collected with a CTD (RBR XR-420)

Site Location: unavailable

Table A1-1a. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2010

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		August 30, 2010 (Open-water)		
56.1	4.2	51.20	10.38	79.63
57.8	4.1	52.50	10.36	79.42
57.8	4.1	50.20	10.40	79.78
57.8	4.1	51.60	10.38	79.59
57.8	4.1	52.80	10.41	79.86
57.8	4.1	52.20	10.39	79.71
57.9	4.1	51.90	10.38	79.61
57.9	4.1	51.10	10.39	79.67
57.9	4.1	53.30	10.38	79.60
57.9	4.1	52.10	10.39	79.71
57.9	4.1	49.00	10.40	79.74
58.1	4.1	51.80	10.40	79.76
58.1	4.1	51.70	10.41	79.80
58.1	4.1	49.60	10.42	79.89
58.1	4.1	54.30	10.41	79.77
58.1	4.1	52.50	10.41	79.76
58.1	4.1	50.90	10.39	79.65
58.2	4.1	53.00	10.39	79.61
58.2	4.1	52.60	10.42	79.83
58.2	4.1	51.20	10.42	79.86
58.2	4.1	51.20	10.41	79.74
58.4	4.1	52.20	10.41	79.77
58.4	4.1	52.80	10.43	79.91
58.4	4.1	52.90	10.44	79.96
58.4	4.1	51.40	10.43	79.88
58.4	4.1	52.80	10.43	79.87
58.4	4.1	51.80	10.42	79.85
58.4	4.1	51.70	10.43	79.87
58.4	4.1	52.20	10.41	79.78
58.4	4.1	52.00	10.42	79.80
58.4	4.1	52.40	10.42	79.85
58.4	4.1	52.90	10.44	79.98
58.4	4.1	52.00	10.44	79.98
58.4	4.1	51.00	10.46	80.13
58.5	4.1	51.10	10.46	80.15
58.5	4.1	50.40	10.45	80.07
58.3	4.1	51.60	10.46	80.10
58.3	4.1	51.50	10.48	80.27
58.3	4.1	51.80	10.46	80.15
58.3	4.1	52.70	10.45	80.05
58.3	4.1	51.50	10.44	79.98
58.3	4.1	50.00	10.43	79.93
58.3	4.1	50.30	10.44	79.96
58.3	4.1	50.10	10.43	79.91
58.3	4.1	50.60	10.42	79.81
58.4	4.1	49.90	10.41	79.78
58.3	4.1	51.30	10.41	79.80
58.4	4.1	51.90	10.42	79.85
58.4	4.1	50.50	10.43	79.93
58.4	4.1	51.70	10.43	79.94
58.4	4.1	51.50	10.45	80.10
58.4	4.1	50.80	10.46	80.09
58.4	4.1	52.10	10.46	80.14
58.5	4.1	50.60	10.45	80.04
58.5	4.1	51.00	10.45	80.04

Notes:

Maximum depth 80 m

Data collected with a CTD (RBR XR-420)

Site Location: unavailable

Table A1-1a. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2010

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		August 30, 2010 (Open-water)		
58.5	4.1	52.60	10.45	80.02
58.5	4.1	51.60	10.43	79.92
58.5	4.1	48.80	10.42	79.83
58.5	4.1	51.60	10.42	79.79
58.5	4.1	51.30	10.42	79.82
58.5	4.1	50.00	10.41	79.75
58.5	4.1	52.80	10.41	79.74
58.5	4.1	51.00	10.42	79.77
58.5	4.1	52.00	10.42	79.77
58.5	4.1	52.60	10.41	79.70
58.5	4.1	49.10	10.41	79.69
58.5	4.1	48.40	10.41	79.69
58.5	4.1	50.60	10.40	79.64
58.5	4.1	52.60	10.41	79.70
58.5	4.1	51.20	10.41	79.73
58.5	4.1	51.10	10.42	79.82
58.5	4.1	50.60	10.41	79.75
58.5	4.1	50.90	10.41	79.71
58.6	4.1	51.00	10.40	79.66
58.6	4.1	49.30	10.40	79.61
58.6	4.1	49.60	10.39	79.58
58.6	4.1	49.20	10.39	79.57
58.6	4.1	49.30	10.40	79.62
58.6	4.1	49.30	10.39	79.57
58.6	4.1	50.50	10.39	79.55
58.6	4.1	50.90	10.39	79.55
58.6	4.1	51.10	10.40	79.63
58.6	4.1	53.30	10.40	79.65
58.6	4.1	49.10	10.40	79.63
58.6	4.1	49.80	10.41	79.69
58.6	4.1	49.50	10.41	79.69
58.6	4.1	49.20	10.42	79.78
58.6	4.1	52.30	10.44	79.93
58.6	4.1	50.00	10.45	79.96
58.7	4.1	48.80	10.45	79.98
58.6	4.1	51.80	10.45	79.98
58.6	4.1	49.20	10.45	79.97
58.6	4.1	50.30	10.45	79.98
58.7	4.1	51.10	10.46	80.04
58.7	4.1	52.60	10.47	80.12
58.7	4.1	51.30	10.47	80.12
58.7	4.1	49.80	10.48	80.19
58.7	4.1	49.50	10.47	80.14
58.7	4.1	49.10	10.48	80.20
58.7	4.1	51.70	10.49	80.25
58.7	4.1	51.70	10.49	80.25
58.7	4.1	50.30	10.48	80.22
58.7	4.1	49.90	10.49	80.27
58.7	4.1	49.70	10.49	80.28
58.7	4.1	50.60	10.50	80.32
59.0	4.1	51.00	10.49	80.25
59.1	4.1	50.90	10.48	80.22
59.1	4.1	49.90	10.47	80.10
59.1	4.1	49.90	10.46	80.04
59.4	4.1	48.70	10.44	79.90

Notes:

Maximum depth 80 m

Data collected with a CTD (RBR XR-420)

Site Location: unavailable

Table A1-1a. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2010

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
August 30, 2010 (Open-water)				
61.9	4.0	49.30	10.42	79.66
63.7	4.0	49.20	10.39	79.45
64.9	4.0	49.90	10.38	79.33
66.5	4.0	52.50	10.36	79.12
68.5	4.0	50.30	10.34	79.03
70.5	4.0	49.40	10.31	78.83
72.2	4.0	50.80	10.30	78.63
72.6	4.0	51.50	10.28	78.56
72.6	4.0	50.90	10.27	78.48
72.6	4.0	51.50	10.26	78.40
72.6	4.0	48.70	10.25	78.34
72.6	4.0	50.80	10.25	78.30
72.6	4.0	51.00	10.24	78.25
72.6	4.0	51.40	10.24	78.21
72.7	4.0	53.20	10.23	78.18
72.7	4.0	50.20	10.24	78.20
72.7	4.0	51.20	10.23	78.18
72.7	4.0	50.10	10.23	78.16
72.7	4.0	52.00	10.23	78.18
72.7	4.0	51.60	10.24	78.19
72.7	4.0	50.10	10.24	78.20
73.7	4.0	49.50	10.23	78.13
73.7	4.0	50.20	10.23	78.10
73.8	4.0	50.00	10.22	78.07
73.8	4.0	49.90	10.22	78.06
75.3	4.0	50.10	10.21	77.97
76.2	4.0	50.20	10.20	77.85
76.2	4.0	50.30	10.19	77.77
76.2	4.0	50.00	10.18	77.71
76.2	4.0	50.50	10.17	77.67
76.3	4.0	51.10	10.17	77.62
76.3	4.0	49.70	10.16	77.56
76.3	4.0	49.40	10.15	77.52
76.7	4.0	49.90	10.14	77.42
78.9	4.0	51.30	10.14	77.36
79.5	4.0	51.50	10.13	77.28
79.7	3.9	49.30	10.12	77.21
81.9	3.9	48.80	10.11	77.11
83.2	3.9	49.70	10.09	76.97
85.0	3.9	51.80	10.06	76.75
85.1	3.9	50.70	10.04	76.57
84.6	3.9	51.30	10.02	76.40
84.5	3.9	51.40	10.01	76.33
84.5	3.9	51.10	10.00	76.25
84.5	3.9	50.50	9.99	76.19
84.5	3.9	51.90	9.98	76.14
84.5	3.9	52.10	9.97	76.08
84.5	3.9	50.40	9.97	76.03
84.5	3.9	51.10	9.97	76.02
84.5	3.9	51.00	9.96	75.96
84.5	3.9	51.30	9.96	75.96
84.5	3.9	48.50	9.96	75.94
84.5	3.9	50.20	9.95	75.92
84.5	3.9	51.70	9.95	75.89
84.6	3.9	49.90	9.95	75.89

Notes:

Maximum depth 80 m

Data collected with a CTD (RBR XR-420)

Site Location: unavailable

Table A1-1a. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2010

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		August 30, 2010 (Open-water)		
84.5	3.9	51.20	9.95	75.88
84.5	3.9	51.60	9.94	75.84
84.5	3.9	48.90	9.94	75.84
84.6	3.9	52.20	9.94	75.82
84.2	3.9	51.00	9.94	75.78
2.0	9.1	50.80	9.15	79.40
2.5	9.0	52.50	9.15	79.32
2.4	9.1	53.00	9.16	79.46
2.5	9.1	52.10	9.17	79.54
2.4	9.1	50.50	9.16	79.51
2.5	9.1	53.70	9.18	79.65
2.5	9.1	51.30	9.18	79.66
2.5	9.1	49.20	9.19	79.72
2.5	9.1	49.90	9.19	79.74
2.5	9.1	52.30	9.20	79.88
2.5	9.1	52.80	9.20	79.89
2.5	9.1	51.20	9.20	79.82
2.5	9.1	51.00	9.20	79.88
2.5	9.1	50.50	9.20	79.86
2.5	9.1	50.50	9.20	79.85
2.5	9.1	51.40	9.22	80.04
3.4	9.1	51.00	9.21	79.99
3.4	9.1	51.10	9.21	79.96
3.4	9.1	51.60	9.22	80.07
3.4	9.1	52.10	9.23	80.10
3.4	9.1	52.50	9.23	80.14
3.4	9.1	52.20	9.24	80.20
3.4	9.1	52.00	9.25	80.26
3.4	9.1	49.90	9.25	80.29
3.4	9.1	49.80	9.25	80.31
4.3	9.1	50.40	9.25	80.33
4.3	9.1	51.90	9.24	80.23
4.3	9.1	52.20	9.25	80.31
4.3	9.1	52.20	9.25	80.31
4.3	9.1	53.00	9.26	80.39
4.3	9.1	53.40	9.26	80.43
4.3	9.1	51.50	9.26	80.41
4.4	9.1	53.00	9.26	80.39
4.4	9.1	51.00	9.26	80.40
4.4	9.1	52.70	9.26	80.41
4.4	9.1	50.50	9.26	80.36
4.4	9.1	50.90	9.25	80.32
4.4	9.1	51.20	9.25	80.32
4.4	9.1	52.40	9.25	80.29
5.2	9.1	51.70	9.24	80.24
5.2	9.1	50.60	9.23	80.14
5.2	9.1	51.10	9.23	80.13
5.2	9.1	52.00	9.23	80.10
5.3	9.1	49.00	9.22	80.11
5.3	9.1	51.50	9.22	80.10
5.3	9.1	51.20	9.22	80.05
5.3	9.1	50.30	9.22	80.03
5.3	9.1	51.30	9.21	80.03
5.3	9.1	51.10	9.21	79.95
5.3	9.1	53.00	9.21	79.97

Notes:

Maximum depth 80 m

Data collected with a CTD (RBR XR-420)

Site Location: unavailable

Table A1-1a. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2010

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		August 30, 2010 (Open-water)		
5.3	9.1	51.70	9.21	79.95
5.3	9.1	51.50	9.20	79.94
6.4	9.1	52.40	9.20	79.91
6.4	9.1	50.90	9.20	79.84
6.4	9.1	52.90	9.20	79.81
6.4	9.1	51.60	9.20	79.84
6.4	9.1	51.20	9.20	79.86
6.4	9.1	52.60	9.20	79.85
6.4	9.1	51.10	9.19	79.79
6.4	9.1	51.00	9.20	79.84
7.1	9.1	52.10	9.20	79.85
7.5	8.9	52.80	9.19	79.46
7.5	8.9	51.90	9.20	79.60
7.5	9.0	50.90	9.20	79.66
7.5	9.0	50.80	9.21	79.69
7.6	9.0	52.00	9.21	79.68
7.6	8.9	52.40	9.21	79.67
7.6	8.9	51.50	9.21	79.67
7.6	8.9	51.10	9.21	79.69
7.6	8.9	52.10	9.21	79.68
7.7	8.9	50.90	9.21	79.65
8.7	8.7	52.20	9.21	79.25
8.7	8.7	52.80	9.23	79.37
8.7	8.7	51.40	9.24	79.44
8.7	8.7	52.70	9.24	79.45
8.7	8.7	51.90	9.24	79.45
8.7	8.7	53.10	9.24	79.46
9.0	8.7	50.30	9.24	79.43
9.8	8.7	52.20	9.25	79.52
9.8	8.7	52.20	9.26	79.56
9.8	8.7	51.40	9.26	79.61
9.8	8.7	51.90	9.27	79.61
9.8	8.7	51.20	9.27	79.62
10.8	8.6	51.20	9.27	79.55
10.8	8.6	51.30	9.28	79.59
10.8	8.6	52.10	9.29	79.65
10.8	8.6	52.50	9.29	79.68
10.8	8.6	52.50	9.30	79.72
11.9	8.6	51.30	9.30	79.74
12.0	8.6	51.90	9.31	79.78
12.0	8.6	51.10	9.32	79.88
12.0	8.6	51.20	9.32	79.89
12.0	8.6	51.50	9.32	79.90
12.0	8.6	51.20	9.33	79.93
12.0	8.6	51.30	9.33	79.98
13.2	8.6	51.30	9.33	79.95
13.2	8.5	52.60	9.34	80.01
13.2	8.5	51.70	9.34	80.05
13.2	8.5	51.60	9.34	80.04
13.2	8.5	52.10	9.34	80.05
13.3	8.5	51.00	9.35	80.11
14.4	8.5	50.60	9.35	80.06
14.4	8.5	50.60	9.36	80.02
14.4	8.5	50.20	9.36	80.04
14.4	8.4	51.80	9.37	80.06

Notes:

Maximum depth 80 m

Data collected with a CTD (RBR XR-420)

Site Location: unavailable

Table A1-1a. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2010

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		August 30, 2010 (Open-water)		
14.4	8.4	50.00	9.37	79.93
14.4	8.4	50.40	9.37	80.12
15.8	7.5	51.60	9.33	77.93
15.8	7.2	52.30	9.45	78.24
15.8	7.1	52.60	9.54	78.82
15.8	7.0	51.60	9.60	79.20
15.8	7.0	50.60	9.67	79.81
15.8	7.0	50.90	9.71	80.12
15.8	7.0	51.60	9.75	80.45
16.9	6.2	52.40	9.68	78.32
16.9	5.8	53.80	9.89	79.18
17.0	5.7	52.30	10.08	80.43
17.0	5.6	52.10	10.06	80.14
17.0	5.6	52.60	10.08	80.23
17.0	5.6	51.60	10.11	80.43
18.1	5.3	53.10	10.13	80.13
18.1	5.2	52.60	10.34	81.53
18.1	5.2	52.00	10.35	81.54
18.1	5.1	52.40	10.41	81.99
18.4	5.1	52.20	10.32	81.21
19.4	5.0	53.30	10.44	82.02
19.4	5.0	50.00	10.51	82.43
19.4	5.0	54.20	10.53	82.56
19.4	5.0	53.50	10.51	82.41
20.7	4.9	52.40	10.50	82.24
20.7	4.9	51.30	10.53	82.36
20.8	4.9	51.20	10.57	82.64
20.7	4.9	54.00	10.53	82.35
20.8	4.9	53.90	10.51	82.13
20.8	4.9	52.20	10.52	82.26
22.0	4.8	52.00	10.53	82.17
22.3	4.8	52.30	10.58	82.51
22.3	4.8	52.60	10.58	82.47
23.3	4.7	54.80	10.53	82.01
23.5	4.7	53.60	10.55	82.10
23.5	4.7	50.90	10.56	82.12
23.5	4.7	54.60	10.55	82.03
23.5	4.7	54.30	10.54	82.00
24.4	4.6	52.70	10.51	81.68
24.5	4.6	51.30	10.53	81.75
24.5	4.6	52.00	10.55	81.88
24.5	4.6	52.30	10.52	81.69
24.5	4.6	53.60	10.53	81.72
24.6	4.6	54.10	10.52	81.65
26.0	4.6	52.30	10.50	81.38
26.0	4.5	51.90	10.52	81.52
26.0	4.5	55.60	10.52	81.50
26.0	4.5	53.90	10.50	81.32
26.0	4.5	53.10	10.49	81.25
26.0	4.5	51.30	10.47	81.10
26.0	4.5	52.10	10.47	81.12
26.0	4.5	51.10	10.46	81.04
27.0	4.5	52.10	10.46	81.02
27.5	4.5	52.30	10.47	81.04
27.5	4.5	52.00	10.47	81.04

Notes:

Maximum depth 80 m

Data collected with a CTD (RBR XR-420)

Site Location: unavailable

Table A1-1a. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2010

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		August 30, 2010 (Open-water)		
27.5	4.5	53.60	10.47	81.04
27.6	4.5	52.50	10.46	80.94
28.8	4.4	51.80	10.45	80.76
28.8	4.4	52.70	10.44	80.71
28.8	4.4	52.60	10.44	80.66
28.8	4.4	51.50	10.42	80.54
29.5	4.4	53.40	10.40	80.40
29.8	4.4	52.10	10.42	80.47
29.8	4.4	53.50	10.43	80.50
29.8	4.4	52.60	10.42	80.45
29.8	4.4	52.50	10.42	80.46
30.8	4.4	52.60	10.41	80.31
30.9	4.4	53.90	10.40	80.27
30.9	4.4	50.70	10.40	80.23
30.9	4.4	52.80	10.40	80.26
30.9	4.4	51.60	10.39	80.16
31.0	4.4	52.90	10.38	80.11
31.0	4.4	52.20	10.38	80.12
32.1	4.4	51.60	10.36	79.97
32.2	4.4	54.40	10.37	80.01
32.2	4.4	50.00	10.37	80.00
32.2	4.4	52.30	10.38	80.03
32.9	4.3	52.90	10.35	79.82
33.1	4.3	50.70	10.36	79.90
33.1	4.3	53.00	10.37	79.95
33.2	4.3	52.90	10.37	79.91
34.1	4.3	52.30	10.34	79.69
34.2	4.3	51.80	10.35	79.76
34.2	4.3	52.80	10.35	79.75
34.2	4.3	52.30	10.36	79.79
34.2	4.3	53.10	10.34	79.63
34.2	4.3	53.00	10.35	79.69
34.2	4.3	50.50	10.35	79.71
34.3	4.3	51.50	10.34	79.64
35.2	4.3	52.10	10.34	79.62
35.2	4.3	51.90	10.34	79.59
35.2	4.3	53.20	10.33	79.56
35.8	4.3	52.70	10.32	79.47
36.1	4.3	50.60	10.33	79.55
36.1	4.3	50.00	10.33	79.54
36.2	4.3	53.00	10.32	79.46
36.3	4.3	52.50	10.32	79.43
37.2	4.3	54.00	10.32	79.38
37.2	4.3	51.70	10.32	79.37
37.2	4.3	51.40	10.33	79.44
37.3	4.3	51.00	10.32	79.35
38.1	4.2	50.50	10.30	79.22
38.2	4.2	51.80	10.31	79.25
38.2	4.2	51.90	10.31	79.23
38.2	4.2	53.40	10.30	79.20
39.0	4.2	52.20	10.30	79.18
39.8	4.2	54.80	10.29	79.10
39.9	4.2	53.10	10.30	79.13
39.9	4.2	51.50	10.30	79.10
39.9	4.2	52.40	10.30	79.09

Notes:

Maximum depth 80 m

Data collected with a CTD (RBR XR-420)

Site Location: unavailable

Table A1-1a. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2010

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		August 30, 2010 (Open-water)		
39.9	4.2	52.50	10.29	79.00
40.9	4.2	52.90	10.28	78.93
41.0	4.2	52.50	10.29	79.01
41.8	4.2	51.00	10.28	78.90
41.8	4.2	52.30	10.29	78.97
42.6	4.2	50.80	10.27	78.81
42.6	4.2	52.60	10.28	78.87
42.8	4.2	52.80	10.27	78.81
43.6	4.2	50.60	10.28	78.86
43.6	4.1	52.40	10.27	78.74
44.6	4.1	52.20	10.26	78.69
44.6	4.1	49.50	10.27	78.75
44.6	4.1	51.80	10.27	78.76
44.6	4.1	53.60	10.26	78.72
45.6	4.1	51.80	10.25	78.61
45.7	4.1	52.10	10.26	78.64
45.7	4.1	50.70	10.26	78.63
46.2	4.1	51.40	10.24	78.51
47.2	4.1	52.50	10.25	78.56
47.2	4.1	51.90	10.25	78.54
47.6	4.1	51.30	10.24	78.44
48.6	4.1	52.30	10.25	78.47
49.0	4.1	51.00	10.23	78.39
50.1	4.1	53.80	10.25	78.44
50.1	4.1	51.00	10.24	78.44
50.1	4.1	51.50	10.24	78.43
51.5	4.1	50.00	10.23	78.32
51.5	4.1	50.00	10.24	78.34
51.4	4.1	53.50	10.24	78.34
51.5	4.1	51.70	10.23	78.31
52.2	4.1	48.70	10.23	78.25
53.3	4.0	50.90	10.23	78.29
53.2	4.0	51.40	10.24	78.29
53.3	4.0	49.40	10.23	78.28
55.0	4.0	52.60	10.23	78.21
55.0	4.0	51.10	10.23	78.24
55.0	4.0	51.90	10.24	78.25
55.1	4.0	48.40	10.22	78.13
56.6	4.0	50.90	10.23	78.18
56.6	4.0	49.10	10.23	78.18
56.6	4.0	50.50	10.23	78.15
56.6	4.0	51.10	10.22	78.13
56.7	4.0	52.30	10.23	78.15
58.0	4.0	52.10	10.22	78.07
58.0	4.0	50.60	10.22	78.12
58.0	4.0	50.10	10.23	78.13
58.0	4.0	50.70	10.22	78.08
59.2	4.0	51.70	10.22	78.09
59.2	4.0	51.90	10.22	78.10
59.2	4.0	50.00	10.22	78.11
59.2	4.0	51.60	10.22	78.08
59.3	4.0	51.70	10.22	78.07
59.6	4.0	50.30	10.21	77.98
60.5	4.0	52.20	10.22	78.06
60.5	4.0	50.60	10.22	78.06

Notes:

Maximum depth 80 m

Data collected with a CTD (RBR XR-420)

Site Location: unavailable

Table A1-1a. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2010

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		August 30, 2010 (Open-water)		
60.5	4.0	52.00	10.21	78.02
60.5	4.0	50.60	10.21	78.00
60.5	4.0	51.10	10.21	77.99
60.5	4.0	50.10	10.21	77.97
60.6	4.0	51.20	10.21	77.99
61.7	4.0	50.70	10.20	77.91
61.7	4.0	50.50	10.21	77.97
61.7	4.0	50.20	10.20	77.93
63.1	4.0	50.40	10.20	77.93
63.1	4.0	51.20	10.20	77.92
63.1	4.0	50.00	10.19	77.89
63.1	4.0	50.60	10.19	77.90
64.4	4.0	51.90	10.19	77.88
64.4	4.0	51.20	10.18	77.83
64.4	4.0	52.40	10.18	77.80
65.6	4.0	52.30	10.17	77.72
65.6	4.0	53.20	10.17	77.72
65.6	4.0	53.40	10.17	77.69
65.6	4.0	52.10	10.17	77.67
66.4	4.0	52.20	10.16	77.61
66.4	4.0	51.30	10.16	77.61
66.4	4.0	51.70	10.16	77.58
67.4	4.0	50.00	10.15	77.54
67.4	4.0	50.60	10.15	77.55
67.6	4.0	50.20	10.15	77.50
68.6	4.0	50.50	10.15	77.51
68.7	4.0	53.10	10.14	77.49
68.7	4.0	49.70	10.14	77.46
70.0	4.0	51.80	10.14	77.39
70.0	4.0	48.70	10.13	77.37
70.0	4.0	50.40	10.13	77.35
71.3	4.0	50.10	10.13	77.33
71.3	4.0	50.30	10.12	77.32
71.3	4.0	51.90	10.12	77.28
71.9	4.0	51.10	10.11	77.22
72.8	4.0	49.20	10.11	77.21
72.8	4.0	49.70	10.11	77.17
72.8	4.0	48.70	10.10	77.13
72.8	4.0	48.70	10.10	77.14
73.6	4.0	51.00	10.09	77.08
73.7	4.0	50.70	10.09	77.07
73.8	4.0	51.30	10.09	77.05
73.8	4.0	51.90	10.09	77.02
73.8	4.0	50.20	10.08	76.99
74.7	4.0	49.50	10.08	76.94
74.8	4.0	49.70	10.07	76.86

Notes:

Maximum depth 80 m

Data collected with a CTD (RBR XR-420)

Site Location: unavailable

Table A1-1b. Temperature and Dissolved Oxygen Profiles from Brucejack Lake (BJ), 2011

Depth (m)	Temperature (˚C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
August 23 2011 (Open-water)			
0.1	6.4	10.74	101.70
0.5	6.4	10.74	101.70
1.0	6.4	10.74	101.70
7.0	6.4	10.69	101.20
10.0	6.4	10.69	101.20
15.0	6.4	10.65	100.90
20.0	6.5	10.63	100.60
25.0	6.4	10.57	100.10
30.0	6.4	10.56	100.00
35.0	6.5	10.52	99.40
40.0	5.8	10.56	98.70
45.0	4.6	10.23	92.70
50.0	4.5	10.39	93.70
55.0	4.4	8.18	73.80
60.0	4.3	7.24	65.00
70.0	4.3	7.37	66.40
80.0	4.2	5.84	52.20
90.0	4.2	5.80	51.90

Notes:
Data collected with a YSI
Site Location: 09V 427690 259052

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		July 1, 2012 (Under-ice)	
0.2	0.5	5.29	11.63
0.3	0.6	24.80	11.74
0.7	0.6	45.65	11.73
1.1	0.7	54.37	11.79
1.4	0.7	55.48	11.75
1.7	0.8	55.44	11.73
1.9	0.9	58.47	11.74
2.3	0.9	57.15	11.69
2.6	0.9	58.38	11.60
2.9	0.9	55.89	11.56
3.3	1.0	56.58	11.49
3.6	1.0	58.31	11.43
3.9	1.0	60.44	11.43
4.2	1.0	56.46	11.39
4.6	1.0	56.44	11.33
5.0	1.0	55.94	11.32
5.4	1.0	59.41	11.27
5.8	1.0	59.30	11.20
6.2	1.0	58.29	11.19
6.7	1.0	59.31	11.20
7.3	1.0	58.90	11.15
7.8	1.0	56.74	11.09
8.2	1.1	59.57	11.07
8.6	1.1	58.50	11.05
9.1	1.1	58.02	10.99
9.7	1.1	59.56	10.97
10.2	1.1	58.39	10.91
10.8	1.2	56.92	10.90
11.1	1.2	57.51	10.86
11.7	1.2	58.88	10.82
12.3	1.3	60.02	10.79
12.9	1.3	56.67	10.75
13.5	1.4	58.65	10.71
14.0	1.4	58.79	10.67
14.5	1.4	57.38	10.64
15.1	1.5	61.31	10.60
15.5	1.5	56.55	10.57
16.0	1.6	58.63	10.53
16.4	1.7	56.53	10.49
17.0	1.7	55.16	10.46
17.6	1.8	56.21	10.43
18.2	1.8	55.23	10.40
18.8	1.9	53.89	10.36
19.3	1.9	54.46	10.32
19.9	2.0	54.81	10.30
20.5	2.1	54.65	10.28
21.3	2.1	56.60	10.25
22.0	2.2	53.05	10.21
22.6	2.2	51.32	10.18
23.3	2.3	53.81	10.15
23.9	2.3	55.25	10.13
24.6	2.4	54.61	10.10

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		July 1, 2012 (Under-ice)	
25.3	2.4	54.69	10.07
26.1	2.5	51.49	10.05
26.5	2.5	53.67	10.02
27.2	2.6	52.22	10.01
27.9	2.6	55.02	10.00
28.5	2.6	50.49	9.98
28.8	2.7	52.41	9.96
29.3	2.7	52.02	9.95
29.9	2.7	54.06	9.94
30.6	2.7	50.24	9.93
31.3	2.8	53.15	9.91
32.0	2.8	50.57	9.90
32.6	2.8	51.92	9.88
33.2	2.8	53.02	9.87
33.7	2.8	53.97	9.86
34.4	2.8	55.14	9.84
35.0	2.9	53.58	9.83
35.6	2.9	53.43	9.82
36.2	2.9	52.12	9.82
36.9	2.9	53.00	9.81
37.5	2.9	52.57	9.80
38.0	2.9	52.92	9.81
38.6	2.9	53.12	9.80
39.2	2.9	52.72	9.80
39.9	2.9	53.32	9.80
40.7	3.0	52.09	9.80
41.4	3.0	49.43	9.80
42.0	3.0	52.65	9.79
42.2	3.0	51.73	9.79
42.7	3.0	51.54	9.79
43.3	3.0	52.52	9.79
43.8	3.0	53.65	9.79
44.3	3.0	52.81	9.79
45.0	3.0	52.06	9.79
45.5	3.0	51.07	9.79
46.0	3.0	53.71	9.79
46.6	3.0	51.54	9.79
47.0	3.0	51.75	9.79
47.7	3.0	54.95	9.80
48.4	3.0	52.31	9.79
48.9	3.0	53.25	9.78
49.4	3.0	54.80	9.78
49.9	3.0	53.77	9.77
50.6	3.0	53.29	9.76
51.2	3.0	54.79	9.75
51.8	3.0	54.33	9.74
52.4	3.0	52.14	9.73
53.1	3.0	56.24	9.71
53.5	3.0	52.40	9.71
53.8	3.0	53.98	9.69
54.3	3.0	53.93	9.68
55.1	3.0	51.80	9.68

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		July 1, 2012 (Under-ice)	
55.9	3.0	54.90	9.66
56.8	3.0	56.48	9.64
57.6	3.0	56.11	9.63
58.4	3.0	56.19	9.62
58.8	3.0	55.16	9.60
59.1	3.0	55.91	9.59
59.5	3.0	54.87	9.58
59.9	3.0	54.14	9.57
60.3	3.0	53.48	9.56
60.7	3.0	53.65	9.55
61.0	3.0	55.46	9.54
61.3	3.0	53.13	9.53
61.7	3.0	55.73	9.52
62.0	3.0	54.46	9.51
62.5	3.0	52.09	9.51
62.9	3.0	53.97	9.50
63.4	3.0	54.65	9.49
63.8	3.0	53.93	9.48
64.4	3.0	53.88	9.47
64.8	3.1	55.66	9.46
65.3	3.1	54.83	9.45
65.8	3.0	55.76	9.43
65.9	3.0	56.04	9.42
65.9	3.1	56.17	9.41
65.9	3.1	54.56	9.40
65.9	3.1	55.38	9.39
64.3	3.1	55.88	9.38
64.1	3.0	53.39	9.38
64.1	3.0	54.90	9.38
62.9	3.0	53.65	9.37
62.9	3.0	55.66	9.38
62.9	3.0	52.08	9.38
61.6	3.0	54.04	9.38
61.6	3.0	54.74	9.39
61.6	3.0	57.52	9.40
60.4	3.0	55.28	9.40
60.3	3.0	56.36	9.41
60.3	3.0	55.01	9.42
59.3	3.0	54.87	9.41
59.1	3.0	54.45	9.43
59.1	3.0	54.21	9.44
59.1	3.0	54.74	9.44
57.9	3.0	54.32	9.44
57.9	3.0	54.38	9.45
57.6	3.0	55.77	9.44
56.7	3.0	54.83	9.46
56.7	3.0	55.96	9.47
55.5	3.0	52.78	9.47
55.5	3.0	52.46	9.48
55.4	3.0	52.96	9.48
54.3	3.0	54.49	9.49
54.3	3.0	53.65	9.50

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		July 1, 2012 (Under-ice)	
53.8	3.0	54.14	9.50
53.1	3.0	53.80	9.51
53.1	3.0	53.24	9.52
52.0	3.0	53.11	9.52
51.9	3.0	51.77	9.53
51.8	3.0	55.27	9.54
51.6	3.0	54.22	9.54
50.7	3.0	53.55	9.55
50.7	3.0	53.07	9.56
50.2	3.0	52.47	9.56
49.5	3.0	52.32	9.58
49.5	3.0	52.01	9.59
48.4	3.0	53.03	9.59
48.3	3.0	53.12	9.60
48.3	3.0	53.88	9.61
46.8	3.0	53.90	9.62
46.8	3.0	53.18	9.64
46.9	3.0	54.19	9.65
45.6	3.0	51.37	9.66
45.5	3.0	55.19	9.68
44.8	3.0	52.60	9.69
44.1	3.0	52.03	9.71
44.1	3.0	53.03	9.72
42.9	3.0	53.44	9.72
42.7	3.0	51.30	9.74
42.6	3.0	51.73	9.74
41.4	2.9	54.21	9.75
41.3	2.9	51.73	9.76
40.0	2.9	53.82	9.76
39.8	2.9	51.56	9.77
39.8	2.9	53.39	9.77
38.3	2.9	50.77	9.77
38.3	2.9	50.31	9.79
36.9	2.9	52.52	9.77
36.7	2.9	52.07	9.79
36.7	2.9	50.54	9.79
35.3	2.9	52.99	9.78
35.1	2.8	53.90	9.80
35.2	2.8	54.30	9.80
34.0	2.8	52.23	9.79
33.8	2.8	53.36	9.80
33.8	2.8	51.89	9.80
33.0	2.8	55.26	9.78
32.5	2.8	54.83	9.79
32.5	2.8	53.74	9.80
31.5	2.8	54.92	9.78
31.1	2.7	51.18	9.80
31.1	2.7	53.79	9.80
30.5	2.7	53.33	9.79
29.8	2.7	52.74	9.80
29.8	2.7	53.28	9.82
28.7	2.7	53.68	9.79

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		July 1, 2012 (Under-ice)	
28.5	2.6	52.52	9.82
28.5	2.6	54.52	9.84
27.2	2.6	52.60	9.81
27.0	2.6	51.15	9.85
27.0	2.5	51.89	9.86
25.7	2.5	53.91	9.84
25.6	2.5	52.90	9.87
25.6	2.5	53.13	9.88
24.3	2.4	54.37	9.85
24.2	2.4	52.61	9.90
24.2	2.4	54.94	9.91
22.7	2.3	53.87	9.89
22.7	2.3	51.36	9.91
22.7	2.3	54.44	9.93
21.4	2.2	53.79	9.89
21.2	2.2	54.21	9.94
21.3	2.1	52.33	9.95
20.0	2.1	53.17	9.90
19.7	2.0	53.70	9.95
19.8	2.0	53.17	9.96
18.5	2.0	54.89	9.94
18.4	1.9	54.33	9.98
18.4	1.9	53.74	9.99
16.8	1.9	53.35	9.97
16.8	1.8	54.96	10.01
16.8	1.8	56.26	10.02
15.4	1.7	54.20	10.01
15.4	1.6	56.78	10.05
15.4	1.6	55.32	10.05
14.0	1.5	57.03	10.05
14.0	1.5	58.27	10.08
13.4	1.5	58.70	10.03
12.5	1.4	58.93	10.09
12.5	1.3	59.82	10.10
11.1	1.3	57.97	10.05
11.0	1.2	56.19	10.12
11.0	1.2	56.64	10.13
9.6	1.1	56.75	10.10
9.6	1.1	57.45	10.15
9.6	1.1	57.49	10.18
7.9	0.9	57.99	10.17
8.0	0.9	59.97	10.20
8.0	0.9	57.30	10.21
6.6	0.8	56.06	10.23
6.6	0.8	61.14	10.27
5.8	0.8	55.40	10.22
5.2	0.8	57.13	10.30
5.2	0.8	60.28	10.34
4.0	0.8	56.10	10.29
3.8	0.8	54.33	10.36
3.8	0.7	58.37	10.39
2.5	0.7	56.91	10.36

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
July 1, 2012 (Under-ice)			
2.4	0.7	55.03	10.43
2.5	0.7	56.07	10.45
1.0	0.6	54.67	10.44
1.1	0.4	54.00	10.52
0.8	0.4	53.43	10.50
0.0	0.3	29.90	10.62
September 8, 2012 (Open-water)			
0.2	7.8	42.28	9.04
0.1	7.2	45.56	9.74
0.1	7.1	44.90	9.89
0.2	7.1	46.14	9.97
0.4	7.1	44.00	10.01
1.5	7.1	45.19	10.12
2.4	7.1	45.95	10.12
3.7	7.1	45.18	10.13
4.5	7.0	46.22	10.13
5.5	7.0	45.65	10.15
6.9	7.0	45.93	10.15
8.3	7.0	43.80	10.15
9.2	7.0	43.03	10.14
10.8	7.0	41.47	10.13
12.3	7.0	42.76	10.13
13.9	6.9	44.06	10.14
15.6	6.5	43.55	10.15
16.9	6.0	41.38	10.24
18.5	5.5	43.82	10.36
20.3	5.2	47.01	10.51
21.7	5.0	44.68	10.55
23.6	4.8	46.04	10.63
25.4	4.8	45.21	10.66
26.6	4.7	44.89	10.66
28.0	4.7	41.93	10.69
30.2	4.6	43.98	10.68
32.1	4.5	46.21	10.64
33.2	4.5	47.10	10.66
34.2	4.4	44.11	10.61
35.2	4.4	48.06	10.60
36.8	4.4	45.06	10.58
37.8	4.4	43.75	10.54
39.3	4.4	47.26	10.54
40.8	4.3	47.18	10.53
42.0	4.3	46.02	10.50
43.3	4.3	45.16	10.49
44.9	4.3	43.40	10.49
46.6	4.2	47.18	10.47
48.0	4.2	47.32	10.46
49.3	4.1	42.96	10.46
50.6	4.1	48.54	10.46
51.6	4.1	42.52	10.46
52.8	4.1	42.76	10.45
54.1	4.1	44.78	10.45
55.7	4.1	42.20	10.44

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
September 8, 2012 (Open-water)			
57.2	4.0	45.29	10.43
59.3	4.0	42.82	10.60
61.1	4.0	45.39	10.65
62.3	4.0	44.43	10.65
64.6	4.0	43.00	10.64
66.1	4.0	45.99	10.63
67.2	4.0	45.23	10.62
68.4	4.0	43.31	10.61
68.9	4.0	42.13	10.60
69.0	4.0	40.76	10.58
68.8	4.0	45.42	10.58
67.5	4.0	45.09	10.58
66.0	4.0	45.85	10.58
64.4	4.0	45.03	10.59
62.7	4.0	46.72	10.59
60.9	4.0	44.17	10.59
58.8	4.0	44.67	10.60
56.8	4.0	45.03	10.61
55.0	4.0	46.04	10.62
53.2	4.1	43.96	10.62
51.1	4.1	45.23	10.63
48.9	4.1	45.03	10.63
46.7	4.1	43.29	10.63
44.9	4.2	44.05	10.63
42.8	4.2	43.86	10.63
40.4	4.3	42.09	10.62
38.2	4.3	45.55	10.63
35.8	4.4	43.93	10.64
33.7	4.4	39.19	10.65
31.7	4.5	44.13	10.66
29.8	4.5	42.41	10.68
27.8	4.5	43.70	10.69
25.5	4.6	46.10	10.70
23.2	4.7	43.22	10.69
21.1	4.8	42.51	10.72
18.5	5.3	41.57	10.75
16.2	5.6	43.07	10.60
13.9	6.3	43.48	10.54
11.5	6.8	44.58	10.35
9.4	6.9	43.96	10.28
7.3	6.9	42.56	10.27
4.7	6.9	41.16	10.25
2.3	6.9	42.81	10.21
0.0	6.9	46.91	9.84
December 12, 2012 (Under-ice)			
1.2	0.2	45.66	11.36
1.2	0.1	46.14	11.36
1.2	0.1	46.00	11.35
1.2	0.1	47.82	11.34
1.2	0.1	48.73	11.33
1.2	0.2	46.35	11.33
1.2	0.1	48.08	11.32

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		December 12, 2012 (Under-ice)	
1.2	0.1	47.24	11.31
1.2	0.1	46.61	11.30
1.2	0.1	48.32	11.30
1.2	0.1	47.38	11.29
1.3	0.1	45.96	11.26
1.3	0.1	48.49	11.25
1.3	0.1	48.04	11.23
1.3	0.2	46.56	11.23
1.3	0.2	49.41	11.21
1.3	0.2	48.17	11.21
1.3	0.2	46.80	11.20
1.3	0.3	47.24	11.19
1.4	0.3	47.21	11.18
1.7	0.6	46.57	11.17
2.3	1.1	50.48	11.15
2.3	1.1	48.83	11.13
2.3	1.1	49.25	11.11
2.3	1.1	49.02	11.09
2.3	0.9	50.47	11.06
2.3	1.1	46.55	11.03
2.3	1.2	49.94	10.99
3.3	1.4	49.12	10.96
3.3	1.5	51.31	10.90
3.3	1.5	50.84	10.82
3.3	1.5	52.18	10.94
3.3	1.5	52.34	10.87
3.6	1.5	52.45	10.96
4.3	1.6	50.44	10.91
4.3	1.7	53.25	10.82
4.3	1.6	54.18	10.78
4.3	1.6	52.37	10.77
4.3	1.6	52.35	10.77
4.3	1.6	51.36	10.75
5.3	1.7	54.28	10.80
5.3	1.7	50.59	10.73
5.3	1.7	53.02	10.70
5.3	1.7	53.78	10.69
5.3	1.7	54.94	10.68
5.3	1.7	55.31	10.70
5.3	1.7	52.58	10.71
5.3	1.7	56.73	10.72
6.2	1.8	53.36	10.75
6.3	1.8	52.96	10.65
6.3	1.8	52.52	10.58
6.3	1.8	54.36	10.54
6.3	1.8	51.54	10.50
6.3	1.8	52.80	10.47
7.1	1.8	51.85	10.50
7.2	1.9	53.16	10.44
7.3	1.9	52.08	10.41
7.2	1.9	52.86	10.39
7.3	1.9	52.29	10.37

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		December 12, 2012 (Under-ice)	
7.2	1.9	54.29	10.36
7.3	1.9	51.05	10.34
7.2	1.9	53.34	10.34
8.3	1.9	51.65	10.39
8.4	2.0	52.30	10.34
8.3	2.0	53.11	10.31
8.4	2.0	50.73	10.30
8.4	2.0	51.60	10.27
8.4	2.0	50.49	10.27
8.4	2.0	49.51	10.27
8.4	1.9	53.47	10.27
8.5	1.9	52.57	10.27
9.3	2.0	49.98	10.27
9.3	2.1	53.60	10.25
9.3	2.1	50.40	10.23
9.3	2.1	52.82	10.21
9.3	2.1	53.83	10.20
9.3	2.0	53.34	10.20
9.3	2.0	52.77	10.19
9.3	2.0	52.51	10.19
9.3	2.0	53.96	10.19
9.3	2.0	51.53	10.18
9.3	2.0	52.08	10.19
10.3	2.1	52.38	10.23
10.3	2.2	51.54	10.19
10.3	2.2	53.96	10.18
10.3	2.2	52.17	10.17
10.3	2.2	53.67	10.16
10.3	2.2	54.43	10.15
11.2	2.2	51.36	10.18
11.2	2.2	51.16	10.16
11.3	2.2	53.50	10.14
11.2	2.2	52.40	10.13
11.2	2.2	51.83	10.13
11.2	2.2	50.85	10.13
11.2	2.2	52.19	10.13
11.2	2.2	51.57	10.13
11.8	2.2	52.42	10.15
12.3	2.3	51.56	10.14
12.3	2.4	50.58	10.12
12.3	2.3	52.94	10.11
12.3	2.3	51.10	10.10
12.3	2.3	53.02	10.10
13.0	2.4	50.45	10.12
13.3	2.4	52.32	10.11
13.3	2.4	52.68	10.10
13.3	2.4	51.77	10.08
13.2	2.4	50.36	10.09
13.3	2.4	52.54	10.07
13.3	2.4	52.98	10.06
13.3	2.4	52.94	10.07
13.3	2.4	53.40	10.05

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		December 12, 2012 (Under-ice)	
13.8	2.4	52.29	10.07
14.3	2.5	50.57	10.07
14.3	2.5	51.81	10.06
14.3	2.5	50.86	10.05
14.3	2.5	51.47	10.05
14.3	2.5	52.93	10.04
14.3	2.5	52.63	10.04
14.4	2.5	52.12	10.04
14.4	2.5	52.37	10.03
15.1	2.5	52.78	10.05
15.3	2.6	52.74	10.04
15.3	2.5	52.97	10.03
15.3	2.5	53.20	10.02
15.3	2.6	49.42	10.02
15.3	2.5	50.66	10.02
15.3	2.5	51.13	10.02
15.4	2.5	53.30	10.02
16.2	2.6	50.63	10.03
16.4	2.6	53.86	10.03
16.5	2.6	50.93	10.02
16.5	2.6	52.56	10.02
16.5	2.6	53.14	10.01
16.5	2.6	50.74	10.00
16.5	2.6	50.72	10.00
17.3	2.7	51.42	10.02
17.3	2.7	53.59	10.01
17.3	2.7	53.13	10.00
17.3	2.7	52.40	9.99
17.3	2.7	51.15	10.00
17.4	2.7	50.96	9.99
17.8	2.7	50.88	10.00
18.5	2.7	50.98	10.00
18.4	2.7	54.10	9.98
18.4	2.7	50.55	9.98
18.4	2.7	54.44	9.97
18.5	2.7	51.74	9.97
18.5	2.8	52.17	9.96
18.5	2.8	53.84	9.96
18.5	2.7	52.67	9.96
19.2	2.8	52.41	9.97
19.3	2.8	50.55	9.97
19.3	2.8	52.55	9.96
19.3	2.8	51.86	9.96
19.3	2.8	51.69	9.96
19.3	2.8	53.30	9.95
19.7	2.8	52.89	9.96
20.3	2.8	53.08	9.96
20.3	2.9	52.87	9.95
20.3	2.8	53.10	9.95
20.3	2.8	52.27	9.94
20.4	2.8	53.05	9.94
20.4	2.8	51.92	9.94

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		December 12, 2012 (Under-ice)	
21.0	2.9	51.34	9.95
21.1	2.9	52.80	9.94
21.2	2.9	51.02	9.94
21.3	2.9	51.51	9.94
21.3	2.9	52.04	9.93
21.3	2.9	51.06	9.93
21.3	2.9	52.89	9.93
21.3	2.9	50.88	9.93
21.3	2.9	51.89	9.93
21.5	2.9	52.82	9.93
22.1	2.9	52.84	9.94
22.3	2.9	52.06	9.93
22.3	2.9	50.34	9.92
22.3	2.9	51.33	9.93
22.3	2.9	51.23	9.92
23.4	2.9	52.78	9.93
23.4	2.9	50.94	9.92
23.4	2.9	52.13	9.92
23.3	2.9	52.92	9.92
23.5	2.9	52.37	9.92
24.3	3.0	53.20	9.92
24.3	3.0	51.90	9.91
24.3	3.0	49.31	9.91
24.3	3.0	53.67	9.91
24.3	3.0	51.01	9.91
25.1	3.0	49.69	9.92
25.3	3.0	52.84	9.91
25.3	3.0	50.54	9.90
25.3	3.0	52.97	9.90
25.3	3.0	48.68	9.90
25.3	3.0	53.02	9.90
25.3	3.0	53.25	9.90
25.6	3.0	50.79	9.90
26.3	3.0	51.72	9.90
26.3	3.0	51.07	9.90
26.3	3.0	51.14	9.89
26.3	3.0	53.52	9.89
26.3	3.0	50.60	9.89
27.3	3.0	51.84	9.90
27.3	3.0	52.84	9.89
27.4	3.1	51.57	9.89
27.4	3.1	52.23	9.89
27.4	3.0	52.24	9.88
28.3	3.1	53.77	9.89
28.3	3.1	53.09	9.88
28.3	3.1	51.49	9.88
28.3	3.1	52.24	9.88
28.3	3.1	51.89	9.88
28.3	3.1	51.57	9.88
28.5	3.1	53.79	9.88
28.5	3.1	51.53	9.88
28.8	3.1	50.85	9.88

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		December 12, 2012 (Under-ice)	
29.3	3.1	50.76	9.88
29.3	3.1	50.32	9.87
29.3	3.1	52.55	9.87
29.3	3.1	52.17	9.87
29.3	3.1	51.42	9.87
30.1	3.1	50.62	9.87
30.3	3.1	51.45	9.87
30.3	3.1	53.00	9.87
30.3	3.1	51.65	9.87
30.3	3.1	51.98	9.87
30.3	3.1	53.32	9.87
31.9	3.1	51.64	9.87
32.3	3.1	49.71	9.87
32.3	3.1	51.88	9.86
32.3	3.1	52.27	9.86
32.3	3.1	50.88	9.86
32.4	3.1	51.43	9.86
32.4	3.1	48.98	9.86
33.4	3.1	51.72	9.86
34.3	3.2	48.43	9.86
34.3	3.2	51.06	9.85
34.3	3.2	49.18	9.85
34.3	3.2	53.07	9.85
34.3	3.2	51.84	9.85
34.3	3.2	54.37	9.85
35.4	3.2	50.54	9.85
36.4	3.2	51.33	9.85
36.3	3.2	52.53	9.84
36.3	3.2	52.80	9.84
36.4	3.2	50.76	9.84
37.3	3.2	51.85	9.84
38.4	3.2	53.24	9.84
38.4	3.2	51.23	9.83
38.4	3.2	51.61	9.83
38.5	3.2	53.01	9.83
38.5	3.2	51.93	9.83
38.8	3.2	50.97	9.82
40.3	3.2	50.71	9.82
40.3	3.2	53.41	9.82
40.3	3.2	55.20	9.82
40.3	3.2	51.51	9.82
40.3	3.2	50.52	9.82
42.4	3.2	52.38	9.82
44.3	3.2	50.64	9.81
44.3	3.2	51.82	9.81
44.3	3.2	52.20	9.81
44.3	3.2	51.64	9.81
44.3	3.2	53.74	9.80
44.5	3.2	52.07	9.80
46.5	3.2	51.59	9.80
48.6	3.2	50.95	9.80
49.3	3.2	50.60	9.79

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		December 12, 2012 (Under-ice)	
49.3	3.2	52.27	9.79
49.5	3.2	52.62	9.78
50.5	3.2	53.90	9.78
50.6	3.2	52.25	9.77
50.7	3.2	53.14	9.77
52.2	3.2	52.08	9.77
53.1	3.2	52.81	9.76
54.3	3.2	51.05	9.76
54.4	3.2	50.40	9.75
54.4	3.2	53.81	9.74
54.4	3.2	52.16	9.74
54.4	3.2	49.44	9.74
54.4	3.2	53.55	9.74
54.4	3.2	51.12	9.74
54.4	3.2	52.14	9.74
56.2	3.2	54.29	9.73
58.1	3.2	52.60	9.72
59.4	3.2	53.49	9.71
59.4	3.2	53.27	9.71
59.4	3.2	51.56	9.70
59.4	3.2	51.36	9.70
59.4	3.2	52.32	9.69
59.4	3.2	53.01	9.69
60.2	3.2	53.47	9.68
62.3	3.2	53.07	9.68
63.7	3.2	50.49	9.67
64.4	3.2	50.75	9.66
64.4	3.2	51.74	9.66
64.4	3.2	54.02	9.65
64.4	3.2	52.65	9.65
64.4	3.2	51.42	9.65
64.4	3.2	52.48	9.65
64.9	3.2	52.71	9.64
66.8	3.2	52.30	9.64
68.3	3.2	53.21	9.63
68.3	3.2	51.67	9.62
68.3	3.2	52.19	9.61
68.3	3.2	53.06	9.60
68.3	3.2	51.78	9.60
68.3	3.2	51.69	9.60
68.3	3.2	52.61	9.60
68.3	3.2	52.15	9.59
69.3	3.2	53.01	9.59
69.7	3.2	54.08	9.58
70.4	3.2	52.05	9.57
70.8	3.2	52.04	9.57
71.5	3.2	54.45	9.57
72.3	3.2	52.63	9.56
72.3	3.2	53.23	9.56
72.3	3.2	53.62	9.56
72.3	3.2	53.04	9.56
72.3	3.2	51.19	9.57

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		December 12, 2012 (Under-ice)	
72.3	3.2	53.37	9.57
72.3	3.2	53.65	9.57
72.3	3.2	51.06	9.57
73.7	3.2	54.70	9.56
73.9	3.1	52.67	9.56
73.3	3.1	53.20	9.57
73.0	3.1	51.84	9.57
72.8	3.1	52.57	9.57
72.7	3.2	53.71	9.57
73.0	3.2	53.42	9.57
73.1	3.2	53.30	9.57
73.2	3.1	52.96	9.57
73.3	3.1	54.06	9.57
73.2	3.1	52.57	9.57
73.4	3.1	50.71	9.57
73.5	3.1	51.15	9.57
73.6	3.1	52.30	9.57
73.7	3.1	52.78	9.57
73.8	3.1	51.38	9.57
73.8	3.1	54.48	9.57
73.9	3.1	53.99	9.58
73.9	3.1	50.79	9.58
74.1	3.1	54.94	9.57
74.1	3.1	53.53	9.57
74.2	3.1	54.49	9.57
74.2	3.1	54.76	9.58
74.2	3.1	53.49	9.58
74.3	3.1	51.80	9.58
74.3	3.1	52.26	9.58
74.3	3.1	52.04	9.58
74.3	3.1	50.97	9.58
74.0	3.1	53.40	9.57
73.5	3.1	52.73	9.58
73.5	3.1	51.22	9.58
73.5	3.1	52.26	9.58
73.5	3.1	53.76	9.58
73.5	3.1	50.74	9.59
73.5	3.1	53.77	9.59
73.5	3.1	54.52	9.58
73.5	3.2	52.71	9.59
73.3	3.2	54.97	9.58
72.5	3.2	52.90	9.58
72.3	3.2	53.05	9.58
71.2	3.2	53.54	9.57
70.5	3.2	54.01	9.57
69.3	3.2	52.64	9.56
68.3	3.2	50.18	9.56
67.6	3.2	51.90	9.56
67.0	3.2	52.73	9.56
66.0	3.2	52.23	9.56
65.1	3.2	52.40	9.57
64.0	3.2	53.45	9.58

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		December 12, 2012 (Under-ice)	
63.0	3.2	52.28	9.58
62.0	3.2	50.54	9.59
61.1	3.2	51.01	9.60
60.1	3.2	50.36	9.61
59.2	3.2	51.53	9.61
58.2	3.2	53.94	9.62
57.2	3.2	51.94	9.63
56.1	3.2	52.86	9.63
55.1	3.2	51.86	9.64
54.1	3.2	52.76	9.65
53.2	3.2	51.20	9.65
52.1	3.2	50.40	9.66
51.0	3.2	52.74	9.68
49.8	3.2	53.12	9.69
48.6	3.2	51.52	9.70
47.3	3.3	52.12	9.71
46.2	3.3	52.47	9.72
45.0	3.3	51.37	9.73
43.5	3.3	51.30	9.74
42.1	3.3	53.43	9.75
40.8	3.3	51.47	9.76
39.5	3.3	51.62	9.76
38.2	3.2	50.52	9.77
37.2	3.2	51.73	9.77
36.1	3.2	50.83	9.78
34.8	3.2	49.57	9.78
33.6	3.2	52.15	9.79
32.3	3.2	51.35	9.80
31.2	3.2	52.13	9.80
30.0	3.2	52.80	9.81
28.9	3.1	51.93	9.82
28.6	3.1	51.89	9.83
27.8	3.1	52.12	9.82
26.8	3.1	52.76	9.84
26.4	3.1	51.26	9.84
24.9	3.1	54.26	9.84
23.7	3.0	51.32	9.85
22.7	3.0	52.77	9.86
21.6	3.0	51.68	9.86
20.3	3.0	50.36	9.86
18.9	2.9	51.01	9.86
17.6	2.8	50.19	9.86
16.2	2.8	53.71	9.87
15.3	2.7	52.63	9.89
14.5	2.7	52.40	9.90
13.0	2.6	51.17	9.89
11.7	2.6	52.37	9.92
10.3	2.5	51.74	9.90
9.0	2.4	49.00	9.92
8.0	2.3	52.41	9.93
6.7	2.2	55.12	9.95
5.3	2.0	53.22	9.97

Notes:

Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1c. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2012

Depth (m)	Temperature (˚C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
December 12, 2012 (Under-ice)			
4.1	1.9	55.04	10.01
2.7	1.9	58.14	10.05
1.3	1.7	56.67	10.03
1.0	1.2	53.56	9.93
0.9	1.0	57.11	10.06
0.6	0.9	58.19	10.09
0.2	0.5	60.99	10.15
0.2	0.5	55.57	10.27
0.2	0.5	57.07	10.36
0.2	0.5	59.32	10.43
0.0	0.5	52.40	10.26

Notes:
Data collected with a CTD (RBR XR-420)
July 2012 Site Location: 09V 427920 6259060
September 2012 Site Location: 09V 427653 6259018
Decemeber 2012 Site Location: 09V 427693 6259057
July 2012 ice/compact snow cover: 1.2 m
December 2012 ice/compact snow cover: 0.75 m

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
March 14, 2013 (Under-ice); Max Depth 74 m				
0.17	0.27	0.21	59.47	7.10
0.20	0.27	0.67	59.55	7.07
0.33	0.26	0.80	59.25	6.97
0.46	0.28	1.09	60.85	6.98
0.78	0.36	1.09	57.88	7.03
1.40	0.67	1.10	59.81	7.06
1.79	0.98	1.11	58.02	7.05
2.08	1.30	1.11	59.05	7.05
2.50	1.51	1.11	57.73	7.07
2.98	1.66	1.12	57.70	7.08
3.34	1.76	2.06	59.45	7.00
3.66	1.85	2.66	56.37	6.98
3.88	1.90	2.66	58.18	7.02
4.12	1.92	2.67	56.32	7.03
4.35	1.95	4.28	58.11	6.99
4.64	1.98	4.42	53.60	6.97
4.94	2.04	4.42	55.13	6.98
5.16	2.06	5.29	56.38	6.94
5.39	2.09	6.11	54.27	6.93
5.63	2.12	6.15	55.39	6.96
6.13	2.15	6.15	58.25	6.96
6.29	2.18	7.52	57.42	6.95
6.55	2.20	7.52	54.84	6.94
6.92	2.22	7.53	56.73	6.95
7.15	2.24	7.59	53.14	6.92
7.44	2.26	8.90	55.98	6.93
7.55	2.29	8.91	54.92	6.92
7.89	2.31	9.09	55.76	6.90
8.12	2.33	10.19	54.00	6.90
8.47	2.35	10.20	55.18	6.92
8.61	2.36	10.21	54.91	6.88
9.12	2.38	11.32	56.09	6.87
9.41	2.40	11.32	55.17	6.90
9.66	2.42	11.32	55.60	6.89
10.10	2.46	12.31	54.90	6.88
10.37	2.48	12.33	54.88	6.86
10.60	2.51	12.34	54.80	6.87
10.93	2.53	13.37	55.93	6.84
11.59	2.61	13.37	54.46	6.86
12.14	2.64	13.38	52.85	6.82
12.70	2.68	13.39	53.95	6.86
13.50	2.71	14.89	55.39	6.81
13.96	2.75	14.90	55.11	6.83
14.89	2.80	14.94	54.12	6.83
15.26	2.86	16.54	54.50	6.79
15.72	2.88	16.55	53.57	6.81
16.23	2.92	16.55	57.23	6.82
16.97	2.97	18.30	53.61	6.80
17.56	3.00	18.30	55.19	6.78
18.43	3.03	18.31	53.30	6.80
18.71	3.06	18.35	54.82	6.77
19.33	3.13	19.89	54.01	6.78
19.74	3.15	19.90	55.71	6.77
19.83	3.16	19.90	56.33	6.77
20.35	3.19	19.91	55.48	6.78
21.02	3.21	19.98	56.78	6.75
21.08	3.21	21.44	55.87	6.75
21.22	3.21	21.47	56.39	6.73
21.41	3.21	21.47	56.28	6.75

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
March 14, 2013 (Under-ice); Max Depth 74 m				
21.90	3.21	21.47	54.89	6.74
22.43	3.20	23.05	57.42	6.72
22.71	3.20	23.05	56.82	6.71
23.42	3.20	23.06	57.41	6.72
23.82	3.20	23.06	57.83	6.73
24.31	3.20	23.06	53.73	6.72
24.75	3.18	23.08	54.45	6.73
25.46	3.18	24.64	58.82	6.70
26.22	3.18	24.64	54.26	6.70
26.21	3.17	24.65	58.51	6.70
27.50	3.17	24.77	54.01	6.69
28.38	3.17	26.29	56.09	6.68
28.78	3.16	26.29	56.11	6.68
29.70	3.15	26.30	58.43	6.69
30.46	3.15	27.91	56.21	6.67
30.69	3.14	27.94	55.93	6.67
31.28	3.14	27.97	57.12	6.67
31.93	3.13	28.59	54.94	6.66
32.59	3.12	29.67	55.58	6.66
33.51	3.11	29.71	57.51	6.66
34.11	3.11	29.71	56.51	6.66
34.59	3.10	31.26	59.39	6.65
34.89	3.10	31.28	55.13	6.65
35.54	3.10	31.30	56.21	6.65
37.35	3.09	31.53	57.24	6.64
37.64	3.08	32.79	56.05	6.64
38.35	3.08	32.79	56.92	6.64
39.78	3.09	32.81	54.82	6.64
39.85	3.09	33.66	58.26	6.64
40.77	3.08	33.68	57.34	6.64
42.34	3.08	33.69	58.61	6.64
42.76	3.08	34.52	56.54	6.63
44.64	3.08	35.07	59.39	6.63
45.91	3.07	35.08	58.20	6.64
46.79	3.07	35.09	57.05	6.63
46.89	3.06	36.65	57.75	6.63
47.34	3.06	36.70	58.68	6.63
47.44	3.06	36.71	55.98	6.63
47.85	3.06	37.80	59.51	6.62
48.51	3.06	37.91	59.20	6.62
49.01	3.06	37.91	58.69	6.62
50.07	3.06	37.92	58.15	6.63
50.79	3.06	38.78	58.71	6.61
51.41	3.06	38.80	56.07	6.62
51.97	3.06	38.80	56.96	6.62
53.43	3.06	38.84	58.27	6.62
53.79	3.06	39.54	56.71	6.61
54.30	3.06	39.56	56.48	6.62
54.75	3.06	39.57	56.01	6.62
55.09	3.06	40.35	56.33	6.61
55.50	3.06	40.36	57.47	6.61
55.88	3.06	40.36	56.58	6.62
56.33	3.06	40.36	58.16	6.62
56.71	3.06	41.08	56.33	6.60
57.05	3.06	41.11	59.74	6.61
57.33	3.06	41.12	58.59	6.61
57.65	3.06	41.15	57.38	6.61
57.84	3.06	41.89	60.45	6.60

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
March 14, 2013 (Under-ice); Max Depth 74 m				
57.85	3.06	41.91	58.20	6.60
58.03	3.06	41.92	57.28	6.61
58.36	3.06	42.72	58.39	6.60
58.56	3.06	42.73	58.73	6.60
59.02	3.06	43.44	58.53	6.59
59.68	3.06	43.52	58.54	6.60
60.16	3.06	43.55	57.79	6.60
60.39	3.06	44.31	58.78	6.59
61.09	3.06	44.31	56.78	6.59
61.40	3.06	45.05	57.58	6.59
61.96	3.06	45.13	58.99	6.59
62.54	3.06	45.14	57.90	6.59
63.11	3.06	45.80	59.28	6.59
63.37	3.06	45.87	56.72	6.58
63.55	3.06	45.88	57.76	6.59
63.49	3.06	45.88	57.22	6.59
63.96	3.06	46.74	57.41	6.58
64.44	3.06	46.74	58.25	6.58
64.88	3.06	47.55	57.30	6.58
65.51	3.06	47.58	59.28	6.58
66.09	3.06	47.65	58.53	6.57
66.56	3.07	48.40	57.46	6.57
66.95	3.06	48.40	57.69	6.57
67.56	3.06	49.15	59.02	6.56
68.19	3.06	49.19	59.04	6.57
68.16	3.06	49.20	58.87	6.57
68.29	3.06	49.97	56.61	6.56
68.53	3.06	49.98	57.26	6.56
68.69	3.06	50.13	58.24	6.56
68.75	3.06	50.80	60.24	6.56
69.30	3.06	50.80	58.21	6.56
69.71	3.06	51.64	56.24	6.56
70.25	3.06	51.65	59.41	6.56
70.55	3.06	52.46	57.03	6.56
71.03	3.06	52.46	57.95	6.56
71.38	3.07	52.51	58.93	6.56
71.81	3.07	53.20	60.24	6.55
72.16	3.07	53.21	58.04	6.55
72.54	3.07	54.14	60.11	6.54
72.67	3.07	54.14	57.04	6.55
73.04	3.07	55.05	59.71	6.54
73.30	3.07	55.05	59.90	6.54
73.83	3.06	55.97	58.10	6.54
73.93	3.06	55.98	58.36	6.53
73.69	3.06	55.99	58.62	6.54
73.72	3.06	56.00	56.73	6.53
73.82	3.06	56.77	57.73	6.53
		56.80	56.96	6.53
		56.81	60.09	6.53
		57.60	59.83	6.52
		57.61	55.78	6.52
		57.61	60.33	6.52
		57.61	59.20	6.53
		58.44	56.85	6.52
		58.69	56.73	6.51
		59.27	58.94	6.51
		60.02	57.97	6.51
		60.26	58.48	6.51

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
March 14, 2013 (Under-ice); Max Depth 74 m				
		61.03	59.11	6.50
		61.08	57.63	6.50
		61.40	57.69	6.50
		61.95	56.28	6.50
		61.97	58.56	6.50
		62.84	58.97	6.50
		62.85	58.71	6.50
		63.80	59.17	6.49
		63.84	57.83	6.49
		64.67	57.74	6.49
		64.68	56.68	6.49
		64.69	60.44	6.49
		65.63	58.37	6.49
		65.65	57.49	6.49
		66.54	58.20	6.49
		66.74	59.89	6.49
		67.48	58.86	6.49
		68.46	59.09	6.49
		68.47	57.93	6.49
		68.55	58.11	6.49
		69.44	60.37	6.48
		69.45	59.37	6.49
		70.09	59.82	6.48
		70.83	58.92	6.48
		70.84	59.43	6.48
		71.72	57.66	6.48
		71.75	56.85	6.48
		71.79	56.76	6.48
		72.69	59.43	6.48
		72.70	57.39	6.49
		72.87	60.03	6.48
		73.82	60.32	6.49
July 16, 2013 (Open-water); Max Depth 78 m				
0.10	6.76	0.50	56.55	14.00
0.42	6.74	0.51	58.89	14.00
0.72	6.72	0.51	57.90	14.00
1.08	6.68	0.52	55.43	14.00
1.37	6.68	0.52	56.42	14.00
1.64	6.64	1.74	56.17	14.00
2.03	6.51	1.76	56.36	14.00
2.34	6.30	1.77	55.64	14.00
2.59	6.22	1.77	57.07	14.00
2.79	5.99	1.79	57.72	14.00
3.26	5.76	1.79	58.24	14.00
3.56	5.67	2.96	57.33	14.00
3.88	5.61	2.98	58.21	14.00
4.53	5.46	2.98	59.32	14.00
4.87	5.37	2.99	58.00	14.00
5.50	5.29	3.00	59.08	14.00
6.07	5.19	3.02	57.11	14.00
6.80	5.14	3.02	58.66	14.00
7.12	5.10	3.05	55.69	14.00
7.69	5.08	4.28	58.03	14.00
8.00	5.10	4.32	58.33	14.00
8.46	5.09	4.62	55.50	14.00
8.69	5.10	5.70	59.58	14.00
9.40	5.06	5.71	56.54	14.00
9.93	5.04	5.71	57.75	14.00

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
July 16, 2013 (Open-water); Max Depth 78 m				
10.30	5.03	7.01	58.21	14.00
10.93	4.95	7.03	59.79	14.00
11.41	4.83	7.05	58.11	14.00
11.98	4.82	7.05	56.35	14.00
12.21	4.81	7.05	58.42	14.00
12.56	4.80	8.24	58.37	14.00
13.00	4.78	8.24	56.89	14.00
13.29	4.77	8.24	57.81	14.00
13.64	4.73	8.25	58.18	14.00
14.01	4.73	9.49	60.58	14.00
14.41	4.73	9.49	58.07	14.00
14.87	4.69	9.49	60.32	14.00
14.85	4.69	10.81	59.52	14.00
15.09	4.66	10.81	59.52	14.00
15.29	4.64	10.81	57.79	14.00
15.49	4.63	12.15	58.12	14.00
15.67	4.64	12.16	57.25	14.00
15.73	4.65	12.17	57.76	14.00
15.85	4.67	13.44	60.33	14.00
16.07	4.67	13.45	58.76	14.00
16.32	4.65	13.45	57.69	14.00
16.48	4.65	13.45	59.19	14.00
16.69	4.65	14.67	57.36	14.00
16.86	4.65	14.68	57.95	14.00
17.06	4.64	14.70	56.98	14.00
17.26	4.64	15.57	56.83	14.00
17.57	4.65	15.86	60.31	14.00
17.75	4.62	15.89	59.51	14.00
17.88	4.60	15.89	57.64	14.00
18.04	4.60	17.18	60.01	14.00
18.45	4.59	17.22	58.57	14.00
18.62	4.53	17.22	58.09	14.00
18.73	4.52	17.23	58.12	14.00
18.88	4.53	17.23	60.09	14.00
18.99	4.52	18.35	56.48	14.01
19.19	4.52	18.35	56.69	14.01
19.49	4.53	18.36	62.66	14.00
19.83	4.52	18.38	58.12	14.01
19.98	4.47	19.53	58.21	14.01
20.21	4.45	19.55	60.43	14.01
20.40	4.43	19.59	58.67	14.01
20.57	4.41	20.67	58.71	14.01
20.90	4.40	20.67	56.96	14.01
21.15	4.39	20.69	57.06	14.01
21.56	4.38	20.74	58.37	14.01
21.80	4.36	21.94	57.60	14.01
22.06	4.38	21.94	57.98	14.01
22.45	4.38	21.95	59.17	14.01
22.76	4.39	21.99	58.90	14.01
22.88	4.36	23.16	59.73	14.01
23.14	4.37	23.18	55.76	14.01
23.59	4.35	23.19	59.15	14.01
24.21	4.33	23.22	57.30	14.01
24.64	4.31	23.25	60.61	14.01
24.92	4.31	24.22	58.45	14.01
25.16	4.28	24.35	58.17	14.01
25.69	4.28	24.36	58.28	14.01
25.91	4.25	24.37	60.18	14.01

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
July 16, 2013 (Open-water); Max Depth 78 m				
26.10	4.26	25.45	61.34	14.01
26.23	4.26	25.51	58.12	14.01
26.49	4.25	25.52	59.89	14.01
26.74	4.24	25.53	58.03	14.01
27.08	4.26	25.55	59.12	14.01
27.33	4.26	26.71	58.61	14.01
27.73	4.25	26.72	57.60	14.01
28.06	4.25	26.72	58.56	14.01
28.26	4.26	26.74	59.87	14.01
28.67	4.25	27.78	61.10	14.01
29.06	4.25	27.83	60.24	14.01
29.66	4.23	27.84	61.45	14.01
30.17	4.22	27.84	60.19	14.01
30.95	4.21	27.85	57.53	14.01
31.10	4.21	28.97	58.33	14.01
31.69	4.20	29.01	57.20	14.01
32.05	4.21	29.01	60.20	14.01
32.43	4.21	29.01	59.08	14.01
32.75	4.22	30.27	60.41	14.01
33.12	4.22	30.28	60.30	14.01
33.47	4.22	30.28	57.02	14.01
33.87	4.22	30.36	59.91	14.01
34.18	4.22	31.41	59.34	14.01
34.83	4.20	31.43	57.97	14.01
35.23	4.18	31.45	58.09	14.01
35.68	4.17	32.61	60.04	14.01
36.16	4.16	32.62	59.28	14.01
36.50	4.15	32.63	57.63	14.01
37.02	4.14	33.85	58.88	14.01
37.52	4.13	33.86	57.18	14.01
38.28	4.10	33.86	60.35	14.01
38.85	4.08	34.54	58.41	14.01
39.46	4.05	35.10	60.33	14.01
39.87	4.05	35.10	60.29	14.01
40.38	4.04	35.12	60.82	14.01
40.88	4.04	36.33	60.46	14.01
41.41	4.04	36.35	58.78	14.01
41.79	4.04	36.35	60.55	14.01
42.25	4.04	37.42	56.61	14.01
42.82	4.05	37.56	60.81	14.01
43.19	4.03	37.57	60.26	14.01
43.53	4.03	37.57	56.27	14.01
43.84	4.03	38.65	59.03	14.01
44.18	4.04	38.80	61.62	14.01
44.46	4.03	38.81	59.87	14.01
44.84	4.03	38.81	56.97	14.01
45.16	4.02	38.81	58.17	14.01
45.60	4.01	38.85	58.88	14.01
46.06	4.00	40.12	61.64	14.01
46.66	3.99	40.12	59.12	14.01
47.24	3.99	40.12	60.33	14.01
47.72	3.98	40.13	58.15	14.01
48.16	3.99	40.13	58.65	14.01
48.52	3.98	40.14	59.27	14.01
49.07	3.98	41.33	60.75	14.02
49.37	3.98	41.35	59.82	14.02
49.90	3.98	41.35	59.36	14.02
50.25	3.98	41.35	59.20	14.02

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
July 16, 2013 (Open-water); Max Depth 78 m				
50.92	3.97	41.35	59.37	14.02
51.21	3.97	41.36	60.82	14.02
51.85	3.97	41.61	58.53	14.02
52.05	3.98	42.53	57.66	14.02
52.33	3.98	42.57	60.20	14.02
52.82	3.97	42.57	60.54	14.02
53.03	3.96	43.80	60.32	14.02
53.37	3.96	43.80	59.74	14.02
53.80	3.95	43.84	58.76	14.02
54.18	3.94	44.22	58.76	14.02
54.49	3.94	45.03	60.65	14.02
54.67	3.94	45.03	60.16	14.02
54.85	3.94	45.04	58.71	14.02
55.18	3.94	45.05	58.62	14.02
55.25	3.95	46.22	60.66	14.02
56.25	3.94	46.22	58.27	14.02
56.72	3.92	46.22	60.19	14.02
57.24	3.93	46.23	59.11	14.02
57.78	3.92	47.35	59.82	14.02
57.97	3.93	47.36	61.35	14.02
58.23	3.93	47.40	58.76	14.02
58.45	3.93	47.68	59.59	14.02
58.87	3.93	48.54	58.85	14.02
59.08	3.92	48.56	60.25	14.02
59.37	3.93	49.72	60.10	14.02
59.82	3.93	49.75	60.12	14.02
60.24	3.93	49.76	57.91	14.02
60.57	3.92	50.77	60.79	14.02
60.82	3.92	50.99	59.81	14.02
61.04	3.92	51.01	59.67	14.02
61.24	3.92	52.16	57.68	14.02
61.48	3.92	52.20	58.90	14.02
61.84	3.92	52.24	58.34	14.02
62.20	3.92	53.37	62.71	14.02
62.42	3.91	53.38	60.56	14.02
62.63	3.91	53.38	58.90	14.02
62.94	3.92	53.39	59.22	14.02
63.21	3.92	53.65	59.52	14.02
63.53	3.92	54.52	60.51	14.02
63.61	3.92	54.52	57.82	14.02
64.02	3.92	54.53	59.79	14.02
64.25	3.91	55.68	60.00	14.02
64.59	3.91	55.68	57.43	14.02
64.98	3.91	55.68	60.92	14.02
65.26	3.90	56.91	58.29	14.02
65.61	3.90	56.96	63.80	14.02
66.15	3.90	57.24	60.57	14.02
66.67	3.90	58.16	60.68	14.02
67.06	3.89	58.16	60.65	14.02
67.27	3.89	58.17	60.70	14.02
67.51	3.89	58.20	59.62	14.02
67.81	3.89	59.13	60.38	14.02
68.14	3.89	59.15	60.24	14.02
68.28	3.89	59.16	59.90	14.02
68.82	3.88	60.04	59.62	14.02
69.25	3.89	60.22	59.95	14.02
69.49	3.88	60.23	59.45	14.02
69.85	3.88	60.24	58.53	14.02

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
July 16, 2013 (Open-water); Max Depth 78 m				
70.15	3.89	60.24	62.40	14.02
70.45	3.88	60.24	59.15	14.02
70.69	3.88	60.25	59.69	14.02
71.05	3.88	61.44	57.58	14.02
71.31	3.88	61.45	59.89	14.02
71.72	3.88	61.45	60.79	14.02
72.12	3.88	61.45	57.83	14.02
72.43	3.88	61.48	58.83	14.02
72.61	3.88	61.69	59.33	14.02
72.99	3.88	62.57	62.41	14.02
73.43	3.87	62.60	58.42	14.02
73.73	3.87	62.60	58.44	14.02
74.33	3.87	62.60	58.55	14.02
74.93	3.86	62.60	60.79	14.02
75.22	3.86	62.60	60.75	14.02
75.59	3.86	62.61	61.70	14.02
75.91	3.87	62.61	62.92	14.02
76.26	3.86	63.80	61.67	14.02
76.66	3.86	63.87	60.18	14.03
76.97	3.86	63.90	57.54	14.03
77.17	3.86	64.95	60.34	14.03
77.41	3.86	64.96	59.97	14.03
77.77	3.86	64.97	58.85	14.03
77.97	3.85	66.08	61.39	14.03
78.05	3.86	66.10	59.32	14.03
		66.16	60.97	14.03
		66.98	61.62	14.03
		67.03	57.43	14.03
		67.03	61.77	14.03
		67.03	59.74	14.03
		67.88	57.45	14.03
		67.96	60.90	14.03
		67.97	60.77	14.03
		68.07	59.58	14.03
		68.09	59.46	14.03
		69.15	58.83	14.03
		69.16	59.44	14.03
		69.16	56.68	14.03
		70.17	59.97	14.03
		70.17	58.69	14.03
		70.21	61.20	14.03
		71.19	62.69	14.03
		71.20	60.09	14.03
		71.24	60.46	14.03
		72.19	61.90	14.03
		72.28	60.86	14.03
		72.29	61.11	14.03
		72.30	60.49	14.03
		72.31	60.15	14.03
		73.29	61.16	14.03
		73.29	60.93	14.03
		73.29	60.08	14.03
		73.29	58.49	14.03
		74.18	62.59	14.03
		74.19	59.93	14.03
		74.21	61.59	14.03
		74.24	57.02	14.03
		75.04	61.80	14.03

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
July 16, 2013 (Open-water); Max Depth 78 m				
		75.05	60.39	14.03
		75.13	61.38	14.03
		75.97	60.54	14.03
		75.98	59.58	14.03
		76.09	59.46	14.03
		76.79	62.86	14.03
		76.98	58.94	14.03
		77.23	60.94	14.03
		77.48	58.58	14.03
		78.05	60.49	14.03
August 10, 2013 (Open-water); Max Depth 83 m				
0.17	14.34	0.65	56.66	6.26
0.32	14.33	0.99	55.78	6.77
0.40	14.32	1.02	55.26	6.64
0.44	14.30	1.04	57.31	6.60
0.59	14.28	1.06	56.45	6.58
0.73	14.26	1.07	55.13	6.53
0.78	14.25	2.09	56.77	6.99
0.96	14.24	2.44	59.62	7.35
1.08	14.24	2.45	58.08	6.99
1.30	14.23	2.48	57.76	6.83
1.53	14.21	2.48	56.55	6.87
1.68	14.21	3.19	58.87	7.73
1.81	14.21	3.82	58.32	7.50
1.93	14.22	3.84	55.98	7.38
2.26	14.20	3.84	57.40	7.80
2.54	14.15	3.84	55.90	7.39
2.89	14.02	3.85	54.68	7.31
3.13	13.60	3.87	57.42	7.31
3.31	12.92	3.87	57.88	7.33
3.60	12.46	3.87	57.45	7.28
3.93	11.82	5.06	56.77	7.72
4.44	10.82	5.33	59.68	7.63
4.91	10.13	5.35	56.99	7.53
5.24	9.49	5.38	59.30	7.45
5.73	9.07	5.38	58.78	7.43
6.02	8.67	5.39	58.43	7.44
6.22	8.32	5.39	57.15	7.46
6.46	7.90	6.01	60.98	7.70
6.71	7.55	6.75	56.13	7.63
6.90	7.31	6.78	58.27	7.50
7.13	7.13	6.78	58.00	7.57
7.51	6.87	6.82	58.19	7.54
7.71	6.75	6.83	56.96	7.51
7.97	6.57	6.85	57.29	7.60
8.16	6.44	7.39	59.75	7.78
8.49	6.22	8.11	58.22	7.56
8.72	6.05	8.11	58.51	7.68
8.98	5.89	8.15	59.38	7.56
9.25	5.68	8.20	59.67	7.55
9.60	5.52	8.21	58.11	7.55
9.81	5.37	8.22	59.20	7.53
10.06	5.29	8.23	56.40	7.55
10.36	5.17	8.25	60.39	7.57
10.71	5.11	9.26	58.58	7.67
11.07	5.05	9.49	59.70	7.56
11.31	5.01	9.52	58.18	7.54
11.52	4.96	9.52	59.41	7.53

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
August 10, 2013 (Open-water); Max Depth 83 m				
11.75	4.93	9.54	58.24	7.55
12.12	4.87	9.54	57.71	7.54
12.16	4.83	9.65	59.52	7.63
12.45	4.80	10.87	57.23	7.56
12.52	4.79	10.93	59.09	7.50
12.78	4.77	10.95	60.33	7.50
12.90	4.77	10.95	57.38	7.51
13.00	4.78	10.95	59.67	7.49
13.31	4.75	11.55	58.00	7.52
13.42	4.75	12.45	57.53	7.48
13.90	4.72	12.48	58.75	7.47
14.34	4.70	12.49	58.33	7.48
14.59	4.68	12.50	58.19	7.49
15.19	4.65	12.52	60.14	7.49
15.66	4.63	12.52	58.98	7.48
16.15	4.61	12.52	59.29	7.49
16.54	4.59	12.99	61.05	7.48
16.76	4.59	13.92	59.05	7.46
17.17	4.57	13.97	60.25	7.46
17.65	4.55	13.98	58.32	7.46
18.21	4.53	14.00	57.91	7.47
18.45	4.52	14.01	60.87	7.47
18.71	4.50	14.20	59.58	7.47
18.88	4.48	15.43	56.87	7.46
19.36	4.47	15.44	57.36	7.45
19.82	4.44	15.44	58.56	7.44
20.42	4.41	15.48	58.36	7.45
20.86	4.39	15.48	61.01	7.45
21.40	4.38	15.48	58.88	7.46
21.83	4.37	15.48	58.58	7.45
22.04	4.37	15.48	59.46	7.45
22.70	4.35	15.51	58.51	7.46
22.97	4.34	15.92	59.78	7.45
23.58	4.32	16.80	59.78	7.44
23.79	4.32	16.87	60.62	7.45
24.09	4.31	16.87	57.23	7.44
24.43	4.31	16.89	58.81	7.45
24.94	4.30	16.89	60.64	7.44
25.21	4.30	16.90	58.57	7.45
25.49	4.30	17.40	60.21	7.44
25.76	4.30	18.30	58.57	7.44
26.10	4.29	18.35	58.79	7.44
26.56	4.27	18.38	59.39	7.42
26.86	4.27	18.38	60.74	7.43
27.22	4.26	18.90	58.18	7.44
27.63	4.25	19.90	57.44	7.42
28.09	4.25	19.91	61.76	7.41
28.49	4.24	19.94	60.20	7.42
28.86	4.23	20.01	59.74	7.42
29.16	4.22	21.35	58.59	7.40
29.49	4.22	21.41	59.72	7.40
29.64	4.22	21.41	59.08	7.41
30.09	4.21	21.42	60.46	7.41
30.46	4.20	22.85	59.15	7.40
30.87	4.18	22.87	59.97	7.40
31.40	4.17	22.88	58.99	7.39
31.73	4.16	22.90	61.79	7.39
32.07	4.15	22.90	60.44	7.41

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
August 10, 2013 (Open-water); Max Depth 83 m				
32.34	4.15	22.91	60.88	7.40
32.61	4.14	23.48	59.68	7.39
32.93	4.14	24.24	60.28	7.40
33.26	4.13	24.24	59.68	7.39
33.58	4.11	24.27	59.74	7.38
34.11	4.11	24.28	59.30	7.39
34.50	4.10	24.28	60.60	7.39
34.74	4.10	24.38	58.87	7.39
34.93	4.10	25.53	59.18	7.38
35.52	4.10	25.56	60.25	7.39
35.78	4.09	25.59	59.05	7.38
35.99	4.09	25.60	58.51	7.39
36.10	4.08	25.61	59.46	7.38
36.51	4.07	25.62	59.15	7.38
36.60	4.08	25.97	59.08	7.37
36.83	4.09	26.97	61.02	7.38
37.11	4.07	26.98	60.21	7.38
37.47	4.07	26.99	59.31	7.38
37.86	4.06	27.01	59.09	7.37
38.12	4.06	27.40	59.89	7.36
38.34	4.05	28.50	59.83	7.36
38.53	4.05	28.51	59.80	7.37
38.79	4.07	28.51	60.28	7.36
39.06	4.05	28.52	58.69	7.37
39.38	4.05	30.03	59.58	7.35
39.66	4.04	30.03	60.01	7.37
40.21	4.04	30.04	58.70	7.36
40.51	4.03	30.04	60.61	7.37
40.66	4.04	30.73	59.54	7.35
40.97	4.03	31.38	59.54	7.33
41.31	4.03	31.39	61.07	7.35
41.52	4.03	31.42	60.84	7.35
41.92	4.03	31.44	58.65	7.35
42.36	4.02	31.44	62.18	7.34
42.52	4.02	31.44	59.47	7.34
42.93	4.02	32.82	61.51	7.34
43.25	4.02	32.82	61.19	7.33
43.45	4.02	32.82	60.91	7.33
43.83	4.02	32.83	60.02	7.34
44.11	4.01	32.83	59.33	7.33
44.34	4.02	32.84	58.63	7.34
44.68	4.01	32.84	58.69	7.34
45.19	4.01	32.84	61.79	7.34
45.69	4.00	32.93	60.56	7.33
46.22	4.00	34.09	60.58	7.33
46.58	4.00	34.09	59.40	7.33
46.73	4.01	34.09	61.90	7.33
46.92	4.01	34.09	59.43	7.32
47.32	4.01	34.10	61.50	7.33
47.71	4.01	34.10	59.29	7.33
48.08	4.01	34.10	59.37	7.32
48.32	4.01	34.11	60.07	7.32
48.70	4.01	34.66	60.02	7.33
49.36	4.01	35.17	60.96	7.32
49.68	4.02	35.21	58.58	7.31
50.16	4.02	35.22	59.61	7.33
50.65	4.01	35.23	60.38	7.32
51.11	4.01	35.24	59.89	7.31

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
August 10, 2013 (Open-water); Max Depth 83 m				
51.65	4.02	35.25	59.18	7.33
52.09	4.03	35.25	59.50	7.32
52.70	4.02	35.26	58.30	7.33
53.05	4.03	35.26	60.02	7.32
53.63	4.03	35.27	59.95	7.33
54.05	4.03	36.23	61.27	7.31
54.62	4.03	36.35	59.20	7.32
55.10	4.03	36.35	59.59	7.32
55.74	4.02	36.36	59.05	7.31
56.02	4.02	36.37	61.64	7.32
56.78	4.01	36.37	60.90	7.31
57.35	4.00	36.38	58.79	7.31
57.83	4.01	36.38	59.79	7.31
58.95	4.00	37.59	61.38	7.31
59.20	4.00	37.59	58.14	7.31
59.70	4.00	37.59	61.17	7.31
60.14	4.00	37.60	59.68	7.32
60.26	4.00	37.61	58.97	7.31
60.57	4.01	37.63	60.66	7.32
61.10	4.01	37.64	61.60	7.31
61.55	4.01	37.65	62.96	7.30
61.95	4.01	38.29	63.79	7.31
62.21	4.01	38.71	60.15	7.30
62.39	4.01	38.73	61.50	7.30
62.70	4.01	38.73	59.49	7.30
63.11	4.00	38.73	58.35	7.31
63.41	4.00	38.74	60.12	7.32
63.69	4.00	38.75	59.83	7.30
64.15	4.00	38.78	59.79	7.30
64.50	4.00	38.80	61.58	7.30
64.87	3.99	40.03	59.67	7.30
65.19	3.99	40.03	59.04	7.30
65.48	4.00	40.03	60.66	7.30
65.69	4.00	40.04	61.58	7.29
66.02	4.00	40.04	57.36	7.30
66.39	3.99	40.58	60.43	7.29
66.71	3.99	41.23	58.32	7.29
66.89	3.99	41.24	59.68	7.29
67.26	3.99	41.24	61.28	7.30
67.63	3.99	41.25	60.40	7.29
67.92	3.99	41.55	60.36	7.28
68.30	3.99	42.61	59.94	7.28
68.61	3.99	42.62	59.95	7.29
68.72	3.99	42.63	59.85	7.30
69.04	3.99	42.63	60.02	7.28
69.07	3.99	42.63	60.29	7.28
69.53	3.99	43.77	60.11	7.28
69.72	3.99	43.82	62.28	7.29
70.41	3.99	43.82	59.67	7.28
70.75	3.99	43.83	60.25	7.29
71.01	3.99	43.83	61.01	7.28
71.39	3.99	43.84	61.37	7.28
71.75	3.99	45.01	60.57	7.29
72.28	3.99	45.04	59.57	7.26
72.60	3.99	45.04	60.24	7.27
73.14	3.99	45.04	61.75	7.27
73.47	3.99	45.05	61.15	7.27
73.76	3.99	45.07	60.61	7.28

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
August 10, 2013 (Open-water); Max Depth 83 m				
74.03	3.99	45.09	62.73	7.28
74.34	4.00	45.35	60.10	7.27
74.55	4.00	46.42	60.36	7.26
74.71	4.00	46.43	59.08	7.27
75.00	4.00	46.43	60.89	7.27
75.39	3.99	46.43	60.29	7.27
75.48	3.99	46.44	61.56	7.26
75.52	4.00	47.64	59.54	7.26
75.82	4.00	47.65	60.07	7.26
76.23	3.99	47.65	60.69	7.26
76.53	3.99	47.65	59.68	7.25
77.09	3.99	47.65	62.22	7.24
77.57	3.99	47.66	63.46	7.26
77.79	3.98	48.84	60.64	7.23
78.14	3.99	48.84	62.94	7.25
78.46	3.98	48.85	59.77	7.25
78.76	3.98	48.85	59.61	7.23
79.04	3.98	48.85	60.84	7.24
79.49	3.98	48.85	60.97	7.24
79.73	3.99	48.87	60.70	7.23
79.80	3.99	48.87	61.09	7.23
80.04	3.99	50.04	60.83	7.22
80.36	3.98	50.04	62.34	7.23
80.62	3.98	50.04	60.20	7.23
80.75	3.98	50.04	58.63	7.21
81.10	3.98	50.04	63.36	7.21
81.40	3.98	51.29	61.47	7.22
81.62	3.98	51.30	62.06	7.22
81.93	3.98	51.30	61.14	7.22
82.35	3.98	51.30	61.95	7.22
82.72	3.97	51.30	61.83	7.21
82.97	3.97	51.30	60.61	7.22
83.34	3.97	51.31	62.17	7.22
83.36	3.97	52.56	62.55	7.21
83.37	3.97	52.57	61.33	7.21
83.37	3.98	52.57	59.94	7.21
83.37	3.98	52.57	59.85	7.21
83.38	3.99	52.57	61.42	7.22
		52.59	63.23	7.21
		53.54	60.87	7.20
		53.81	60.10	7.20
		53.81	64.33	7.21
		53.82	61.56	7.21
		54.60	59.91	7.21
		55.07	61.08	7.21
		55.08	61.02	7.22
		55.09	63.02	7.21
		55.09	59.32	7.20
		56.23	58.62	7.20
		56.23	61.70	7.20
		56.23	62.32	7.21
		56.23	61.24	7.21
		56.24	62.15	7.19
		56.24	62.08	7.20
		56.99	63.04	7.17
		57.26	63.62	7.19
		57.26	61.27	7.19
		57.29	61.78	7.20

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
August 10, 2013 (Open-water); Max Depth 83 m				
		57.32	61.59	7.20
		57.32	61.98	7.20
		57.32	62.02	7.20
		57.33	62.51	7.20
		57.69	60.97	7.19
		58.03	60.85	7.19
		58.04	61.23	7.20
		58.04	62.10	7.20
		58.04	63.89	7.20
		58.05	61.14	7.19
		58.98	61.37	7.19
		59.34	61.60	7.20
		59.35	62.18	7.19
		59.35	62.73	7.21
		59.35	61.13	7.19
		59.35	63.46	7.20
		60.49	62.09	7.20
		60.62	62.03	7.20
		60.62	60.79	7.22
		60.63	62.72	7.21
		60.63	61.08	7.20
		60.63	62.43	7.20
		61.87	63.54	7.21
		61.87	59.98	7.21
		61.87	63.53	7.21
		61.87	62.12	7.22
		61.88	60.83	7.20
		62.16	59.39	7.19
		63.14	62.57	7.21
		63.14	60.76	7.21
		63.15	61.23	7.21
		63.15	62.80	7.21
		63.34	61.08	7.21
		64.34	62.42	7.20
		64.34	61.55	7.21
		64.35	61.91	7.20
		64.35	61.39	7.21
		64.35	62.45	7.20
		64.35	61.51	7.19
		64.36	61.61	7.20
		64.36	61.74	7.20
		65.59	62.66	7.19
		65.59	62.99	7.19
		65.59	61.46	7.19
		65.59	61.02	7.20
		65.61	61.31	7.20
		66.27	60.08	7.19
		66.87	61.96	7.20
		66.87	64.62	7.18
		66.87	61.69	7.19
		66.87	61.12	7.20
		66.87	61.09	7.20
		66.89	62.38	7.18
		68.15	60.15	7.19
		68.18	62.88	7.19
		68.18	60.89	7.19
		68.19	64.21	7.19
		68.19	60.27	7.18

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
August 10, 2013 (Open-water); Max Depth 83 m				
		68.20	61.46	7.18
		69.22	60.37	7.18
		69.48	61.74	7.17
		69.49	62.55	7.18
		69.49	61.46	7.16
		69.49	61.29	7.17
		69.49	63.81	7.18
		69.50	61.86	7.17
		69.50	59.49	7.18
		70.76	60.50	7.16
		70.81	61.70	7.17
		70.81	61.91	7.17
		70.81	61.50	7.17
		70.81	62.01	7.17
		70.84	62.58	7.17
		71.26	63.06	7.18
		72.15	61.20	7.17
		72.15	64.48	7.16
		72.16	63.26	7.16
		72.28	62.33	7.16
		73.27	63.84	7.17
		73.27	64.03	7.16
		73.28	64.01	7.17
		73.28	61.67	7.17
		73.28	62.46	7.17
		73.29	62.94	7.16
		73.60	61.79	7.14
		74.37	62.05	7.15
		74.37	60.29	7.15
		74.38	63.62	7.15
		74.38	64.78	7.15
		74.38	63.37	7.16
		74.39	63.06	7.15
		74.40	61.42	7.15
		74.40	62.83	7.15
		74.40	61.41	7.15
		75.64	60.08	7.15
		75.64	61.47	7.14
		75.64	63.19	7.15
		75.65	62.87	7.15
		75.65	59.69	7.14
		75.65	64.22	7.15
		75.66	61.71	7.14
		76.28	62.93	7.14
		76.39	61.79	7.15
		76.41	62.70	7.15
		76.42	62.05	7.15
		76.42	62.20	7.15
		77.61	63.51	7.13
		77.62	61.05	7.14
		77.63	62.59	7.13
		78.42	62.76	7.12
		78.44	63.58	7.13
		78.44	62.34	7.13
		79.62	62.48	7.10
		79.65	63.10	7.11
		79.98	62.36	7.11
		80.87	62.08	7.10

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
August 10, 2013 (Open-water); Max Depth 83 m				
		81.03	64.27	7.10
		81.04	61.72	7.10
		81.04	65.22	7.10
		81.97	64.37	7.10
		82.16	62.94	7.10
		82.16	62.68	7.09
		82.24	62.48	7.10
		83.17	60.03	7.10
		83.37	60.94	7.10
		83.38	62.55	7.11
		83.38	61.59	7.11
October 26, 2013 (Open-water); Max Depth 83 m				
0.25	4.34	0.25	54.79	-
0.69	4.32	0.69	55.51	-
1.13	4.31	1.13	53.47	-
1.50	4.30	1.50	53.58	-
1.92	4.29	1.92	56.86	-
2.44	4.29	2.44	54.82	-
2.93	4.28	2.93	54.31	-
3.48	4.28	3.48	57.31	-
3.96	4.29	3.96	53.37	-
4.37	4.28	4.37	53.88	-
4.73	4.28	4.73	55.85	-
5.08	4.28	5.08	55.77	-
5.43	4.28	5.43	55.76	-
5.73	4.27	5.73	54.15	-
6.03	4.27	6.03	54.67	-
6.44	4.27	6.44	55.64	-
6.80	4.27	6.80	53.92	-
7.14	4.27	7.14	54.87	-
7.43	4.28	7.43	55.04	-
7.69	4.28	7.69	54.86	-
8.04	4.27	8.04	54.10	-
8.28	4.26	8.28	57.98	-
8.54	4.26	8.54	54.11	-
8.89	4.26	8.89	53.85	-
9.24	4.26	9.24	52.62	-
9.60	4.26	9.60	53.72	-
9.94	4.25	9.94	55.54	-
10.32	4.25	10.32	53.95	-
10.67	4.25	10.67	54.63	-
10.89	4.25	10.89	56.00	-
11.17	4.25	11.17	55.11	-
11.63	4.24	11.63	55.07	-
12.09	4.24	12.09	55.22	-
12.55	4.24	12.55	54.19	-
13.02	4.24	13.02	55.29	-
13.35	4.24	13.35	56.55	-
13.73	4.24	13.73	56.55	-
14.08	4.24	14.08	55.72	-
14.46	4.24	14.46	55.78	-
14.86	4.23	14.86	55.15	-
15.15	4.23	15.15	56.53	-
15.53	4.24	15.53	54.71	-
15.92	4.25	15.92	54.85	-
16.39	4.25	16.39	54.91	-
16.86	4.25	16.86	56.26	-
17.38	4.26	17.38	54.93	-

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
October 26, 2013 (Open-water); Max Depth 83 m				
17.88	4.25	17.88	53.71	-
18.32	4.26	18.32	54.89	-
18.76	4.25	18.76	55.46	-
19.14	4.23	19.14	54.39	-
19.53	4.23	19.53	54.53	-
20.01	4.23	20.01	55.43	-
20.51	4.23	20.51	56.21	-
20.97	4.22	20.97	56.11	-
21.43	4.22	21.43	55.00	-
21.90	4.22	21.90	54.24	-
22.38	4.22	22.38	55.71	-
22.86	4.22	22.86	57.08	-
23.25	4.22	23.25	55.47	-
23.70	4.22	23.70	56.25	-
24.02	4.23	24.02	54.18	-
24.61	4.22	24.61	54.91	-
25.06	4.22	25.06	55.69	-
25.63	4.22	25.63	56.33	-
26.18	4.22	26.18	55.49	-
26.79	4.22	26.79	56.78	-
27.26	4.22	27.26	56.19	-
27.64	4.22	27.64	54.90	-
28.16	4.21	28.16	55.40	-
28.61	4.21	28.61	55.69	-
29.00	4.22	29.00	56.62	-
29.40	4.21	29.40	55.40	-
29.82	4.21	29.82	56.44	-
30.24	4.21	30.24	56.24	-
30.74	4.22	30.74	55.45	-
31.10	4.22	31.10	55.65	-
31.64	4.22	31.64	56.46	-
32.20	4.23	32.20	55.26	-
32.59	4.24	32.59	57.82	-
33.05	4.24	33.05	56.00	-
33.42	4.24	33.42	55.71	-
33.75	4.24	33.75	54.51	-
34.18	4.24	34.18	56.97	-
34.56	4.24	34.56	54.37	-
34.96	4.24	34.96	55.49	-
35.31	4.24	35.31	55.29	-
35.66	4.24	35.66	54.52	-
36.09	4.25	36.09	57.16	-
36.54	4.24	36.54	55.58	-
36.91	4.24	36.91	54.73	-
37.32	4.24	37.32	55.50	-
37.69	4.24	37.69	57.29	-
38.13	4.24	38.13	55.33	-
38.61	4.24	38.61	57.81	-
39.06	4.24	39.06	54.70	-
39.55	4.24	39.55	54.97	-
39.95	4.24	39.95	54.07	-
40.40	4.24	40.40	55.98	-
40.82	4.24	40.82	55.38	-
41.25	4.24	41.25	55.58	-
41.82	4.25	41.82	54.72	-
42.29	4.25	42.29	55.75	-
42.76	4.25	42.76	56.21	-
43.26	4.25	43.26	56.05	-

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
October 26, 2013 (Open-water); Max Depth 83 m				
43.80	4.25	43.80	55.19	-
44.31	4.25	44.31	55.99	-
44.78	4.25	44.78	56.30	-
45.28	4.25	45.28	55.27	-
45.83	4.25	45.83	55.94	-
46.46	4.25	46.46	57.39	-
46.96	4.25	46.96	55.38	-
47.47	4.25	47.47	55.76	-
47.98	4.25	47.98	58.31	-
48.43	4.25	48.43	55.71	-
48.86	4.25	48.86	56.31	-
49.25	4.25	49.25	56.38	-
49.71	4.25	49.71	56.33	-
50.19	4.25	50.19	57.08	-
50.61	4.25	50.61	56.09	-
51.04	4.25	51.04	56.84	-
51.47	4.25	51.47	57.42	-
51.90	4.25	51.90	56.59	-
52.44	4.25	52.44	57.12	-
53.02	4.26	53.02	58.55	-
53.57	4.26	53.57	56.87	-
53.92	4.26	53.92	55.72	-
54.38	4.26	54.38	55.75	-
54.93	4.26	54.93	56.07	-
55.43	4.26	55.43	55.67	-
55.90	4.26	55.90	57.34	-
56.35	4.27	56.35	59.18	-
56.74	4.27	56.74	55.53	-
57.29	4.27	57.29	56.25	-
57.82	4.27	57.82	56.05	-
58.27	4.27	58.27	57.93	-
58.69	4.27	58.69	56.12	-
59.13	4.27	59.13	56.95	-
59.58	4.27	59.58	58.87	-
60.03	4.27	60.03	57.59	-
60.44	4.27	60.44	55.52	-
60.96	4.27	60.96	57.62	-
61.44	4.27	61.44	57.42	-
61.92	4.28	61.92	55.30	-
62.31	4.28	62.31	59.65	-
62.78	4.29	62.78	58.56	-
63.27	4.29	63.27	57.75	-
63.27	4.30	63.83	59.39	-
63.83	4.30	64.36	58.69	-
64.36	4.30	64.84	58.64	-
64.84	4.30	65.37	57.92	-
65.37	4.30	65.84	58.01	-
65.84	4.31	66.38	58.66	-
66.38	4.32	66.93	57.89	-
66.93	4.33	67.50	57.61	-
67.50	4.33	68.08	57.03	-
68.08	4.33	68.60	57.99	-
68.60	4.33	69.11	58.47	-
69.11	4.33	69.73	59.73	-
69.73	4.33	70.32	58.20	-
70.32	4.34	70.91	58.65	-
70.91	4.34	71.52	58.55	-
71.52	4.34	72.20	59.51	-

Table A1-1d. Temperature, Dissolved Oxygen and Conductivity Profiles from Brucejack Lake (BJ), 2013

Depth (m)	Temperature (°C)	Depth (m)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
October 26, 2013 (Open-water); Max Depth 83 m				
72.20	4.34	72.84	57.79	-
72.84	4.35	73.54	56.95	-
73.54	4.35	74.06	56.53	-
74.06	4.35	74.73	58.57	-
74.73	4.35	75.42	58.33	-
75.42	4.35	75.79	58.30	-
75.79	4.36	76.56	57.17	-
76.56	4.36	77.09	60.22	-
77.09	4.36	77.71	58.92	-
77.71	4.36	78.38	59.00	-
78.38	4.36	79.04	59.68	-
79.04	4.36	79.65	59.82	-
79.65	4.36	80.29	59.25	-
80.29	4.36	80.91	57.30	-
80.91	4.36	81.67	58.82	-
81.67	4.36	82.40	59.14	-
82.40	4.36	82.47	58.65	-
82.47	4.36			
82.47	4.36			
82.47	4.37			
82.47	4.37			
82.48	4.37			
82.48	4.37			
82.48	4.37			
82.47	4.38			
82.47	4.38			
82.47	4.38			
82.27	4.38			
82.31	4.37			
82.34	4.37			
82.38	4.37			
82.40	4.37			
82.41	4.37			
82.40	4.36			
82.39	4.36			
82.39	4.36			
82.39	4.36			
82.39	4.36			

Table A1-2a. Temperature and Dissolved Oxygen Profiles from Sulphurets Lake (SUL), 2008

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		September 10, 2008	
0	0.5	14.77	103.0
1	0.4	14.96	103.5
2	0.4	14.97	103.6
3	0.4	14.95	103.1
4	0.6	15.10	104.9
5	0.6	14.89	103.3
6	0.6	14.60	101.8
7	0.6	0.74	4.7

Table A1-2b. Temperature and Dissolved Oxygen Profiles from Sulphurets Lake (SUL), 2009

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
SUL Deep; August 22, 2009			
0	1.1	10.48	73.9
1	1.2	8.80	67.6
2	1.2	8.09	56.8
3	1.2	7.52	53.5
4	1.3	7.22	51.0
5	1.3	7.30	51.3
6	1.3	7.49	52.9
7	1.3	7.54	53.5
8	1.3	7.50	53.1
9	1.3	7.66	54.1
10	1.4	7.92	56.4
11	1.3	13.76	97.6
12	1.3	14.10	100.4
13	1.3	14.27	101.5
SUL Mid; August 22, 2009			
0	1.0	14.44	101.3
0.5	0.9	14.50	101.9
1	0.9	14.60	102.5
1.5	0.9	14.35	100.7
2	0.9	14.35	100.7
2.5	0.9	14.46	101.6
3	0.9	14.37	100.6
3.5	0.9	14.40	101.3
4	0.9	14.15	99.9
4.5	0.9	13.97	100.1
5	0.9	14.00	99.0
SUL Shallow; August 22, 2009			
0	1.4	14.22	101.2
0.5	1.3	13.93	98.7
1	1.3	14.12	100.2
1.5	1.5	14.12	100.3
2	2.8	0.26	2.0
2.5	2.9	0.22	1.6

Notes:
YSI used to collect data
Maximum depth at time of collection was 14 m for SUL Deep; 6.8 m at SUL Mid; and 3 m at SUL shallow

Table A1-2c. Temperature and Dissolved Oxygen Profiles from Sulphurets Lake (SUL), 2012

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	pH	Conductivity (µS/cm)
Max Depth 22 m; August 1, 2012					
0.1	0.6				
1	0.7				
2	0.7				
3	0.5				
4	0.6				
5	0.7				
6	0.8				
7	0.9				
8	0.9				
9	0.9				
10	0.9				
11	0.9				
12	0.9				
13	0.9				
14	0.9				
15	0.9				
16	0.8				
17	0.9				
18	0.9				
19	0.9				
20	0.9				
21	0.9				
Max Depth 22 m; June 28, 2012					
0.1	0.9	15.11	106.0		
1	0.8	15.63	109.3		
2	0.7	15.70	109.5		
3	0.7	15.70	109.5		
4	0.7	15.68	109.4		
5	0.7	15.70	109.5		
6	0.9	15.72	110.3		
7	1.0	15.71	110.5		
8	1.0	15.71	110.5		
9	1.0	15.73	110.6		
10	1.0	15.70	110.5		
11	1.0	15.68	110.3		
12	1.1	15.59	110.0		
13	1.1	15.57	109.8		
14	1.1	15.55	109.7		
15	1.1	15.55	109.7		
16	1.1	15.53	109.5		
17	1.1	14.73	103.9		
18	1.6	11.29	80.8		
19	1.7	11.03	79.1		
20	1.7	10.74	77.0		
21	1.7	10.74	77.0		

Notes:
maximum depth at time of collection was 22 m in August and June
August Site Location: 09V 0421010 6261384
June Site Location: 09V 0421013 6261363
October Site location and depth: unavailable

Table A1-2c. Temperature and Dissolved Oxygen Profiles from Sulphurets Lake (SUL), 2012

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	pH	Conductivity (µS/cm)
		October 5, 2012			
0.5	0.7	13.37	93.2	7.07	78
1.0	0.7	13.14	91.5	7.10	78
1.5	0.7	13.07	91.1	7.13	78
2.0	0.7	13.08	91.1	7.19	78
2.5	0.7	13.06	91.0	7.22	78
3.0	0.6	13.02	90.7	7.25	78
3.5	0.7	12.98	90.4	7.27	78
4.0	0.7	12.98	90.5	7.29	77
4.5	0.7	12.99	90.6	7.32	77
5.0	0.7	12.99	90.6	7.35	76
5.5	0.7	12.98	90.6	7.37	76
6.0	0.7	12.99	90.7	7.39	76
6.5	0.7	13.01	90.8	7.42	76
7.0	0.7	13.00	90.8	7.44	76
7.5	0.7	13.02	90.9	7.46	76
8.0	0.8	13.02	91.0	7.49	76
8.5	0.7	13.02	90.9	7.50	76
9.0	0.7	13.00	90.8	7.52	76
9.5	0.7	13.00	90.8	7.54	76
10.0	0.7	12.96	90.6	7.54	76
10.5	0.7	12.95	90.5	7.56	76
11.0	0.7	12.99	90.6	7.56	77
11.5	0.7	12.95	90.4	7.55	77
12.0	0.6	12.96	90.2	7.55	79
12.5	0.6	12.89	89.8	7.53	80
13.0	0.6	12.86	89.5	7.51	79
13.5	0.6	12.87	89.5	7.50	80
14.0	0.7	12.85	89.7	7.49	77
14.5	0.7	12.91	90.2	7.53	76
15.0	0.8	12.95	90.5	7.57	76

Notes:
maximum depth at time of collection was 22 m in August and June
August Site Location: 09V 0421010 6261384
June Site Location: 09V 0421013 6261363
October Site location and depth: unavailable

Table A1-2d. Temperature, Dissolved Oxygen and Conductivity Profiles from Sulphurets Lake (SUL), 2012

Depth (m)	Temperature (°C)	Depth	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
March 14, 2013 (Under-ice); Max Depth 19 m				
0.02	0.67	0.25	379.83	3.41
0.22	0.43	0.57	384.29	3.42
0.39	0.35	0.57	385.58	3.41
0.67	0.36	0.62	385.96	3.41
0.65	0.34	0.62	386.46	3.41
0.68	0.34	0.77	386.80	3.42
0.68	0.35	0.63	380.78	3.42
0.68	0.36	0.60	383.44	3.43
0.69	0.37	0.62	381.83	3.43
0.69	0.37	0.63	385.55	3.43
0.69	0.37	0.66	386.51	3.42
0.69	0.35	0.67	386.44	3.42
0.80	0.34	0.90	385.98	3.42
1.73	0.31	1.21	386.62	3.44
1.73	0.31	1.54	388.64	3.46
1.74	0.31	1.96	388.99	3.48
1.74	0.31	2.41	385.93	3.50
1.76	0.32	2.85	389.27	3.51
2.82	0.36	3.36	391.23	3.51
2.83	0.35	3.99	394.95	3.49
2.83	0.36	4.51	398.39	3.48
3.74	0.37	5.15	399.49	3.47
3.86	0.46	5.64	405.23	3.46
3.87	0.47	6.16	401.68	3.46
3.88	0.47	6.73	404.77	3.46
3.90	0.44	7.38	407.78	3.45
3.93	0.46	7.85	405.66	3.45
4.49	0.47	8.50	404.39	3.43
5.01	0.44	8.99	405.81	3.42
5.03	0.44	9.45	407.98	3.41
5.04	0.44	9.82	407.65	3.38
5.05	0.45	10.30	410.70	3.36
5.06	0.45	10.72	413.36	3.33
5.68	0.44	11.23	412.93	3.31
6.02	0.40	11.77	410.93	3.28
6.02	0.40	12.29	414.37	3.24
6.04	0.40	12.74	419.82	3.21
6.05	0.41	13.15	426.53	3.18
6.07	0.41	13.51	425.30	3.15
6.07	0.41	13.97	432.89	3.12
6.07	0.41	14.34	440.25	3.09
6.07	0.42	14.66	445.06	3.07
6.08	0.41	15.01	447.96	3.05
6.70	0.40	15.38	446.83	3.02
7.23	0.37	15.74	452.92	3.00
7.26	0.37	16.13	451.73	2.98
7.27	0.38	16.34	457.64	2.96
7.27	0.38	16.71	470.70	2.95
7.29	0.38	17.07	478.05	2.95
7.28	0.37	17.43	486.07	2.95
7.97	0.37	17.66	491.83	2.96
8.28	0.40	17.96	495.56	2.97
8.28	0.40	18.42	501.35	2.99
8.28	0.40	18.63	512.92	3.02
8.28	0.41	19.04	535.51	3.04
8.31	0.40			
9.21	0.43			
9.21	0.45			

Table A1-2d. Temperature, Dissolved Oxygen and Conductivity Profiles from Sulphurets Lake (SUL), 2012

Depth (m)	Temperature (°C)	Depth	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
March 14 ,2013 (Under-ice); Max Depth 19 m				
9.21	0.44			
9.22	0.46			
9.30	0.45			
10.33	0.48			
10.33	0.48			
10.33	0.49			
10.36	0.49			
11.27	0.50			
11.22	0.50			
11.23	0.51			
11.88	0.51			
12.23	0.59			
12.23	0.60			
12.23	0.60			
12.25	0.61			
13.33	0.61			
13.32	0.61			
13.32	0.62			
13.32	0.62			
13.33	0.62			
13.34	0.62			
13.35	0.62			
13.94	0.62			
14.74	0.65			
14.73	0.65			
14.82	0.66			
14.85	0.66			
15.65	0.66			
15.86	0.71			
15.86	0.72			
15.87	0.73			
15.88	0.73			
15.89	0.73			
15.91	0.74			
15.91	0.73			
15.92	0.73			
15.94	0.73			
15.95	0.74			
16.99	0.79			
17.01	0.82			
17.02	0.82			
17.03	0.82			
17.03	0.82			
17.03	0.83			
17.04	0.84			
17.43	0.83			
18.04	0.83			
18.04	0.83			
18.04	0.84			
18.04	0.85			
18.03	0.86			
18.04	0.84			
18.03	0.85			
18.07	0.85			
18.51	0.84			
19.04	0.85			

Table A1-2d. Temperature, Dissolved Oxygen and Conductivity Profiles from Sulphurets Lake (SUL), 2012

Depth (m)	Temperature (°C)	Depth	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
July 14, 2013 (Open-water); Max Depth 20.5 m				
0.20	2.15	0.20	96.55	-
0.34	2.13	0.34	98.54	-
0.46	2.11	0.46	95.99	-
0.53	2.10	0.53	98.86	-
0.70	2.09	0.70	95.76	-
0.85	2.09	0.85	97.79	-
0.99	2.08	0.99	98.94	-
1.08	2.15	1.08	98.59	-
1.18	2.18	1.18	100.50	-
1.27	2.17	1.27	98.50	-
1.28	2.19	1.28	100.08	-
1.38	2.16	1.38	101.38	-
1.45	2.15	1.45	99.82	-
1.55	2.14	1.55	100.28	-
1.65	2.08	1.65	102.68	-
1.74	2.07	1.74	99.81	-
1.83	2.07	1.83	101.96	-
1.89	2.04	1.89	101.48	-
1.97	2.04	1.97	101.02	-
2.07	2.04	2.07	101.82	-
2.16	2.05	2.16	102.13	-
2.25	2.11	2.25	100.33	-
2.29	2.13	2.29	100.91	-
2.36	2.14	2.36	102.15	-
2.41	2.18	2.41	100.57	-
2.48	2.15	2.48	99.73	-
2.52	2.20	2.52	101.54	-
2.59	2.18	2.59	99.33	-
2.66	2.10	2.66	99.92	-
2.71	2.08	2.71	103.39	-
2.79	2.04	2.79	98.81	-
2.86	2.04	2.86	102.69	-
2.90	2.07	2.90	100.31	-
2.96	2.09	2.96	100.74	-
3.02	2.04	3.02	102.54	-
3.07	2.00	3.07	103.58	-
3.14	2.00	3.14	99.10	-
3.19	2.00	3.19	100.21	-
3.28	2.00	3.28	100.90	-
3.34	2.00	3.34	101.17	-
3.42	1.99	3.42	98.74	-
3.45	1.95	3.45	101.20	-
3.55	1.96	3.55	98.70	-
3.62	1.96	3.62	97.54	-
3.72	1.97	3.72	96.51	-
3.80	1.97	3.80	97.31	-
3.95	1.95	3.95	100.04	-
4.04	1.89	4.04	99.31	-
4.19	1.89	4.19	96.42	-
4.28	1.89	4.28	98.78	-
4.43	1.90	4.43	97.41	-
4.59	1.89	4.59	99.87	-
4.72	1.89	4.72	99.09	-
4.84	1.87	4.84	99.90	-
4.93	1.86	4.93	99.09	-
5.04	1.88	5.04	99.08	-
5.16	1.91	5.16	94.65	-
5.27	1.89	5.27	98.20	-

Table A1-2d. Temperature, Dissolved Oxygen and Conductivity Profiles from Sulphurets Lake (SUL), 2012

Depth (m)	Temperature (°C)	Depth	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
July 14, 2013 (Open-water); Max Depth 20.5 m				
5.40	1.90	5.40	98.94	-
5.54	1.92	5.54	97.51	-
5.66	1.88	5.66	98.61	-
5.80	1.86	5.80	99.85	-
5.85	1.85	5.85	97.79	-
6.16	1.82	6.16	100.76	-
6.38	1.76	6.38	101.82	-
6.64	1.82	6.64	105.38	-
6.84	1.86	6.84	103.51	-
7.04	1.87	7.04	104.51	-
7.20	1.89	7.20	104.74	-
7.38	1.92	7.38	104.30	-
7.56	1.91	7.56	103.76	-
7.66	1.92	7.66	109.01	-
7.79	1.92	7.79	108.36	-
7.95	1.91	7.95	107.09	-
8.13	1.90	8.13	108.24	-
8.23	1.90	8.23	107.65	-
8.36	1.89	8.36	105.29	-
8.53	1.89	8.53	110.04	-
8.69	1.89	8.69	104.94	-
8.81	1.87	8.81	105.79	-
8.94	1.87	8.94	106.24	-
9.12	1.87	9.12	106.04	-
9.21	1.84	9.21	106.99	-
9.34	1.85	9.34	106.58	-
9.40	1.83	9.40	106.07	-
9.51	1.81	9.51	105.36	-
9.64	1.81	9.64	103.61	-
9.70	1.79	9.70	105.95	-
9.86	1.80	9.86	105.39	-
10.11	1.78	10.11	106.85	-
10.26	1.74	10.26	106.19	-
10.37	1.74	10.37	105.24	-
10.47	1.75	10.47	105.52	-
10.65	1.72	10.65	107.97	-
10.81	1.72	10.81	106.80	-
10.93	1.70	10.93	104.81	-
11.07	1.69	11.07	103.11	-
11.23	1.69	11.23	100.70	-
11.36	1.70	11.36	104.07	-
11.49	1.69	11.49	106.11	-
11.77	1.69	11.77	104.74	-
11.95	1.68	11.95	104.62	-
12.24	1.68	12.24	106.46	-
12.48	1.69	12.48	103.23	-
12.65	1.70	12.65	103.70	-
12.93	1.69	12.93	104.27	-
13.12	1.69	13.12	103.13	-
13.27	1.71	13.27	104.78	-
13.47	1.70	13.47	103.60	-
13.63	1.69	13.63	103.99	-
13.87	1.70	13.87	102.61	-
13.97	1.70	13.97	104.87	-
14.24	1.71	14.24	104.46	-
14.45	1.70	14.45	101.16	-
14.63	1.70	14.63	101.92	-
14.83	1.70	14.83	100.84	-

Table A1-2d. Temperature, Dissolved Oxygen and Conductivity Profiles from Sulphurets Lake (SUL), 2012

Depth (m)	Temperature (°C)	Depth	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
July 14, 2013 (Open-water); Max Depth 20.5 m				
15.07	1.69	15.07	103.91	-
15.27	1.69	15.27	101.94	-
15.54	1.70	15.54	102.58	-
15.79	1.71	15.79	101.15	-
15.96	1.71	15.96	102.05	-
16.21	1.72	16.21	100.88	-
16.29	1.72	16.29	100.11	-
16.37	1.70	16.37	101.03	-
16.60	1.70	16.60	102.36	-
16.79	1.71	16.79	101.25	-
17.01	1.71	17.01	100.89	-
17.16	1.71	17.16	99.28	-
17.35	1.69	17.35	100.36	-
17.57	1.70	17.57	99.57	-
17.78	1.70	17.78	100.54	-
17.89	1.71	17.89	98.52	-
18.06	1.71	18.06	102.58	-
18.19	1.71	18.19	98.78	-
18.36	1.72	18.36	100.65	-
18.50	1.73	18.50	99.59	-
18.70	1.73	18.70	98.03	-
18.91	1.71	18.91	99.68	-
19.14	1.70	19.14	100.80	-
19.30	1.70	19.30	101.68	-
19.58	1.70	19.58	99.36	-
19.79	1.68	19.79	98.19	-
19.97	1.67	19.97	98.66	-
20.15	1.68	20.15	100.34	-
20.27	1.69	20.27	98.06	-
20.36	1.70	20.36	95.58	-
20.45	1.70	20.45	100.58	-
20.53	1.69	20.53	97.43	-
August 10, 2013 (Open-water); Max Depth 20m				
0.15	1.97	0.30	64.22	9.87
0.25	1.96	0.29	61.97	9.90
0.46	1.92	0.27	63.13	9.88
0.69	1.91	0.90	61.51	9.89
0.84	1.90	1.41	63.75	9.94
0.93	1.90	1.43	63.30	9.94
1.19	1.90	1.45	61.19	9.93
1.33	1.90	2.55	66.15	9.94
1.42	1.89	2.54	64.14	9.93
1.57	1.88	2.53	63.47	9.94
1.66	1.87	2.53	63.03	9.94
1.73	1.87	2.53	63.16	9.93
1.80	1.89	2.63	61.49	9.92
1.85	1.89	3.13	64.00	9.91
1.93	1.89	3.76	63.72	9.93
2.11	1.88	3.75	64.14	9.92
2.18	1.87	3.76	64.81	9.93
2.36	1.86	3.76	62.87	9.92
2.39	1.87	3.76	63.30	9.93
2.66	1.86	3.75	61.47	9.94
2.81	1.85	3.75	64.39	9.93
2.98	1.85	3.75	63.19	9.90
3.06	1.85	3.74	62.72	9.91
3.41	1.83	3.74	64.42	9.93
3.61	1.84	3.75	63.43	9.89

Table A1-2d. Temperature, Dissolved Oxygen and Conductivity Profiles from Sulphurets Lake (SUL), 2012

Depth (m)	Temperature (°C)	Depth	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
August 10, 2013 (Open-water); Max Depth 20m				
3.79	1.83	4.28	63.07	9.87
4.10	1.82	4.85	64.14	9.91
4.36	1.81	4.85	64.20	9.88
4.48	1.81	4.85	62.16	9.89
4.61	1.80	4.85	61.67	9.88
4.75	1.79	4.85	61.48	9.88
4.89	1.79	4.85	62.34	9.87
5.04	1.79	4.84	63.64	9.86
5.14	1.80	5.09	63.52	9.83
5.28	1.79	5.95	70.31	9.83
5.36	1.79	5.94	69.20	9.82
5.54	1.79	5.92	68.74	9.84
5.64	1.78	5.94	67.67	9.83
5.73	1.78	5.88	66.34	9.79
5.77	1.79	7.12	70.98	9.82
5.84	1.79	7.11	71.48	9.82
5.97	1.78	7.11	69.41	9.81
6.14	1.78	7.11	69.08	9.78
6.33	1.76	7.10	69.15	9.78
6.46	1.78	7.11	67.49	9.80
6.66	1.84	7.10	65.63	9.79
6.81	1.86	7.06	67.91	9.78
6.88	1.88	8.25	69.03	9.74
7.05	1.87	8.24	70.30	9.74
7.27	1.87	8.23	71.24	9.77
7.44	1.86	8.23	70.12	9.76
7.48	1.87	8.23	73.51	9.73
7.54	1.88	9.24	73.25	9.73
7.69	1.88	9.35	73.43	9.74
7.84	1.87	9.35	73.99	9.73
8.00	1.86	9.35	71.32	9.74
8.09	1.85	9.33	72.16	9.74
8.20	1.83	9.33	70.92	9.73
8.30	1.84	9.32	71.26	9.73
8.52	1.84	10.45	72.57	9.69
8.82	1.82	10.43	73.34	9.74
9.11	1.82	10.44	73.22	9.73
9.26	1.82	10.42	71.77	9.74
9.38	1.82	10.45	73.35	9.73
9.43	1.82	10.44	70.96	9.73
9.44	1.83	10.75	71.28	9.72
9.44	1.83	11.54	73.12	9.72
9.44	1.85	11.55	73.14	9.72
9.64	1.84	11.54	71.09	9.73
9.79	1.82	11.55	71.89	9.70
9.98	1.81	12.75	73.02	9.69
10.07	1.80	12.72	74.15	9.71
10.21	1.80	12.72	75.55	9.70
10.40	1.79	12.71	73.41	9.70
10.55	1.78	14.06	73.96	9.70
10.68	1.78	14.06	73.93	9.72
10.73	1.78	14.04	75.01	9.71
10.88	1.78	14.02	72.03	9.71
11.12	1.78	14.47	74.55	9.70
11.30	1.77	15.15	74.83	9.70
11.41	1.76	15.16	73.76	9.69
11.47	1.76	15.15	74.43	9.72
11.66	1.76	15.15	73.21	9.70

Table A1-2d. Temperature, Dissolved Oxygen and Conductivity Profiles from Sulphurets Lake (SUL), 2012

Depth (m)	Temperature (°C)	Depth	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
August 10, 2013 (Open-water); Max Depth 20m				
11.78	1.76	15.69	75.73	9.71
12.07	1.75	16.29	73.69	9.69
12.17	1.75	16.29	71.34	9.71
12.48	1.74	16.30	74.24	9.70
12.74	1.74	16.29	73.16	9.70
13.08	1.73	16.29	73.17	9.70
13.20	1.73	16.27	74.85	9.70
13.41	1.74	17.34	72.53	9.70
13.57	1.73	17.33	75.54	9.70
13.72	1.73	17.33	74.60	9.70
13.94	1.73	17.31	74.44	9.68
14.12	1.72	18.40	72.97	9.70
14.37	1.72	18.39	74.41	9.70
14.44	1.73	18.40	75.47	9.70
15.02	1.73	19.19	73.28	9.72
15.18	1.74	19.26	76.59	9.71
15.40	1.74	19.27	76.31	9.70
15.54	1.74	20.23	73.87	9.69
15.78	1.74	20.30	73.85	9.68
16.11	1.74	20.32	74.76	9.70
16.32	1.74			
16.58	1.75			
16.87	1.74			
17.07	1.74			
17.24	1.74			
17.44	1.73			
17.61	1.73			
17.78	1.73			
17.87	1.73			
18.07	1.73			
18.32	1.73			
18.45	1.73			
18.69	1.73			
18.97	1.73			
19.12	1.73			
19.30	1.73			
19.51	1.74			
19.64	1.74			
19.76	1.74			
19.96	1.74			
20.05	1.74			
20.13	1.75			
20.30	1.75			
20.32	1.75			

Table A1-3. Temperature and Dissolved Oxygen Profiles from Todedada Lake (TL1), 2010

Depth (m)	Temperature (˚C)	Dissolved Oxygen (mg/L)
	August 25, 2010	
0	16.5	9.55
1	16.4	9.19
2	16.3	8.96
3	16.3	8.43
4	16.3	7.31
5	16.2	6.2
6	16.2	5.77
7	16.2	5.33
8	15.9	5.41
9	13.0	6.21
10	11.4	5.75
11	9.3	4.87
12	8.6	4.77

Notes:
YSI used to collect data
Maximum depth at time of collection was 12 m

Table A1-4. Temperature and Dissolved Oxygen Profiles from Knipple Lake (KL), 2013

Depth (m)	Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		August 24, 2011	
0.01	2.5	57.90	9.0
0.11	2.5	58.91	9.4
0.24	2.5	56.50	9.2
0.46	2.5	56.16	9.4
0.72	2.5	56.66	9.5
0.83	2.5	57.14	9.5
1.02	2.5	56.92	9.5
1.29	2.5	57.90	9.7
1.66	2.4	55.48	9.7
1.99	2.4	59.30	9.7
2.39	2.4	58.34	9.8
2.52	2.4	58.88	9.9
2.74	2.4	57.54	10.0
2.89	2.3	61.30	10.0
3.09	2.4	59.92	9.9
3.26	2.4	58.88	10.0
3.37	2.3	59.89	10.1
3.49	2.3	59.18	10.0
3.57	2.3	59.72	10.0
3.70	2.3	57.32	10.1
3.89	2.3	55.84	9.9
4.01	2.3	57.64	10.0
4.14	2.3	58.65	10.0
4.14	2.3	59.63	9.9
4.41	2.3	58.69	10.0
4.47	2.3	58.47	10.0
4.48	2.3	59.87	10.0
4.56	2.2	59.16	9.9
4.67	2.2	58.39	10.0
4.78	2.2	58.14	10.0
4.88	2.2	59.36	10.0
4.91	2.2	57.70	10.0
4.91	2.2	57.50	10.0
4.90	2.2	57.10	10.0
4.91	2.2	57.43	10.0
4.91	2.3	57.78	10.0
4.91	2.3	56.57	9.9
4.94	2.3	59.79	9.9
4.98	2.3	58.16	9.9
5.04	2.3	57.64	9.9
5.10	2.3	57.67	9.9
5.17	2.3	59.84	9.9
5.25	2.3	57.19	9.8
5.37	2.2	58.06	9.8
5.52	2.2	58.77	9.9
5.66	2.2	58.34	9.8
5.90	2.2	58.32	9.8
6.19	2.2	57.72	9.8
6.50	2.2	57.53	9.8
6.69	2.2	58.04	9.8
6.84	2.2	60.06	9.8
6.92	2.1	57.39	9.8

Notes:

Data collected with a CTD (RBR XR-420)

Table A1-4. Temperature and Dissolved Oxygen Profiles from Knipple Lake (KL), 2013

Depth (m)	Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		August 24, 2011	
7.07	2.1	58.48	9.8
7.24	2.1	57.96	9.8
7.31	2.1	58.39	9.8
7.31	2.1	58.63	9.8
7.42	2.1	59.89	9.8
7.61	2.1	58.66	9.8
7.81	2.1	57.76	9.8
7.99	2.1	59.53	9.8
8.12	2.1	61.17	9.8
8.27	2.1	57.46	9.7
8.46	2.1	57.58	9.8
8.54	2.1	60.67	9.8
8.56	2.2	58.66	9.8
8.74	2.2	57.09	9.8
8.88	2.2	58.65	9.8
9.11	2.1	59.07	9.8
9.15	2.1	56.44	9.8
9.27	2.2	59.24	9.8
9.66	2.1	57.35	9.8
9.96	2.1	57.60	9.8
10.07	2.1	58.04	9.7
10.25	2.1	58.97	9.7
10.38	2.1	57.37	9.8
10.57	2.1	56.60	9.8
10.74	2.1	58.71	9.7
11.06	2.1	57.97	9.7
11.28	2.0	58.19	9.7
11.45	2.0	55.19	9.7
11.60	2.0	55.95	9.7
11.68	2.0	56.11	9.7
11.91	2.0	57.86	9.8
12.07	2.1	60.65	9.8
12.19	2.1	57.12	9.7
12.34	2.1	55.97	9.8
12.46	2.1	58.21	9.8
12.62	2.0	57.37	9.7
12.79	2.0	58.59	9.7
12.91	2.0	57.61	9.8
13.10	2.0	57.29	9.7
13.35	2.0	56.06	9.8
13.64	2.0	56.79	9.8
13.90	2.0	57.89	9.7
14.11	2.0	56.67	9.8
14.31	2.0	56.57	9.7
14.46	2.0	57.50	9.7
14.64	2.0	56.86	9.7
14.78	2.0	55.62	9.7
15.07	2.0	55.73	9.7
15.13	2.0	55.54	9.7
15.29	2.0	57.09	9.7
15.51	2.0	55.50	9.7
15.77	2.0	57.49	9.7

Notes:

Data collected with a CTD (RBR XR-420)

Table A1-4. Temperature and Dissolved Oxygen Profiles from Knipple Lake (KL), 2013

Depth (m)	Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		August 24, 2011	
15.92	2.0	57.42	9.7
15.95	2.0	56.34	9.7
16.09	2.0	55.55	9.7
16.28	2.0	56.88	9.7
16.51	2.0	58.07	9.7
16.72	2.0	55.85	9.7
17.04	2.0	57.15	9.8
17.37	1.9	54.45	9.7
17.55	1.9	57.22	9.7
17.78	2.0	55.80	9.7
18.00	1.9	54.18	9.7
18.02	1.9	56.29	9.7
18.04	1.9	54.97	9.8
18.10	1.9	57.09	9.8
18.25	1.9	56.39	9.7
18.55	1.9	57.30	9.7
18.74	1.9	55.58	9.7
19.10	1.9	55.08	9.7
19.24	1.9	56.35	9.7
19.57	1.9	55.19	9.8
19.81	1.9	55.13	9.7
20.21	1.9	55.81	9.7
20.43	1.9	55.58	9.7
20.66	1.9	57.59	9.7
20.91	1.9	55.58	9.7
21.16	1.9	55.42	9.7
21.37	1.9	55.75	9.7
21.70	1.9	55.05	9.8
21.95	1.9	56.55	9.7
22.30	1.9	55.52	9.7
22.55	1.9	57.44	9.7
22.79	1.9	57.02	9.7
22.98	1.9	53.55	9.7
23.09	1.9	54.12	9.7
23.24	1.9	56.12	9.7
23.56	1.9	55.26	9.7
23.85	1.9	54.70	9.7
24.04	1.9	57.81	9.7
24.24	1.9	53.46	9.7
24.51	1.9	56.58	9.7
24.67	1.9	56.53	9.7
24.90	1.9	55.46	9.7
25.23	1.9	56.42	9.7
25.51	1.9	56.01	9.7
25.68	1.9	55.24	9.7
25.91	1.9	55.60	9.7
26.22	1.9	57.16	9.7
26.42	1.9	54.99	9.7
26.73	1.9	55.48	9.7
27.18	1.9	53.49	9.7
27.33	1.9	55.28	9.7
27.65	1.9	55.77	9.7

Notes:

Data collected with a CTD (RBR XR-420)

Table A1-4. Temperature and Dissolved Oxygen Profiles from Knipple Lake (KL), 2013

Depth (m)	Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		August 24, 2011	
27.89	1.9	58.09	9.7
28.17	1.8	55.91	9.7
28.50	1.8	55.85	9.7
28.85	1.8	54.52	9.7
29.12	1.8	57.37	9.7
29.39	1.8	54.54	9.7
29.64	1.9	56.59	9.7
29.88	1.9	55.46	9.7
30.13	1.9	53.81	9.7
30.17	1.9	55.79	9.7
30.37	1.9	55.77	9.7
30.76	1.9	54.80	9.7
31.02	1.9	56.14	9.7
31.12	1.9	55.18	9.7
31.41	1.9	55.16	9.7
31.78	1.9	56.17	9.7
31.94	1.9	56.11	9.7
32.22	1.9	54.19	9.7
32.43	1.8	53.83	9.7
32.56	1.8	55.71	9.7
32.65	1.8	54.83	9.7
32.78	1.8	53.87	9.7
33.00	1.8	55.98	9.7
33.09	1.8	55.07	9.7
33.43	1.8	55.11	9.7
33.83	1.8	51.78	9.7
34.07	1.8	55.13	9.7
34.32	1.8	55.05	9.7
34.67	1.8	54.97	9.7
34.92	1.8	56.34	9.7
35.28	1.8	54.91	9.7
35.58	1.8	55.42	9.7
35.95	1.8	55.51	9.7
36.22	1.8	54.45	9.7
36.50	1.8	56.05	9.7
36.89	1.8	56.42	9.7
37.19	1.8	57.15	9.7
37.42	1.8	55.32	9.7
37.57	1.8	53.96	9.7
37.81	1.8	55.62	9.7
38.02	1.8	53.34	9.7
38.29	1.8	52.45	9.7
38.56	1.8	54.61	9.7
38.91	1.8	54.59	9.7
39.20	1.8	55.18	9.7
39.42	1.8	53.98	9.7
39.75	1.8	54.29	9.7
40.13	1.8	53.84	9.7
40.49	1.8	55.40	9.7
40.88	1.8	56.35	9.7
41.17	1.8	55.50	9.7
41.52	1.8	54.53	9.7

Notes:

Data collected with a CTD (RBR XR-420)

Table A1-4. Temperature and Dissolved Oxygen Profiles from Knipple Lake (KL), 2013

Depth (m)	Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)
		August 24, 2011	
41.74	1.8	53.02	9.7
41.99	1.8	54.88	9.7
42.19	1.8	53.01	9.7
42.52	1.8	56.13	9.7
42.86	1.8	55.16	9.7
43.27	1.8	52.55	9.7
43.68	1.8	55.33	9.7
44.00	1.8	53.75	9.7
44.36	1.8	54.26	9.7
44.70	1.8	53.85	9.7
44.95	1.8	55.06	9.7
45.18	1.8	54.12	9.7
45.45	1.8	53.34	9.7
45.82	1.8	54.77	9.7
46.15	1.8	54.76	9.7
46.54	1.8	54.43	9.7
46.82	1.8	55.45	9.7
46.91	1.8	53.35	9.7
46.91	1.8	53.43	9.7
46.92	1.8	57.30	9.7
46.93	1.8	53.76	9.7
46.92	1.8	53.28	9.7
46.93	1.8	53.07	9.7

Notes:

Data collected with a CTD (RBR XR-420)

Table A1-5a. Temperature and Dissolved Oxygen Profiles from Lake 1 (L1), 2011

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)
	August 23, 2011 (Open-water)	
0.1	12.5	10.28
0.5	12.4	10.27
1.0	12.6	10.24
2.0	12.6	10.20
3.0	12.1	10.19
5.0	11.0	9.95
6.0	8.7	6.96
7.0	8.0	4.69

Notes:

YSI used to collect data

Table A1-5b. Temperature and Dissolved Oxygen Profiles from Lake 1 (L1), 2012

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)
		July 1, 2012 (Open-water)	
0.0	11.1	10.09	14.74
0.1	11.1	10.09	16.65
0.1	11.2	10.10	15.39
0.1	11.2	10.09	14.28
0.2	11.2	10.10	15.65
0.2	11.2	10.09	16.33
0.3	11.2	10.09	15.77
0.3	11.2	10.10	15.09
0.3	11.2	10.10	16.26
0.4	11.1	10.10	14.22
0.4	11.1	10.11	16.33
0.4	11.1	10.11	16.28
0.4	11.1	10.12	16.29
0.4	11.1	10.12	15.07
0.5	11.1	10.11	16.96
0.5	11.1	10.12	16.24
0.6	11.0	10.13	15.28
0.6	11.1	10.12	16.61
0.7	11.1	10.13	16.01
0.8	10.9	10.13	14.90
0.9	10.9	10.15	14.13
1.0	10.8	10.16	15.31
1.1	10.8	10.16	16.07
1.2	10.8	10.18	15.19
1.3	10.7	10.18	15.06
1.4	10.6	10.20	15.36
1.4	10.4	10.21	13.75
1.5	10.3	10.24	14.49
1.5	10.2	10.27	15.71
1.6	10.2	10.29	14.25
1.7	10.1	10.33	14.76
1.8	10.0	10.31	13.72
1.9	9.8	10.28	11.85
2.0	9.5	10.33	13.93
2.0	9.2	10.38	13.76
2.1	9.0	10.46	13.11
2.2	9.0	10.50	11.04
2.2	8.9	10.47	14.64
2.3	8.9	10.53	13.20
2.4	8.9	10.59	13.08
2.4	8.8	10.54	12.94
2.5	8.8	10.55	13.25
2.6	8.8	10.58	11.87
2.7	8.7	10.61	12.37
2.8	8.7	10.63	11.13
2.9	8.7	10.68	12.30
3.0	8.7	10.67	11.41
3.0	8.6	10.67	11.99
3.1	8.6	10.70	12.08
3.2	8.6	10.72	13.31
3.3	8.5	10.73	13.04

Notes:

Data collected with a CTD (RBR XR-420)

maximum depth at time of collection was 10.8 m in July, 10 m in September, and 14 m in December

July 2012 Site Location: 09V 467794 6260323

September 2012 Site Location: 09V 0467891 6260281

December 2012 Site Location: 09V 0468554 6261515

December 2012 ice/compact snow cover: 40 cm

Table A1-5b. Temperature and Dissolved Oxygen Profiles from Lake 1 (L1), 2012

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)
		July 1, 2012 (Open-water)	
3.4	8.5	10.74	12.07
3.5	8.4	10.79	11.68
3.6	8.4	10.81	11.93
3.7	8.3	10.79	13.35
3.8	8.3	10.81	12.55
3.9	8.2	10.81	12.60
4.0	8.2	10.80	11.46
4.1	8.2	10.83	10.87
4.2	8.2	10.80	11.98
4.3	8.2	10.81	11.60
4.3	8.2	10.79	12.95
4.5	8.1	10.82	11.22
4.5	8.1	10.83	11.46
4.6	8.1	10.82	12.90
4.8	8.1	10.85	12.40
4.9	8.1	10.83	12.80
5.0	8.0	10.82	12.07
5.0	8.0	10.84	13.12
5.1	8.0	10.84	11.98
5.2	8.0	10.84	12.57
5.3	8.0	10.85	11.32
5.4	8.0	10.85	13.16
5.5	8.0	10.85	11.18
5.5	8.0	10.84	11.79
5.6	7.9	10.82	11.30
5.7	7.9	10.81	12.73
5.8	7.9	10.80	11.52
5.9	7.9	10.81	12.18
6.0	7.9	10.78	12.02
6.1	7.9	10.79	11.47
6.2	7.9	10.79	11.03
6.2	7.9	10.77	12.57
6.3	7.8	10.76	12.73
6.4	7.8	10.75	11.64
6.5	7.8	10.74	11.24
6.5	7.8	10.71	11.44
6.6	7.8	10.70	12.31
6.6	7.8	10.70	11.70
6.7	7.8	10.68	11.90
6.7	7.8	10.67	13.28
6.8	7.8	10.67	12.46
6.8	7.8	10.66	11.80
6.9	7.8	10.66	11.78
7.0	7.8	10.65	11.26
7.0	7.7	10.65	11.74
7.1	7.7	10.63	11.64
7.2	7.7	10.64	11.87
7.2	7.7	10.63	11.34
7.3	7.7	10.63	11.36
7.3	7.7	10.62	10.75
7.4	7.7	10.61	11.68

Notes:

Data collected with a CTD (RBR XR-420)

maximum depth at time of collection was 10.8 m in July, 10 m in September, and 14 m in December

July 2012 Site Location: 09V 467794 6260323

September 2012 Site Location: 09V 0467891 6260281

December 2012 Site Location: 09V 0468554 6261515

December 2012 ice/compact snow cover: 40 cm

Table A1-5b. Temperature and Dissolved Oxygen Profiles from Lake 1 (L1), 2012

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)
		July 1, 2012 (Open-water)	
7.5	7.7	10.60	12.74
7.5	7.7	10.60	13.82
7.6	7.7	10.60	13.17
7.7	7.6	10.59	12.40
7.8	7.6	10.59	12.51
7.9	7.6	10.57	11.91
7.9	7.6	10.58	10.82
8.0	7.6	10.55	11.89
8.1	7.5	10.54	11.04
8.2	7.5	10.54	12.25
8.2	7.5	10.53	12.15
8.3	7.5	10.53	11.61
8.4	7.5	10.52	11.63
8.5	7.5	10.52	11.98
8.5	7.5	10.52	11.07
8.6	7.5	10.51	11.31
8.6	7.5	10.49	11.31
8.7	7.5	10.48	11.97
8.8	7.5	10.46	12.39
8.9	7.5	10.45	11.30
9.0	7.5	10.45	10.72
9.0	7.5	10.43	11.36
9.0	7.5	10.43	11.36
9.0	7.5	10.42	11.35
8.1	7.5	10.39	10.13
8.1	7.5	10.38	13.05
8.1	7.5	10.38	12.91
8.1	7.5	10.38	12.27
8.1	7.5	10.36	11.73
7.0	7.6	10.36	12.54
7.0	7.6	10.35	12.07
7.0	7.7	10.35	11.42
7.0	7.7	10.35	12.49
5.7	7.7	10.34	10.76
5.7	7.8	10.35	12.20
5.7	7.8	10.35	11.60
5.7	7.8	10.35	11.36
4.4	7.9	10.37	11.98
4.4	7.9	10.37	11.43
4.4	8.0	10.38	11.32
4.4	8.0	10.38	12.90
3.3	8.1	10.45	10.49
3.3	8.3	10.40	9.22
3.3	8.3	10.40	12.19
3.3	8.4	10.42	11.71
2.1	8.4	10.48	11.59
2.1	8.6	10.43	12.62
2.1	8.7	10.40	11.75
2.1	8.7	10.41	11.44
1.9	8.7	10.45	12.55
1.1	10.1	10.36	13.75

Notes:

Data collected with a CTD (RBR XR-420)

maximum depth at time of collection was 10.8 m in July, 10 m in September, and 14 m in December

July 2012 Site Location: 09V 467794 6260323

September 2012 Site Location: 09V 0467891 6260281

December 2012 Site Location: 09V 0468554 6261515

December 2012 ice/compact snow cover: 40 cm

Table A1-5b. Temperature and Dissolved Oxygen Profiles from Lake 1 (L1), 2012

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)
July 1, 2012 (Open-water)			
1.0	10.4	10.20	14.93
1.0	10.6	10.15	14.05
1.0	10.6	10.16	14.41
1.0	10.7	10.09	14.95
0.8	10.7	10.23	15.07
0.1	11.0	10.09	15.28
September 6, 2012 (Open-water)			
0.0	15.4	8.70	12.39
0.1	15.2	9.15	11.48
0.2	15.2	9.12	11.97
0.2	15.1	9.18	11.35
0.2	15.0	9.18	11.35
0.2	15.0	9.24	10.32
0.2	15.1	9.22	10.69
0.2	15.0	9.23	11.34
0.2	14.9	9.28	11.07
0.3	15.0	9.26	12.92
0.5	14.9	9.28	10.71
0.9	14.8	9.28	10.48
1.2	14.7	9.29	11.48
1.4	14.7	9.30	12.88
1.6	14.7	9.32	10.75
1.8	14.6	9.30	12.65
2.0	14.6	9.27	11.09
2.3	14.6	9.25	10.70
2.3	14.6	9.25	10.14
2.5	14.5	9.25	11.72
2.8	14.5	9.22	8.47
3.1	14.4	9.21	11.03
3.4	14.3	9.18	12.41
3.7	14.1	9.17	10.24
4.0	13.4	9.32	4.31
4.3	12.4	10.07	2.59
4.7	11.4	10.78	6.84
5.1	10.7	11.20	3.08
5.4	10.0	11.17	4.90
5.8	9.1	10.90	3.12
5.9	8.8	10.28	5.49
6.2	8.6	9.57	4.58
6.4	8.5	8.90	6.52
6.9	8.3	8.29	7.48
7.3	8.1	7.63	6.21
7.6	8.0	7.02	8.44
8.0	7.9	6.36	8.31
8.3	7.8	5.67	7.66
8.7	7.8	5.19	9.17
9.1	7.7	4.75	42.38
9.1	7.7	4.75	42.38
8.6	7.7	4.08	9.48
8.0	7.7	3.56	9.39
7.8	7.8	3.26	8.13

Notes:

Data collected with a CTD (RBR XR-420)

maximum depth at time of collection was 10.8 m in July, 10 m in September, and 14 m in December

July 2012 Site Location: 09V 467794 6260323

September 2012 Site Location: 09V 0467891 6260281

December 2012 Site Location: 09V 0468554 6261515

December 2012 ice/compact snow cover: 40 cm

Table A1-5b. Temperature and Dissolved Oxygen Profiles from Lake 1 (L1), 2012

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)
September 6, 2012 (Open-water)			
7.1	8.0	3.10	8.25
6.3	8.3	3.22	6.17
5.9	8.4	3.57	8.10
5.5	8.9	4.24	6.90
4.6	10.2	4.99	5.28
3.8	11.8	6.32	4.60
2.9	13.4	7.03	9.36
2.0	14.2	7.29	10.61
0.9	14.5	7.61	12.63
0.1	14.7	7.88	10.62
December 15, 2012 (Under-ice)			
0.0	-1.5	11.79	9.89
0.2	-0.3	11.79	10.58
0.2	0.0	11.38	10.84
0.6	0.2	10.87	12.88
0.7	0.5	10.41	13.58
0.9	1.1	10.14	12.66
0.9	1.5	9.83	13.43
0.9	1.6	9.62	13.76
1.0	1.7	9.44	12.27
1.0	1.8	9.24	14.30
1.0	1.7	9.11	14.48
1.0	1.7	8.98	12.65
0.8	1.6	8.90	14.28
0.8	1.6	8.64	14.98
0.5	1.2	8.33	12.41
0.5	1.1	8.26	11.06
0.5	1.1	8.20	13.40
0.5	0.9	8.12	11.33
0.5	0.9	8.07	12.02
0.5	0.9	8.03	12.23
0.5	0.9	8.01	11.43
0.5	0.9	7.99	13.34
0.5	0.8	7.97	14.17
0.5	0.8	7.95	11.51
0.5	0.7	7.93	12.47
0.8	1.0	7.91	13.11
0.9	1.3	7.86	12.47
0.9	1.4	7.76	13.64
0.9	1.6	7.63	14.83
0.9	1.7	7.55	16.52
0.9	1.8	7.49	16.47
0.9	1.8	7.39	14.31
0.9	1.9	7.32	14.04
1.0	1.9	7.23	14.49
1.1	2.0	7.16	14.62
1.2	2.2	7.13	13.33
1.2	2.4	7.04	15.57
1.3	2.6	6.95	14.19
1.3	2.6	6.97	15.11
1.3	2.7	6.93	15.16

Notes:

Data collected with a CTD (RBR XR-420)

maximum depth at time of collection was 10.8 m in July, 10 m in September, and 14 m in December

July 2012 Site Location: 09V 467794 6260323

September 2012 Site Location: 09V 0467891 6260281

December 2012 Site Location: 09V 0468554 6261515

December 2012 ice/compact snow cover: 40 cm

Table A1-5b. Temperature and Dissolved Oxygen Profiles from Lake 1 (L1), 2012

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)
		December 15, 2012 (Under-ice)	
1.3	2.7	6.82	15.72
1.3	2.7	6.74	14.64
1.3	2.7	6.69	14.57
1.6	2.8	6.70	14.96
1.6	2.9	6.57	17.18
1.7	3.0	6.44	14.73
1.7	3.0	6.38	16.39
1.7	3.0	6.33	14.63
1.7	3.0	6.26	14.80
1.7	3.1	6.21	16.16
1.7	3.1	6.18	14.34
1.7	3.1	6.14	17.06
1.7	3.1	6.10	15.09
1.7	3.1	6.08	17.27
2.2	3.2	6.08	16.74
2.4	3.3	6.00	17.05
2.4	3.3	5.97	17.71
2.4	3.3	5.95	18.32
2.4	3.3	5.94	19.11
2.4	3.3	5.93	15.43
2.4	3.3	5.91	18.94
2.4	3.3	5.88	17.39
2.4	3.3	5.86	19.09
2.4	3.3	5.85	17.68
2.4	3.2	5.83	18.28
2.6	3.3	5.86	18.70
2.7	3.4	5.82	18.33
2.6	3.4	5.79	17.14
2.7	3.4	5.76	18.68
2.7	3.4	5.74	18.57
2.7	3.4	5.73	19.38
3.1	3.4	5.74	19.34
3.2	3.4	5.70	19.12
3.2	3.4	5.67	17.22
3.2	3.4	5.65	18.54
3.2	3.4	5.64	18.74
3.2	3.4	5.62	17.92
3.6	3.5	5.63	19.60
3.7	3.5	5.60	18.81
3.7	3.5	5.58	18.58
3.7	3.5	5.57	17.95
4.3	3.5	5.57	20.04
4.3	3.5	5.53	17.89
4.4	3.5	5.50	19.46
4.4	3.5	5.48	19.63
4.4	3.5	5.47	17.76
4.9	3.5	5.46	19.81
4.9	3.6	5.41	19.64
4.9	3.6	5.38	17.96
5.2	3.6	5.37	20.82
5.6	3.6	5.31	20.06

Notes:

Data collected with a CTD (RBR XR-420)

maximum depth at time of collection was 10.8 m in July, 10 m in September, and 14 m in December

July 2012 Site Location: 09V 467794 6260323

September 2012 Site Location: 09V 0467891 6260281

December 2012 Site Location: 09V 0468554 6261515

December 2012 ice/compact snow cover: 40 cm

Table A1-5b. Temperature and Dissolved Oxygen Profiles from Lake 1 (L1), 2012

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)
		December 15, 2012 (Under-ice)	
5.6	3.6	5.25	18.46
5.6	3.6	5.21	20.49
5.7	3.6	5.18	20.35
6.2	3.6	5.16	19.86
6.2	3.6	5.09	20.73
6.2	3.6	5.04	19.71
6.2	3.6	5.00	19.92
6.2	3.6	4.98	19.62
6.6	3.6	4.95	19.19
6.6	3.6	4.89	18.96
6.6	3.6	4.85	20.04
6.6	3.6	4.82	21.51
6.7	3.6	4.80	19.41
7.2	3.6	4.78	18.71
7.2	3.6	4.72	19.96
7.2	3.6	4.68	18.84
7.3	3.6	4.66	21.55
7.3	3.6	4.64	18.10
7.3	3.6	4.63	19.55
7.4	3.6	4.62	19.51
7.4	3.6	4.61	21.86
7.5	3.6	4.59	18.85
7.5	3.6	4.57	20.73
7.7	3.6	4.56	19.02
7.8	3.7	4.52	20.27
7.8	3.6	4.49	21.49
7.9	3.6	4.48	19.26
7.9	3.7	4.45	20.24
7.9	3.7	4.42	20.58
7.9	3.7	4.40	19.71
8.3	3.7	4.39	20.70
8.3	3.7	4.34	18.46
8.4	3.7	4.32	19.35
8.4	3.7	4.30	19.29
8.4	3.7	4.28	21.62
8.7	3.7	4.26	18.73
8.7	3.7	4.24	20.22
8.8	3.7	4.22	19.86
9.2	3.7	4.21	20.47
9.4	3.7	4.16	20.39
9.4	3.7	4.08	21.99
9.4	3.7	4.03	19.69
9.4	3.7	4.00	20.04
9.4	3.7	3.97	20.78
9.8	3.7	3.94	22.88
9.9	3.7	3.88	22.72
10.0	3.7	3.81	20.39
10.0	3.7	3.75	21.24
9.9	3.7	3.71	21.26
10.0	3.7	3.66	19.81
10.0	3.7	3.63	21.47

Notes:

Data collected with a CTD (RBR XR-420)

maximum depth at time of collection was 10.8 m in July, 10 m in September, and 14 m in December

July 2012 Site Location: 09V 467794 6260323

September 2012 Site Location: 09V 0467891 6260281

December 2012 Site Location: 09V 0468554 6261515

December 2012 ice/compact snow cover: 40 cm

Table A1-5b. Temperature and Dissolved Oxygen Profiles from Lake 1 (L1), 2012

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)
		December 15, 2012 (Under-ice)	
10.0	3.7	3.63	21.47
9.9	3.7	3.61	20.66
9.9	3.7	3.58	22.05
9.7	3.7	3.56	22.61
9.4	3.7	3.53	22.73
9.4	3.7	3.52	20.48
9.3	3.7	3.50	22.03
9.0	3.7	3.49	21.98
8.6	3.7	3.48	21.23
8.1	3.7	3.51	19.70
7.3	3.7	3.56	19.79
6.5	3.7	3.62	20.03
5.7	3.7	3.70	20.00
4.9	3.6	3.81	18.50
4.6	3.6	3.92	21.41
4.0	3.6	4.04	18.92
3.5	3.6	4.16	18.80
3.0	3.6	4.26	18.22
2.6	3.5	4.37	19.84
2.2	3.5	4.48	17.71
1.8	3.5	4.59	18.22
1.3	3.3	4.65	19.07
0.8	2.9	4.73	18.02
0.2	2.0	4.87	18.84

Notes:

Data collected with a CTD (RBR XR-420)

maximum depth at time of collection was 10.8 m in July, 10 m in September, and 14 m in December

July 2012 Site Location: 09V 467794 6260323

September 2012 Site Location: 09V 0467891 6260281

December 2012 Site Location: 09V 0468554 6261515

December 2012 ice/compact snow cover: 40 cm

Table A1-6. Temperature and Dissolved Oxygen Profiles from Lake 2 (L2), 2011

Depth (m)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)
		August 24, 2011	
0.1	14.5	10.21	105.9
1	14.2	-	-
2	13.0	-	-
3	11.6	-	-
4	7.7	-	-
5	5.9	-	-
6	5.4	-	-
7	5.1	-	-
8	4.9	-	-

Notes:

YSI used to collect data

Maximum depth at time of collection was 16 m

Table A1-7. Temperature and Dissolved Oxygen Profiles from Bowser Lake (BL1), 2010

Depth (m)	Temperature (˚C)	Dissolved Oxygen (mg/L)
	August 25, 2010	
0	7.6	12.06
1	6.7	11.91
2	6.5	11.7
3	6.5	9.96
4	6.5	9.02
5	6.4	8.37
6	6.4	7.78
7	6.2	7.37
8	6.2	7.09
9	6.1	7.06
10	6.1	7.01
11	6.0	6.79
12	6.0	6.68
13	6.0	6.65
14	5.9	6.71
15	5.9	6.57
16	5.9	6.52
17	5.9	6.3
18	5.9	6.5
19	5.9	6.5
20	5.9	6.5

Notes:

YSI used to collect data

Maximum depth at time of collection was > 50 m

Appendix 2

Water Quality Data for Mine Site Area and Downstream Receiving Environment Sampling Sites, 2008-2013

Table A2-1. 2007-2008: Brucejack, Sulphurets, and Unuk River Watersheds

Table A2-2. 2009: Brucejack, Sulphurets, and Unuk River Watersheds

Table A2-3. 2010: Brucejack, Sulphurets, and Unuk River Watersheds

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Table A2-1. 2007-2008: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2007	2007	2007	2007	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC		Replicate	Replicate		Replicate	Replicate							Replicate	Replicate						Replicate	
Sample ID	SC1	SC3	SC3	SC3	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2
Date Sampled	23-Sep-07	25-Jul-07	25-Jul-07	23-Sep-07	28-May-08	28-May-08	5-Jun-08	11-Jun-08	26-Jun-08	3-Jul-08	25-Jul-08	10-Sep-08	2-Oct-08	2-Oct-08	29-Oct-08	6-Dec-08	28-May-08	5-Jun-08	11-Jun-08	3-Jul-08	25-Jul-08
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L559547-3	L535508-6	L535508-7	L559547-8	L635965-8	L635965-9	L639617-10	L642688-2	L650936-30	L652071-8	L662220-10	L683687-1	L691752-10	L691752-9	L703445-12	L717413-30	L635965-12	L639617-11	L642688-3	L652071-9	L662220-11
Physical Tests																					
Colour, True	-	-	-	-	-	-	64.1	66.5	<5.0	<5.0	<5.0	<5.0	6.6	<5.0	<5.0	<5.0	95.3	89.5	94.2	<5.0	<5.0
Conductivity (uS/cm)	104	-	-	199	-	-	<5.0	<5.0	122	101	89.6	97.5	114	114	237	307	<5.0	<5.0	<5.0	186	139
Hardness (as $CaCO_3$)	47	63	63.4	93.7	-	-	154	155	60.0	44.4	36.0	43.4	50.3	50.6	104	138	222	218	227	68.2	61.0
pH	7.77	7.74	7.73	7.83	7.76	7.91	7.86	7.89	7.32	7.90	7.77	7.73	7.74	7.87	7.83	7.82	7.64	7.26	7.42	6.92	7.37
Total Suspended Solids	16.0	-	-	77.5	-	-	96	101	61.4	153	61.7	37.2	291	293	<3.0	<3.0	134	138	144	545	140
Total Dissolved Solids	80.0	86.0	98.0	124	-	-	40.3	25.8	75	71	53	57	75	94	150	198	291	146	94.3	115	85
Turbidity (NTU)		-	-	-	-	-	53.6	37.2	57.1	78.1	74.8	42.9	350	352	1.48	0.57	212	124	99.9	339	88.6
Anions and Nutrients																					
Acidity (as $CaCO_3$)	2.4	<1.0	<1.0	2.8	5.6	3.9	1.9	1.1	2.5	5.9	1.4	1.5	1.2	<1.0	1.4	1.3	4.6	3.8	1.5	9.9	2.2
Alkalinity, Bicarbonate (as $CaCO_3$)		-	-	-	39.1	38.6	31	34.9	28.1	23.2	21.7	23.0	34.1	34.2	45.3	49.7	25.6	18.9	15.7	<2.0	22.1
Alkalinity, Carbonate (as $CaCO_3$)		-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)		-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	23.4	25.0	25.2	36.9	39.1	38.6	31	34.9	28.1	23.2	21.7	23.0	34.1	34.2	45.3	49.7	25.6	18.9	15.7	<2.0	22.1
Ammonia, Total (as N)	<0.0050	0.0053	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0058	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.024	0.082	0.081	0.094	0.052	0.052	0.039	0.031	0.030	0.023	<0.020	<0.020	<0.020	<0.020	0.039	0.05	0.136	0.128	0.14	0.125	0.070
Nitrate (as N)	0.0067	0.0211	0.0225	0.0201	0.034	0.0335	0.0218	0.0237	0.0159	0.0123	0.0143	0.0114	0.0157	0.0137	0.0701	0.0253	0.116	0.0712	0.061	0.0219	0.0186
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.085	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	-	-	-	-	<0.05	<0.05	<0.060	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.11	0.14	0.071	<0.05	<0.05	<0.05
Orthophosphate-Dissolved (as P)	0.0091	<0.0010	<0.0010	0.0028	-	-	-	-	-	-	-	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	0.0253	0.0364	0.0387	0.0271	0.0587	0.0346	0.0788	0.0342	0.163	0.163	0.0028	0.0027	1.45	0.416	0.282	1.02	0.187
Sulfate (SO_4)	25.9	40.6	40.5	58.2	58.4	58.6	38	36	30.9	22.3	18.2	23.1	22.4	22.4	71.4	103	74.5	74.8	79.7	76.6	40.1
Cyanides																					
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	0.0013	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	0.59	0.79	<0.50	<0.50	1.14	0.52	0.51	1.43	<0.50
Total Metals																					
Aluminum (Al)-Total	0.447	8.03	9.09	1.92	1.87	1.97	2.38	1.43	1.67	3.43	1.88	1.20	9.02	10.6	0.046	0.0546	6.67	5.29	3.35	10.2	3.31
Antimony (Sb)-Total	0.00092	0.00149	0.00164	0.00072	0.00145	0.00145	0.00143	0.00135	0.00131	0.00192	0.00133	0.00110	0.00364	0.00405	0.00109	0.00142	0.00115	0.00107	0.00092	0.00202	0.00096
Arsenic (As)-Total	0.00142	0.0134	0.0146	0.00239	0.00416	0.00436	0.00418	0.00328	0.00328	0.00711	0.00418	0.00303	0.0111	0.0124	0.00043	0.00023	0.0495	0.0181	0.00847	0.0568	0.00492
Barium (Ba)-Total	0.0340	0.170	0.188	0.0700	0.0612	0.0643	0.0767	0.0573	0.0741	0.101	0.0699	0.0538	0.223	0.251	0.0298	0.0413	0.159	0.137	0.0835	0.287	0.114
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00064	0.00052	<0.00050	0.00083	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000050	0.00159	0.00166	0.000968	0.000116	0.000135	0.000104	0.00008	0.000104	0.000148	0.000082	0.000067	0.000195	0.000205	0.000059	0.000111	0.00407	0.00303	0.00336	0.00541	0.00140
Calcium (Ca)-Total	16.9	30.4	30.9	32.9	34.8	35.3	23.7	24.9	20.6	17.5	14.1	16.2	17.5	18.6	36.7	49.2	37.5	33.5	35.5	28.4	23.0
Chromium (Cr)-Total	<0.00050	0.00688	0.00799	0.00141	0.00134	0.00145	0.00149	0.00098	0.00110	0.00253	0.00170	0.00096	0.00648	0.00755	<0.00050	<0.00050	0.00551	0.00355	0.00184	0.00868	0.00245
Cobalt (Co)-Total	0.00050	0.00677	0.00734	0.00201	0.00138	0.00139	0.00124	0.00088	0.00120	0.00225	0.00112	0.00091	0.00375	0.00428	0.00034	0.00096	0.00841	0.00649	0.00599	0.0135	0.00317
Copper (Cu)-Total	0.00776	0.165	0.169	0.109	0.016	0.0167	0.0144	0.0103	0.0135	0.0257	0.0108	0.00779	0.0327	0.0360	0.0069	0.0214	0.248	0.364	0.443	0.417	0.155
Iron (Fe)-Total	0.558	14.1	15.5	4.18	2.02	2.11	2.27	1.64	1.64	3.86	2.32	1.35	11.0	11.9	0.068	0.059	18.1	13.6	10.2	31.6	6.24
Lead (Pb)-Total	0.000921	0.00772	0.00807	0.00281	0.00199	0.00212	0.00209	0.00167	0.00214	0.00450	0.00265	0.00206	0.00979	0.0101	0.000065	<0.000050	0.00939	0.00835	0.00767	0.0175	0.00563
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0066	0.0076	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0070	<0.0050
Magnesium (Mg)-Total	1.60	5.44	6.02	3.27	3.03	3.02	2.42	2.24	2.08	2.32	1.81	1.61	4.70	5.39	2.55	3.97	4.96	4.12	3.6	5.96	3.02
Manganese (Mn)-Total	0.0535	0.377	0.407	0.174	0.154	0.158	0.116	0.0789	0.116	0.205	0.103	0.0741	0.287	0.322	0.0462	0.0997	0.387	0.341	0.319	0.581	0.255
Mercury (Hg)-Total	<0.000010	0.000049	0.000032	<0.000010	<0.000010	0.00001	0.000015	0.000017	<0.000010	<0.000010	0.000015	0.000013	0.000075	0.000052	<0.000010	<0.000010	0.000022	0.000012	0.000011	0.000014	0.000012
Molybdenum (Mo)-Total	0.000605	0.00279	0.00314	0.00221	0.00137	0.0014	0.00115	0.00102	0.000893	0.000913	0.000769	0.000698	0.00148	0.00163	0.00128	0.00151	0.00416	0.00324	0.00262	0.00581	0.00177
Nickel (Ni)-Total	<0.00050	0.00831	0.00919	0.00275	0.00133	0.00145	0.00125	0.0009	0.00111	0.00208	0.00356	0.00096	0.00427	0.00485	<0.00050	0.00087	0.00693	0.00481	0.00332	0.0116	0.00265
Phosphorus (P)-Total	<0.30	0.64	0.59	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	1	0.68	<0.30	1.40	<0.30

Table A2-1. 2007-2008: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2007	2007	2007	2007	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC		Replicate	Replicate		Replicate	Replicate							Replicate	Replicate						Replicate	
Sample ID	SC1	SC3	SC3	SC3	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2
Date Sampled	23-Sep-07	25-Jul-07	25-Jul-07	23-Sep-07	28-May-08	28-May-08	5-Jun-08	11-Jun-08	26-Jun-08	3-Jul-08	25-Jul-08	10-Sep-08	2-Oct-08	2-Oct-08	29-Oct-08	6-Dec-08	28-May-08	5-Jun-08	11-Jun-08	3-Jul-08	25-Jul-08
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L559547-3	L535508-6	L535508-7	L559547-8	L635965-8	L635965-9	L639617-10	L642688-2	L650936-30	L652071-8	L662220-10	L683687-1	L691752-10	L691752-9	L703445-12	L717413-30	L635965-12	L639617-11	L642688-3	L652071-9	L662220-11
Total Metals *(cont'd)*																					
Potassium (K)-Total	<2.0	3.1	3.4	<2.0	1.11	1.16	1.2	0.857	0.884	1.67	0.784	0.587	3.71	4.22	0.34	0.457	2.71	2.3	1.6	3.57	1.43
Selenium (Se)-Total	<0.0010	0.0015	0.0016	0.0012	0.00041	0.00039	0.00044	0.00038	0.00031	0.00024	0.00032	0.00021	0.00038	0.00042	0.00055	0.00067	0.00284	0.0021	0.00161	0.00339	0.00111
Silicon (Si)-Total	1.15	15.4	17.7	4.62	4.5	4.55	6.09	3.9	4.35	7.02	4.96	2.49	19.5	22.0	1.24	1.62	11.2	9.9	5.83	18.5	7.33
Silver (Ag)-Total	0.000012	0.000183	0.000307	0.000054	0.000043	0.000045	0.000047	0.000036	0.000039	0.000092	0.000046	0.000132	0.000162	0.000195	<0.000010	<0.000010	0.00015	0.000139	0.000069	0.000283	0.000076
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.0880	0.138	0.145	0.160	0.167	0.17	0.13	0.123	0.118	0.0869	0.0847	0.0829	0.0990	0.106	0.17	0.252	0.178	0.186	0.18	0.145	0.140
Thallium (Tl)-Total	<0.00010	0.00011	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00016	0.00017	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	0.00020	<0.00010
Tin (Sn)-Total	<0.00010	<0.00020	<0.00030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	0.00015	0.00018	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	0.00016	0.00019
Titanium (Ti)-Total	<0.010	0.434	0.540	0.091	0.053	0.053	0.071	0.044	0.053	0.101	0.063	0.029	0.229	0.261	<0.010	<0.010	0.332	0.238	0.116	0.636	0.173
Uranium (U)-Total	0.000032	0.000542	0.000647	0.000291	0.000083	0.000089	0.000091	0.000092	0.000067	0.000113	0.000060	0.000056	0.000263	0.000227	0.000062	0.000077	0.000611	0.000684	0.00065	0.000816	0.000305
Vanadium (V)-Total	0.0012	0.0315	0.0367	0.0063	0.0061	0.0065	0.0074	0.0048	0.0047	0.0117	0.0058	0.0038	0.0282	0.0330	<0.0010	<0.0010	0.0239	0.0177	0.0101	0.0408	0.0106
Zinc (Zn)-Total	0.0046	0.125	0.131	0.0686	0.0128	0.0149	0.0129	<0.010	0.0100	0.0206	0.0120	0.0077	0.0374	0.0423	0.0045	0.0108	0.278	0.21	0.209	0.385	0.101
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB		LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0415	0.0188	0.0179	0.0234	0.0493	0.0389	0.063	0.0474	-	0.0571	0.0489	0.0599	0.0749	0.0762	0.0267	0.0321	0.0041	0.009	0.0147	0.208	0.0151
Antimony (Sb)-Dissolved	0.00075	0.00038	0.00038	0.00040	0.00094	0.00093	0.00086	0.00084	-	0.00070	0.00066	0.00069	0.00138	0.00137	0.00107	0.00133	0.00035	0.00031	0.00032	<0.00010	0.00040
Arsenic (As)-Dissolved	0.00033	0.00015	0.00015	<0.00010	0.00047	0.00043	0.00052	0.00056	-	0.00037	0.00045	0.00051	0.00086	0.00080	0.00027	0.00014	0.00015	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)-Dissolved	0.0225	0.0258	0.0265	0.0250	0.0276	0.0276	0.0271	0.0264	-	0.0241	0.0212	0.0251	0.0302	0.0304	0.03	0.0407	0.0396	0.0362	0.0304	0.0450	0.0303
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000050	0.000742	0.000750	0.000580	<0.000080	<0.000070	0.000049	0.000039	-	0.000019	0.000019	0.000024	<0.000017	<0.000017	0.000056	0.000105	0.00222	0.00235	0.0027	0.00485	0.000928
Calcium (Ca)-Dissolved	16.6	22.4	22.4	33.2	33.8	33.9	23	23.9	-	16.1	12.8	15.4	18.1	18.2	37.3	49	34.3	31.6	33.2	24.6	21.6
Chromium (Cr)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Dissolved	0.00013	0.00202	0.00213	0.00115	0.0003	0.00029	0.0002	0.00013	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00033	0.00093	0.00384	0.00443	0.00458	0.00760	0.00148
Copper (Cu)-Dissolved	0.00030	0.00131	0.00141	0.00155	0.001	0.00094	0.0006	0.0004	-	0.00037	0.00026	<0.00030	0.00018	0.00022	0.00319	0.0136	0.00324	0.0108	0.0174	0.256	0.00304
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	0.148	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	2.13	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000100	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	1.38	1.71	1.82	2.61	2.34	2.35	1.65	1.67	-	1.05	0.981	1.18	1.24	1.24	2.59	3.87	2.32	2.57	2.72	1.68	1.73
Manganese (Mn)-Dissolved	0.0214	0.131	0.134	0.122	0.0899	0.0878	0.0511	0.0352	-	0.00941	0.0107	0.0156	0.000355	0.000348	0.0442	0.0966	0.184	0.234	0.255	0.312	0.154
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000725	0.000953	0.000950	0.00130	0.00126	0.0013	0.000995	0.00094	-	0.000696	0.000626	0.000734	0.00134	0.00130	0.00131	0.00156	0.00226	0.00112	0.000961	<0.000050	0.00100
Nickel (Ni)-Dissolved	<0.00050	0.00143	0.00151	0.00103	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00104	0.00129	0.00191	0.00197	0.00325	0.00133
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	<2.0	<2.0	<2.0	<2.0	0.39	0.394	0.322	0.265	-	0.212	0.157	0.175	0.399	0.404	0.345	0.454	1.23	1.01	0.897	0.879	0.685
Selenium (Se)-Dissolved	<0.0010	<0.0010	<0.0010	0.0011	0.00036	0.00038	0.00027	0.00028	-	0.00019	0.00012	0.00020	0.00036	0.00040	0.00055	0.00046	0.00152	0.0013	0.00129	0.00087	0.00093
Silicon (Si)-Dissolved	0.582	0.918	0.925	1.41	1.29	1.24	1.08	1.01	-	0.661	0.548	0.582	0.647	0.653	1.2	1.55	1.35	1.41	1.5	1.11	0.958
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0873	0.102	0.104	0.154	0.162	0.162	0.124	0.118	-	0.0778	0.0747	0.0807	0.0925	0.0923	0.171	0.249	0.157	0.175	0.171	0.110	0.128
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00018
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000024	0.000012	0.000011	0.000049	0.000052	0.000054	0.00005	0.000048	-	0.000026	0.000026	0.000025	0.000036	0.000039	0.000065	0.000074	<0.000010	0.000012	0.000016	0.000063	0.000013
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0010	0.0307	0.0322	0.0276	<0.0010	0.0015	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0034	0.0093	0.105	0.12	0.144	0.325	0.0390

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-1. 2007-2008: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	lake	stream	stream	stream	stream	stream	stream	stream	stream
QAQC			Replicate	Replicate						Replicate											Replicate
Sample ID	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC3	SC3	SC3	SC3	SUL	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1
Date Sampled	10-Sep-08	17-Sep-08	25-Sep-08	25-Sep-08	2-Oct-08	9-Oct-08	29-Oct-08	6-Dec-08	26-Jun-08	3-Jul-08	10-Sep-08	5-Dec-08	10-Sep-08	28-May-08	5-Jun-08	11-Jun-08	26-Jun-08	3-Jul-08	25-Jul-08	10-Sep-08	6-Dec-08
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L683687-2	L686098-8	L688714-7	L688714-8	L691752-11	L694973-7	L703445-7	L717413-15	L650936-23	L652071-10	L683687-3	L717413-19	L683687-12	L635965-3	L639617-1	L642688-10	L650936-22	L652071-1	L662220-2	L683687-8	L717413-13
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	51.9	55.6	53.1	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	157	124	193	193	129	209	304	357	200	186	157	324	95.3	6.2	<5.0	<5.0	139	127	125	144	244
Hardness (as $CaCO_3$)	67.5	52.7	79.1	79.6	60.2	88.6	133	160	83.0	67.0	67.1	144	46.4	114	124	138	61.7	52.5	52.5	63.7	108
pH	7.66	7.98	7.71	7.74	7.84	7.88	7.97	8	7.56	6.65	7.70	8.12	7.70	6.89	7.58	7.64	7.71	7.99	7.87	7.83	8.08
Total Suspended Solids	69.2	261	51.4	52.4	561	51.2	15.3	37	137	150	93.7	5.5	36.7	85	78	85	77.9	379	89.7	57.2	13
Total Dissolved Solids	105	71	123	119	85	127	200	231	123	106	96	206	70	186	49.8	33.8	79	74	72	98	151
Turbidity (NTU)	55.9	213	38.5	40.9	369	52.3	28.9	43	110	344	70.6	6.63	57.2	122	48	28.1	62.2	88.8	69.9	50.8	13.8
Anions and Nutrients																					
Acidity (as $CaCO_3$)	1.7	3.7	1.5	1.4	1.0	2.4	1.3	1.2	1.9	12.1	1.6	<1.0	1.4	5.4	2	1.8	1.7	4.9	1.4	1.5	<1.0
Alkalinity, Bicarbonate (as $CaCO_3$)	29.2	26.2	33.8	33.9	35.8	36.9	59.4	82.2	23.2	2.8	29.7	77.8	22.0	36.2	29.8	33.9	30.5	22.7	31.1	36.3	71.9
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	29.2	26.2	33.8	33.9	35.8	36.9	59.4	82.2	23.2	2.8	29.7	77.8	22.0	36.2	29.8	33.9	30.5	22.7	31.1	36.3	71.9
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.078	0.047	0.093	0.094	0.042	0.098	0.129	0.14	0.123	0.122	0.078	0.095	<0.020	0.048	0.053	0.057	0.062	0.060	0.045	0.053	0.066
Nitrate (as N)	0.0202	0.0122	0.0218	0.0222	0.0216	0.0391	0.113	0.0972	0.0466	0.0206	0.0219	0.165	0.0113	0.0982	0.0642	0.0594	0.0359	0.0212	0.0239	0.0245	0.107
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	0.061	<0.050	<0.050	<0.050	<0.050	<0.050	0.115	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.05	<0.05	<0.05	<0.05	0.05	0.10	0.1	0.13	0.07	<0.05	<0.05	0.28	<0.05	0.12	0.09	<0.05	0.06	<0.05	<0.05	<0.05	0.15
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	0.0016	<0.0010	0.0014	<0.0010	-	-	<0.0010	0.0011	<0.0010	-	-	-	-	-	-	<0.0010	<0.0010
Phosphorus (P)-Total	0.091	0.284	0.0456	0.0609	0.531	0.0040	0.0741	0.0271	0.265	1.42	0.108	0.0112	0.0477	0.426	0.167	0.133	0.132	0.505	0.151	0.0688	0.0177
Sulfate (SO_4)	44.8	30.6	54.4	54.2	27.5	61.6	93.2	113	65.7	77.0	43.3	91.4	21.6	23.4	26.4	29.9	32.9	34.0	26.0	32.3	57.1
Cyanides																					
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		0.0011	<0.0010	<0.0010	0.0013	0.0016	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	0.97	<0.50	0.64	-	<0.50	1.46	<0.50	0.6	<0.50	1.55	0.88	0.71	0.51	1.58	<0.50	<0.50	0.51
Total Metals																					
Aluminum (Al)-Total	1.42	9.54	1.74	1.90	12.6	2.12	0.805	0.97	4.26	11.2	3.05	0.204	2.30	5.06	2.48	1.06	2.38	8.64	2.76	2.09	0.322
Antimony (Sb)-Total	0.00058	0.00135	0.00076	0.00078	0.00231	0.00094	0.00068	0.00079	0.00093	0.00205	0.00070	0.00053	0.00136	0.00199	0.00174	0.00128	0.00136	0.00198	0.00181	0.00208	0.00199
Arsenic (As)-Total	0.00234	0.00845	0.00225	0.00231	0.0140	0.00254	0.00269	0.00398	0.00850	0.0590	0.00362	0.00066	0.00409	0.0136	0.00542	0.00215	0.00417	0.0263	0.00318	0.00248	0.00146
Barium (Ba)-Total	0.0582	0.218	0.0506	0.0516	0.307	0.0676	0.0421	0.0426	0.118	0.288	0.0794	0.0351	0.0698	0.108	0.065	0.0353	0.0680	0.199	0.0833	0.0582	0.0326
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00084	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.00100	0.00109	0.00120	0.00120	0.000921	0.00141	0.00171	0.00235	0.00246	0.00559	0.00112	0.00106	0.000077	0.000894	0.000724	0.000707	0.000936	0.00212	0.000674	0.000554	0.000728
Calcium (Ca)-Total	24.6	24.6	29.7	29.7	26.6	33.4	49.2	55.7	32.8	29.6	24.7	51.2	15.4	20.6	20.2	19	22.3	24.2	20.5	22.0	36.8
Chromium (Cr)-Total	0.00109	0.00903	0.00133	0.00146	0.0112	0.00113	<0.00050	0.00058	0.00355	0.00941	0.00235	<0.00050	0.00171	0.0084	0.00366	0.0009	0.00268	0.0119	0.00294	0.00204	<0.00050
Cobalt (Co)-Total	0.00192	0.00530	0.00225	0.00226	0.00794	0.00256	0.00246	0.00238	0.00520	0.0139	0.00242	0.00131	0.00114	0.00446	0.00217	0.00145	0.00249	0.00838	0.00210	0.00150	0.0007
Copper (Cu)-Total	0.0881	0.0794	0.107	0.107	0.0852	0.138	0.153	0.19	0.303	0.432	0.0845	0.0444	0.00901	0.0661	0.0883	0.0978	0.122	0.174	0.0747	0.0421	0.071
Iron (Fe)-Total	3.14	12.6	3.53	3.84	20.0	4.25	3.31	4.68	9.00	32.2	4.99	0.768	2.39	9.5	4.51	2.86	4.49	18.4	4.24	3.17	1.53
Lead (Pb)-Total	0.00288	0.00966	0.00299	0.00305	0.0117	0.00338	0.00239	0.00365	0.00656	0.0193	0.00331	0.000485	0.00257	0.00678	0.00275	0.00213	0.00339	0.0102	0.00385	0.00195	0.00122
Lithium (Li)-Total	<0.0050	0.0054	<0.0050	<0.0050	0.0080	<0.0050	<0.0050	<0.0050	<0.0050	0.0073	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0063	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	2.45	6.24	3.05	3.09	6.93	3.25	4.09	4.83	3.94	6.35	2.97	4.29	1.93	4.29	3.31	2.49	3.30	5.78	3.25	3.03	3.94
Manganese (Mn)-Total	0.161	0.370	0.183	0.182	0.565	0.232	0.239	0.264	0.334	0.612	0.177	0.153	0.0874	0.214	0.117	0.0805	0.151	0.407	0.154	0.105	0.0842
Mercury (Hg)-Total	0.000012	0.000027	0.000013	<0.000010	0.000044	<0.000010	<0.000010	<0.000010	<0.000010	0.000030	0.000012	<0.000010	0.000017	0.00004	0.000012	<0.000010	<0.000010	0.000023	0.000016	0.000012	<0.000010
Molybdenum (Mo)-Total	0.00119	0.00225	0.00173	0.00176	0.00249	0.00207	0.0023	0.00274	0.00234	0.00636	0.00160	0.00195	0.000850	0.00146	0.00145	0.00101	0.00131	0.00291	0.00132	0.00128	0.00153
Nickel (Ni)-Total	0.00219	0.00708	0.00234	0.00229	0.00856	0.00253	0.00228	0.0021	0.00414	0.00957	0.00246	0.00133	0.00130	0.00919	0.00348	0.00221	0.00283	0.0117	0.00243	0.00213	0.00079
Phosphorus (P)-Total	<0.30	0.49	<0.30	<0.30	0.78	<0.30	<0.30	<0.30	<0.30	1.41	<0.30	<0.30	<0.30	0.39	<0.30	<0.30	<0.30	0.78	<0.30	<0.30	<0.30

Table A2-1. 2007-2008: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	lake	stream	stream	stream	stream	stream	stream	stream	stream
QAQC			Replicate	Replicate						Replicate											Replicate
Sample ID	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC3	SC3	SC3	SC3	SUL	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1
Date Sampled	10-Sep-08	17-Sep-08	25-Sep-08	25-Sep-08	2-Oct-08	9-Oct-08	29-Oct-08	6-Dec-08	26-Jun-08	3-Jul-08	10-Sep-08	5-Dec-08	10-Sep-08	28-May-08	5-Jun-08	11-Jun-08	26-Jun-08	3-Jul-08	25-Jul-08	10-Sep-08	6-Dec-08
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L683687-2	L686098-8	L688714-7	L688714-8	L691752-11	L694973-7	L703445-7	L717413-15	L650936-23	L652071-10	L683687-3	L717413-19	L683687-12	L635965-3	L639617-1	L642688-10	L650936-22	L652071-1	L662220-2	L683687-8	L717413-13
Total Metals *(cont'd)*																					
Potassium (K)-Total	1.16	3.45	1.46	1.48	4.69	1.64	1.45	1.55	1.99	3.91	1.63	1.31	0.997	1.78	1.25	0.684	1.22	3.18	1.25	1.23	0.879
Selenium (Se)-Total	0.00088	0.00107	0.00118	0.00108	0.00124	0.00124	0.00188	0.00269	0.00161	0.00367	0.00089	0.00255	0.00020	0.00072	0.00081	0.0007	0.00095	0.00191	0.00078	0.00066	0.0014
Silicon (Si)-Total	3.10	16.9	4.29	4.39	24.7	5.20	2.86	3.12	8.40	19.0	5.89	2.73	4.23	10.9	6.28	3.2	5.72	15.8	6.08	4.74	2.49
Silver (Ag)-Total	0.000126	0.000236	0.000035	0.000038	0.000243	0.000050	0.000013	0.000011	0.000094	0.000296	0.000174	<0.000010	0.000131	0.000116	0.000053	0.000031	0.000061	0.000207	0.000047	0.000111	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.3	<2.0	<2.0	<2.0	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2
Strontium (Sr)-Total	0.132	0.134	0.149	0.148	0.144	0.176	0.233	0.3	0.181	0.153	0.131	0.262	0.0798	0.127	0.141	0.12	0.148	0.141	0.149	0.135	0.223
Thallium (Tl)-Total	<0.00010	0.00012	<0.00010	<0.00010	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	0.00021	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.00010	0.00019	<0.00010	0.00020	0.00018	<0.00010	<0.00010	<0.00010	0.00018	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00017	0.00012	<0.00010	<0.00010
Titanium (Ti)-Total	0.063	0.545	0.064	0.068	0.695	0.070	0.02	0.016	0.213	0.643	0.158	<0.010	0.058	0.243	0.105	0.044	0.119	0.430	0.130	0.098	<0.010
Uranium (U)-Total	0.000244	0.000614	0.000300	0.000294	0.000634	0.000374	0.000426	0.000596	0.000494	0.000832	0.000283	0.000293	0.000073	0.000208	0.000199	0.000182	0.000215	0.000446	0.000170	0.000153	0.000223
Vanadium (V)-Total	0.0042	0.0309	0.0051	0.0054	0.0440	0.0055	0.002	0.0018	0.0127	0.0426	0.0092	<0.0010	0.0073	0.0207	0.0103	0.0037	0.0083	0.0382	0.0098	0.0070	<0.0010
Zinc (Zn)-Total	0.0662	0.0930	0.0810	0.0817	0.0924	0.0881	0.112	0.167	0.162	0.395	0.0735	0.0672	0.0110	0.0755	0.0542	0.0472	0.0657	0.166	0.0512	0.0386	0.0538
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0232	0.0282	0.0398	0.0390	0.0815	0.0332	0.0608	0.0318	0.0438	0.215	0.0366	0.0463	0.0513	0.073	0.0607	0.0495	0.0558	0.0057	0.0351	0.0453	0.0347
Antimony (Sb)-Dissolved	0.00042	0.00044	0.00047	0.00047	0.00078	0.00055	0.00055	0.00061	0.00040	<0.00010	0.00037	0.00047	0.00076	0.00136	0.00141	0.00111	0.00107	0.00063	0.00132	0.00196	0.00189
Arsenic (As)-Dissolved	0.00010	<0.00010	<0.00010	<0.00010	0.00033	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00049	0.00045	0.00015	<0.00010	0.00010	<0.00010	<0.00010	0.00012	<0.00010
Barium (Ba)-Dissolved	0.0293	0.0323	0.0298	0.0297	0.0463	0.0347	0.0334	0.0349	0.0351	0.0456	0.0294	0.0332	0.0259	0.0218	0.0202	0.0182	0.0281	0.0281	0.0244	0.0270	0.0302
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000577	0.000208	0.000698	0.000707	0.000028	0.000750	0.00095	0.00108	0.000906	0.00483	0.000481	0.000724	0.000017	0.000117	0.000276	0.000364	0.000331	0.000636	0.000281	0.000282	0.000388
Calcium (Ca)-Dissolved	23.8	18.8	27.9	28.1	22.0	31.3	47	56.2	29.3	24.1	23.9	51	15.1	17.7	18.6	17.8	20.9	18.4	17.8	21.7	37
Chromium (Cr)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Dissolved	0.00091	0.00032	0.00120	0.00116	<0.00010	0.00135	0.002	0.00183	0.00222	0.00761	0.00076	0.00113	<0.00010	0.00019	0.00077	0.00083	0.00070	0.00152	0.00054	0.00040	0.00053
Copper (Cu)-Dissolved	0.00446	0.00041	0.00201	0.00197	0.00030	0.00204	0.0083	0.00422	0.00208	0.257	0.00151	0.00393	0.00028	0.00266	0.00331	0.00317	0.00152	0.00093	0.00133	0.00125	0.00355
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.09	<0.030	<0.030	1.84	<0.030	<0.030	<0.030	0.049	0.036	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000065	<0.000050	<0.000050	0.000143	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	1.96	1.41	2.28	2.31	1.30	2.55	3.74	4.74	2.37	1.67	1.80	4.11	1.13	1.86	2.21	2.12	2.33	1.61	1.94	2.30	3.83
Manganese (Mn)-Dissolved	0.108	0.0395	0.129	0.126	0.00169	0.169	0.213	0.231	0.209	0.308	0.0953	0.143	0.000808	0.0239	0.0528	0.057	0.0800	0.0959	0.0610	0.0512	0.0752
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013
Molybdenum (Mo)-Dissolved	0.00127	0.00114	0.00147	0.00147	0.00155	0.00164	0.00198	0.00229	0.00144	<0.000050	0.00132	0.00205	0.000749	0.000909	0.000957	0.000776	0.00101	0.00115	0.000873	0.00114	0.00152
Nickel (Ni)-Dissolved	0.00104	<0.00050	0.00113	0.00109	<0.00050	0.00095	0.0019	0.00166	0.00106	0.00242	0.00068	0.00123	<0.00050	<0.00050	0.00068	<0.00050	<0.00050	0.00076	0.00069	0.00054	0.00078
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.809	0.950	0.888	0.863	1.32	0.975	1.3	1.52	0.946	0.845	0.853	1.28	0.171	0.568	0.543	0.426	0.604	0.658	0.527	0.675	0.863
Selenium (Se)-Dissolved	0.00081	0.00056	0.00095	0.00094	0.00076	0.00122	0.00184	0.00201	0.00098	0.00071	0.00078	0.00198	0.00010	0.00075	0.00088	0.00049	0.00065	0.00050	0.00042	0.00063	0.00124
Silicon (Si)-Dissolved	1.04	0.750	1.14	1.15	0.773	1.36	1.97	2.2	1.25	1.11	1.05	2.44	0.561	1.37	1.36	1.37	1.22	0.849	0.971	1.09	2.1
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.3	<2.0	<2.0	<2.0	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2
Strontium (Sr)-Dissolved	0.128	0.0996	0.141	0.140	0.104	0.167	0.227	0.298	0.161	0.110	0.124	0.259	0.0794	0.107	0.132	0.114	0.139	0.101	0.123	0.133	0.222
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000048	0.000022	0.000080	0.000084	0.000060	0.000099	0.000238	0.000299	0.000034	0.000066	0.000062	0.000276	0.000018	0.000044	0.000056	0.000051	0.000052	<0.000010	0.000035	0.000069	0.00016
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0193	0.0036	0.0242	0.0241	<0.0020	0.0216	0.0395	0.0432	0.0225	0.322	0.0109	0.032	<0.0010	0.0025	0.0084	0.0122	0.0057	0.0223	0.0078	0.0071	0.0162

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-1. 2007-2008: Brucejack, Sulphurets, and Unuk River Watersheds

Year	**2008**	**2008**	**2008**	**2008**	**2008**	**2008**	**2008**
Station Type	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**
QAQC	**Replicate**						
Sample ID	**UR1**	**UR1A**	**UR1A**	**UR1A**	**UR2**	**UR2**	**UR2**
Date Sampled	**6-Dec-08**	**26-Jun-08**	**10-Sep-08**	**6-Dec-08**	**26-Jun-08**	**10-Sep-08**	**6-Dec-08**
Included/Excluded	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L717413-14**	**L650936-21**	**L683687-9**	**L717413-10**	**L650936-24**	**L683687-10**	**L717413-9**
Physical Tests							
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	244	96.9	124	165	117	115	179
Hardness (as $CaCO_3$)	108	44.0	58.8	77.9	50.4	51.2	78
pH	8.09	7.79	7.88	8.04	7.74	7.73	8.04
Total Suspended Solids	9	17.9	18.7	<3.0	38.9	38.2	3
Total Dissolved Solids	146	57	84	106	75	74	97
Turbidity (NTU)	14	24.3	29.5	1.38	36.5	40.4	2.49
Anions and Nutrients							
Acidity (as $CaCO_3$)	<1.0	1.5	1.5	<1.0	1.6	1.6	<1.0
Alkalinity, Bicarbonate (as $CaCO_3$)	70.2	35.1	41.8	63.3	32.3	34.5	64.1
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	70.2	35.1	41.8	63.3	32.3	34.5	64.1
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.066	0.020	0.026	0.03	0.044	0.045	0.045
Nitrate (as N)	0.108	0.0295	0.0259	0.0915	0.0672	0.0389	0.157
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.073	<0.050	<0.050	0.069	<0.050	<0.050	0.113
Total Nitrogen	0.18	0.06	<0.05	0.16	0.11	<0.05	0.27
Orthophosphate-Dissolved (as P)	<0.0010	-	0.0010	0.0014	-	<0.0010	0.001
Phosphorus (P)-Total	0.0136	0.0415	0.0401	0.0036	0.0791	0.0499	0.0059
Sulfate (SO_4)	56.9	12.1	18.3	27.2	21.4	21.0	31.7
Cyanides							
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-
Organic / Inorganic Carbon							
Total Organic Carbon	0.55	0.69	<0.50	0.63	0.51	<0.50	0.64
Total Metals							
Aluminum (Al)-Total	0.328	0.979	1.33	0.041	1.51	1.51	0.0895
Antimony (Sb)-Total	0.00202	0.00158	0.00407	0.00334	0.00072	0.00089	0.00073
Arsenic (As)-Total	0.00146	0.00151	0.00168	0.00041	0.00204	0.00124	0.00054
Barium (Ba)-Total	0.0326	0.0341	0.0409	0.0275	0.0473	0.0469	0.0316
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000731	0.000047	0.000055	0.000044	0.000373	0.000208	0.000165
Calcium (Ca)-Total	36.7	15.4	19.0	24.8	19.2	18.6	28.4
Chromium (Cr)-Total	<0.00050	0.00191	0.00198	<0.00050	0.00201	0.00190	<0.00050
Cobalt (Co)-Total	0.0007	0.00067	0.00076	<0.00010	0.00131	0.00094	0.00017
Copper (Cu)-Total	0.0712	0.00325	0.00346	0.00048	0.0485	0.0165	0.0119
Iron (Fe)-Total	1.53	1.30	1.70	0.109	2.39	1.99	0.276
Lead (Pb)-Total	0.00122	0.00125	0.00101	0.0002	0.00179	0.00158	0.000231
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	3.96	2.81	3.53	3.75	2.39	2.13	2.27
Manganese (Mn)-Total	0.0838	0.0363	0.0421	0.0107	0.0757	0.0597	0.0274
Mercury (Hg)-Total	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	0.000016	<0.000010
Molybdenum (Mo)-Total	0.00158	0.000647	0.000957	0.00089	0.00161	0.00162	0.00222
Nickel (Ni)-Total	0.00085	0.00188	0.00241	<0.00050	0.00210	0.00166	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-1. 2007-2008: Brucejack, Sulphurets, and Unuk River Watersheds

Year	**2008**	**2008**	**2008**	**2008**	**2008**	**2008**	**2008**
Station Type	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**
QAQC	**Replicate**						
Sample ID	**UR1**	**UR1A**	**UR1A**	**UR1A**	**UR2**	**UR2**	**UR2**
Date Sampled	**6-Dec-08**	**26-Jun-08**	**10-Sep-08**	**6-Dec-08**	**26-Jun-08**	**10-Sep-08**	**6-Dec-08**
Included/Excluded	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L717413-14**	**L650936-21**	**L683687-9**	**L717413-10**	**L650936-24**	**L683687-10**	**L717413-9**
Total Metals *(cont'd)*							
Potassium (K)-Total	0.878	0.632	0.744	0.443	1.08	1.13	0.973
Selenium (Se)-Total	0.00123	0.00045	0.00056	0.00071	0.00057	0.00044	0.00085
Silicon (Si)-Total	2.49	3.20	3.45	2.06	4.47	3.88	2.68
Silver (Ag)-Total	<0.000010	0.000020	0.000079	<0.000010	0.000028	0.000088	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	2	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.223	0.126	0.150	0.192	0.114	0.101	0.144
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	0.00027	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	0.041	0.050	<0.010	0.093	0.087	<0.010
Uranium (U)-Total	0.00023	0.000030	0.000052	0.000035	0.000245	0.000261	0.000278
Vanadium (V)-Total	<0.0010	0.0046	0.0057	<0.0010	0.0053	0.0050	<0.0010
Zinc (Zn)-Total	0.0539	<0.0070	0.0061	0.0032	0.0280	0.0158	0.0107
Dissolved Metals							
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0497	0.0472	0.0306	<0.0070	0.0625	0.0531	0.0308
Antimony (Sb)-Dissolved	0.0019	0.00150	0.00420	0.0033	0.00060	0.00084	0.00072
Arsenic (As)-Dissolved	0.00015	0.00035	0.00039	0.00028	0.00015	0.00016	0.0002
Barium (Ba)-Dissolved	0.0302	0.0187	0.0225	0.0276	0.0249	0.0246	0.03
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000403	<0.000017	0.000018	0.000034	0.000148	0.000108	0.000134
Calcium (Ca)-Dissolved	37	14.0	18.6	25	17.5	18.1	27.7
Chromium (Cr)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Dissolved	0.00053	<0.00010	<0.00010	<0.00010	0.00023	0.00013	0.00013
Copper (Cu)-Dissolved	0.00651	<0.00060	<0.00040	0.00035	0.00169	<0.0012	0.00275
Iron (Fe)-Dissolved	0.065	0.041	<0.030	<0.030	<0.030	0.030	<0.030
Lead (Pb)-Dissolved	0.000054	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	3.85	2.21	2.97	3.77	1.61	1.49	2.15
Manganese (Mn)-Dissolved	0.0752	0.00513	0.00415	0.00803	0.0331	0.0207	0.0241
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00159	0.000654	0.000947	0.00098	0.00158	0.00174	0.00233
Nickel (Ni)-Dissolved	0.0008	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.863	0.331	0.419	0.444	0.646	0.768	0.965
Selenium (Se)-Dissolved	0.00111	0.00039	0.00053	0.00058	0.00045	0.00039	0.00076
Silicon (Si)-Dissolved	2.07	1.25	1.09	1.97	1.58	1.37	2.51
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.223	0.122	0.146	0.194	0.106	0.0968	0.141
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.00016	0.000016	0.000031	0.000038	0.000132	0.000165	0.000259
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0178	<0.0010	<0.0010	0.0026	0.0030	0.0028	0.0066

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-2. 2009: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009
Station Type	Effluent	Lake	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC							Replicate			Replicate	Replicate					Replicate	Replicate				
Sample ID	ADIT	BJ	BJ OF	BJ U/S	BJ U/S	Camp Creek	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2	SC2
Date Sampled	12-Oct-09	12-Oct-09	12-Oct-09	12-Oct-09	12-Oct-09	12-Oct-09	27-May-09	27-May-09	2-Jul-09	4-Aug-09	4-Aug-09	22-Aug-09	27-Sep-09	31-Oct-09	1-Dec-09	4-Mar-09	4-Mar-09	28-Mar-09	28-Apr-09	27-May-09	8-Jun-09
Included/Excluded	Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L829659-2	L829659-6	L829659-1	L829659-4	L829659-5	L829659-3	L771080-1	L771080-2	L787346-23	L801967-8	L801967-9	L809879-16	L824535-10	L837185-10	L845898-4	L740333-5	L740333-6	L748538-9	L759011-2	L771080-7	L776835-8
Physical Tests																					
Colour, True	-	-	-	-	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	-	-	-	-	-	-	330	331	141	68.3	66.5	63.2	108	229	303	419	418	442	437	299	195
Hardness (as $CaCO_3$)	164	22.1	40.4	22.6	22.5	51.9	170	166	65.5	31	29.8	27.8	46	93.4	142	193	197	202	224	135	85.7
pH	7.91	7.44	7.87	7.65	7.54	7.76	7.76	7.86	7.89	8.08	7.93	7.99	7.8	7.94	7.93	7.98	7.97	7.98	7.8	7.46	7.34
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	11	8.5	12	110	115	88.3	20.5	<3.0	<3.0	5.5	6	9.3	28.3	153	323
Total Dissolved Solids	220	21	50	23	22	66	227	225	88	42	40	47	85	147	196	293	291	225	298	181	122
Turbidity (NTU)	-	-	-	-	-	-	10.5	10	26.7	137	132	113	97.6	3.62	0.85	12.6	11.7	13	27.8	129	223
Anions and Nutrients																					
Acidity (as $CaCO_3$)	-	-	-	-	-	-	3.8	3.5	2.8	<1.0	1.1	<1.0	2	1.2	2.4	3.9	3.6	2.9	5.7	4.8	3.2
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	63.2	73.8	36.2	26	25.3	21.6	24.8	44.1	59.0	95	94.4	99	89.2	35.9	22.4
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	-	-	-	-	-	-	63.2	73.8	36.2	26	25.3	21.6	24.8	44.1	59.0	95	94.4	99	89.2	35.9	22.4
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.150	<0.020	0.023	<0.020	<0.020	<0.020	0.077	0.077	0.027	<0.020	<0.020	<0.020	0.023	0.032	0.061	0.164	0.162	0.142	0.146	0.202	0.105
Nitrate (as N)	0.0293	<0.0050	<0.0050	<0.0050	<0.0050	0.0199	0.0574	0.0473	0.0116	0.011	0.012	0.0089	0.0136	0.0449	0.0628	0.0857	0.0836	0.0756	0.253	0.192	0.0812
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	-	-	-	-	-	-	<0.050	<0.050	<0.050	0.075	0.056	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.069
Total Nitrogen	-	-	-	-	-	-	0.05	0.07	<0.050	0.086	0.068	<0.050	<0.050	<0.050	0.110	0.07	0.09	0.09	0.3	0.237	0.15
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.0012	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	0.0085	<0.0010	0.0106	<0.0010
Phosphorus (P)-Total	-	-	-	-	-	-	0.0148	0.0136	0.0112	0.105	0.112	0.078	0.036	0.0025	<0.0020	0.0341	0.035	0.0413	0.0803	0.838	0.399
Sulfate (SO_4)	98.8	8.31	20.8	8.72	8.75	29.8	110	110	33.3	10.1	10.1	11.5	25.5	64.3	93.7	134	134	132	136	111	64.7
Cyanides																					
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0018
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	<0.50	0.56	0.97	1.27
Total Metals																					
Aluminum (Al)-Total	0.0324	0.0275	0.0700	0.0189	0.0222	0.0503	0.139	0.13	1.33	4.78	4.83	4.11	2.85	0.106	0.0434	0.365	0.371	0.432	0.876	4.56	9.02
Antimony (Sb)-Total	0.00140	0.00025	0.00063	0.00025	0.00024	0.00013	0.00112	0.00105	0.00127	0.002	0.00204	0.00199	0.00184	0.00107	0.00112	0.00062	0.00063	0.0006	0.00073	0.00122	0.00136
Arsenic (As)-Total	0.00570	0.00086	0.00627	0.00079	0.00078	0.00051	0.001	0.00078	0.00235	0.00773	0.00778	0.00599	0.00615	0.00061	0.00034	0.00243	0.00246	0.00292	0.00359	0.0576	0.0272
Barium (Ba)-Total	0.0124	0.0363	0.0310	0.0360	0.0349	0.0550	0.0356	0.0347	0.0625	0.128	0.132	0.12	0.0904	0.0349	0.0382	0.0377	0.0382	0.0397	0.0418	0.112	0.197
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00064	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	0.024	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000122	<0.000010	0.000078	<0.000010	<0.000010	<0.000010	0.000143	0.000136	0.000065	0.000138	0.000133	0.000122	0.000104	0.000065	0.000079	0.0019	0.00195	0.00172	0.00147	0.00576	0.00304
Calcium (Ca)-Total	57.9	9.04	15.0	9.18	8.68	20.3	54.5	55.9	26	11.6	11.9	10.8	18.3	37.0	49.6	68.6	67.2	72.9	92.5	58.4	34.3
Chromium (Cr)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00089	0.00315	0.00317	0.00247	0.00241	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00082	0.00654	0.00669
Cobalt (Co)-Total	0.00024	<0.00010	0.00031	<0.00010	<0.00010	<0.00010	0.00125	0.00118	0.00075	0.00227	0.00229	0.00185	0.00171	0.00049	0.00061	0.00184	0.00186	0.00165	0.00328	0.00948	0.00818
Copper (Cu)-Total	0.00117	0.00017	0.00182	0.00037	0.00011	0.00023	0.0196	0.018	0.00776	0.0196	0.0201	0.0158	0.022	0.00683	0.0130	0.0849	0.0864	0.0803	0.127	0.315	0.293
Iron (Fe)-Total	0.172	<0.030	0.380	<0.030	<0.030	0.071	0.248	0.189	1.08	5.2	5.12	4.75	3.59	0.147	0.061	1.97	2	1.85	3.75	15.6	17.8
Lead (Pb)-Total	0.00289	<0.000050	0.00329	<0.000050	<0.000050	0.000053	0.000386	0.000288	0.0011	0.00554	0.00558	0.00461	0.00397	0.000194	<0.000050	0.00144	0.00145	0.00139	0.00233	0.00708	0.0118
Lithium (Li)-Total	0.0234	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	5.30	0.299	0.894	0.304	0.295	0.969	4.34	4.15	2.8	2.49	2.46	2.17	2.35	2.66	3.96	5.55	5.71	6.29	6.55	6.41	5.23
Manganese (Mn)-Total	0.123	0.00411	0.102	0.00515	0.00400	0.00869	0.188	0.176	0.0833	0.183	0.186	0.151	0.125	0.0615	0.0785	0.272	0.281	0.25	0.28	0.425	0.571
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000017	0.000016	0.000022	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001
Molybdenum (Mo)-Total	0.00122	0.000380	0.000483	0.000383	0.000368	0.00142	0.00139	0.00134	0.00118	0.000703	0.000698	0.000767	0.001	0.00132	0.00125	0.00247	0.0026	0.00259	0.00266	0.00416	0.00369
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00127	0.00131	0.00076	0.00222	0.00233	0.00182	<0.0020	0.00068	0.00071	0.00147	0.00159	0.00151	0.00292	0.00729	0.00753
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.94	0.79

Table A2-2. 2009: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009
Station Type	Effluent	Lake	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC							Replicate			Replicate	Replicate					Replicate	Replicate				
Sample ID	ADIT	BJ	BJ OF	BJ U/S	BJ U/S	Camp Creek	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2	SC2
Date Sampled	12-Oct-09	12-Oct-09	12-Oct-09	12-Oct-09	12-Oct-09	12-Oct-09	27-May-09	27-May-09	2-Jul-09	4-Aug-09	4-Aug-09	22-Aug-09	27-Sep-09	31-Oct-09	1-Dec-09	4-Mar-09	4-Mar-09	28-Mar-09	28-Apr-09	27-May-09	8-Jun-09
Included/Excluded	Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L829659-2	L829659-6	L829659-1	L829659-4	L829659-5	L829659-3	L771080-1	L771080-2	L787346-23	L801967-8	L801967-9	L809879-16	L824535-10	L837185-10	L845898-4	L740333-5	L740333-6	L748538-9	L759011-2	L771080-7	L776835-8
Total Metals *(cont'd)*																					
Potassium (K)-Total	1.74	0.097	0.279	0.104	0.095	0.149	0.568	0.539	0.738	1.84	1.89	1.59	1.27	0.342	0.371	1.78	1.78	1.84	1.93	2.08	2.78
Selenium (Se)-Total	<0.00010	0.00013	0.00012	0.00011	<0.00010	<0.00010	0.00055	0.00057	<0.00010	0.00013	0.00022	0.0001	0.00035	0.00054	0.00070	0.00269	0.00258	0.00236	0.00305	0.00385	0.00221
Silicon (Si)-Total	2.91	0.555	0.869	0.555	0.559	0.505	1.91	1.81	2.95	7.31	7.35	8.07	6.01	1.32	1.68	2.88	2.89	2.91	3.31	7.59	14.1
Silver (Ag)-Total	0.000027	<0.000010	0.000105	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000026	0.000103	0.000089	0.000077	<0.000080	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000022	0.000105	0.000187
Sodium (Na)-Total	8.7	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.5	3.5	4	2.8	<2.0	<2.0
Strontium (Sr)-Total	1.15	0.0565	0.184	0.0582	0.0561	0.184	0.265	0.254	0.167	0.0614	0.0628	0.0595	0.097	0.195	0.284	0.368	0.385	0.369	0.332	0.262	0.206
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.029	0.114	0.111	0.111	0.08	<0.010	<0.010	<0.010	<0.010	<0.010	0.031	0.2	0.401
Uranium (U)-Total	0.000227	0.000037	0.000069	0.000037	0.000036	0.000054	0.000084	0.000085	0.000071	0.000122	0.000099	0.00011	0.000087	0.000056	0.000069	0.000531	0.000528	0.00057	0.000631	0.000675	0.000647
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0032	0.0149	0.0147	0.0124	0.0096	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.003	0.0155	0.0309
Zinc (Zn)-Total	0.0213	0.0016	0.0103	0.0011	0.0014	0.0016	0.013	0.0124	0.0071	0.0242	0.025	0.0204	0.0179	0.0044	0.0074	0.124	0.126	0.117	0.104	0.383	0.23
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0166	0.0049	0.0112	0.0041	0.0038	0.0070	0.027	0.0297	0.0545	0.417	0.0724	0.11	0.0617	0.0191	0.0260	0.0389	0.0384	0.0358	0.0503	0.011	0.005
Antimony (Sb)-Dissolved	0.00121	0.00025	0.00039	0.00024	0.00025	0.00013	0.00106	0.00105	0.0009	0.00066	0.00058	0.00063	0.00074	0.00102	0.00112	0.00054	0.00055	0.00048	0.00054	0.0004	0.00034
Arsenic (As)-Dissolved	0.00224	0.00075	0.00060	0.00069	0.00068	<0.00030	0.00021	0.00025	0.0006	0.00096	0.00058	0.00063	0.00047	0.00029	0.00021	<0.00010	<0.00010	0.00012	<0.00010	0.00018	<0.00010
Barium (Ba)-Dissolved	0.0123	0.0348	0.0294	0.0343	0.0338	0.0525	0.0336	0.0345	0.0304	0.0329	0.0237	0.0232	0.0256	0.0321	0.0383	0.0362	0.0374	0.0352	0.0336	0.035	0.042
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	0.025	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000102	<0.000010	0.000026	<0.000010	<0.000010	<0.000010	0.000133	0.000143	0.000033	0.000016	0.00001	<0.000010	0.00002	0.000057	0.000078	0.00122	0.00129	0.00104	0.000673	0.00296	0.0017
Calcium (Ca)-Dissolved	57.2	8.41	14.7	8.56	8.52	19.2	60.3	58.4	22.8	11.2	10.8	10.1	16.5	33.5	50.0	68.1	69.7	70.8	80.5	47.6	29.8
Chromium (Cr)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Dissolved	0.00016	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00109	0.00114	0.00013	0.00014	<0.00010	<0.00010	<0.00010	0.00035	0.00060	0.00171	0.00174	0.00147	0.0017	0.00551	0.00357
Copper (Cu)-Dissolved	<0.00060	<0.00010	<0.00020	<0.00010	<0.00010	<0.00020	0.00649	0.00682	0.00036	0.00159	0.00108	0.00032	0.0005	0.00213	0.00767	0.00385	0.00397	0.00371	0.0044	0.00439	0.00293
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.291	<0.030	0.035	0.031	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	0.000217	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000379	0.000079	0.000056	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.0239	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	5.27	0.279	0.886	0.286	0.285	0.933	4.63	4.93	2.11	0.769	0.663	0.666	1.13	2.38	4.03	5.57	5.69	6.1	5.71	4	2.74
Manganese (Mn)-Dissolved	0.0931	0.000060	0.0134	0.000228	0.000245	0.00422	0.182	0.187	0.0336	0.011	0.00141	0.000893	0.0115	0.0482	0.0779	0.272	0.274	0.237	0.182	0.27	0.249
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00132	0.000378	0.000472	0.000426	0.000350	0.00138	0.00149	0.00152	0.001	0.000492	0.000483	0.000554	0.000761	0.00120	0.00136	0.0024	0.00244	0.00231	0.00204	0.00202	0.00143
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00129	0.00153	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00086	0.00169	0.00168	0.00127	0.00171	0.0027	0.00169
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	1.72	0.088	0.271	0.095	0.082	0.133	0.59	0.625	0.273	0.286	0.16	0.143	0.202	0.270	0.377	1.78	1.82	1.75	1.63	1.14	1.05
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00061	0.00057	0.00028	<0.00010	<0.00010	0.00013	0.00028	0.00054	0.00066	0.00223	0.00232	0.00207	0.00304	0.00207	0.00118
Silicon (Si)-Dissolved	2.93	0.528	0.843	0.533	0.527	0.425	1.68	1.65	0.935	0.998	0.383	0.437	0.669	1.22	1.59	2.52	2.53	2.42	2.39	1.83	1.24
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	8.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.5	3.6	4	2.5	<2.0	<2.0
Strontium (Sr)-Dissolved	1.14	0.0514	0.179	0.0541	0.0528	0.175	0.271	0.278	0.148	0.0572	0.0556	0.0528	0.084	0.180	0.284	0.375	0.386	0.352	0.313	0.237	0.182
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000205	0.000034	0.000041	0.000033	0.000030	0.000045	0.000084	0.000084	0.000045	0.000022	0.000016	0.000018	0.00003	0.000050	0.000065	0.000418	0.000427	0.000444	0.000437	0.000029	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0147	<0.0010	0.0030	<0.0010	<0.0010	<0.0010	0.0095	0.0097	<0.0010	<0.0030	<0.0020	<0.0010	<0.0010	0.0028	0.0067	0.0478	0.0513	0.0465	0.0186	0.15	0.0832

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-2. 2009: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	lake	stream	stream	stream	stream
QAQC		Replicate									Replicate	Replicate									
Sample ID	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC3	SC3	SC3	SC3	SC3	SC3	SUL	UR1	UR1	UR1	UR1
Date Sampled	13-Jun-09	19-Jun-09	19-Jun-09	5-Jul-09	4-Aug-09	22-Aug-09	13-Sep-09	27-Sep-09	31-Oct-09	26-Nov-09	29-Mar-09	29-Mar-09	28-Apr-09	2-Jul-09	22-Aug-09	26-Nov-09	16-Aug-09	29-Mar-09	2-Jul-09	22-Aug-09	26-Nov-09
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L778602-7	L781603-3	L781603-4	L788462-4	L801967-3	L809879-17	L817873-8	L824535-11	L837185-11	L844495-22	L749298-6	L749298-7	L759011-3	L787346-24	L809879-18	L844495-23	L807858-2	L749298-3	L787346-4	L809879-3	L844495-4
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	197	184	187	159	98.5	107	105	200	313	354	417	417	446	199	106	322	76.1	330	129	105	238
Hardness (as $CaCO_3$)	81.7	76.3	79.2	65.8	43.6	44.4	43.6	83.2	135	176	194	188	221	92.2	45.8	160	34.3	152	60.6	48.7	116
pH	7.24	7.01	7.32	7.73	7.83	7.81	7.96	7.98	7.97	7.97	8.1	8.12	7.85	7.78	7.88	8.03	7.8	8.04	7.84	7.85	8.02
Total Suspended Solids	235	173	172	230	280	203	282	86.5	24.5	13.9	7.5	5	<3.0	61	179	42.4	27.7	5	20.5	153	6.4
Total Dissolved Solids	125	116	113	98	53	63	63	121	207	235	276	277	306	120	63	218	49	205	73	63	151
Turbidity (NTU)	165	138	132	167	207	131	215	92.1	39.1	20.5	7.58	8.63	0.43	60.2	126	23.4	46.8	4.37	28	129	8.05
Anions and Nutrients																					
Acidity (as $CaCO_3$)	2.8	3.2	2.8	3.8	1.4	1.5	1.8	2.3	1.5	1.6	3	2.9	5.1	3.2	1.3	1.4	<1.0	3.5	3.2	1.8	1.3
Alkalinity, Bicarbonate (as $CaCO_3$)	18	21.8	21.8	23.5	19.9	21.4	31.3	34.3	60.8	69.5	97.4	100	70.4	33.2	23.7	66.7	18.2	91.8	33	29.6	69.4
Alkalinity, Carbonate (as $CaCO_3$)	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	18	21.8	21.8	23.5	19.9	21.4	31.3	34.3	60.8	69.5	97.4	100	70.4	33.2	23.7	66.7	18.2	91.8	33	29.6	69.4
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	0.0073	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.141	0.116	0.103	0.085	0.032	0.037	0.046	0.097	0.112	0.158	0.123	0.121	0.081	0.107	0.036	0.129	<0.020	0.084	0.046	0.027	0.061
Nitrate (as N)	0.0664	0.0509	0.0507	0.0248	0.0111	0.0132	0.0125	0.0401	0.0960	0.0712	0.0988	0.0981	0.0133	0.0556	0.0159	0.100	0.0087	0.0901	0.0387	0.0146	0.0792
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	0.088	0.09	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	0.094	0.073	0.072	0.113	0.101	<0.050	<0.050	<0.050	0.060	0.090	0.1	0.08	<0.050	0.073	<0.050	0.150	<0.050	0.09	0.053	<0.050	0.110
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.404	0.273	0.269	0.286	0.306	0.161	0.273	0.103	0.047	0.039	0.0171	0.0205	<0.0020	0.089	0.149	0.081	<0.0020	0.01	0.0416	0.169	0.0145
Sulfate (SO_4)	68.8	61.6	61.3	48.7	22	26.9	23.5	58.1	96.0	114	122	121	153	62.8	25.3	97.6	15.8	80	28.6	20.1	62.3
Cyanides																					
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	0.62	<0.50	<0.50	0.65	0.53	<0.50	0.54	<0.50	0.62	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	<0.50	<0.50	0.67
Total Metals																					
Aluminum (Al)-Total	6.04	4.1	5	4.82	7.4	5.21	7.03	2.83	0.920	1.07	0.322	0.324	0.0393	2.55	4.83	1.00	1.46	0.175	1.17	4.08	0.702
Antimony (Sb)-Total	0.00121	0.00086	0.00096	0.00108	0.00141	0.00116	0.00153	0.00111	0.00068	0.00078	0.00055	0.00055	0.00105	0.00074	0.00111	0.00069	0.00111	0.00186	0.00107	0.00129	0.00191
Arsenic (As)-Total	0.0128	0.00736	0.00801	0.0103	0.00912	0.0057	0.009	0.00483	0.00192	0.00266	0.00254	0.00257	0.00017	0.00458	0.00543	0.00238	0.00273	0.00141	0.00198	0.00493	0.00194
Barium (Ba)-Total	0.139	0.0941	0.111	0.109	0.243	0.14	0.247	0.0921	0.0466	0.0493	0.0386	0.038	0.0392	0.0751	0.144	0.0537	0.0591	0.0383	0.0426	0.109	0.0412
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.00307	0.00242	0.0025	0.00248	0.000946	0.00081	0.000867	0.00131	0.00157	0.00245	0.00147	0.00148	0.000168	0.00221	0.000659	0.00183	0.000059	0.000699	0.000727	0.000455	0.000955
Calcium (Ca)-Total	31.6	30.1	30.7	26.6	18.9	18.3	19.1	31.9	51.0	65.2	68.6	68.9	80	36	17.5	60.8	12.6	52	21.8	19.1	40.7
Chromium (Cr)-Total	0.00497	0.00333	0.00391	0.00488	0.00515	0.00371	0.0055	0.00201	0.00070	<0.00050	<0.00050	<0.00050	<0.00050	0.00126	0.00364	0.00064	0.00088	0.00064	0.00122	0.00471	<0.00050
Cobalt (Co)-Total	0.00772	0.00571	0.00602	0.00568	0.00472	0.00305	0.00409	0.00336	0.00262	0.00270	0.00125	0.00127	0.00199	0.00384	0.00287	0.00225	0.00082	0.00057	0.00145	0.00257	0.00110
Copper (Cu)-Total	0.345	0.328	0.329	0.167	0.109	0.0705	0.0728	0.133	0.149	0.213	0.0554	0.0552	0.0404	0.343	0.0575	0.139	0.0105	0.0269	0.098	0.0398	0.102
Iron (Fe)-Total	13.6	8.39	9.64	10.3	10.7	6.83	9.91	5.63	3.63	4.24	1.34	1.33	0.064	5.52	6.97	3.11	1.56	0.699	2.15	5.36	2.55
Lead (Pb)-Total	0.00797	0.00656	0.00682	0.00654	0.00892	0.0052	0.00873	0.00454	0.00249	0.00313	0.000974	0.000971	<0.000050	0.00425	0.00496	0.00300	0.00217	0.000506	0.00171	0.00421	0.00180
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	4.5	3.53	3.9	3.88	4.06	3.36	3.89	3.38	4.11	5.83	6.18	6.31	5.76	4.04	3.06	5.33	1.38	5.88	3.28	3.13	4.72
Manganese (Mn)-Total	0.434	0.353	0.378	0.286	0.354	0.253	0.338	0.235	0.263	0.344	0.205	0.206	0.215	0.314	0.225	0.274	0.0838	0.0983	0.111	0.192	0.124
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	0.000014	0.000021	0.000011	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00291	0.00202	0.0022	0.00208	0.00172	0.00133	0.00183	0.00187	0.00233	0.00294	0.00228	0.00229	0.00173	0.0023	0.0014	0.00259	0.000637	0.00172	0.0012	0.00103	0.00176
Nickel (Ni)-Total	0.00583	0.00446	0.00509	0.00622	0.00491	0.00328	0.00441	<0.0035	0.00251	0.00286	0.00177	0.00171	0.00146	0.00309	0.00303	0.00249	0.00079	0.00109	0.0017	0.00394	0.00152
Phosphorus (P)-Total	0.49	<0.30	<0.30	0.41	0.41	<0.30	0.34	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-2. 2009: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	lake	stream	stream	stream	stream
QAQC		Replicate									Replicate	Replicate									
Sample ID	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC3	SC3	SC3	SC3	SC3	SC3	SUL	UR1	UR1	UR1	UR1
Date Sampled	13-Jun-09	19-Jun-09	19-Jun-09	5-Jul-09	4-Aug-09	22-Aug-09	13-Sep-09	27-Sep-09	31-Oct-09	26-Nov-09	29-Mar-09	29-Mar-09	28-Apr-09	2-Jul-09	22-Aug-09	26-Nov-09	16-Aug-09	29-Mar-09	2-Jul-09	22-Aug-09	26-Nov-09
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L778602-7	L781603-3	L781603-4	L788462-4	L801967-3	L809879-17	L817873-8	L824535-11	L837185-11	L844495-22	L749298-6	L749298-7	L759011-3	L787346-24	L809879-18	L844495-23	L807858-2	L749298-3	L787346-4	L809879-3	L844495-4
Total Metals *(cont'd)*																					
Potassium (K)-Total	2.54	1.84	2.03	2.13	2.4	2.08	2.76	1.69	1.44	1.65	1.68	1.68	0.635	1.28	1.89	1.57	0.661	1.21	0.727	1.67	0.970
Selenium (Se)-Total	0.00201	0.00146	0.00157	0.00144	0.00096	0.00071	0.00106	0.00149	0.00186	0.00237	0.00259	0.00255	0.00041	0.00151	0.00052	0.00196	<0.00010	0.00184	0.00078	0.00052	0.00106
Silicon (Si)-Total	10.6	7.21	8.8	8.98	11.6	9.44	16.6	6.72	3.39	2.99	2.67	2.68	1.98	4.28	9.61	3.14	3.37	2.35	2.89	8.77	2.78
Silver (Ag)-Total	0.000116	0.000077	0.000101	0.000119	0.00018	0.000121	0.000214	<0.000080	0.000019	0.000010	<0.000010	<0.000010	<0.000010	0.000041	0.000099	0.000017	0.000026	<0.000010	0.000018	0.000069	0.000012
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.6	3.5	3.4	<2.0	<2.0	<2.0	2.3	<2.0	3.1	<2.0	<2.0	2.2
Strontium (Sr)-Total	0.169	0.162	0.168	0.128	0.107	0.104	0.111	0.169	0.265	0.384	0.366	0.368	0.326	0.235	0.101	0.349	0.0726	0.316	0.187	0.115	0.274
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	0.00011	<0.00010	<0.00010	0.00012	0.00045	0.00011	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.29	0.144	0.211	0.277	0.396	0.237	0.391	0.132	0.040	0.016	<0.010	<0.010	<0.010	0.077	0.266	0.029	0.037	<0.010	0.037	0.177	0.021
Uranium (U)-Total	0.000764	0.00057	0.000698	0.000453	0.000358	0.000265	0.000504	0.000343	0.000429	0.000616	0.00048	0.000475	0.000093	0.000405	0.000243	0.000464	0.000045	0.000244	0.000146	0.000187	0.000268
Vanadium (V)-Total	0.0204	0.0129	0.0157	0.0192	0.0249	0.0149	0.0215	0.0089	0.0024	0.0018	<0.0010	<0.0010	<0.0010	0.0059	0.0154	0.0024	0.0042	<0.0010	0.0034	0.0152	0.0019
Zinc (Zn)-Total	0.204	0.159	0.165	0.184	0.0854	0.0701	0.0864	0.0919	0.104	0.166	0.101	0.0995	0.025	0.149	0.059	0.124	0.0083	0.0483	0.0496	0.0411	0.0729
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0072	0.0168	0.0177	0.0153	0.0553	0.0238	0.0727	0.0374	0.0323	0.0594	0.0505	0.0491	0.0231	0.0366	0.0304	0.0553	0.101	0.0415	0.0438	0.035	0.0523
Antimony (Sb)-Dissolved	0.00032	0.00035	0.00036	0.00039	0.00033	0.00036	0.00037	0.00045	0.00051	0.00057	0.00047	0.00046	0.00103	0.00041	0.00036	0.00049	0.00062	0.00175	0.0009	0.00083	0.00180
Arsenic (As)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	0.00019	0.00018	<0.00010	<0.00010	<0.00010	0.00012	0.00045	0.00019	<0.00010	0.00012	0.00013
Barium (Ba)-Dissolved	0.0349	0.0316	0.0312	0.0321	0.0367	0.0331	0.0423	0.0312	0.0320	0.0372	0.0354	0.0357	0.0395	0.0306	0.0364	0.0341	0.0242	0.0364	0.0214	0.0308	0.0318
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.00233	0.00172	0.00185	0.00139	0.000173	0.000226	0.000167	0.000715	0.000854	0.00104	0.000739	0.000752	0.000169	0.00105	0.000194	0.000771	0.000015	0.00045	0.000398	0.000093	0.000383
Calcium (Ca)-Dissolved	29.1	27.1	28.2	23.4	15.9	15.9	15.8	29.6	48.0	61.6	67.9	65.9	78.9	31.8	16.5	56.3	12.3	51.6	19.9	17.2	39.3
Chromium (Cr)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Dissolved	0.00451	0.00323	0.00348	0.00216	0.00029	0.00033	0.00023	0.00162	0.00188	0.00192	0.00109	0.0011	0.00203	0.00237	0.00028	0.00144	<0.00010	0.0005	0.00075	0.00011	0.00062
Copper (Cu)-Dissolved	0.0131	0.00803	0.0102	0.00258	<0.00080	0.0005	0.00074	0.0025	0.00518	0.00431	0.00242	0.00234	0.0335	0.00369	0.00277	0.00333	<0.00050	0.00246	0.00313	0.00036	0.00380
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	0.123	<0.030	<0.030	0.033	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000083	<0.000050	0.000055	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	2.19	2.1	2.17	1.77	0.975	1.13	1.03	2.26	3.68	5.45	5.86	5.61	5.79	3.1	1.11	4.78	0.886	5.67	2.68	1.42	4.42
Manganese (Mn)-Dissolved	0.278	0.243	0.246	0.148	0.0836	0.0683	0.0658	0.151	0.218	0.285	0.194	0.189	0.212	0.229	0.0649	0.214	0.017	0.0914	0.0687	0.0274	0.0918
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000837	0.00103	0.00103	0.00119	0.000816	0.000908	0.000889	0.00134	0.00194	0.00241	0.00219	0.00217	0.00178	0.0014	0.000951	0.00216	0.000585	0.0017	0.000899	0.000931	0.00153
Nickel (Ni)-Dissolved	0.00213	0.00178	0.00193	0.00127	<0.00050	<0.00050	<0.00050	0.00136	0.00183	0.00215	0.00172	0.00215	0.00157	0.00168	<0.00050	0.00173	<0.00050	0.00119	0.00081	<0.00050	0.00085
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.968	0.865	0.873	0.813	0.552	0.619	0.637	0.863	1.18	1.49	1.63	1.59	0.631	0.815	0.65	1.35	0.152	1.19	0.489	0.601	0.862
Selenium (Se)-Dissolved	0.00102	0.00097	0.00098	0.00098	0.00058	0.00041	0.00057	0.00142	0.00186	0.00219	0.00224	0.00209	0.00027	0.00124	0.00057	0.00173	0.0001	0.00167	0.00066	0.00045	0.00098
Silicon (Si)-Dissolved	1.39	1.36	1.37	1.12	0.604	0.704	0.765	1.35	2.04	2.11	2.43	2.41	2	1.43	0.734	2.18	0.489	2.18	1.32	0.723	1.99
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.6	3.4	3.5	<2.0	<2.0	<2.0	2.3	<2.0	3.1	<2.0	<2.0	2.2
Strontium (Sr)-Dissolved	0.143	0.142	0.145	0.109	0.0801	0.0841	0.0865	0.157	0.259	0.364	0.362	0.363	0.326	0.196	0.0887	0.327	0.0675	0.31	0.158	0.1	0.265
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000015	0.000017	0.000016	0.000012	0.000019	0.000019	0.000024	0.000083	0.000258	0.000378	0.000398	0.000425	0.000093	0.000075	0.000019	0.000299	0.000018	0.00022	0.000066	0.000027	0.000158
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.118	0.0757	0.097	0.06	<0.0020	0.0039	0.0021	0.0261	0.0309	0.0344	0.0234	0.0232	0.0245	0.0371	0.0042	0.0250	0.0011	0.0204	0.0145	0.0024	0.0145

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-2. 2009: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC		Replicate	Replicate	Replicate							Replicate						Replicate	Replicate		
Sample ID	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2
Date Sampled	29-Mar-09	2-Jul-09	2-Jul-09	5-Jul-09	22-Aug-09	26-Nov-09	28-Mar-09	27-May-09	8-Jun-09	13-Jun-09	13-Jun-09	19-Jun-09	2-Jul-09	4-Aug-09	22-Aug-09	13-Sep-09	27-Sep-09	27-Sep-09	31-Oct-09	27-Nov-09
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L749298-5	L787346-30	L787346-6	L788462-9	L809879-5	L844495-6	L748538-8	L771080-9	L776835-7	L778602-2	L778602-3	L781603-5	L787346-5	L801967-10	L809879-4	L817873-2	L824535-12	L824535-2	L837185-2	L844495-5
Physical Tests																				
Colour, True	<5.0	<5.0	6.6	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.8	<5.0
Conductivity (uS/cm)	226	91	90.7	92	108	169	242	130	107	105	105	100	115	85.5	85.9	84.7	120	119	136	188
Hardness (as $CaCO_3$)	106	45.1	43.7	39.3	53.5	85.4	114	57	52	48.2	44.1	44.7	52.5	37.3	37.5	37.3	50.9	52.1	58.7	94.9
pH	8.04	7.89	7.9	7.93	7.99	8.04	7.73	6.99	7.82	7.84	7.85	7.81	7.91	7.97	7.88	7.99	7.83	7.76	7.90	7.98
Total Suspended Solids	<3.0	7.5	8.5	8.6	147	<3.0	<3.0	51.6	219	146	137	97	21	175	109	160	41	44	43.0	<3.0
Total Dissolved Solids	136	57	50	55	86	103	155	85	69	66	67	60	74	49	63	56	86	70	94	119
Turbidity (NTU)	0.55	12.8	12.6	13	146	0.51	1.11	39.5	172	94.7	93	80.2	25.6	133	89.9	131	51.7	49.2	46.6	1.96
Anions and Nutrients																				
Acidity (as $CaCO_3$)	3.2	2.7	2.6	2	1.6	1.2	2.9	4.5	1.5	1.2	1.2	1.4	2.7	1.1	1.6	2	2.2	2.5	1.1	1.3
Alkalinity, Bicarbonate (as $CaCO_3$)	79.7	32.7	35.3	32.9	44.5	62.2	78.1	42.3	34.4	28.8	29.1	29.4	36.6	26.4	25.3	37.6	36.5	37	41.5	65.5
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	79.7	32.7	35.3	32.9	44.5	62.2	78.1	42.3	34.4	28.8	29.1	29.4	36.6	26.4	25.3	37.6	36.5	37	41.5	65.5
Ammonia, Total (as N)	0.0052	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.69	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.045	<0.020	<0.020	<0.020	<0.020	0.026	0.062	0.058	0.037	0.052	0.051	0.036	0.04	0.023	0.023	0.03	0.04	0.037	0.033	0.044
Nitrate (as N)	0.093	0.0279	0.0292	0.027	0.0197	0.0669	0.137	0.218	0.113	0.0999	0.101	0.075	0.0697	0.022	0.0262	0.0254	0.099	0.101	0.143	0.127
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.061	<0.050	<0.050	0.059	<0.050	0.141	<0.050	<0.050	<0.050	<0.050	<0.050	0.053
Total Nitrogen	0.08	<0.050	<0.050	0.05	<0.050	0.100	0.17	0.26	0.174	0.144	0.134	0.134	0.083	0.163	<0.050	<0.050	0.12	0.1	0.178	0.180
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	0.0026	0.0024	0.0022	0.0019	0.0014	<0.0010	0.0012	0.0011	0.0014	0.0016	0.0014	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	0.0156	0.0105	0.0187	0.222	0.0099	0.0043	0.114	0.254	0.207	0.0583	0.128	0.0295	0.227	0.115	0.177	0.064	0.067	0.077	0.0031
Sulfate (SO_4)	36.9	11.7	11.6	11.3	11.2	28.1	50.8	24.3	19.2	18	18	16.7	20.9	11.4	13.5	12	19.5	19.4	22.0	37.9
Cyanides																				
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	0.0027	0.0014
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																				
Total Organic Carbon	<0.50	0.52	0.6	<0.50	0.62	0.71	0.52	1.12	1.61	1.01	0.98	1.04	0.51	2.56	<0.50	0.74	0.86	0.67	2.43	0.82
Total Metals																				
Aluminum (Al)-Total	0.0141	0.429	0.53	0.433	6.07	0.509	0.052	1.92	8.57	5.35	4.67	4	1.11	4.37	3.25	5.32	2.06	2.02	1.58	0.0857
Antimony (Sb)-Total	0.00303	0.00123	0.00123	0.00154	0.00229	0.00314	0.00074	0.00109	0.00108	0.00104	0.00088	0.00082	0.00062	0.00079	0.00067	0.00088	0.00123	0.00134	0.00078	0.00079
Arsenic (As)-Total	0.00028	0.00056	0.00072	0.00066	0.00838	0.00127	0.00055	0.00513	0.00746	0.00513	0.00399	0.00288	0.00122	0.00353	0.00279	0.00392	0.0019	0.00204	0.00160	0.00041
Barium (Ba)-Total	0.0328	0.0214	0.0245	0.0215	0.112	0.0414	0.0407	0.0475	0.146	0.0882	0.0848	0.0752	0.0399	0.104	0.0804	0.118	0.0547	0.0531	0.0426	0.0372
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000022	0.00003	0.000037	0.000032	0.000125	0.000081	0.000153	0.000514	0.000534	0.000472	0.000402	0.00036	0.000326	0.000257	0.000206	0.000226	0.000151	0.000181	0.000230	0.000185
Calcium (Ca)-Total	30.7	14.8	15.3	13.7	20.2	29.4	40.2	23.4	19.5	18.5	17.1	17.7	20.2	16.3	15.3	15.6	18.8	20.2	22.4	34.6
Chromium (Cr)-Total	<0.00050	0.00082	0.00112	0.00147	0.0113	0.00104	<0.00050	0.00321	0.00966	0.00895	0.00701	0.00554	0.0015	0.00574	0.00414	0.00739	0.00296	0.00316	0.00325	<0.00050
Cobalt (Co)-Total	<0.00010	0.00021	0.00032	0.0003	0.0036	0.00058	0.00013	0.0018	0.00443	0.00387	0.00319	0.00244	0.00096	0.00282	0.0019	0.00304	0.00133	0.00144	0.00134	0.00021
Copper (Cu)-Total	<0.00050	0.00104	0.00151	0.00136	0.0132	0.00246	0.00714	0.0368	0.0499	0.066	0.0525	0.0547	0.0464	0.0288	0.019	0.0224	0.0191	0.0204	0.0328	0.00996
Iron (Fe)-Total	0.074	0.447	0.632	0.598	8.31	1.01	0.192	2.99	10.5	7.84	6.74	5.08	1.6	5.49	4.06	6.99	2.93	3.11	2.75	0.210
Lead (Pb)-Total	0.000065	0.00032	0.00054	0.000523	0.00444	0.00163	0.000148	0.00174	0.00515	0.00396	0.00323	0.00272	0.00114	0.00412	0.00286	0.00424	0.00171	0.00213	0.00281	0.000156
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	4.59	3.01	3.07	2.3	5.04	4.92	3.33	2.97	4.56	3.91	3.37	3.08	2.54	3.03	2.43	3.49	2.34	2.51	2.63	2.96
Manganese (Mn)-Total	0.00703	0.0143	0.0204	0.018	0.204	0.0484	0.0209	0.0922	0.291	0.165	0.158	0.137	0.0625	0.176	0.121	0.183	0.0776	0.08	0.0837	0.0278
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	0.000016	<0.000010	<0.000010	<0.000010	0.000032	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00101	0.000657	0.000683	0.00061	0.000922	0.00104	0.00273	0.00169	0.00171	0.00176	0.00153	0.00155	0.00174	0.00129	0.00126	0.00138	0.00168	0.00179	0.00184	0.00272
Nickel (Ni)-Total	0.00092	0.00089	0.00114	0.00145	0.0085	0.00172	<0.00050	0.00302	0.00862	0.00784	0.00583	0.00468	0.00143	0.00469	0.00322	0.00604	<0.0030	<0.0040	0.00285	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.33	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-2. 2009: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC		Replicate	Replicate	Replicate							Replicate						Replicate	Replicate		
Sample ID	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2
Date Sampled	29-Mar-09	2-Jul-09	2-Jul-09	5-Jul-09	22-Aug-09	26-Nov-09	28-Mar-09	27-May-09	8-Jun-09	13-Jun-09	13-Jun-09	19-Jun-09	2-Jul-09	4-Aug-09	22-Aug-09	13-Sep-09	27-Sep-09	27-Sep-09	31-Oct-09	27-Nov-09
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L749298-5	L787346-30	L787346-6	L788462-9	L809879-5	L844495-6	L748538-8	L771080-9	L776835-7	L778602-2	L778602-3	L781603-5	L787346-5	L801967-10	L809879-4	L817873-2	L824535-12	L824535-2	L837185-2	L844495-5
Total Metals *(cont'd)*																				
Potassium (K)-Total	0.495	0.423	0.455	0.408	1.92	0.612	1.26	1.18	2.14	2.05	1.69	1.55	0.861	1.73	1.42	1.93	1.2	1.28	1.09	1.14
Selenium (Se)-Total	0.00069	0.00041	0.00066	0.00038	0.00044	0.00064	0.00083	0.00094	0.00084	0.00069	0.00066	0.00064	0.00074	0.00045	0.00041	0.00062	0.00057	0.0007	0.00063	0.00063
Silicon (Si)-Total	1.93	1.88	2.04	1.96	13.5	2.52	2.56	5.21	15.2	11.7	10.7	8.74	3.26	8.26	7.09	12.1	6.06	6.24	4.81	2.46
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	0.000096	0.000054	<0.000010	0.000032	0.000089	0.000096	0.000069	0.000057	0.000013	0.000054	0.000046	0.000086	<0.000040	0.000035	0.000028	<0.000010
Sodium (Na)-Total	2.9	<2.0	<2.0	<2.0	<2.0	2.1	3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.242	0.157	0.162	0.103	0.144	0.252	0.198	0.122	0.142	0.0975	0.103	0.105	0.138	0.0895	0.0899	0.0951	0.105	0.112	0.120	0.200
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	0.013	0.018	0.016	0.313	0.021	<0.010	0.105	0.491	0.356	0.304	0.22	0.056	0.247	0.2	0.349	0.142	0.151	0.107	<0.010
Uranium (U)-Total	0.000046	0.00002	0.000026	0.000028	0.00015	0.000050	0.000358	0.00026	0.000348	0.000377	0.000322	0.000288	0.000227	0.000319	0.000258	0.000316	0.000239	0.00026	0.000269	0.000330
Vanadium (V)-Total	<0.0010	0.0017	0.0023	0.0021	0.0288	0.0025	<0.0010	0.0066	0.0274	0.0218	0.0169	0.0138	0.0036	0.0158	0.0113	0.0185	0.007	0.0074	0.0061	<0.0010
Zinc (Zn)-Total	0.0023	0.0032	0.0046	0.0061	0.0238	0.0075	0.0108	0.0403	0.0575	0.0501	0.0392	0.0329	0.0233	0.0299	0.0221	0.0322	0.0162	0.017	0.0212	0.0109
Dissolved Metals																				
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0035	0.0807	0.0358	0.0365	0.0463	0.0094	0.019	0.0507	0.0565	0.827	0.0755	0.126	0.0467	0.0785	0.063	0.309	0.0411	0.0519	0.0386	0.0694
Antimony (Sb)-Dissolved	0.00342	0.0011	0.00114	0.00107	0.00168	0.00303	0.00073	0.00081	0.00064	0.00057	0.00054	0.00052	0.0005	0.00045	0.00041	0.00045	0.00102	0.00111	0.00064	0.00079
Arsenic (As)-Dissolved	0.00027	0.00046	0.00027	0.00025	0.0005	0.00029	0.00029	0.00036	0.00028	0.00241	0.00013	0.00016	0.00012	0.00019	0.00014	0.00039	0.00016	0.00019	0.00019	0.00051
Barium (Ba)-Dissolved	0.0353	0.0175	0.0157	0.0147	0.0218	0.0299	0.0401	0.0225	0.0233	0.0382	0.0193	0.0214	0.0209	0.0236	0.0238	0.031	0.021	0.0225	0.0220	0.0362
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000024	0.00003	0.000022	0.000019	<0.000010	0.000025	0.000132	0.000184	0.000078	0.000378	0.00009	0.000118	0.00018	0.000036	0.000047	0.000038	0.000063	0.000065	0.000100	0.000212
Calcium (Ca)-Dissolved	33.8	13.7	13.3	12.6	18.3	27.0	40.1	19.9	17.7	16.5	15.5	15.8	17.9	13.4	13.5	13.2	18	18.4	20.7	33.3
Chromium (Cr)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00094	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Dissolved	<0.00010	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00038	0.00015	0.0017	0.00021	0.00024	0.00032	<0.00010	<0.00010	0.00015	0.00014	0.00015	0.00014	0.00020
Copper (Cu)-Dissolved	0.00038	0.00088	0.00039	0.00031	0.00016	0.00043	0.00156	0.00352	0.0018	0.047	0.00206	0.00299	0.00272	<0.00060	0.0004	0.00141	0.0022	0.00238	0.00669	0.00302
Iron (Fe)-Dissolved	<0.030	0.188	0.048	0.032	<0.030	<0.030	<0.030	<0.030	0.036	3.5	0.051	0.089	<0.030	0.034	0.036	0.338	<0.030	0.039	0.039	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00236	<0.000050	0.00006	<0.000050	0.000057	<0.000050	0.000232	<0.000050	<0.000050	<0.000050	0.000233
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	5.29	2.67	2.56	1.91	1.9	4.35	3.32	1.75	1.91	1.73	1.32	1.31	1.92	0.916	0.937	1.05	1.43	1.49	1.72	2.85
Manganese (Mn)-Dissolved	0.0066	0.0131	0.00538	0.00492	0.000412	0.00759	0.0184	0.0327	0.0269	0.0999	0.0333	0.0346	0.0329	0.023	0.0176	0.016	0.022	0.0225	0.0187	0.0271
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00102	0.000521	0.000622	0.000568	0.000762	0.000999	0.00266	0.00138	0.0014	0.000956	0.00123	0.00124	0.00154	0.00113	0.00116	0.00108	0.00145	0.00157	0.00163	0.00251
Nickel (Ni)-Dissolved	0.0006	0.00058	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	<0.00050	0.00199	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.561	0.299	0.294	0.263	0.418	0.463	1.27	0.672	0.75	0.732	0.611	0.622	0.605	0.645	0.619	0.677	0.726	0.728	0.705	1.07
Selenium (Se)-Dissolved	0.00079	0.00033	0.00033	0.00034	0.00034	0.00058	0.00088	0.00055	0.0005	0.00045	0.00037	0.0004	0.00057	0.00019	0.00022	0.00037	0.00039	0.00055	0.00051	0.00073
Silicon (Si)-Dissolved	1.98	1.27	1.25	1.25	0.763	1.87	2.57	2.09	1.47	3.07	1.49	1.54	1.61	0.929	1.02	1.81	1.74	1.75	2.16	2.32
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	2.8	<2.0	<2.0	<2.0	<2.0	2.1	2.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.258	0.137	0.133	0.0926	0.122	0.231	0.195	0.106	0.12	0.0876	0.0807	0.0864	0.119	0.0697	0.0716	0.0726	0.0927	0.0991	0.113	0.190
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.065	<0.010	<0.010	<0.010	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000049	0.000019	0.000018	0.000015	0.000021	0.000034	0.000362	0.000155	0.000119	0.000245	0.000113	0.000119	0.000149	0.000093	0.000089	0.000113	0.000154	0.000167	0.000189	0.000318
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0035	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0015	0.003	0.0011	<0.0010	<0.0010	0.0016	0.0067	0.0055	0.0014	0.0292	0.0019	0.0027	0.0064	<0.0020	0.0025	0.0022	0.0012	0.0015	0.0041	0.0132

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-3. 2010: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	Effluent	Effluent	Effluent	Effluent	Lake	Lake	Lake	Lake	Lake	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC												replicate									
Sample ID	ADIT	ADIT	ADIT	ADIT	BJ (1M)	BJ 15M	BJ 30M	BJ 50M	BJ 75M	Camp Creek	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	SC1	SC1	SC1	SC1	SC1	SC1
Date Sampled	28-Aug-10	21-Sep-10	19-Oct-10	15-Nov-10	30-Aug-10	30-Aug-10	30-Aug-10	30-Aug-10	30-Aug-10	28-Aug-10	28-Aug-10	28-Aug-10	21-Sep-10	19-Oct-10	15-Nov-10	17-Jan-10	3-Mar-10	28-Mar-10	1-May-10	20-May-10	26-May-10
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L927354-13	L939078-8	L945638-8	L955657-8	L927354-17	L927354-18	L927354-19	L927354-20	L927354-21	L927354-15	L927354-14	L927354-16	L939078-9	L945638-9	L955657-9	L855505-7	L866873-7	L873293-9	L884476-5	L889248-5	L891484-16
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	10.9	<5.0
Conductivity (uS/cm)	366	74.7	57.1	53.5	47.0	48.2	48.5	48.8	49.3	75.2	56.5	57.0	53.1	56.9	53.8	338	382	401	348	58.5	191
Hardness (as $CaCO_3$)	155	34.0	22.8	22.6	21.9	22.8	22.7	22.5	22.5	29.4	25.0	24.7	23.9	22.7	24.0	154	172	196	179	28.0	88.3
pH	8.03	7.70	8.40	7.84	7.39	7.39	7.38	7.39	7.37	6.34	7.38	7.35	7.61	8.34	7.77	8.00	8.00	8.03	8.02	7.58	8.04
Total Suspended Solids	<3.0	16.5	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	27.1	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	12.0	26.0
Total Dissolved Solids	203	49	34	37	28	26	23	30	28	46	37	29	34	35	27	231	261	269	232	42	125
Turbidity (NTU)	1.59	2.91	1.02	5.49	1.07	0.44	0.32	0.26	0.40	20.5	1.42	1.55	0.95	1.23	0.89	0.52	0.48	0.75	1.25	8.07	30.0
Anions and Nutrients																					
Acidity (as $CaCO_3$)	4.9	2.6	<1.0	1.8	3.6	3.7	3.6	3.7	5.2	3.7	3.4	3.7	2.6	<1.0	1.8	3.2	3.2	2.3	4.0	2.2	3.7
Alkalinity, Bicarbonate (as $CaCO_3$)	84.0	17.2	14.4	15.2	14.5	14.6	14.9	14.7	14.8	<1.0	14.6	14.2	15.0	14.3	15.1	60.2	64.5	83.1	65.5	18.2	39.5
Alkalinity, Carbonate (as $CaCO_3$)	<1.0	<2.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<1.0	<2.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	84.0	17.2	14.4	15.2	14.5	14.6	14.9	14.7	14.8	<1.0	14.6	14.2	15.0	14.3	15.1	60.2	64.5	83.1	65.5	18.2	39.5
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0055	0.0054	<0.0050	0.0061	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0080	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.160	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.033	<0.020	<0.020	<0.020	<0.020	<0.020	0.049	0.075	0.068	0.059	<0.020	0.039
Nitrate (as N)	0.0183	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0706	0.0654	0.120	0.0626	0.298	0.0226
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	0.070	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	0.070	<0.050	<0.050	0.080	0.080	0.120	0.060	0.340	<0.050
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0039	<0.0010	<0.0010	<0.0010	-	<0.0010
Phosphorus (P)-Total	0.0025	0.0192	<0.0020	0.0096	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0143	<0.0020	0.0021	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0150	0.0031	0.0155	0.0317
Sulfate (SO_4)	103	13.7	11.0	9.66	7.66	7.96	8.11	8.04	8.10	29.3	11.7	11.8	1.83	10.8	9.71	104	127	135	112	9.02	52.1
Cyanides																					
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	-		-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0030	0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	2.19	0.50	<0.50	<0.50	1.87	1.81	1.91	1.95	2.06	2.19	2.14	1.45	0.77	0.61	<0.50	<0.50	<0.50	<0.50	0.26	2.98	<0.50
Total Metals																					
Aluminum (Al)-Total	0.0266	0.348	0.0712	0.0430	0.0432	0.0184	0.0164	0.0258	0.0314	0.881	0.0621	0.0589	0.0398	0.0735	0.0424	0.0191	0.0189	0.0478	0.0910	0.730	1.36
Antimony (Sb)-Total	0.00107	0.00046	0.00023	0.00022	0.00023	0.00025	0.00025	0.00024	0.00026	0.00018	0.00024	0.00024	0.00024	0.00022	0.00021	0.00113	0.00109	0.00108	0.00128	<0.00010	0.00141
Arsenic (As)-Total	0.00563	0.00468	0.00073	0.00070	0.00084	0.00076	0.00074	0.00076	0.00083	0.00254	0.00095	0.00093	0.00079	0.00064	0.00068	0.00031	0.00027	0.00051	0.00085	0.00029	0.00343
Barium (Ba)-Total	0.0121	0.0456	0.0340	0.0336	0.0348	0.0349	0.0348	0.0334	0.0345	0.0433	0.0333	0.0333	0.0383	0.0337	0.0340	0.0413	0.0412	0.0419	0.0396	0.0175	0.0565
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	0.030	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000067	0.000081	0.000023	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000231	0.000035	0.000033	0.000016	0.000025	0.000010	0.000075	0.000078	0.000071	0.000111	<0.000010	0.000100
Calcium (Ca)-Total	55.8	13.6	8.77	8.89	8.83	9.18	9.17	8.95	9.04	11.3	10.2	10.1	10.1	9.01	9.15	53.8	62.6	75.8	69.5	7.52	32.4
Chromium (Cr)-Total	<0.00020	0.00024	0.00019	<0.00010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00013	0.00010	0.00012	<0.00050	<0.00050	<0.00050	<0.00050	0.00155	0.00100
Cobalt (Co)-Total	0.00017	0.00045	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00190	0.00015	0.00015	<0.00010	0.00013	<0.00010	0.00044	0.00057	0.00054	0.00074	0.00045	0.00117
Copper (Cu)-Total	0.00064	0.00188	<0.00050	<0.00050	0.00016	0.00019	0.00014	0.00043	0.00019	0.00394	0.00041	0.00057	<0.00050	<0.00050	<0.00050	0.0103	0.0122	0.0138	0.00922	0.00194	0.0150
Iron (Fe)-Total	0.182	0.641	0.045	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	1.10	0.047	0.045	<0.030	<0.030	<0.030	<0.030	<0.030	0.067	0.125	0.671	1.55
Lead (Pb)-Total	0.00242	0.00241	0.000155	0.000074	<0.000050	<0.000050	<0.000050	0.000084	0.000077	0.000965	0.000154	0.000140	0.000066	0.000128	0.000095	<0.000050	<0.000050	0.000084	0.000191	0.000184	0.00181
Lithium (Li)-Total	0.0301	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	4.82	0.683	0.327	0.322	0.277	0.299	0.299	0.291	0.295	0.657	0.414	0.399	0.330	0.326	0.325	4.24	4.85	5.32	4.87	2.84	2.85
Manganese (Mn)-Total	0.164	0.112	0.0186	0.00654	0.00380	0.00241	0.00256	0.00336	0.00435	0.259	0.0310	0.0298	0.00741	0.0200	0.00691	0.0597	0.0832	0.0859	0.113	0.0302	0.131
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00133	0.000522	0.000331	0.000353	0.000352	0.000411	0.000381	0.000372	0.000386	0.000066	0.000371	0.000330	0.000382	0.000358	0.000352	0.00132	0.00142	0.00160	0.00167	0.000305	0.00119
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00079	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00069	0.00091	0.00082	0.00096	0.00247	0.00103
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-3. 2010: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	Effluent	Effluent	Effluent	Effluent	Lake	Lake	Lake	Lake	Lake	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC												replicate									
Sample ID	ADIT	ADIT	ADIT	ADIT	BJ (1M)	BJ 15M	BJ 30M	BJ 50M	BJ 75M	Camp Creek	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	SC1	SC1	SC1	SC1	SC1	SC1
Date Sampled	28-Aug-10	21-Sep-10	19-Oct-10	15-Nov-10	30-Aug-10	30-Aug-10	30-Aug-10	30-Aug-10	30-Aug-10	28-Aug-10	28-Aug-10	28-Aug-10	21-Sep-10	19-Oct-10	15-Nov-10	17-Jan-10	3-Mar-10	28-Mar-10	1-May-10	20-May-10	26-May-10
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L927354-13	L939078-8	L945638-8	L955657-8	L927354-17	L927354-18	L927354-19	L927354-20	L927354-21	L927354-15	L927354-14	L927354-16	L939078-9	L945638-9	L955657-9	L855505-7	L866873-7	L873293-9	L884476-5	L889248-5	L891484-16
Total Metals *(cont'd)*																					
Potassium (K)-Total	1.60	0.321	0.092	0.085	0.081	0.091	0.090	0.084	0.091	0.305	0.127	0.123	0.122	0.096	0.094	0.400	0.455	0.538	0.544	0.318	0.822
Selenium (Se)-Total	<0.00020	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00012	<0.00010	<0.00010	0.00077	0.00052	0.00083	0.00059	0.00021	0.00033
Silicon (Si)-Total	3.09	1.25	0.691	0.616	0.636	0.605	0.611	0.585	0.612	1.41	0.739	0.720	0.596	0.653	0.613	1.81	1.82	1.86	1.67	2.63	3.57
Silver (Ag)-Total	0.000011	0.000144	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000130	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000037
Sodium (Na)-Total	9.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	1.09	0.128	0.0611	0.0566	0.0525	0.0558	0.0554	0.0541	0.0557	0.0517	0.0775	0.0744	0.0607	0.0604	0.0561	0.323	0.360	0.376	0.339	0.0928	0.172
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.039
Uranium (U)-Total	0.000219	0.000082	0.000025	0.000026	0.000032	0.000032	0.000033	0.000032	0.000031	0.000081	0.000034	0.000033	0.000033	0.000025	0.000028	0.000074	0.000085	0.000113	0.000107	<0.000010	0.000071
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	0.0043
Zinc (Zn)-Total	0.0112	0.0092	0.0040	<0.0030	0.0014	0.0013	0.0045	0.0012	0.0012	0.0177	0.0033	0.0031	<0.0030	<0.0030	<0.0030	0.0080	0.0091	0.0096	0.0081	0.0034	0.0096
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0116	0.0083	0.0121	0.0058	0.0043	0.0037	0.0034	0.0073	0.0058	0.0180	0.0112	0.0113	0.0071	0.0134	0.0068	0.0133	0.0117	0.0122	0.0167	0.0794	0.0347
Antimony (Sb)-Dissolved	0.00090	0.00028	0.00020	0.00021	0.00021	0.00023	0.00024	0.00024	0.00024	<0.00010	0.00021	0.00021	0.00022	0.00022	0.00020	0.00111	0.00111	0.00110	0.00117	<0.00010	0.00102
Arsenic (As)-Dissolved	0.00213	0.00041	0.00052	0.00060	0.00070	0.00069	0.00065	0.00066	0.00064	<0.00010	0.00056	0.00053	0.00067	0.00052	0.00060	0.00023	0.00025	0.00030	0.00050	<0.00010	0.00047
Barium (Ba)-Dissolved	0.0116	0.0344	0.0320	0.0326	0.0318	0.0321	0.0318	0.0322	0.0324	0.0281	0.0309	0.0303	0.0347	0.0321	0.0324	0.0411	0.0412	0.0412	0.0369	0.0110	0.0287
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	0.029	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000060	0.000034	0.000022	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000218	0.000030	0.000028	<0.000010	0.000023	<0.000010	0.000067	0.000079	0.000065	0.000093	<0.000010	0.000051
Calcium (Ca)-Dissolved	54.2	12.6	8.60	8.54	8.32	8.67	8.63	8.54	8.56	10.9	9.41	9.28	9.07	8.56	9.10	54.5	61.2	70.0	63.9	7.07	31.4
Chromium (Cr)-Dissolved	<0.00020	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020
Cobalt (Co)-Dissolved	0.00016	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00146	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00046	0.00051	0.00044	0.00060	<0.00010	0.00021
Copper (Cu)-Dissolved	0.00019	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	0.00015	0.00010	<0.00010	0.00034	0.00020	0.00017	<0.00050	0.00052	<0.00050	0.00830	0.00962	0.00823	0.00406	0.00085	0.00067
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.056	<0.030
Lead (Pb)-Dissolved	0.000075	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.0287	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	4.76	0.611	0.317	0.305	0.265	0.283	0.276	0.275	0.281	0.555	0.374	0.368	0.305	0.313	0.313	4.30	4.80	5.11	4.64	2.51	2.38
Manganese (Mn)-Dissolved	0.150	0.0121	0.0154	0.00387	0.000807	0.000168	0.000478	0.000773	0.000872	0.229	0.0220	0.0209	0.00177	0.0166	0.00416	0.0614	0.0760	0.0717	0.100	0.00390	0.0596
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00130	0.000410	0.000311	0.000322	0.000328	0.000367	0.000335	0.000340	0.000378	<0.000050	0.000344	0.000325	0.000329	0.000320	0.000342	0.00141	0.00143	0.00151	0.00153	0.000249	0.00111
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00071	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00080	0.00084	0.00079	0.00072	0.00084	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	1.56	0.187	0.086	0.080	0.072	0.085	0.082	0.079	0.085	0.121	0.106	0.106	0.084	0.084	0.082	0.410	0.445	0.506	0.500	0.191	0.349
Selenium (Se)-Dissolved	<0.00020	0.00012	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	<0.00010	<0.00010	0.00073	0.00069	0.00070	0.00052	0.00021	0.00042
Silicon (Si)-Dissolved	3.14	0.733	0.578	0.547	0.545	0.552	0.579	0.559	0.566	0.671	0.643	0.651	0.537	0.578	0.555	1.75	1.83	1.84	1.61	1.80	1.15
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	10.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	1.07	0.123	0.0591	0.0540	0.0490	0.0520	0.0518	0.0509	0.0521	0.0490	0.0711	0.0670	0.0561	0.0591	0.0542	0.328	0.352	0.375	0.322	0.0871	0.169
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000209	0.000026	0.000018	0.000023	0.000027	0.000029	0.000026	0.000028	0.000027	0.000015	0.000027	0.000026	0.000026	0.000020	0.000024	0.000071	0.000079	0.000107	0.000101	<0.000010	0.000050
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0107	<0.0030	<0.0030	<0.0030	0.0017	<0.0010	<0.0010	<0.0010	0.0023	0.0090	0.0022	0.0024	<0.0030	<0.0030	<0.0030	0.0077	0.0105	0.0089	0.0069	<0.0010	<0.0010

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-3. 2010: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																					
Sample ID	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2
Date Sampled	5-Jul-10	3-Aug-10	27-Aug-10	28-Sep-10	15-Nov-10	15-Dec-10	17-Jan-10	3-Mar-10	28-Mar-10	1-May-10	20-May-10	26-May-10	1-Jun-10	8-Jun-10	5-Jul-10	3-Aug-10	27-Aug-10	28-Sep-10	21-Oct-10	15-Nov-10	15-Dec-10
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L905787-23	L916942-16	L926457-23	L938295-16	L955725-22	L963831-6	L855505-8	L866873-8	L873293-10	L884476-14	L889248-4	L891484-11	L893465-3	L896218-3	L905787-24	L916942-11	L926457-24	L938295-11	L946803-1	L955725-23	L963831-1
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	114	63	85.5	135	304	355	398	426	402	359	106	219	103	112	171	87.1	138	158	316	351	409
Hardness (as $CaCO_3$)	52.3	28.4	38.2	59.9	151	168	188	193	192	179	52.5	95.2	46.6	51.7	75.5	38.6	58.1	68.7	145	176	167
pH	7.94	7.93	8.05	7.74	8.07	8.11	8.02	8.08	8.04	7.07	7.88	7.80	7.87	7.61	7.81	7.82	7.95	7.77	6.72	7.94	7.85
Total Suspended Solids	25.0	123	45.5	54.3	<3.0	<3.0	8.3	5.3	23.2	64.5	27.0	111	56.8	41.1	97.5	500	102	532	54.8	21.1	15.5
Total Dissolved Solids	103	47	57	87	182	223	273	292	274	240	70	143	69	79	108	54	86	102	211	228	267
Turbidity (NTU)	75.4	126	23.5	74.4	0.98	0.37	16.1	13.3	35.3	81.0	21.1	86.9	44.3	52.9	87.9	218	61.3	388	54.5	34.2	27.5
Anions and Nutrients																					
Acidity (as $CaCO_3$)	3.0	2.1	3.9	5	2.2	4.7	3.4	3.0	2.4	6.3	2.1	4.6	2.9	2.6	3.3	2.4	4.5	6.9	9.4	2.4	6.2
Alkalinity, Bicarbonate (as $CaCO_3$)	28.3	21.3	25.0	30.8	62	71	82.2	83.6	89.6	49.7	38.3	31.9	45.2	61.3	27.2	24	25.2	36.2	39.5	60.7	74.7
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<2.0	<1.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<2.0	<1.0	<2.0
Alkalinity, Total (as $CaCO_3$)	28.3	21.3	25.0	30.8	62	71	82.2	83.6	89.6	49.7	38.3	31.9	45.2	61.3	27.2	24	25.2	36.2	39.5	60.7	74.7
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	0.026	0.053	0.056	0.123	0.141	0.142	0.189	0.029	0.112	0.025	0.026	0.090	0.022	0.048	0.061	0.167	0.171	0.191
Nitrate (as N)	0.0167	0.0073	0.0105	0.0148	0.0619	0.0717	0.0901	0.0963	0.195	0.236	0.667	0.0554	0.189	0.124	0.0258	0.0064	0.0152	0.0323	0.0954	0.111	0.085
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.064	0.096	<0.050	0.092	<0.050	<0.050	<0.050	<0.050	0.055	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	0.09	0.08	0.110	0.120	0.190	0.300	0.763	0.050	0.280	0.170	<0.050	<0.050	<0.050	0.087	0.1	0.15	0.08
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	-	0.0016	-	-	<0.0010	0.0012	<0.0010	<0.0010	0.0035	<0.0010	<0.0010
Phosphorus (P)-Total	0.0356	0.131	0.0288	0.0592	0.0025	<0.0020	0.0244	0.0283	0.0634	0.850	0.0436	0.380	0.081	0.0975	0.129	0.596	0.099	0.914	0.444	0.152	0.0701
Sulfate (SO_4)	24.2	9.72	17.5	34.3	90.3	108	117	132	128	130	13.5	71.3	12.1	13.9	52.4	11.2	36.9	39.8	109	112	132
Cyanides																					
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-		-			-	-	-	-	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0019	0.0012	0.0019	0.0016	<0.0010	<0.0010	<0.0010	0.0012	0.0012	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	<0.50	0.88	<0.50	<0.50	0.58	0.65	<0.50	<0.50	<0.50	0.39	2.23	<0.50	1.37	1.12	0.50	0.97	<0.50	1.39	<0.50	0.62	0.54
Total Metals																					
Aluminum (Al)-Total	2.80	3.29	0.741	2.39	0.078	0.0396	0.374	0.320	0.991	2.54	1.47	3.13	1.89	2.59	3.52	7.79	0.963	5.95	1.76	0.974	0.898
Antimony (Sb)-Total	0.00182	0.00166	0.00096	0.00163	0.00132	0.00136	0.00066	0.00068	0.00079	0.00112	0.00021	0.00125	0.00032	0.00045	0.00109	0.00153	0.00060	0.00098	0.00076	0.00072	0.00069
Arsenic (As)-Total	0.00315	0.00562	0.00217	0.00619	0.00058	0.00049	0.00135	0.00120	0.00251	0.0470	0.00121	0.0222	0.00206	0.00227	0.00451	0.00934	0.00225	0.00687	0.0209	0.00772	0.00463
Barium (Ba)-Total	0.104	0.107	0.0532	0.0783	0.0399	0.0447	0.0383	0.0384	0.0486	0.0890	0.0472	0.128	0.0584	0.0729	0.105	0.234	0.0614	0.16	0.0486	0.0402	0.0415
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000067	0.000116	0.000053	0.000105	0.000084	0.000055	0.00166	0.00138	0.00162	0.00377	0.000086	0.00291	0.000145	0.000171	0.00171	0.000961	0.000947	0.000864	0.00269	0.00229	0.00288
Calcium (Ca)-Total	19.2	10.9	15.1	24	55.9	62.2	65.5	70.1	74.0	65.2	17.1	36.1	15.8	18.4	27.1	20.6	24.0	34	50.3	59.2	71.2
Chromium (Cr)-Total	0.00185	0.00248	0.00050	0.00205	0.00011	0.00014	<0.00050	<0.00050	0.00073	0.00147	0.00118	0.00186	0.00165	0.00240	0.00259	0.00717	0.00093	0.00681	0.00101	0.00057	0.00028
Cobalt (Co)-Total	0.00107	0.00187	0.00068	0.00144	0.00057	0.00031	0.00179	0.00176	0.00286	0.00593	0.00066	0.00441	0.00106	0.00126	0.00357	0.00607	0.00199	0.00595	0.00465	0.00323	0.00304
Copper (Cu)-Total	0.0102	0.015	0.00708	0.0191	0.00854	0.00497	0.0872	0.0734	0.143	0.268	0.00191	0.178	0.00262	0.00303	0.204	0.0915	0.0863	0.0863	0.336	0.228	0.225
Iron (Fe)-Total	2.75	4.19	0.700	2.52	0.084	0.039	2.05	1.72	4.00	11.8	1.44	9.66	2.58	3.01	7.03	14.7	2.50	10.3	9.12	5.28	4.21
Lead (Pb)-Total	0.00245	0.00495	0.00197	0.00329	0.000115	<0.000050	0.00123	0.000926	0.00219	0.00686	0.000579	0.00673	0.00104	0.00113	0.00497	0.0133	0.00387	0.00804	0.0034	0.00225	0.00214
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0061	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	2.42	1.91	1.24	2.34	3.99	4.96	5.42	5.89	6.18	5.85	3.46	3.65	2.58	3.18	3.33	4.59	1.97	4.39	4.89	4.91	6.31
Manganese (Mn)-Total	0.0870	0.158	0.0669	0.117	0.0688	0.0474	0.260	0.284	0.376	0.395	0.0540	0.278	0.0908	0.0923	0.280	0.454	0.191	0.474	0.297	0.269	0.351
Mercury (Hg)-Total	0.000018	0.000026	0.000011	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	0.000031	<0.000010	0.000027	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00119	0.000555	0.000594	0.00113	0.0015	0.0016	0.00251	0.00251	0.00273	0.00415	0.000437	0.00277	0.000504	0.000750	0.00207	0.00206	0.00101	0.00171	0.00347	0.0029	0.00282
Nickel (Ni)-Total	0.00106	0.00182	<0.00050	0.0015	0.00084	0.00086	0.00175	0.00183	0.00254	0.00342	0.00185	0.00269	0.00208	0.00236	0.00315	0.00704	0.00174	0.00668	0.00399	0.00316	0.00283
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.84	<0.30	0.43	<0.30	<0.30	<0.30	0.95	<0.30	0.71	0.39	<0.30	<0.30

Table A2-3. 2010: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																					
Sample ID	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2
Date Sampled	5-Jul-10	3-Aug-10	27-Aug-10	28-Sep-10	15-Nov-10	15-Dec-10	17-Jan-10	3-Mar-10	28-Mar-10	1-May-10	20-May-10	26-May-10	1-Jun-10	8-Jun-10	5-Jul-10	3-Aug-10	27-Aug-10	28-Sep-10	21-Oct-10	15-Nov-10	15-Dec-10
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L905787-23	L916942-16	L926457-23	L938295-16	L955725-22	L963831-6	L855505-8	L866873-8	L873293-10	L884476-14	L889248-4	L891484-11	L893465-3	L896218-3	L905787-24	L916942-11	L926457-24	L938295-11	L946803-1	L955725-23	L963831-1
Total Metals *(cont'd)*																					
Potassium (K)-Total	1.39	1.37	0.434	1.18	0.469	0.562	1.50	1.50	1.65	1.70	0.604	1.60	0.799	1.08	1.75	2.63	0.992	2.99	1.61	1.43	1.83
Selenium (Se)-Total	0.00021	0.00043	<0.00020	0.00032	0.00069	0.00078	0.00235	0.00185	0.00231	0.00390	0.00020	0.00210	0.00034	0.00037	0.00092	0.00127	0.00057	0.0012	0.00257	0.00233	0.00226
Silicon (Si)-Total	6.75	5.11	1.36	3.43	1.76	1.91	2.66	2.50	3.49	4.69	4.09	6.70	5.22	6.77	7.67	13.8	1.90	10.6	3.7	3.01	3
Silver (Ag)-Total	0.000047	0.000078	0.000016	0.000051	<0.000010	<0.000010	<0.000010	<0.000010	0.000016	0.000055	<0.000020	0.000166	0.000035	0.000031	0.000068	0.000254	0.000021	0.000069	0.000022	0.000011	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.0	3.2	3.1	2.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.9
Strontium (Sr)-Total	0.111	0.0591	0.0802	0.127	0.28	0.347	0.382	0.417	0.395	0.350	0.177	0.199	0.125	0.158	0.159	0.118	0.124	0.167	0.287	0.313	0.375
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.079	0.08	0.013	0.042	<0.010	<0.010	<0.010	<0.010	0.034	0.094	0.026	0.152	0.049	0.078	0.151	0.498	0.032	0.311	0.05	0.02	<0.010
Uranium (U)-Total	0.000094	0.000076	0.000041	0.000087	0.000095	0.00011	0.000480	0.000496	0.000590	0.000791	0.000045	0.000462	0.000074	0.000076	0.000415	0.000503	0.000221	0.000564	0.000499	0.00046	0.000528
Vanadium (V)-Total	0.0075	0.0108	0.0025	0.008	<0.0010	<0.0010	<0.0010	<0.0010	0.0025	0.0071	0.0028	0.0090	0.0044	0.0065	0.0105	0.0292	0.0029	0.0242	0.0039	0.0019	0.0012
Zinc (Zn)-Total	0.0105	0.0163	0.0064	0.0125	0.0063	0.0051	0.112	0.0829	0.107	0.285	0.0091	0.229	0.0109	0.0172	0.105	0.0834	0.0662	0.0682	0.174	0.153	0.191
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0461	0.109	0.0583	0.0867	0.0277	0.0137	0.0427	0.0569	0.0271	0.0100	0.0328	0.0064	0.0280	0.0705	0.0223	0.105	0.0226	0.0586	0.0178	0.0714	0.0151
Antimony (Sb)-Dissolved	0.00106	0.00062	0.00062	0.00094	0.00132	0.00132	0.00055	0.00059	0.00055	0.00047	0.00011	0.00043	0.00013	0.00013	0.00051	0.00037	0.00041	0.00058	0.0005	0.00056	0.00055
Arsenic (As)-Dissolved	0.00037	0.00057	0.00035	0.00054	0.00042	0.00041	<0.00010	0.00012	0.00011	0.00017	0.00020	0.00011	0.00028	0.00032	<0.00010	0.00019	<0.00010	0.00016	<0.00010	<0.00010	0.00041
Barium (Ba)-Dissolved	0.0330	0.0223	0.0265	0.0259	0.0387	0.0436	0.0370	0.0368	0.0361	0.0269	0.0216	0.0301	0.0225	0.0240	0.0384	0.0432	0.0302	0.0294	0.0316	0.0329	0.0419
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000017	<0.000010	0.000022	0.000037	0.000088	0.00005	0.00106	0.000795	0.000820	0.00122	0.000039	0.00129	0.000042	0.000050	0.00101	0.000035	0.000521	0.000111	0.00151	0.000904	0.000055
Calcium (Ca)-Dissolved	18.5	10.3	13.7	21.4	54.2	59.4	66.4	67.6	67.8	63.2	16.1	33.9	15.3	16.9	26.6	14.1	20.8	24.8	50.4	62.1	59
Chromium (Cr)-Dissolved	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	0.00017	0.00049	0.00029	0.00166	0.00146	0.00198	0.00385	<0.00010	0.00236	<0.00010	<0.00010	0.00151	<0.00010	0.00086	0.00037	0.00387	0.00254	0.00023
Copper (Cu)-Dissolved	0.00019	0.0002	0.00023	0.00098	0.00434	0.00393	0.00443	0.00338	0.00456	0.00250	0.00058	0.00260	0.00043	0.00033	0.00272	0.0003	0.00133	0.00072	0.00464	0.00416	0.00371
Iron (Fe)-Dissolved	<0.030	0.039	<0.030	0.058	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.050	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	0.000078	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	1.46	0.665	0.990	1.54	3.86	4.82	5.43	5.76	5.60	5.11	2.96	2.53	2.02	2.33	2.19	0.806	1.51	1.63	4.68	5.01	4.76
Manganese (Mn)-Dissolved	0.00598	0.00125	0.0174	0.0338	0.0631	0.043	0.256	0.260	0.313	0.306	0.00634	0.174	0.00895	0.0106	0.184	0.0146	0.118	0.0838	0.271	0.254	0.0417
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00102	0.000432	0.000592	0.00104	0.00146	0.00156	0.00235	0.00221	0.00205	0.00253	0.000331	0.00159	0.000447	0.000507	0.00131	0.000774	0.00105	0.00141	0.00217	0.0022	0.00147
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	0.0008	0.00076	0.00166	0.00151	0.00164	0.00180	0.00056	0.00095	<0.00050	<0.00050	0.00098	<0.00050	0.00061	<0.00050	0.00306	0.00215	0.00068
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.284	0.16	0.167	0.285	0.446	0.524	1.54	1.46	1.45	1.28	0.197	0.839	0.166	0.172	0.840	0.725	0.690	1.27	1.43	1.44	0.518
Selenium (Se)-Dissolved	0.00021	<0.00020	<0.00020	0.00034	0.0007	0.00087	0.00199	0.00208	0.00203	0.00278	<0.00020	0.00127	0.00024	0.00030	0.00083	0.00064	0.00064	0.00096	0.00202	0.00217	0.00081
Silicon (Si)-Dissolved	0.725	0.48	0.484	0.83	1.62	1.83	2.37	2.31	2.32	1.86	1.96	1.29	1.62	1.73	1.14	0.594	0.893	1.01	1.91	2.09	1.85
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.0	3.2	3.0	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2	<2.0
Strontium (Sr)-Dissolved	0.105	0.0532	0.0761	0.117	0.272	0.341	0.383	0.404	0.374	0.335	0.165	0.185	0.123	0.143	0.151	0.0745	0.110	0.127	0.289	0.307	0.32
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000034	0.000014	0.000018	0.000036	0.000087	0.000106	0.000398	0.000407	0.000363	0.000222	0.000026	0.000033	0.000026	0.000032	0.000019	0.000026	0.000023	0.000109	0.000079	0.000304	0.000109
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0030	0.0048	0.0044	0.0403	0.0285	0.0285	0.0560	0.0014	0.0660	0.0010	0.0012	0.0259	<0.0010	0.0160	<0.0030	0.065	0.0265	0.0044

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-3. 2010: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																					
Sample ID	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1
Date Sampled	17-Jan-10	3-Mar-10	28-Mar-10	1-May-10	26-May-10	5-Jul-10	3-Aug-10	27-Aug-10	28-Sep-10	21-Oct-10	15-Nov-10	15-Dec-10	17-Jan-10	3-Mar-10	28-Mar-10	1-May-10	26-May-10	5-Jul-10	3-Aug-10	27-Aug-10	28-Sep-10
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L855505-9	L866873-9	L873293-11	L884476-15	L891484-12	L905787-25	L916942-12	L926457-25	L938295-12	L946803-2	L955725-24	L963831-2	L855505-1	L866873-1	L873292-4	L884476-7	L891484-1	L905787-1	L916942-1	L926457-1	L938295-1
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	362	384	335	338	210	171	92.1	136	161	291	321	380	256	275	211	200	136	138	98	124	135
Hardness (as $CaCO_3$)	165	174	159	173	94.1	78.6	41.4	58.4	72.1	133	161	176	121	125	98.0	93.8	60.3	62.2	45.6	55.9	59.8
pH	8.11	8.12	8.06	7.94	7.96	7.89	7.84	8.00	7.89	7.83	8.08	8.08	7.81	8.16	8.00	8.08	8.00	7.85	7.9	7.92	7.9
Total Suspended Solids	5.3	<3.0	22.2	37.0	89.5	82.0	341	104	558	57.8	30.6	13.5	9.3	<3.0	6.7	11.0	54.0	39.3	257	84.0	448
Total Dissolved Solids	241	261	220	220	143	106	53	98	108	194	194	247	166	175	135	126	74	87	54	69	92
Turbidity (NTU)	11.4	11.2	31.4	47.2	80.6	79.4	174	47.6	431	47.3	30.8	23.3	6.82	5.33	7.81	14.7	31.2	47.4	173	62.7	296
Anions and Nutrients																					
Acidity (as $CaCO_3$)	2.8	2.8	2.2	4.5	4.1	3.2	2.5	4.2	5.9	5.9	2.1	4.9	3.8	2.6	2.5	3.1	2.1	2.0	2.5	4.8	2.4
Alkalinity, Bicarbonate (as $CaCO_3$)	78.4	79.5	82.2	56.0	34.6	27.4	25.1	29.2	40.6	45.5	64.7	76.9	70.4	65.5	68.3	49.9	35.0	33.7	33.4	54.3	44.7
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0
Alkalinity, Total (as $CaCO_3$)	78.4	79.5	82.2	56.0	34.6	27.4	25.1	29.2	40.6	45.5	64.7	76.9	70.4	65.5	68.3	49.9	35.0	33.7	33.4	54.3	44.7
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.102	0.119	0.108	0.155	0.100	0.087	0.036	0.042	0.056	0.145	0.139	0.165	0.061	0.066	0.052	0.062	0.046	0.053	0.029	0.034	0.035
Nitrate (as N)	0.120	0.139	0.258	0.286	0.0697	0.0310	0.0107	0.0173	0.0465	0.129	0.149	0.122	0.0986	0.0996	0.140	0.203	0.0538	0.0296	0.0133	0.0175	0.0426
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	0.074	<0.050	<0.050	<0.050	<0.050	0.068	<0.050	0.061	<0.050	<0.050	0.060	0.060	0.767	<0.050	<0.050	0.053	<0.050	0.103
Total Nitrogen	0.140	0.170	0.290	0.360	0.050	<0.050	<0.050	<0.050	0.114	0.13	0.21	0.12	0.140	0.160	0.200	0.970	0.100	0.060	0.066	<0.050	0.146
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	0.0023	0.0017	<0.0010	<0.0010	<0.0010	0.0014	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0031	0.0017	<0.0010	0.0019	<0.0010	0.0022
Phosphorus (P)-Total	0.0174	0.0210	0.0606	0.605	0.303	0.115	0.404	0.091	0.973	0.324	0.161	0.0663	0.0086	0.0078	0.0183	0.154	0.130	0.0615	0.237	0.0996	0.751
Sulfate (SO_4)	103	113	96.1	112	65.2	50.7	19.1	31.9	38	92.4	94.9	117	59.6	64.3	44.5	46.3	27.8	32.1	15.3	25.6	23.3
Cyanides																					
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	<0.0010	<0.0010	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	0.0012	0.0011	<0.0010	<0.0010	0.0013	0.0022	0.0015	0.0015	<0.0010	<0.0010	<0.0010	0.0021
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	<0.50	0.52	1.04	0.34	<0.50	<0.50	0.58	<0.50	1.58	0.7	0.84	0.51	0.61	0.77	1.55	0.76	0.76	0.51	0.88	<0.50	2.53
Total Metals																					
Aluminum (Al)-Total	0.309	0.273	1.09	1.40	2.57	3.01	6.53	1.76	6.49	1.63	0.877	0.744	0.237	0.130	0.340	0.495	1.46	1.93	3.69	0.766	10.2
Antimony (Sb)-Total	0.00057	0.00065	0.00071	0.00083	0.00101	0.00095	0.00132	0.00069	0.00097	0.00071	0.00063	0.00064	0.00176	0.00148	0.00148	0.00142	0.00122	0.00151	0.00099	0.00079	0.00197
Arsenic (As)-Total	0.00100	0.00110	0.00280	0.0337	0.0164	0.00395	0.00692	0.00243	0.00695	0.0155	0.00637	0.00389	0.00082	0.00063	0.00097	0.00897	0.00496	0.00234	0.00463	0.00178	0.00987
Barium (Ba)-Total	0.0363	0.0370	0.0439	0.0515	0.0974	0.0920	0.19	0.0690	0.17	0.0528	0.0411	0.0387	0.0344	0.0344	0.0335	0.0311	0.0522	0.0595	0.117	0.0442	0.209
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	0.011	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.00118	0.00110	0.00139	0.00286	0.00219	0.00153	0.000691	0.000759	0.000812	0.00201	0.00178	0.0023	0.000522	0.000429	0.000395	0.000779	0.000679	0.000717	0.000412	0.000431	0.000568
Calcium (Ca)-Total	58.5	65.6	59.6	65.7	34.4	27.6	17.1	23.1	36.3	47	57.2	64	42.7	42.9	34.8	34.7	21.4	22.1	18	19.1	27.8
Chromium (Cr)-Total	<0.00050	<0.00050	0.00089	0.00078	0.00167	0.00230	0.00631	0.00157	0.0073	0.00146	0.00069	0.00024	<0.00050	<0.00050	<0.00050	<0.00050	0.00172	0.00202	0.0045	0.00084	0.0158
Cobalt (Co)-Total	0.00133	0.00137	0.00194	0.00407	0.00340	0.00320	0.0043	0.00186	0.00615	0.00373	0.00253	0.00238	0.00061	0.00052	0.00055	0.00118	0.00149	0.00176	0.00286	0.00114	0.00695
Copper (Cu)-Total	0.0666	0.0610	0.120	0.205	0.128	0.182	0.0681	0.0707	0.0817	0.252	0.172	0.181	0.0339	0.0244	0.0310	0.0567	0.0414	0.0885	0.039	0.0436	0.0547
Iron (Fe)-Total	1.41	1.43	3.77	7.59	7.09	6.17	11	3.09	11.1	7.18	4.29	3.5	0.884	0.642	1.11	2.38	2.93	3.46	5.82	1.67	16.7
Lead (Pb)-Total	0.000957	0.000796	0.00218	0.00415	0.00425	0.00427	0.00805	0.00329	0.0101	0.00294	0.00202	0.0018	0.000622	0.000366	0.000727	0.00126	0.00191	0.00237	0.00543	0.00207	0.00778
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0064
Magnesium (Mg)-Total	4.96	5.36	5.04	5.34	3.29	3.11	3.8	2.14	4.73	4.53	4.37	5.67	4.67	4.64	4.00	3.84	2.88	3.10	2.85	2.09	7.08
Manganese (Mn)-Total	0.192	0.216	0.256	0.280	0.219	0.254	0.322	0.175	0.504	0.248	0.211	0.274	0.0899	0.0837	0.0738	0.0844	0.0923	0.126	0.223	0.107	0.453
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000021	<0.000010	0.000027	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000025	<0.000010	0.000044
Molybdenum (Mo)-Total	0.00231	0.00240	0.00231	0.00358	0.00233	0.00185	0.00162	0.00117	0.00171	0.00296	0.00247	0.00258	0.00165	0.00156	0.00127	0.00136	0.00110	0.00137	0.000854	0.000765	0.00176
Nickel (Ni)-Total	0.00163	0.00147	0.00195	0.00227	0.00217	0.00286	0.00492	0.00170	0.00717	0.00365	0.00266	0.00234	0.00106	0.00077	0.00101	0.00117	0.00203	0.00222	0.00419	0.00164	0.0129
Phosphorus (P)-Total	<0.30	<0.30	<0.30	0.54	0.30	<0.30	0.41	<0.30	0.81	0.32	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.32	<0.30	0.53

Table A2-3. 2010: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																					
Sample ID	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1
Date Sampled	17-Jan-10	3-Mar-10	28-Mar-10	1-May-10	26-May-10	5-Jul-10	3-Aug-10	27-Aug-10	28-Sep-10	21-Oct-10	15-Nov-10	15-Dec-10	17-Jan-10	3-Mar-10	28-Mar-10	1-May-10	26-May-10	5-Jul-10	3-Aug-10	27-Aug-10	28-Sep-10
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L855505-9	L866873-9	L873293-11	L884476-15	L891484-12	L905787-25	L916942-12	L926457-25	L938295-12	L946803-2	L955725-24	L963831-2	L855505-1	L866873-1	L873292-4	L884476-7	L891484-1	L905787-1	L916942-1	L926457-1	L938295-1
Total Metals *(cont'd)*																					
Potassium (K)-Total	1.40	1.42	1.40	1.47	1.46	1.54	2.39	1.27	3.13	1.55	1.36	1.63	0.945	0.869	0.754	0.692	0.876	1.08	1.61	0.734	3.37
Selenium (Se)-Total	0.00185	0.00174	0.00180	0.00338	0.00170	0.00088	0.00099	0.00066	0.00119	0.00227	0.00195	0.00188	0.00122	0.00099	0.00082	0.00120	0.00078	0.00062	0.00071	0.00060	0.00116
Silicon (Si)-Total	2.50	2.54	3.71	3.22	6.05	6.37	11.8	3.47	11.5	3.96	3.11	3.01	2.28	2.18	2.40	2.36	4.25	4.94	8.8	2.03	21.4
Silver (Ag)-Total	<0.000010	<0.000010	0.000015	0.000024	0.000081	0.000053	0.000348	0.000040	0.000089	0.000027	0.00001	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	0.000067	0.000099	0.000077	0.000026	0.000195
Sodium (Na)-Total	3.0	2.9	2.6	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.7	2.7	2.6	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.343	0.381	0.317	0.339	0.186	0.156	0.0991	0.118	0.176	0.263	0.281	0.35	0.283	0.280	0.214	0.222	0.148	0.147	0.109	0.114	0.179
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012
Tin (Sn)-Total	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	0.00010	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	0.042	0.035	0.115	0.123	0.397	0.073	0.346	0.059	0.028	<0.010	0.011	<0.010	0.015	0.017	0.058	0.080	0.183	0.034	0.572
Uranium (U)-Total	0.000420	0.000414	0.000484	0.000623	0.000357	0.000368	0.00033	0.000228	0.000501	0.000407	0.000381	0.000471	0.000216	0.000199	0.000168	0.000182	0.000135	0.000180	0.000187	0.000108	0.000347
Vanadium (V)-Total	<0.0010	<0.0010	0.0031	0.0033	0.0075	0.0087	0.0233	0.0055	0.0272	0.0044	0.0021	0.0011	<0.0010	<0.0010	<0.0010	0.0015	0.0050	0.0068	0.0146	0.0028	0.0428
Zinc (Zn)-Total	0.0774	0.0675	0.102	0.211	0.170	0.0946	0.0645	0.0559	0.0656	0.134	0.123	0.154	0.0366	0.0269	0.0296	0.0576	0.0545	0.0444	0.036	0.0347	0.061
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0392	0.0658	0.0366	0.0238	0.0155	0.0482	0.083	0.0256	0.0862	0.0427	0.0878	0.0829	0.0271	0.0458	0.0279	0.260	0.0257	0.0487	0.0824	0.0368	0.055
Antimony (Sb)-Dissolved	0.00052	0.00052	0.00045	0.00050	0.00047	0.00051	0.00037	0.00040	0.00056	0.00046	0.0005	0.00051	0.00173	0.00149	0.00139	0.00130	0.00100	0.00125	0.00054	0.00066	0.00099
Arsenic (As)-Dissolved	0.00011	0.00014	0.00013	0.00028	0.00012	<0.00010	0.00013	<0.00010	0.00018	<0.00010	0.00011	<0.00010	0.00016	0.00018	0.00017	0.00825	0.00023	<0.00010	0.00021	<0.00010	0.00025
Barium (Ba)-Dissolved	0.0346	0.0340	0.0306	0.0241	0.0277	0.0376	0.0413	0.0294	0.0297	0.0282	0.0303	0.0342	0.0320	0.0331	0.0277	0.0262	0.0219	0.0284	0.0345	0.0268	0.0252
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000720	0.000533	0.000500	0.000592	0.000682	0.000629	0.000046	0.000402	0.000079	0.000623	0.000598	0.000831	0.000348	0.000270	0.000214	0.000720	0.000272	0.000312	0.00003	0.000223	0.000042
Calcium (Ca)-Dissolved	58.0	61.3	56.2	61.2	33.6	27.8	15.1	20.9	26.2	46.4	57.6	61.4	41.0	42.4	33.2	31.8	20.3	21.1	16.2	19.4	20.4
Chromium (Cr)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00013	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	0.00023	<0.00020	0.00015
Cobalt (Co)-Dissolved	0.00119	0.00105	0.00100	0.00238	0.00164	0.00096	<0.00010	0.00070	0.00026	0.00249	0.00177	0.00176	0.00046	0.00040	0.00028	0.00101	0.00047	0.00044	<0.00010	0.00037	0.0001
Copper (Cu)-Dissolved	0.00300	0.00274	0.00430	0.00209	0.00123	0.00156	0.00089	0.00114	0.00094	0.00262	0.00381	0.00334	0.00292	0.00302	0.00522	0.0507	0.00250	0.00149	0.0003	0.00095	0.00168
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.048	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	2.15	<0.030	<0.030	<0.030	<0.030	0.032
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00106	<0.000050	<0.000050	<0.000050	<0.000050	0.000217
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	4.90	5.06	4.44	4.81	2.44	2.21	0.867	1.47	1.65	4.12	4.31	5.48	4.48	4.60	3.65	3.49	2.32	2.31	1.26	1.80	2.14
Manganese (Mn)-Dissolved	0.183	0.189	0.183	0.206	0.133	0.146	0.0217	0.0994	0.0727	0.202	0.184	0.243	0.0716	0.0760	0.0526	0.0719	0.0434	0.0659	0.00824	0.0611	0.0263
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00217	0.00212	0.00183	0.00235	0.00159	0.00138	0.000802	0.00107	0.00147	0.00214	0.00206	0.00219	0.00158	0.00150	0.00115	0.00118	0.000807	0.00109	0.000765	0.000938	0.000939
Nickel (Ni)-Dissolved	0.00151	0.00123	0.00110	0.00132	0.00068	0.00057	<0.00050	<0.00050	<0.00050	0.00224	0.00168	0.00157	0.00069	0.00068	0.00065	0.00080	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	1.41	1.31	1.18	1.23	0.840	0.830	0.72	0.707	1.35	1.3	1.32	1.56	0.898	0.858	0.681	0.589	0.479	0.581	0.621	0.609	0.922
Selenium (Se)-Dissolved	0.00194	0.00176	0.00166	0.00260	0.00126	0.00087	0.00063	0.00071	0.00089	0.00185	0.00182	0.00194	0.00122	0.00107	0.00092	0.00112	0.00060	0.00049	0.00053	0.00046	0.00057
Silicon (Si)-Dissolved	2.34	2.30	2.26	1.83	1.29	1.16	0.641	0.909	1.12	1.87	2.17	2.33	2.06	2.12	2.03	2.05	1.33	1.15	0.706	0.858	1.25
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000025	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	2.7	2.8	2.5	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.7	2.4	2.6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.339	0.356	0.306	0.312	0.177	0.157	0.0771	0.111	0.129	0.26	0.277	0.337	0.277	0.284	0.204	0.199	0.143	0.142	0.0916	0.117	0.132
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000350	0.000348	0.000308	0.000311	0.000070	0.000043	0.000026	0.000031	0.000116	0.000171	0.000274	0.00037	0.000165	0.000172	0.000115	0.000158	0.000052	0.000049	0.000029	0.000039	0.000071
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0235	0.0158	0.0158	0.0200	0.0266	0.0086	<0.0010	0.0113	<0.0030	0.0165	0.0164	0.0218	0.0144	0.0100	0.0103	0.0541	0.0126	0.0045	<0.0010	0.0059	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-3. 2010: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																			
Sample ID	UR1	UR1	UR1	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR2	UR2	UR2	UR2
Date Sampled	21-Oct-10	15-Nov-10	15-Dec-10	17-Jan-10	3-Mar-10	28-Mar-10	1-May-10	26-May-10	5-Jul-10	3-Aug-10	27-Aug-10	28-Sep-10	21-Oct-10	15-Nov-10	15-Dec-10	1-May-10	5-Jul-10	27-Aug-10	15-Nov-10
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L946802-1	L955725-1	L963832-1	L855505-2	L866873-2	L873293-1	L884476-8	L891484-2	L905787-3	L916942-2	L926457-3	L938295-2	L946802-2	L955725-3	L963832-2	L884476-10	L905787-2	L926457-2	L955725-2
Physical Tests																			
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	8.7	<5.0	<5.0	<5.0	<5.0	<5.0	5.8	5.3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	195	220	297	181	193	153	135	90.2	111	100	109	115	138	153	206	169	116	99.1	172
Hardness (as $CaCO_3$)	87.1	108	128	85.1	90.8	74.5	63.5	45.1	53.1	49.1	50.9	52.6	62.6	74.1	93.9	77.3	52.8	43.4	80.4
pH	7.14	8.05	8.05	8.02	8.10	7.83	8.10	7.49	7.97	8.07	7.77	7.94	8.04	8.07	8.15	8.08	7.25	8.03	8.04
Total Suspended Solids	14.3	5.1	8	<3.0	<3.0	4.2	<3.0	<3.0	8.8	190	36.5	333	6.8	<3.0	7.5	5.5	18.3	48.5	6.1
Total Dissolved Solids	122	126	177	112	118	91	80	65	69	72	75	89	85	85	117	104	78	58	99
Turbidity (NTU)	21.9	10.9	14.3	0.74	0.61	1.16	1.50	16.0	20.7	148	43.0	225	4.93	1.17	0.69	6.59	26.8	39.1	5.43
Anions and Nutrients																			
Acidity (as $CaCO_3$)	6.9	2.3	4.8	2.9	2.4	2.6	2.8	3.0	3.2	2.1	4.9	11.9	3.8	2.1	3.7	3.1	4.7	4.1	2.2
Alkalinity, Bicarbonate (as $CaCO_3$)	47.3	63.1	77.1	64.5	68.2	62.2	47.6	34.2	39.5	42.7	40.2	47.4	48.4	56.7	73.5	49.8	33.6	32.8	57.9
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0
Alkalinity, Total (as $CaCO_3$)	47.3	63.1	77.1	64.5	68.2	62.2	47.6	34.2	39.5	42.7	40.2	47.4	48.4	56.7	73.5	49.8	33.6	32.8	57.9
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.074	0.074	0.095	0.026	0.037	0.031	0.027	0.020	<0.020	<0.020	<0.020	0.021	0.029	0.033	0.037	0.051	0.042	0.032	0.055
Nitrate (as N)	0.0995	0.11	0.0987	0.0863	0.0840	0.0938	0.175	0.0465	0.0234	0.0139	0.0184	0.0378	0.0802	0.0822	0.0903	0.314	0.0441	0.0290	0.16
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	0.06	<0.050	<0.050	<0.050	<0.050	0.095	<0.050	<0.050	0.094	<0.050	0.132	<0.050	<0.050	<0.050	0.147	<0.050	<0.050	<0.050
Total Nitrogen	0.11	0.17	0.09	0.110	0.130	0.110	0.270	0.050	<0.050	0.108	<0.050	0.17	0.08	0.12	0.09	0.460	0.050	<0.050	0.2
Orthophosphate-Dissolved (as P)	0.0014	<0.0010	<0.0010	0.0019	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	0.002	0.0011	<0.0010	<0.0010	0.0027	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.0956	0.0457	0.0318	0.0035	<0.0020	0.0070	0.0063	0.0243	0.0260	0.254	0.0738	0.512	0.0216	0.0052	0.002	0.0562	0.0373	0.0584	0.0223
Sulfate (SO_4)	45.9	50.1	74	26.9	29.6	22.4	18.6	11.4	14.8	8.82	13.3	12.7	18.5	21.2	33	31.6	21.5	16.8	30.2
Cyanides																			
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	0.0026	0.0017	0.0011	<0.0010	0.0015	0.0022	0.0011	0.0010	<0.0010	<0.0010	<0.0010	0.0018	0.0023	0.0016	<0.0010	0.0011	<0.0010	<0.0010	0.0013
CN-THIO Thiocyanate	-	-	-	-	-	<0.50	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	1.2	1.15	0.8	0.71	0.88	1.78	0.96	0.88	<0.50	1.18	<0.50	3.09	1.41	1.23	0.57	0.56	<0.50	<0.50	1.07
Total Metals																			
Aluminum (Al)-Total	0.763	0.337	0.451	0.623	0.0316	0.176	0.0971	0.814	1.01	5.1	0.545	8.27	0.209	0.0745	0.0358	0.303	1.05	0.736	0.452
Antimony (Sb)-Total	0.00154	0.00131	0.00139	0.00282	0.00231	0.00212	0.00169	0.00134	0.00197	0.0013	0.00109	0.00233	0.00215	0.00175	0.00219	0.00070	0.00073	0.00041	0.00056
Arsenic (As)-Total	0.00605	0.00262	0.00244	0.00099	0.00031	0.00056	0.00031	0.00094	0.00120	0.00671	0.00153	0.00899	0.00051	0.00049	0.00034	0.00309	0.00115	0.00115	0.00121
Barium (Ba)-Total	0.0359	0.0309	0.0395	0.0399	0.0325	0.0292	0.0226	0.0291	0.0338	0.112	0.0320	0.177	0.0287	0.0257	0.0339	0.0319	0.0404	0.0354	0.0338
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.010
Cadmium (Cd)-Total	0.000755	0.000695	0.00112	0.000041	0.000025	0.000046	0.000047	0.000052	0.000048	0.000118	0.000044	0.000278	0.000054	0.000039	0.000024	0.000276	0.000280	0.000156	0.000221
Calcium (Ca)-Total	28.2	38.2	46.7	28.6	30.7	26.5	21.5	14.3	16.8	19.1	16.7	24.8	20.4	23.5	29.4	29.6	19.2	15.8	29
Chromium (Cr)-Total	0.00091	0.0003	0.00027	0.00138	<0.00050	<0.00050	<0.00050	0.00166	0.00220	0.00864	0.00083	0.0161	0.00062	0.00029	0.00021	<0.00050	0.00138	0.00096	0.00079
Cobalt (Co)-Total	0.00151	0.00097	0.00113	0.00046	<0.00010	0.00017	<0.00010	0.00055	0.00057	0.00333	0.00075	0.00603	0.00019	<0.00010	<0.00010	0.00044	0.00084	0.00071	0.0005
Copper (Cu)-Total	0.0896	0.0662	0.102	0.00239	0.00049	0.00131	0.00095	0.00238	0.00253	0.0139	0.00632	0.0247	0.00128	0.00079	0.00054	0.0202	0.0339	0.0155	0.0209
Iron (Fe)-Total	2.8	1.63	2.09	1.02	0.088	0.331	0.156	1.10	1.36	7.42	1.02	13.1	0.297	0.121	0.084	0.990	1.69	1.24	1.02
Lead (Pb)-Total	0.00119	0.000779	0.00114	0.000507	0.000051	0.000284	0.000176	0.00100	0.000779	0.00459	0.00122	0.00726	0.000325	0.000095	0.000066	0.000525	0.00131	0.00134	0.000619
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0071	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	3.69	4.01	5.3	4.74	4.79	4.16	3.32	2.58	3.04	4.04	2.51	6.45	3.55	3.63	5.06	2.66	2.07	1.51	2.47
Manganese (Mn)-Total	0.0981	0.0841	0.133	0.0252	0.00858	0.0166	0.00731	0.0309	0.0319	0.211	0.0484	0.383	0.0149	0.00873	0.0089	0.0338	0.0605	0.0563	0.0364
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000024	<0.000010	0.000053	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00152	0.00148	0.00205	0.00107	0.00100	0.000788	0.000586	0.000477	0.000839	0.000701	0.000781	0.000984	0.000767	0.000821	0.00115	0.00214	0.00178	0.00162	0.00209
Nickel (Ni)-Total	0.00187	0.00133	0.00153	0.00161	<0.00050	0.00086	0.00063	0.00165	0.00173	0.00756	0.00163	0.0161	0.00094	0.00059	0.00083	0.00057	0.00117	0.00138	0.00099
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.31	<0.30	0.54	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-3. 2010: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																			
Sample ID	UR1	UR1	UR1	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR2	UR2	UR2	UR2
Date Sampled	21-Oct-10	15-Nov-10	15-Dec-10	17-Jan-10	3-Mar-10	28-Mar-10	1-May-10	26-May-10	5-Jul-10	3-Aug-10	27-Aug-10	28-Sep-10	21-Oct-10	15-Nov-10	15-Dec-10	1-May-10	5-Jul-10	27-Aug-10	15-Nov-10
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L946802-1	L955725-1	L963832-1	L855505-2	L866873-2	L873293-1	L884476-8	L891484-2	L905787-3	L916942-2	L926457-3	L938295-2	L946802-2	L955725-3	L963832-2	L884476-10	L905787-2	L926457-2	L955725-2
Total Metals *(cont'd)*																			
Potassium (K)-Total	0.82	0.805	1.21	0.616	0.483	0.464	0.353	0.527	0.657	1.77	0.483	2.75	0.442	0.394	0.55	0.912	0.920	0.764	0.948
Selenium (Se)-Total	0.00113	0.00111	0.00143	0.00069	0.00051	0.00056	0.00043	0.00035	0.00047	0.00079	0.00046	0.00077	0.00046	0.00049	0.00071	0.00069	0.00030	0.00041	0.00063
Silicon (Si)-Total	2.8	2.5	2.64	2.73	2.00	2.21	1.93	2.88	3.26	10.4	1.64	20.4	2.25	2.14	2.09	2.70	3.46	2.24	3.15
Silver (Ag)-Total	0.000013	<0.000010	<0.000010	0.000010	<0.000010	0.000012	<0.000010	0.000035	0.000032	0.000086	<0.000010	0.000145	<0.000010	<0.000010	<0.000010	<0.000010	0.000045	0.000013	<0.000010
Sodium (Na)-Total	<2.0	<2.0	2.4	2.5	2.5	2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.2	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.209	0.233	0.312	0.241	0.253	0.211	0.179	0.125	0.140	0.128	0.126	0.188	0.191	0.197	0.264	0.166	0.109	0.0825	0.151
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.025	<0.010	<0.010	0.034	<0.010	<0.010	<0.010	0.029	0.043	0.223	0.019	0.377	<0.010	<0.010	<0.010	0.016	0.056	0.047	0.036
Uranium (U)-Total	0.000176	0.000164	0.000256	0.000050	0.000038	0.000034	0.000022	0.000028	0.000040	0.000113	0.000034	0.000171	0.000026	0.000025	0.00004	0.000303	0.000244	0.000181	0.000272
Vanadium (V)-Total	0.0021	<0.0010	<0.0010	0.0028	<0.0010	<0.0010	<0.0010	0.0033	0.0049	0.0236	0.0028	0.0394	<0.0010	<0.0010	<0.0010	0.0010	0.0037	0.0026	0.0017
Zinc (Zn)-Total	0.0533	0.0489	0.079	0.0055	0.0019	0.0047	0.0037	0.0060	0.0047	0.0204	0.0093	0.039	0.0051	0.0048	<0.0030	0.0202	0.0184	0.0141	0.0164
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0435	0.0694	0.0865	0.0057	<0.0070	0.0174	0.0126	0.0243	0.0229	0.108	0.0357	0.0467	0.0203	0.0112	0.0052	0.0187	0.0506	0.0557	0.0403
Antimony (Sb)-Dissolved	0.00145	0.00125	0.00123	0.00271	0.00232	0.00193	0.00165	0.00131	0.00207	0.00076	0.00110	0.00143	0.0021	0.00171	0.00213	0.00065	0.00065	0.00035	0.00052
Arsenic (As)-Dissolved	0.00013	0.00012	0.00012	0.00028	0.00027	0.00026	0.00021	0.00025	0.00039	0.00047	0.00039	0.00047	0.00028	0.00029	0.00029	0.00026	0.00012	0.00017	0.00024
Barium (Ba)-Dissolved	0.0255	0.0271	0.035	0.0301	0.0316	0.0261	0.0212	0.0162	0.0204	0.0231	0.0211	0.0212	0.0239	0.0243	0.033	0.0253	0.0246	0.0235	0.0286
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000306	0.000322	0.000443	0.000024	0.000022	0.000033	0.000041	0.000026	0.000017	<0.000010	0.000016	0.000012	0.000034	0.000034	0.000021	0.000144	0.000151	0.000085	0.000135
Calcium (Ca)-Dissolved	28.9	37	43.1	27.0	28.8	23.5	20.2	14.2	17.0	16.8	16.6	17	19.5	23.8	29.4	27.1	18.5	15.4	28.4
Chromium (Cr)-Dissolved	0.00016	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	0.00026	<0.00020	<0.00020	0.00016	<0.00010	<0.00010	<0.00050	<0.00020	<0.00020	<0.00010
Cobalt (Co)-Dissolved	0.00099	0.00077	0.0008	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00024	0.00018	0.00015	0.00019
Copper (Cu)-Dissolved	0.00453	0.00597	0.00305	0.00030	0.00031	0.00053	0.00062	0.00044	0.00033	0.00017	0.00024	0.00096	0.00056	<0.00050	<0.00050	0.00324	0.00130	0.00076	0.00387
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	0.041	<0.030	<0.030	<0.030	0.064	<0.030	0.04	<0.030	<0.030	<0.030	<0.030	<0.030	0.035	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	3.6	3.8	4.97	4.26	4.57	3.82	3.15	2.33	2.60	1.76	2.28	2.47	3.39	3.59	4.99	2.37	1.61	1.19	2.33
Manganese (Mn)-Dissolved	0.0795	0.0747	0.11	0.00760	0.00669	0.00785	0.00336	0.00582	0.00263	0.00141	0.00816	0.00336	0.00523	0.00542	0.0058	0.0224	0.0272	0.0249	0.0205
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00127	0.00127	0.0018	0.00100	0.000960	0.000737	0.000581	0.000453	0.000809	0.000574	0.000710	0.00057	0.000717	0.00078	0.00109	0.00195	0.00172	0.00152	0.00211
Nickel (Ni)-Dissolved	0.00115	0.00099	0.00118	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00061	<0.00050	0.00064	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.721	0.764	1.14	0.447	0.457	0.396	0.322	0.315	0.388	0.413	0.412	0.54	0.393	0.378	0.549	0.812	0.681	0.673	0.915
Selenium (Se)-Dissolved	0.00098	0.00106	0.00134	0.00070	0.00063	0.00048	0.00051	0.00034	0.00037	0.00045	0.00042	0.00044	0.00049	0.00052	0.00072	0.00063	0.00038	0.00040	0.00064
Silicon (Si)-Dissolved	1.89	2.07	2.13	1.87	1.96	2.00	1.87	1.33	1.15	0.832	0.827	1.34	1.87	1.99	1.95	2.29	1.48	1.15	2.45
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	2.3	2.2	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.212	0.224	0.296	0.234	0.241	0.200	0.169	0.126	0.142	0.107	0.127	0.134	0.184	0.191	0.255	0.154	0.106	0.0870	0.152
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000097	0.000122	0.000208	0.000036	0.000038	0.000025	0.000018	0.000014	0.000022	0.000017	0.000019	0.000019	0.000021	0.000023	0.000036	0.000259	0.000153	0.000128	0.000239
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0105	0.0112	0.014	0.0014	0.0013	0.0021	0.0025	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0030	0.0032	<0.0030	0.0067	0.0028	0.0019	0.0065

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	lake
QAQC		replicate					replicate														
Sample ID	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	BJ (2M)
Date Sampled	15-Jul-11	25-Aug-11	25-Aug-11	17-Sep-11	6-Oct-11	18-Oct-11	18-Oct-11	5-Nov-11	7-Nov-11	9-Nov-11	11-Nov-11	18-Nov-11	23-Nov-11	30-Nov-11	7-Dec-11	13-Dec-11	14-Dec-11	30-Dec-11	12-Jan-12	26-Jan-12	23-Aug-11
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included
ALS Sample ID	L1033117-7	L1051133-10	L1051133-8	L1060382-1	L1071289-3	L1074434-7	L1074434-9	L1083093-3	L1084049-2	L1084061-2	L1086459-2	L1089230-3	L1089233-3	L1091582-2	L1094651-3	L1096258-5	L1098872-3	L1103237-3	L1104748-3	L1110404-1	L1051244-1
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5.0	<5	<5.0	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	<5.0	<5	<5	<5	<5	<5.0
Conductivity (uS/cm)	402	406	404	401	416	406	406	413	401	414	429	389	438	423	444	448	450	439	477	496	51.5
Hardness (as $CaCO_3$)	156	151	147	156	174	151	151	170	180	170	162	139	164	161	151	150	153	159	127	109	21.6
pH	8.04	8.05	7.99	7.96	8.07	8.02	8.07	8.09	7.89	8.02	7.99	8.02	8.10	8.16	7.99	8.19	8.15	7.94	8.08	7.94	7.63
Total Suspended Solids	<3.0	12.2	27.6	3.2	5.1	19.9	16.5	6.0	36.5	22.5	11.6	17.7	10.3	52.0	17.2	6.7	42.3	50.2	30.7	242	15.6
Total Dissolved Solids	255	261	255	257	259	251	231	272	260	265	259	266	268	265	279	286	263	278	289	296	29
Turbidity (NTU)	1.82	18.8	17.9	4.26	4.23	13.5	13.6	12.8	39.4	25.6	13.4	27.8	19.2	75.4	20.3	11.2	59.4	64.4	24.5	204	1.27
Anions and Nutrients																					
Acidity (as $CaCO_3$)	3.6	2.5	2.7	2.1	2.2	3.9	3.5	2.2	2.8	2.3	4.1	2.8	2.5	1.2	3.2	1.9	2.9	4.2	2.4	3.7	2.4
Alkalinity, Bicarbonate (as $CaCO_3$)	89.7	86.6	85.4	83.8	90.0	87.4	82.3	95.6	97.2	96.7	94.5	83.8	93.1	97.6	105	102	98.7	19.6	106	106	14.7
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2	<2.0	<2.0	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2	<2	<2	<2	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2	<2.0	<2.0	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2	<2	<2	<2	<2.0
Alkalinity, Total (as $CaCO_3$)	89.7	86.6	85.4	83.8	90.0	87.4	82.3	95.6	97.2	96.7	94.5	83.8	93.1	97.6	105	102	98.7	19.6	106	106	14.7
Ammonia, Total (as N)	0.0101	0.0096	0.0103	<0.0050	0.0118	0.0165	0.0148	0.0182	0.0238	0.0249	0.0233	0.0424	0.0541	0.0495	0.0487	0.0646	0.0532	0.0709	0.0640	0.103	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.05	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	<0.05	<0.05	<0.05	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	0.52	0.60	0.67	0.67	0.98	1.05	1.12	1.50	<0.50
Fluoride (F)	0.188	0.202	0.203	0.210	0.216	0.216	0.215	0.218	0.240	0.246	0.226	0.226	0.246	0.242	0.259	0.254	0.261	0.342	0.358	0.412	<0.020
Nitrate (as N)	0.0285	0.0337	0.0333	0.0314	0.0372	0.0174	0.0174	0.0186	0.0185	0.0182	0.0170	0.0177	0.0133	0.0153	0.0200	0.0156	0.0196	0.0240	0.0175	0.0162	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.0010	<0.0010	0.0012	<0.001	<0.001	<0.001	<0.001	0.0013	0.0015	0.0042	0.0023	0.0018	0.0013	0.0024	0.0025	<0.0010
Total Kjeldahl Nitrogen	0.082	0.086	0.097	0.099	<0.05	0.083	0.133	0.054	0.403	<0.05	<0.05	0.064	0.072	0.094	0.120	<0.050	0.109	0.177	0.106	0.133	0.050
Total Nitrogen	0.110	0.120	0.130	0.130	0.0372	0.100	0.150	0.0735	0.422	0.0182	0.0170	0.0818	0.0866	0.110	0.144	<0.050	0.130	0.202	0.126	0.152	0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.0010	<0.0010	0.0010	<0.001	<0.001	<0.001	<0.001	0.0012	0.0011	0.0014	0.0012	0.0013	0.0029	0.0012	0.0032	<0.0010
Phosphorus (P)-Total	0.0042	0.0136	0.0257	0.0105	0.0117	0.0370	0.0334	0.0233	0.0627	0.0385	0.0192	0.0487	0.0330	0.120	0.0326	0.0176	0.076	0.096	0.0433	0.298	<0.0020
Sulfate (SO_4)	118	115	116	114	116	116	115	119	117	118	119	106	125	119	120	121	123	171	139	139	8.50
Cyanides																					
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.005	<0.0011	<0.0012	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0011	<0.005	<0.005	<0.005	<0.005	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0011	<0.005	<0.0011	<0.0011	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0076	-	<0.005	<0.005	<0.005	<0.005	<0.0010
CN-THIO Thiocyanate	-	-	-	-		-	-									-					-
Organic / Inorganic Carbon																					
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.5	0.60	1.41	<0.5	<0.5	<0.5	1.31	0.62	0.51	1.91	<0.5	<0.50	<0.5	2.16	1.55	1.57	<0.50
Total Metals																					
Aluminum (Al)-Total	0.0797	0.307	0.167	0.0543	0.0351	0.222	0.253	0.675	0.900	0.695	0.275	0.237	0.124	0.997	0.154	0.0945	0.834	0.754	0.493	2.93	0.0618
Antimony (Sb)-Total	0.00152	0.00134	0.00129	0.00164	0.00135	0.00163	0.00170	0.00263	0.00348	0.00251	0.00192	0.00260	0.00251	0.00894	0.00251	0.00196	0.00712	0.00605	0.00406	0.0355	0.00028
Arsenic (As)-Total	0.00438	0.00393	0.00387	0.00589	0.00744	0.00914	0.00935	0.0310	0.0371	0.0222	0.0188	0.0346	0.0369	0.149	0.0415	0.0346	0.114	0.0781	0.0524	0.428	0.00068
Barium (Ba)-Total	0.0355	0.0262	0.0238	0.0199	<0.02	0.0228	0.0230	0.032	0.052	0.042	0.026	0.023	0.024	0.052	0.023	0.0218	0.051	0.051	0.039	0.203	0.0325
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.001	<0.00010	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.2	<0.00050	<0.00050	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.00050	<0.2	<0.2	<0.2	<0.2	<0.00050
Boron (B)-Total	0.035	0.034	0.034	0.042	<0.1	0.041	0.043	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.064	<0.1	<0.1	<0.1	0.11	<0.010
Cadmium (Cd)-Total	0.000048	0.000221	0.000229	0.000201	0.000129	0.000351	0.000383	0.000346	0.000688	0.000455	0.000228	0.000482	0.000304	0.000850	0.000167	0.000102	0.000678	0.000401	0.000149	0.00246	<0.000010
Calcium (Ca)-Total	54.8	53.9	53.6	56.7	61.8	54.3	55.7	59.0	61.0	57.0	58.2	53.6	55.8	54.9	52.0	53.8	49.1	55.7	42.4	40.5	7.97
Chromium (Cr)-Total	0.00015	0.00049	0.00050	0.00018	<0.001	0.00013	0.00015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00021	<0.001	<0.001	<0.001	0.0013	0.00015
Cobalt (Co)-Total	0.00025	0.00052	0.00051	0.00043	0.00031	0.00079	0.00077	0.00075	0.00131	0.00096	0.00048	0.00084	0.00042	0.00179	<0.0003	0.00021	0.00154	0.00072	0.00037	0.00419	<0.00010
Copper (Cu)-Total	<0.00050	0.00365	0.00379	0.00150	0.0010	0.00378	0.00381	0.0049	0.0094	0.0073	0.0031	0.0058	0.0041	0.0121	0.0024	0.00124	0.0104	0.0052	0.0024	0.0490	<0.00050
Iron (Fe)-Total	0.150	0.654	0.646	0.201	0.214	1.16	1.22	1.87	3.09	1.89	1.01	1.84	1.67	7.29	1.38	1.11	5.34	3.34	1.50	20.5	<0.030
Lead (Pb)-Total	0.000690	0.00164	0.00169	0.00444	0.00458	0.00783	0.00867	0.0192	0.0294	0.0198	0.0105	0.0243	0.0156	0.0466	0.0106	0.00637	0.0419	0.0294	0.0119	0.147	<0.000050
Lithium (Li)-Total	0.0508	0.0488	0.0488	0.0559	0.0592	0.0540	0.0547	0.0572	0.0507	0.0495	0.0620	0.0610	0.0743	0.0973	0.0958	0.103	0.0923	0.100	0.165	0.209	<0.00050
Magnesium (Mg)-Total	5.20	4.50	4.50	4.96	5.33	4.56	4.67	5.14	4.73	4.82	5.19	4.75	5.06	5.10	4.77	4.99	4.96	5.44	4.26	3.95	0.270
Manganese (Mn)-Total	0.173	0.162	0.165	0.188	0.180	0.229	0.217	0.328	0.340	0.299	0.250	0.314	0.288	0.639	0.212	0.200	0.510	0.303	0.211	1.13	0.00475
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000010	<0.00001	<0.00001	<0.00001	0.000024	<0.000010
Molybdenum (Mo)-Total	0.00177	0.00182	0.00174	0.00162	0.0018	0.00168	0.00173	0.0018	0.0018	0.0017	0.0020	0.0018	0.0017	0.0027	0.0022	0.00231	0.0026	0.0024	0.0031	0.0047	0.000337
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	0.00073	<0.001	<0.00050	0.00050	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.001	<0.001	<0.001	0.0022	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.3	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30	<0.3	<0.3	<0.3	0.37	<0.30

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	lake
QAQC		replicate					replicate														
Sample ID	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	ADIT	BJ (2M)
Date Sampled	15-Jul-11	25-Aug-11	25-Aug-11	17-Sep-11	6-Oct-11	18-Oct-11	18-Oct-11	5-Nov-11	7-Nov-11	9-Nov-11	11-Nov-11	18-Nov-11	23-Nov-11	30-Nov-11	7-Dec-11	13-Dec-11	14-Dec-11	30-Dec-11	12-Jan-12	26-Jan-12	23-Aug-11
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included
ALS Sample ID	L1033117-7	L1051133-10	L1051133-8	L1060382-1	L1071289-3	L1074434-7	L1074434-9	L1083093-3	L1084049-2	L1084061-2	L1086459-2	L1089230-3	L1089233-3	L1091582-2	L1094651-3	L1096258-5	L1098872-3	L1103237-3	L1104748-3	L1110404-1	L1051244-1
Total Metals *(cont'd)*																					
Potassium (K)-Total	2.12	1.92	1.86	1.92	<2	1.88	1.93	2.3	2.1	2.0	2.0	<2	2.0	2.4	<2	2.15	2.5	2.8	2.6	4.3	0.078
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.001	<0.00010	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.00010
Silicon (Si)-Total	3.13	3.41	3.13	3.10	3.19	3.38	3.63	4.48	4.32	3.83	3.71	3.39	3.32	5.07	3.33	3.54	4.60	5.17	3.77	8.34	0.591
Silver (Ag)-Total	0.000023	0.000280	0.000092	0.000084	<0.00002	0.000348	0.000519	0.000547	0.00215	0.00156	0.000347	0.000291	0.000240	0.00194	0.000219	0.000022	0.00237	0.00221	0.000708	0.0262	<0.000010
Sodium (Na)-Total	16.4	17.2	17.3	18.0	19.2	18.4	19.1	19.8	16.9	17.5	20.4	19.2	24.7	28.4	29.9	34.4	32.4	36.3	49.2	62.4	<2.0
Strontium (Sr)-Total	1.05	1.03	1.01	1.10	1.18	1.07	1.09	1.19	1.08	1.10	1.18	1.10	1.19	1.22	1.18	1.31	1.23	1.44	1.16	1.14	0.0537
Thallium (Tl)-Total	0.000014	0.000024	0.000016	0.000017	<0.0002	0.000023	0.000023	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000030	<0.0002	<0.0002	<0.0002	0.00039	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.0005	<0.00010	<0.00010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00010	<0.0005	<0.0005	<0.0005	<0.0005	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	0.015	0.019	<0.01	<0.01	<0.01	<0.01	0.019	<0.01	<0.010	0.013	0.018	<0.01	0.025	<0.010
Uranium (U)-Total	0.000214	0.000230	0.000225	0.000218	<0.0002	0.000230	0.000237	0.00032	0.00031	0.00027	0.00027	0.00036	0.00034	0.00047	0.00032	0.000294	0.00040	0.00036	0.00040	0.00082	0.000026
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.0010	<0.0010	0.0012	0.0015	0.0013	<0.001	<0.001	<0.001	0.0015	<0.001	<0.0010	0.0013	0.0013	<0.001	0.0045	<0.0010
Zinc (Zn)-Total	0.0094	0.0318	0.0328	0.0282	0.0205	0.0457	0.0478	0.0441	0.0866	0.0661	0.0324	0.0530	0.0313	0.108	0.0200	0.0133	0.0870	0.0566	0.0231	0.345	0.0063
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0104	0.0158	0.0146	0.0200	0.0150	0.0923	0.0920	0.0058	0.0117	0.0134	0.0096	0.0054	<0.005	<0.005	0.251	0.0708	<0.005	<0.005	0.0101	0.0094	0.0179
Antimony (Sb)-Dissolved	0.00131	0.00122	0.00120	0.00160	0.00122	0.00143	0.00138	0.00108	0.00126	0.00111	0.00120	0.00117	0.00103	0.00097	0.00457	0.00216	0.00087	0.00137	0.00245	0.00318	0.00022
Arsenic (As)-Dissolved	0.00176	0.00031	0.00018	0.00189	0.00389	0.00769	0.00731	0.00226	0.00133	0.00109	0.00253	0.00192	0.00525	0.00741	0.0727	0.0364	0.00990	0.0113	0.0213	0.0285	0.00057
Barium (Ba)-Dissolved	0.0326	0.0197	0.0195	0.0187	<0.02	0.0177	0.0170	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.034	0.0215	<0.02	<0.02	0.020	<0.02	0.0325
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.001	<0.00010	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.2	<0.00050	<0.00050	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.00050	<0.2	<0.2	<0.2	<0.2	<0.00050
Boron (B)-Dissolved	0.034	0.034	0.033	0.039	<0.1	0.040	0.040	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.056	<0.1	<0.1	<0.1	0.11	<0.010
Cadmium (Cd)-Dissolved	0.000038	0.000142	0.000214	0.000181	0.000106	0.000368	0.000356	0.000088	0.000285	0.000261	0.000115	0.000200	<0.000017	<0.000017	0.000442	0.000101	<0.000017	<0.000017	0.000046	<0.000017	<0.000010
Calcium (Ca)-Dissolved	54.0	53.0	51.6	54.6	61.3	53.3	53.0	59.9	63.9	59.8	56.7	48.6	57.3	56.1	52.7	52.1	52.7	55.1	43.9	37.6	8.21
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	0.00016	<0.001	<0.00010	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.00010
Cobalt (Co)-Dissolved	0.00019	0.00039	0.00051	0.00038	0.00032	0.00070	0.00068	<0.0003	0.00072	0.00065	<0.0003	0.00054	<0.0003	<0.0003	0.00098	0.00021	<0.0003	<0.0003	<0.0003	<0.0003	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.001	0.00335	0.00331	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0057	0.00131	<0.001	<0.001	<0.001	<0.001	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	0.048	0.840	0.783	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	2.92	1.04	<0.03	<0.03	<0.03	<0.03	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	0.000083	0.00059	0.00599	0.00553	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0278	0.00642	<0.0005	<0.0005	<0.0005	<0.0005	<0.000050
Lithium (Li)-Dissolved	0.0521	0.0468	0.0456	0.0527	0.0603	0.0525	0.0499	0.0592	0.0527	0.0522	0.0607	0.0479	0.0784	0.0986	0.0997	0.102	0.0964	0.102	0.191	0.217	<0.00050
Magnesium (Mg)-Dissolved	5.05	4.45	4.41	4.85	5.21	4.36	4.45	5.08	4.86	5.01	5.02	4.18	5.10	5.10	4.81	4.84	5.19	5.23	4.33	3.68	0.275
Manganese (Mn)-Dissolved	0.142	0.155	0.160	0.172	0.164	0.199	0.194	0.205	0.275	0.256	0.197	0.253	0.239	0.206	0.379	0.195	0.174	0.180	0.167	0.226	0.000153
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.000010
Molybdenum (Mo)-Dissolved	0.00170	0.00172	0.00168	0.00158	0.0017	0.00151	0.00154	0.0018	0.0016	0.0016	0.0019	0.0016	0.0023	0.0022	0.0018	0.00207	0.0023	0.0023	0.0032	0.0032	0.000341
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	0.00071	<0.001	<0.00050	0.00051	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.001	<0.001	<0.001	<0.001	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.3	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30	<0.3	<0.3	<0.3	<0.3	<0.30
Potassium (K)-Dissolved	2.01	1.80	1.78	1.91	<2	1.75	1.75	<2	<2	<2	<2	<2	<2	2.0	<2	2.06	2.1	2.1	2.3	2.4	0.070
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.001	<0.00010	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.00010
Silicon (Si)-Dissolved	2.94	2.89	2.84	3.01	3.13	3.06	3.03	3.10	3.10	3.13	3.03	2.64	3.11	3.20	3.36	3.42	3.31	3.33	2.96	3.04	0.538
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.00002	0.000012	<0.000010	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.000143	0.000010	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010
Sodium (Na)-Dissolved	16.0	17.0	16.6	17.1	18.9	18.3	18.2	19.3	17.4	18.2	19.7	16.8	24.7	28.5	30.0	32.8	33.1	33.6	49.9	63.3	<2.0
Strontium (Sr)-Dissolved	1.02	1.03	1.01	1.06	1.14	1.05	1.05	1.17	1.10	1.13	1.14	0.946	1.19	1.19	1.17	1.24	1.27	1.36	1.19	1.01	0.0545
Thallium (Tl)-Dissolved	0.000012	0.000011	0.000011	0.000015	<0.0002	0.000015	0.000015	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000027	<0.0002	<0.0002	<0.0002	<0.0002	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.0005	<0.00010	<0.00010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00010	<0.0005	<0.0005	<0.0005	<0.0005	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010
Uranium (U)-Dissolved	0.000208	0.000202	0.000199	0.000206	<0.0002	0.000223	0.000225	0.00027	0.00023	0.00021	0.00022	0.00026	0.00032	0.00029	0.00039	0.000285	0.00026	0.00026	0.00039	0.00040	0.000023
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.0010
Zinc (Zn)-Dissolved	0.0072	0.0177	0.0248	0.0234	0.0185	0.0456	0.0460	0.0094	0.0289	0.0328	0.0145	0.0201	<0.005	<0.005	0.0521	0.0127	<0.005	<0.005	0.0050	<0.005	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	lake	lake	lake	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																					
Sample ID	BJ (30M)	BJ (50M)	BJ (80M)	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2
Date Sampled	23-Aug-11	23-Aug-11	23-Aug-11	6-Oct-11	5-Nov-11	7-Nov-11	9-Nov-11	11-Nov-11	18-Nov-11	23-Nov-11	30-Nov-11	7-Dec-11	14-Dec-11	30-Dec-11	9-Jun-11	16-Jun-11	25-Jun-11	15-Jul-11	26-Aug-11	17-Sep-11	18-Oct-11
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	:luded-Impac	Included	Included	Included	Included	:luded-Impac	Included	Included	:luded-Impac	Included	Included	Included	Included
ALS Sample ID	L1051244-2	L1051244-3	L1051244-4	L1071289-5	L1083093-4	L1084049-3	L1084061-3	L1086459-3	L1089230-4	L1089233-4	L1091582-3	L1094651-4	L1098872-4	L1103237-4	L1016239-1	L1019628-1	L1023529-1	L1033117-8	L1051133-9	L1060382-2	L1074434-8
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	52.2	48.6	50.6	53.7	51.4	53.4	53.7	53.7	65.3	53.6	50.5	53.9	55.0	53.6	57.8	55.2	60.3	53.5	68.2	65.2	64.6
Hardness (as $CaCO_3$)	21.7	21.7	21.6	23.6	23.0	22.9	23.5	22.5	24.8	23.5	24.4	23.3	24.0	22.9	27.2	22.7	22.5	20.5	27.4	27.6	25.7
pH	7.74	7.30	7.56	7.81	7.63	7.87	7.94	8.16	7.71	7.67	7.54	8.05	8.00	7.90	8.11	7.96	7.82	7.99	7.74	7.77	8.00
Total Suspended Solids	<3.0	<3.0	4.2	<3	<3	<3	<3	<3	5.7	<3	<3	<3	<3	10.9	<3.0	4.7	31.3	8.2	11.6	7.2	19.2
Total Dissolved Solids	29	30	35	27	40	23	30	46	34	24	28	31	31	31	36	31	27	27	40	39	39
Turbidity (NTU)	0.63	0.82	2.45	1.06	0.68	0.53	0.71	0.47	6.42	0.82	0.47	0.27	0.47	9.56	2.52	3.21	14.2	4.58	12.7	8.86	6.36
Anions and Nutrients																					
Acidity (as $CaCO_3$)	2.3	3.0	2.8	1.7	2.9	1.5	1.4	1.4	2.5	2.5	<1	2.0	2.9	3.2	3.0	2.6	2.2	3.1	2.5	<1.0	3.1
Alkalinity, Bicarbonate (as $CaCO_3$)	14.9	14.4	14.9	14.4	14.1	15.9	15.4	15.0	16.6	15.4	15.7	16.0	15.7	17.7	12.8	11.3	10.8	13.1	15.3	15.7	13.9
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	14.9	14.4	14.9	14.4	14.1	15.9	15.4	15.0	16.6	15.4	15.7	16.0	15.7	17.7	12.8	11.3	10.8	13.1	15.3	15.7	13.9
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0141	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	0.021	<0.020	0.022	0.020	0.024
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.005	0.0208	<0.005	<0.005	<0.005	<0.005	0.0067	0.0090	0.0085	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.237	0.101	0.122	0.120	<0.050	0.070	0.120	0.080
Total Nitrogen	<0.050	<0.050	<0.050	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0208	<0.0025	<0.0025	<0.0025	<0.0025	0.244	0.110	0.130	0.120	<0.050	0.070	0.120	0.080
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	0.0029	<0.002	<0.002	<0.002	<0.002	0.0066	0.0111	0.0031	<0.002	<0.002	<0.002	0.0105	0.0027	0.0026	0.0338	0.0122	0.0164	0.0103	0.0335
Sulfate (SO_4)	8.62	8.63	8.81	9.31	9.22	9.11	9.29	9.12	12.1	10.7	9.00	9.06	9.26	10.6	12.9	12.5	14.1	10.7	14.7	13.2	14.3
Cyanides																					
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0011
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.0010	<0.0010	<0.0010	<0.0011	<0.0011
CN-THIO Thiocyanate	-	-	-	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	-	-	-	-	-	-	-
Organic / Inorganic Carbon				<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0							
Total Organic Carbon	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.52	<0.5	<0.5	1.07	0.63	0.54	0.79	<0.50	<0.50	<0.50	<0.50
Total Metals				<0	<0	<0	<0	<0	<0	<0		<0	<0								
Aluminum (Al)-Total	0.0283	0.0245	0.0949	0.0617	0.0205	0.0170	0.0208	0.0175	0.148	0.0104	0.0104	0.0092	0.0070	0.317	0.116	0.165	0.373	0.171	0.721	0.207	0.263
Antimony (Sb)-Total	0.00023	0.00023	0.00030	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00018	0.00017	0.00032	0.00026	0.00033	0.00032	0.00037
Arsenic (As)-Total	0.00071	0.00070	0.00097	0.00074	0.00057	0.00052	0.00051	0.00057	0.00151	0.00059	0.00055	0.00059	0.00054	0.00259	0.00086	0.00089	0.00343	0.00163	0.00246	0.00157	0.00264
Barium (Ba)-Total	0.0340	0.0333	0.0355	0.037	0.034	0.032	0.033	0.033	0.038	0.033	0.033	0.034	0.032	0.043	0.0329	0.0313	0.0386	0.0325	0.0455	0.0409	0.0348
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	0.000027	<0.000017	<0.000017	<0.000017	<0.000017	0.000460	0.000055	0.000072	0.000225	0.000044	0.000119	0.000042	0.000064
Calcium (Ca)-Total	8.66	8.44	8.57	9.27	8.86	8.46	8.58	8.69	8.95	8.88	8.70	8.75	8.47	8.94	10.2	8.72	8.68	8.52	10.5	10.7	9.93
Chromium (Cr)-Total	0.00014	0.00015	0.00014	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00016	0.00017	0.00040	0.00014	0.00059	0.00022	0.00021
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00035	0.00034	0.00078	0.00021	0.00044	0.00018	0.00029
Copper (Cu)-Total	<0.00050	<0.00050	<0.00050	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00097	0.00116	0.00379	0.00085	0.00186	0.00086	0.00122
Iron (Fe)-Total	<0.030	<0.030	0.084	0.046	<0.03	<0.03	<0.03	<0.03	0.200	<0.03	<0.03	<0.03	<0.03	0.404	0.104	0.116	0.630	0.221	0.402	0.216	0.534
Lead (Pb)-Total	<0.000050	<0.000050	0.000641	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00053	<0.0005	<0.0005	<0.0005	<0.0005	0.00056	0.000352	0.000251	0.00225	0.000423	0.000629	0.000650	0.00163
Lithium (Li)-Total	<0.00050	<0.00050	<0.00050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.00098	0.00099	0.00107	0.00113	0.00156	0.00236
Magnesium (Mg)-Total	0.287	0.281	0.292	0.33	0.29	0.29	0.29	0.30	0.35	0.30	0.29	0.26	0.28	0.37	0.365	0.343	0.379	0.329	0.496	0.445	0.469
Manganese (Mn)-Total	0.00390	0.00402	0.00892	0.00760	0.00276	0.00288	0.00292	0.00244	0.0197	0.00244	0.00191	0.00238	0.00177	0.0347	0.0422	0.0406	0.0872	0.0266	0.0770	0.0429	0.0459
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000369	0.000350	0.000363	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000311	0.000260	0.000307	0.000300	0.000431	0.000434	0.000298
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.00050	0.00061	<0.00050	<0.00050	0.00057	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	lake	lake	lake	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																					
Sample ID	BJ (30M)	BJ (50M)	BJ (80M)	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2
Date Sampled	23-Aug-11	23-Aug-11	23-Aug-11	6-Oct-11	5-Nov-11	7-Nov-11	9-Nov-11	11-Nov-11	18-Nov-11	23-Nov-11	30-Nov-11	7-Dec-11	14-Dec-11	30-Dec-11	9-Jun-11	16-Jun-11	25-Jun-11	15-Jul-11	26-Aug-11	17-Sep-11	18-Oct-11
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	:luded-Impac	Included	Included	Included	Included	:luded-Impac	Included	Included	:luded-Impac	Included	Included	Included	Included
ALS Sample ID	L1051244-2	L1051244-3	L1051244-4	L1071289-5	L1083093-4	L1084049-3	L1084061-3	L1086459-3	L1089230-4	L1089233-4	L1091582-3	L1094651-4	L1098872-4	L1103237-4	L1016239-1	L1019628-1	L1023529-1	L1033117-8	L1051133-9	L1060382-2	L1074434-8
Total Metals *(cont'd)*				<0	<0	<0	<0	<0	<0	<0		<0	<0								
Potassium (K)-Total	0.076	0.075	0.106	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0.110	0.143	0.209	0.148	0.480	0.227	0.215
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	0.582	0.583	0.719	0.684	0.573	0.539	0.556	0.557	0.757	0.554	0.541	0.538	0.539	1.08	0.791	0.833	1.04	0.768	1.77	1.01	1.06
Silver (Ag)-Total	<0.000010	<0.000010	0.000085	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.000025	<0.00002	<0.00002	<0.00002	<0.00002	0.000034	0.000021	0.000021	0.000105	0.000036	0.000094	0.000064	0.000127
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.0575	0.0568	0.0565	0.0584	0.0559	0.0541	0.0541	0.0551	0.0563	0.0557	0.0536	0.0547	0.0539	0.0576	0.0583	0.0559	0.0539	0.0492	0.0667	0.0715	0.0745
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.000010	0.000024	0.000012	0.000036	0.000013	0.000015
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	0.000028	0.000025	0.000031	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000031	0.000034	0.000082	0.000036	0.000048	0.000039	0.000042
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	<0.0030	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0060	0.0074	0.0171	0.0047	0.0093	0.0048	0.0071
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0042	0.0046	0.0041	0.0099	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0179	<0.005	<0.005	0.0620	0.0402	0.0268	0.0071	0.0365	0.0427	0.0477
Antimony (Sb)-Dissolved	0.00022	0.00021	0.00023	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00019	0.00016	0.00018	0.00019	0.00025	0.00028	0.00027
Arsenic (As)-Dissolved	0.00060	0.00057	0.00058	0.00059	0.00051	<0.0005	<0.0005	0.00055	0.00057	0.00052	0.00055	0.00082	0.00055	0.00052	0.00056	0.00037	0.00032	0.00036	0.00066	0.00064	0.00148
Barium (Ba)-Dissolved	0.0319	0.0319	0.0320	0.033	0.032	0.032	0.033	0.032	0.035	0.033	0.033	0.034	0.034	0.032	0.0323	0.0285	0.0280	0.0269	0.0299	0.0335	0.0296
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	<0.000017	0.000461	0.000045	0.000069	0.000172	0.000051	0.000077	0.000039	0.000052
Calcium (Ca)-Dissolved	8.24	8.25	8.21	8.96	8.72	8.66	8.92	8.53	9.39	8.94	9.28	8.91	9.10	8.69	10.3	8.54	8.46	7.75	10.3	10.4	9.63
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.00026	0.00027	0.00045	0.00012	0.00020	<0.00010	0.00022
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.00050	0.00058	0.00087	<0.00050	<0.00050	0.00085
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.136
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.000050	<0.000050	0.000128	<0.000050	<0.000050	<0.000050	0.000881
Lithium (Li)-Dissolved	<0.00050	<0.00050	<0.00050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.00101	0.00080	<0.00050	0.00096	0.00139	0.00191
Magnesium (Mg)-Dissolved	0.273	0.274	0.272	0.31	0.29	0.30	0.30	0.29	0.33	0.30	0.30	0.26	0.30	0.29	0.362	0.326	0.347	0.280	0.394	0.411	0.407
Manganese (Mn)-Dissolved	0.000098	0.000196	0.000163	0.00407	0.00053	0.00112	0.00052	<0.0003	<0.0003	0.00054	0.00037	0.00756	0.00065	0.00131	0.0370	0.0352	0.0607	0.0164	0.0637	0.0336	0.0385
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000335	0.000332	0.000349	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000262	0.000226	0.000249	0.000293	0.000366	0.000420	0.000249
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00055	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.072	0.072	0.070	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0.099	0.099	0.120	0.158	0.151	0.177	0.130
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	0.540	0.544	0.542	0.578	0.546	0.543	0.551	0.534	0.548	0.556	0.566	0.556	0.565	0.549	0.795	0.671	0.648	0.378	0.691	0.750	0.666
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0547	0.0545	0.0554	0.0554	0.0541	0.0549	0.0555	0.0534	0.0583	0.0552	0.0552	0.0550	0.0560	0.0550	0.0583	0.0543	0.0514	0.0449	0.0643	0.0702	0.0714
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000023	0.000023	0.000020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.000012	0.000021	0.000014	0.000014	0.000025	0.000023	0.000035
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0030	0.0052	0.0111	0.0043	<0.0030	<0.0030	0.0069

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC									Replicate											
Sample ID	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2
Date Sampled	2-May-11	5-Jun-11	4-Jul-11	1-Aug-11	5-Sep-11	1-Oct-11	26-Oct-11	27-Nov-11	1-Feb-11	1-Feb-11	5-Mar-11	31-Mar-11	2-May-11	4-Jun-11	4-Jul-11	1-Aug-11	5-Sep-11	1-Oct-11	26-Oct-11	27-Nov-11
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1002688-13	L1014013-15	L1028827-4	L1039955-12	L1054953-13	L1067383-4	L1079029-19	L1091310-9	L975149-10	L975149-7	L985810-7	L991777-13	L1002688-11	L1014013-16	L1028827-5	L1039955-13	L1054953-10	L1067383-5	L1079029-20	L1091310-5
Physical Tests																				
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	438	146	120	91.1	126	198	265	336	391	390	406	433	440	188	185	137	166	299	358	427
Hardness (as $CaCO_3$)	215	64.1	51.9	38.7	54.5	90.7	118	148	168	166	215	192	211	79.4	76.3	56.3	71.3	136	160	191
pH	7.64	7.94	7.8	8.35	8.12	7.99	8.01	8.13	7.82	7.97	8.14	7.84	8.08	7.72	7.6	8.27	7.98	7.88	7.73	8.18
Total Suspended Solids	<3.0	29.3	36	42.7	68.8	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	12.8	161	120	86	362	49.3	41.5	26.4
Total Dissolved Solids	299	97	74	71	81	122	161	207	261	260	269	289	290	113	118	80	99	183	234	263
Turbidity (NTU)	0.87	55	43.8	70.4	95.4	7.59	2.27	0.66	0.23	0.36	0.25	0.21	16.3	128	83.7	73.4	248	47.3	52.1	29.2
Anions and Nutrients																				
Acidity (as $CaCO_3$)	5.8	3.2	1.2	<1.0	4.4	3.2	2.9	2	3	3	4.1	5.9	3.4	1.9	1.7	2.3	5.6	4	4.5	1.9
Alkalinity, Bicarbonate (as $CaCO_3$)	82.8	31.9	27.2	27	27.6	42.3	54.2	68.2	80.3	81.9	76.1	61.5	93	26.2	22.9	23.1	34.4	47.2	61.8	83.4
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	82.8	31.9	27.2	27	27.6	42.3	54.2	68.2	80.3	81.9	76.1	61.5	93	26.2	22.9	23.1	34.4	47.2	61.8	83.4
Ammonia, Total (as N)	<0.0050	<0.0050	0.0079	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0052	0.0095	<0.0050	0.0106	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.69	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.06	0.034	0.025	0.021	0.027	0.035	0.052	0.065	0.06	0.062	0.062	0.058	0.131	0.103	0.117	0.082	0.081	0.141	0.169	0.179
Nitrate (as N)	0.0673	0.0287	0.0129	0.0165	0.0158	0.0447	0.0453	0.0479	0.0865	0.0888	0.0614	0.0522	0.164	0.0603	0.0254	0.0199	0.0305	0.0603	0.0815	0.0694
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.133	0.131	0.097	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.068	0.116	0.13	0.105	<0.050	0.069	0.09	<0.050	<0.050
Total Nitrogen	0.2	0.16	0.11	0.05	0.05	0.06	0.09	<0.050	0.06	0.06	0.068	0.12	0.28	0.19	0.13	<0.050	0.1	0.15	0.13	0.05
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0031	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	0.0394	0.0265	0.0564	0.0583	0.007	0.0023	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0758	0.503	0.173	0.12	0.434	0.181	0.168	0.091
Sulfate (SO_4)	141	35.9	27.6	18.1	30	52.4	73.4	96.8	117	119	128	138	133	60.4	61.2	37.7	43.6	95.5	113	127
Cyanides																				
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0011	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0011	0.0025	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0013	<0.0011
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																				
Total Organic Carbon	<0.50	0.89	<0.50	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	0.55	<0.50	0.54	<0.50	0.93	<0.50	0.89	0.68	0.56	0.63	0.64
Total Metals																				
Aluminum (Al)-Total	0.0199	2.64	2.12	1.98	3.42	0.798	0.056	<0.027	0.0134	0.0148	0.0136	0.0434	0.458	5.41	3.88	1.41	10.5	1.78	1.75	1.04
Antimony (Sb)-Total	0.00106	0.00173	0.00129	0.00128	0.00187	0.00147	0.00136	0.00147	0.00142	0.00136	0.00128	0.00117	0.00066	0.00123	0.00089	0.00057	0.00159	0.00086	0.00088	0.0008
Arsenic (As)-Total	0.00047	0.00473	0.00303	0.00418	0.00637	0.00321	0.00062	0.00037	0.00031	0.00033	0.00034	0.0006	0.00339	0.0222	0.00695	0.00346	0.0154	0.00911	0.0103	0.00514
Barium (Ba)-Total	0.0455	0.0725	0.0743	0.075	0.0937	0.0436	0.0348	0.0386	0.0426	0.0435	0.0448	0.047	0.041	0.121	0.0912	0.0591	0.223	0.0579	0.0573	0.0551
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00024	0.00011	0.00029	0.00019	0.00025	0.00019
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000056	0.000089	0.000062	0.000073	0.000105	0.000324	0.000065	0.000071	0.000044	0.000037	0.000096	0.000072	0.00134	0.00164	0.00192	0.00111	0.00131	0.00226	0.00277	0.00239
Calcium (Ca)-Total	80.8	22.6	18.4	14.7	20.3	31.8	44.1	53.7	62.6	63	72.3	66.9	71.2	28.9	27	21.8	30.9	48.5	59.8	68.3
Chromium (Cr)-Total	<0.00020	0.00224	0.00103	0.00139	0.00242	0.0007	0.00014	0.00011	<0.00010	<0.00010	0.00012	<0.00010	<0.00030	0.00468	0.00238	0.00095	0.0103	0.00121	0.00114	0.00059
Cobalt (Co)-Total	0.00028	0.00117	0.00091	0.00114	0.00165	0.00067	0.00044	0.00052	0.00016	0.00016	0.00025	0.00035	0.00197	0.0049	0.00427	0.00225	0.00729	0.00345	0.00389	0.00272
Copper (Cu)-Total	0.00737	0.0136	0.0098	0.0107	0.0205	0.0116	0.00448	0.00782	0.00363	0.00362	0.00485	0.00817	0.0927	0.166	0.277	0.123	0.128	0.238	0.254	0.187
Iron (Fe)-Total	<0.030	2.64	1.98	2.17	3.79	1.14	0.048	<0.030	<0.030	<0.030	<0.030	0.079	2.62	11.7	8.31	3.4	16.7	6.82	7.35	4.57
Lead (Pb)-Total	<0.000050	0.00262	0.00171	0.00278	0.00362	0.00173	0.00014	<0.000050	<0.000050	<0.000050	<0.000050	0.000107	0.00103	0.00506	0.00471	0.00305	0.00759	0.00309	0.00312	0.00216
Lithium (Li)-Total	<0.0050	<0.0050	0.0018	0.00148	0.00282	0.00135	0.00146	0.00122	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00295	0.00111	0.00592	0.00198	0.00241	0.0021
Magnesium (Mg)-Total	7.08	2.46	1.96	1.78	2.76	2.62	3.37	4.22	5.05	5.12	5.43	6.14	7.05	4.21	3.35	2.09	6.86	4.48	5.46	5.8
Manganese (Mn)-Total	0.0666	0.111	0.0756	0.0969	0.138	0.0793	0.063	0.0746	0.0268	0.0273	0.0419	0.0574	0.288	0.284	0.305	0.179	0.487	0.241	0.298	0.297
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	0.000011	0.000014	0.000023	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00196	0.00095	0.000883	0.000696	0.00111	0.00135	0.00167	0.00162	0.00169	0.00163	0.00153	0.00175	0.00238	0.0027	0.00189	0.00108	0.00317	0.00325	0.00347	0.00333
Nickel (Ni)-Total	0.00071	0.00149	0.00092	0.00113	0.00188	0.00085	0.00063	0.00091	0.00064	0.0006	0.00069	0.00071	0.00217	0.00417	0.00366	0.00205	0.00974	0.0038	0.0039	0.00295
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.5	<0.30	<0.30	0.57	<0.30	<0.30	<0.30

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC									Replicate											
Sample ID	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2
Date Sampled	2-May-11	5-Jun-11	4-Jul-11	1-Aug-11	5-Sep-11	1-Oct-11	26-Oct-11	27-Nov-11	1-Feb-11	1-Feb-11	5-Mar-11	31-Mar-11	2-May-11	4-Jun-11	4-Jul-11	1-Aug-11	5-Sep-11	1-Oct-11	26-Oct-11	27-Nov-11
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1002688-13	L1014013-15	L1028827-4	L1039955-12	L1054953-13	L1067383-4	L1079029-19	L1091310-9	L975149-10	L975149-7	L985810-7	L991777-13	L1002688-11	L1014013-16	L1028827-5	L1039955-13	L1054953-10	L1067383-5	L1079029-20	L1091310-5
Total Metals *(cont'd)*																				
Potassium (K)-Total	0.7	1.04	0.978	0.821	1.37	0.625	0.464	0.52	0.507	0.518	0.635	0.61	1.71	2.08	1.59	0.934	3.49	1.68	1.99	2.09
Selenium (Se)-Total	0.00064	0.00032	0.00024	0.0002	0.00028	0.00053	0.00064	0.00078	0.00089	0.00089	0.00081	0.00061	0.00242	0.00162	0.00115	0.00074	0.00149	0.00211	0.0024	0.00235
Silicon (Si)-Total	1.96	6.73	5.09	3.58	7.42	2.73	1.57	1.79	2.04	2.04	2.01	1.98	2.84	11.7	8.02	3.12	17.7	5.01	4.63	3.45
Silver (Ag)-Total	<0.000010	0.000058	0.000035	0.000044	0.00007	0.000058	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000088	0.00006	0.00002	0.000224	0.000028	0.000026	0.000012
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.1	<2.0	<2.0	<2.0	<2.0	<2.0	2	2.9
Strontium (Sr)-Total	0.465	0.127	0.106	0.0846	0.121	0.172	0.232	0.302	0.418	0.4	0.377	0.417	0.438	0.165	0.158	0.124	0.178	0.265	0.317	0.381
Thallium (Tl)-Total	<0.00010	<0.00010	0.000037	0.000033	0.000052	0.000019	<0.000010	<0.000010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000053	0.000024	0.000121	0.000027	0.000026	0.000019
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	0.079	0.055	0.045	0.096	0.028	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	0.328	0.19	0.058	0.653	0.082	0.067	0.038
Uranium (U)-Total	0.000151	0.000073	0.000069	0.000054	0.000074	0.000093	0.000085	0.000093	0.000128	0.000123	0.000103	0.000143	0.000506	0.000411	0.000401	0.000223	0.00053	0.000489	0.000584	0.000521
Vanadium (V)-Total	<0.0010	0.0071	0.0051	0.0055	0.0099	0.0023	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0169	0.0115	0.0042	0.0369	0.0052	0.0049	0.0025
Zinc (Zn)-Total	0.0067	0.0132	0.0099	0.0118	0.0178	0.0095	0.0045	0.0083	0.0053	0.0053	0.0084	0.0072	0.0847	0.125	0.137	0.0815	0.123	0.156	0.201	0.174
Dissolved Metals																				
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0115	0.0854	0.05	0.0639	0.0836	0.0254	0.0203	0.0136	0.0086	0.008	0.0071	0.0082	0.0399	0.0106	0.0188	0.0227	0.0565	0.0305	0.0529	0.0538
Antimony (Sb)-Dissolved	0.00107	0.00112	0.00083	0.00068	0.00088	0.00109	0.00135	0.00144	0.00132	0.00131	0.00132	0.00113	0.00054	0.00058	0.0004	0.00035	0.00055	0.00056	0.00062	0.00066
Arsenic (As)-Dissolved	0.00041	0.00072	0.00038	0.00048	0.00045	0.00046	0.00042	0.00031	0.00029	0.00032	0.00032	0.00038	0.00013	<0.00010	<0.00010	<0.00010	0.0002	<0.00010	<0.00010	<0.00010
Barium (Ba)-Dissolved	0.0418	0.0278	0.03	0.0263	0.0279	0.0255	0.0335	0.0374	0.0409	0.0417	0.0465	0.0445	0.0381	0.033	0.0339	0.0294	0.037	0.0311	0.0346	0.042
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.00005	0.000034	0.000035	0.00002	0.000026	0.000191	0.00006	0.00008	0.000031	0.000033	0.000054	0.000041	0.000713	0.000867	0.00123	0.000682	0.000196	0.00131	0.00103	0.00108
Calcium (Ca)-Dissolved	75.4	22.9	18.5	13.8	19.4	32.3	41.8	52.5	59.5	58.7	76.6	66.8	72.8	28.3	26.9	20	25.6	47.7	56.2	67.3
Chromium (Cr)-Dissolved	0.00011	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	0.00011	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	0.00024	0.00016	<0.00010	<0.00010	<0.00010	0.0002	0.00038	0.00051	0.00014	0.00014	0.00023	0.00017	0.00172	0.00224	0.00224	0.00116	0.00061	0.0026	0.00257	0.00195
Copper (Cu)-Dissolved	0.00691	0.00092	<0.00050	<0.00050	<0.00050	0.00085	0.00216	0.00634	0.0029	0.00294	0.0042	0.00277	0.00376	0.00215	0.00378	0.00198	0.00057	0.0039	0.00341	0.00382
Iron (Fe)-Dissolved	<0.030	0.044	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	0.000074	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.00050	<0.00050	0.00083	0.00086	0.00112	0.00126	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00114	0.00052	0.00112	0.0017	0.00162	0.00183
Magnesium (Mg)-Dissolved	6.56	1.64	1.37	1.03	1.45	2.4	3.24	4.1	4.72	4.64	5.67	6.07	7.19	2.11	2.23	1.57	1.8	4.04	4.83	5.61
Manganese (Mn)-Dissolved	0.0622	0.0418	0.0193	0.014	0.0255	0.0415	0.0586	0.0713	0.0245	0.0247	0.0413	0.034	0.263	0.151	0.219	0.125	0.111	0.205	0.243	0.245
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00194	0.000906	0.000857	0.000656	0.000882	0.00129	0.00159	0.00157	0.0015	0.00153	0.00149	0.00179	0.0022	0.00164	0.00122	0.000985	0.00158	0.00218	0.00266	0.00292
Nickel (Ni)-Dissolved	0.00069	<0.00050	<0.00050	0.00122	<0.00050	<0.00050	0.00056	0.00084	0.0008	0.00057	0.00074	0.00065	0.00187	0.00105	0.00152	0.00102	0.00059	0.00288	0.00246	0.00211
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.648	0.332	0.239	0.176	0.268	0.344	0.451	0.505	0.487	0.488	0.703	0.611	1.77	0.911	0.795	0.622	1.24	1.4	1.67	2.02
Selenium (Se)-Dissolved	0.00065	0.0003	0.00022	0.00015	0.00028	0.00055	0.00063	0.00076	0.00087	0.00088	0.00073	0.00063	0.00252	0.00104	0.00093	0.00065	0.00102	0.00184	0.00212	0.00226
Silicon (Si)-Dissolved	1.82	1.11	0.737	0.535	0.756	1.14	1.49	1.75	2.01	2	1.9	1.91	2.35	1.22	1.23	0.908	1	1.82	2.16	2.34
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.9
Strontium (Sr)-Dissolved	0.463	0.127	0.104	0.0779	0.111	0.169	0.223	0.295	0.364	0.379	0.37	0.411	0.446	0.153	0.153	0.113	0.137	0.254	0.3	0.372
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	0.000012	0.000013	0.000012	0.000014
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000148	0.000048	0.000032	0.000023	0.000033	0.000069	0.000081	0.00009	0.000119	0.000118	0.000107	0.00014	0.000388	0.000017	0.000019	0.000014	0.000077	0.00017	0.000317	0.000375
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0058	<0.0030	0.0095	<0.0030	<0.0030	<0.0030	0.0036	0.0068	0.0042	0.004	0.0074	0.0046	0.0235	0.0394	0.0442	0.0299	<0.0030	0.0637	0.0399	0.0409

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																			Replicate	Replicate	
Sample ID	SC2	SC2	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1
Date Sampled	1-Feb-11	31-Mar-11	2-May-11	4-Jun-11	4-Jul-11	1-Aug-11	4-Sep-11	1-Oct-11	26-Oct-11	27-Nov-11	1-Feb-11	5-Mar-11	31-Mar-11	2-May-11	4-Jun-11	4-Jul-11	1-Aug-11	4-Sep-11	4-Sep-11	5-Sep-11	1-Oct-11
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L975149-5	L991777-6	L1002688-10	L1014013-10	L1028827-6	L1039955-14	L1054465-5	L1067383-6	L1079029-21	L1091310-6	L975149-4	L985810-4	L991777-5	L1002688-8	L1014013-1	L1026874-11	L1039955-1	L1054465-1	L1054465-6	L1054953-19	L1067383-1
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	-	<5.0	<5.0
Conductivity (uS/cm)	446	456	396	181	176	135	154	285	360	394	409	423	390	276	118	135	122	130	-	145	216
Hardness (as $CaCO_3$)	194	209	181	77	72.8	55.6	67.1	137	147	180	180	198	175	126	53	59.4	52	57.2	58.1	-	85.9
pH	7.91	7.81	8.13	7.81	7.75	8.28	8.17	8	7.98	8.17	8.07	8.15	7.84	8.11	7.93	7.7	8.14	8.2	-	8.19	8
Total Suspended Solids	7.3	9.3	7.8	162	131	119	859	48.7	30.2	12.4	5.3	8.8	7.3	<3.0	88	53.3	36	602	-	295	24
Total Dissolved Solids	298	308	256	96	114	80	102	177	212	249	269	282	257	161	74	92	75	117	-	97	132
Turbidity (NTU)	13.2	18.2	10.8	121	89.1	76.4	531	46.3	36.5	24.7	9.43	17.2	14	4.04	70.1	55.1	55.6	495	-	278	24.8
Anions and Nutrients																					
Acidity (as $CaCO_3$)	3.3	6	3	1.6	2.7	2.3	3.5	3.4	3.4	1.9	2.5	4.1	5.5	2.9	2.6	2.5	2.6	3.2	-	3.6	3.4
Alkalinity, Bicarbonate (as $CaCO_3$)	101	71.3	87.8	29.4	27.1	25.8	40.3	56.5	65.2	85.8	94.1	90.1	63.6	71.5	31.7	32.9	32.3	45.5	-	41.6	59.2
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	-	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	-	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	101	71.3	87.8	29.4	27.1	25.8	40.3	56.5	65.2	85.8	94.1	90.1	63.6	71.5	31.7	32.9	32.3	45.5	-	41.6	59.2
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	0.0057	0.0079	<0.0050	0.0179	<0.0050	0.017	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0052	<0.0050	<0.0050	0.0113	0.0129	-	<0.0050
Bromide (Br)	<0.050	<0.71	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.56	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50
Fluoride (F)	0.163	0.142	0.106	0.095	0.099	0.072	0.064	0.126	0.14	0.156	0.143	0.129	0.106	0.048	0.045	0.06	0.048	0.032	-	0.046	0.073
Nitrate (as N)	0.0723	0.0828	0.236	0.0676	0.0302	0.0291	0.0285	0.077	0.11	0.0966	0.108	0.0945	0.158	0.191	0.0452	0.0282	0.0185	0.0264	-	0.0365	0.0625
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	0.095	0.102	0.12	0.061	0.102	0.073	<0.050	<0.050	<0.050	<0.050	<0.050	0.129	0.155	0.083	<0.050	0.134	0.258	-	<0.050
Total Nitrogen	0.05	0.13	0.33	0.17	0.15	0.09	0.13	0.15	0.14	0.07	0.09	0.105	0.2	0.32	0.2	0.1	0.05	0.16	0.16	-	0.11
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	0.0021	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0023	<0.0010	<0.0010	0.0027	-	0.0019	<0.0010
Phosphorus (P)-Total	0.0552	0.0504	0.0513	0.449	0.246	0.149	0.99	0.154	0.121	0.0769	0.0208	0.0431	0.0372	0.0186	0.154	0.085	0.099	1.02	-	0.444	0.0773
Sulfate (SO_4)	135	141	112	54.4	53.3	34.8	33.5	86.2	96.3	113	120	124	112	60.3	23.9	31.7	24.8	18.7	-	24.9	51
Cyanides																					
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.001	<0.0010	<0.0011	<0.0011	<0.0011	<0.0010	<0.0010	0.0014	0.0012	0.0014	<0.0010	<0.0010	<0.0010	-	0.0012	0.002
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	<0.50	0.58	0.98	0.94	0.58	<0.50	1.77	0.63	0.83	<0.50	0.52	<0.50	0.85	1.14	1.52	0.71	<0.50	2.87	3.26	-	0.74
Total Metals																					
Aluminum (Al)-Total	0.458	0.497	0.309	5.27	3.1	1.81	20.9	1.83	1.12	0.79	0.344	0.419	0.376	0.143	3.63	1.87	2.45	19.2	18	-	1.09
Antimony (Sb)-Total	0.00063	0.0007	0.00057	0.00113	0.00073	0.00058	0.00234	0.00082	0.00075	0.00074	0.00057	0.00055	0.00056	0.00123	0.00106	0.00088	0.00093	0.0026	0.0028	-	0.0013
Arsenic (As)-Total	0.00207	0.00308	0.00251	0.0196	0.00565	0.00348	0.0235	0.00775	0.00689	0.00438	0.00144	0.00256	0.00229	0.00111	0.00749	0.00303	0.00398	0.0223	0.0221	-	0.0034
Barium (Ba)-Total	0.0417	0.0422	0.0367	0.116	0.082	0.0622	0.41	0.0621	0.047	0.0471	0.04	0.038	0.037	0.0356	0.0741	0.0539	0.066	0.346	0.349	-	0.0459
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	0.0002	<0.00010	0.00053	0.00015	0.00015	0.00015	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	0.00053	0.00059	-	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00073	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Boron (B)-Total	0.01	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.011	-	<0.010
Cadmium (Cd)-Total	0.00194	0.00182	0.001	0.00134	0.00147	0.000881	0.00152	0.00179	0.00186	0.00201	0.00151	0.00156	0.00126	0.000372	0.00048	0.000629	0.00047	0.000837	0.000876	-	0.000758
Calcium (Ca)-Total	69.5	76.2	63.3	27.6	27.2	21	42.1	47.4	53.1	65.4	65.6	70.8	63	43.1	18.1	19.7	18.7	34.1	34.1	-	35.1
Chromium (Cr)-Total	0.00014	0.0002	<0.00020	0.00498	0.00209	0.00146	0.0237	0.00142	0.00074	0.0004	0.00013	0.0002	0.00018	<0.00030	0.00479	0.00194	0.00281	0.0291	0.0276	-	0.00238
Cobalt (Co)-Total	0.00183	0.00216	0.00145	0.00447	0.00364	0.00219	0.0159	0.003	0.00254	0.00222	0.00141	0.00139	0.00148	0.00055	0.00243	0.00177	0.00176	0.0137	0.0133	-	0.00138
Copper (Cu)-Total	0.0968	0.0989	0.067	0.141	0.215	0.0968	0.158	0.187	0.166	0.155	0.0686	0.0826	0.0694	0.0252	0.0469	0.0886	0.0516	0.0912	0.0901	-	0.0763
Iron (Fe)-Total	2.07	2.25	1.77	10.5	6.79	3.67	36.6	6.07	4.75	3.66	1.43	1.95	1.65	0.71	5.94	3.32	3.82	31.4	31.7	-	2.76
Lead (Pb)-Total	0.00113	0.00114	0.000722	0.00455	0.00441	0.00274	0.0152	0.00285	0.00201	0.00162	0.000797	0.00111	0.000848	0.000339	0.0026	0.00196	0.00216	0.0126	0.0137	-	0.0013
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	0.00237	0.0013	0.013	0.00192	0.00194	0.00182	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00159	0.00146	0.0129	0.0137	-	0.00169
Magnesium (Mg)-Total	6.34	7.03	6.18	4.04	3.08	2.24	13.2	4.41	4.66	5.45	5.85	5.78	5.63	5.71	3.4	2.86	2.88	12.4	11.7	-	3.91
Manganese (Mn)-Total	0.339	0.321	0.196	0.26	0.258	0.169	0.973	0.213	0.211	0.236	0.261	0.208	0.206	0.0759	0.138	0.125	0.125	0.803	0.777	-	0.098
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000063	0.000093	-	<0.000010
Molybdenum (Mo)-Total	0.00268	0.0026	0.00204	0.0024	0.00151	0.00111	0.00454	0.00303	0.00303	0.00321	0.00241	0.00246	0.00221	0.00138	0.00114	0.00102	0.00102	0.00262	0.0029	-	0.0023
Nickel (Ni)-Total	0.00212	0.00203	0.00168	0.00429	0.00335	0.00223	0.0221	0.00356	0.0026	0.00251	0.00179	0.00161	0.00147	0.00105	0.00464	0.00221	0.00258	0.0279	0.0272	-	0.00243
Phosphorus (P)-Total	<0.30	<0.30	<0.30	0.45	<0.30	<0.30	1.37	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	1.02	1.02	-	<0.30

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																			Replicate	Replicate	
Sample ID	SC2	SC2	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1
Date Sampled	1-Feb-11	31-Mar-11	2-May-11	4-Jun-11	4-Jul-11	1-Aug-11	4-Sep-11	1-Oct-11	26-Oct-11	27-Nov-11	1-Feb-11	5-Mar-11	31-Mar-11	2-May-11	4-Jun-11	4-Jul-11	1-Aug-11	4-Sep-11	4-Sep-11	5-Sep-11	1-Oct-11
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L975149-5	L991777-6	L1002688-10	L1014013-10	L1028827-6	L1039955-14	L1054465-5	L1067383-6	L1079029-21	L1091310-6	L975149-4	L985810-4	L991777-5	L1002688-8	L1014013-1	L1026874-11	L1039955-1	L1054465-1	L1054465-6	L1054953-19	L1067383-1
Total Metals *(cont'd)*																					
Potassium (K)-Total	1.88	1.71	1.48	1.99	1.45	1.07	6.17	1.68	1.71	1.94	1.7	1.75	1.43	0.901	1.27	0.981	1.14	5.2	4.83	-	1.2
Selenium (Se)-Total	0.00234	0.00208	0.00202	0.00147	0.00096	0.0008	0.0022	0.00193	0.00199	0.00208	0.0021	0.0019	0.00175	0.0012	0.0007	0.00065	0.00058	0.00151	0.0016	-	0.00118
Silicon (Si)-Total	2.84	2.81	2.67	12.1	6.53	3.8	35.7	5.66	3.75	3.36	2.86	2.67	2.73	2.37	9.48	4.45	5.92	33.2	34.1	-	4.32
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	0.000086	0.000045	0.00003	0.000545	0.000032	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000052	<0.000030	0.000038	0.000399	0.000413	-	0.000018
Sodium (Na)-Total	3.7	3.6	2.6	<2.0	<2.0	<2.0	2.3	<2.0	<2.0	2.5	3.4	3.2	3	2.5	<2.0	<2.0	<2.0	2.3	2.4	-	<2.0
Strontium (Sr)-Total	0.438	0.449	0.383	0.154	0.153	0.118	0.214	0.252	0.276	0.363	0.396	0.391	0.372	0.322	0.129	0.147	0.124	0.199	0.215	-	0.222
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	0.000041	0.000027	0.000266	0.00003	0.000019	0.000017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000027	0.000031	0.000209	0.000224	-	0.000019
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	0.00014	-	<0.00010
Titanium (Ti)-Total	0.012	0.01	<0.010	0.335	0.154	0.089	1.46	0.091	0.041	0.025	0.012	0.011	<0.010	<0.010	0.206	0.091	0.133	0.978	1.03	-	0.054
Uranium (U)-Total	0.000488	0.000514	0.000407	0.000361	0.000336	0.000198	0.000864	0.000448	0.000438	0.000467	0.000416	0.000458	0.000402	0.000185	0.000146	0.000158	0.000135	0.000513	0.00053	-	0.000211
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	0.0172	0.01	0.0059	0.0928	0.0057	0.003	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	0.0122	0.0065	0.009	0.0859	0.0841	-	0.0036
Zinc (Zn)-Total	0.123	0.113	0.0619	0.112	0.107	0.0673	0.167	0.123	0.133	0.146	0.0949	0.106	0.0777	0.0252	0.0428	0.0483	0.0392	0.116	0.114	-	0.0529
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB		LAB
Aluminum (Al)-Dissolved	0.0266	0.0273	0.043	0.0354	0.0513	0.0404	0.0898	0.0505	0.0746	0.0778	0.0381	0.0362	0.0334	0.03	0.0438	0.0682	0.0684	0.0966	0.103	-	0.0599
Antimony (Sb)-Dissolved	0.00055	0.00058	0.00049	0.00055	0.00041	0.00035	0.00058	0.00057	0.00058	0.00062	0.00051	0.00047	0.00049	0.00112	0.00075	0.00072	0.00062	0.0008	0.00083	-	0.00097
Arsenic (As)-Dissolved	<0.00010	0.00011	0.00015	0.00015	<0.00010	<0.00010	0.00039	<0.00010	0.00017	0.00012	<0.00010	0.0001	0.00013	0.00016	0.00019	<0.00010	0.00043	0.00058	0.00061	-	<0.00010
Barium (Ba)-Dissolved	0.0394	0.0399	0.0335	0.0294	0.0323	0.0287	0.0366	0.029	0.0331	0.0388	0.0371	0.0364	0.0346	0.033	0.0204	0.0252	0.0246	0.0301	0.0313	-	0.0278
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Boron (B)-Dissolved	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Cadmium (Cd)-Dissolved	0.00151	0.00115	0.000477	0.000349	0.000492	0.000427	0.000045	0.000664	0.000661	0.000722	0.00103	0.000834	0.000687	0.000232	0.000112	0.000298	0.00022	0.000015	0.000014	-	0.000316
Calcium (Ca)-Dissolved	67.8	72.7	62.6	27.5	25.8	19.8	24.4	48.9	51.7	63.5	62.8	69.7	61.1	41.2	17.8	20.1	17.8	19.7	20	-	28.8
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	0.00014	0.00016	0.00017	-	<0.00010
Cobalt (Co)-Dissolved	0.00166	0.00181	0.00113	0.00135	0.00105	0.00081	<0.00010	0.0018	0.00177	0.00151	0.0012	0.00112	0.00119	0.00041	0.00035	0.00065	0.00042	<0.00010	<0.00010	-	0.00076
Copper (Cu)-Dissolved	0.00508	0.00401	0.00308	0.00115	0.00144	0.00113	<0.00050	0.00286	0.00454	0.00303	0.00325	0.00272	0.00366	0.00339	0.00217	0.0017	0.0011	0.00113	0.00116	-	0.003
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.049	0.168	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.051	0.048	-	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000067	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	0.00088	0.0005	<0.00050	0.00142	0.00124	0.00166	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00074	<0.00050	<0.00050	0.00063	-	0.00103
Magnesium (Mg)-Dissolved	6.08	6.73	6.1	1.99	2.03	1.49	1.5	3.68	4.34	5.16	5.72	5.76	5.54	5.57	2.05	2.25	1.83	1.92	1.97	-	3.43
Manganese (Mn)-Dissolved	0.321	0.299	0.177	0.119	0.154	0.0984	0.0355	0.157	0.175	0.2	0.239	0.191	0.191	0.0652	0.0371	0.0792	0.0544	0.00145	0.00131	-	0.0676
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Dissolved	0.00236	0.00231	0.00198	0.00175	0.00131	0.000999	0.00161	0.00234	0.00247	0.00311	0.0023	0.0022	0.00201	0.00127	0.000877	0.000926	0.000854	0.00103	0.001	-	0.00143
Nickel (Ni)-Dissolved	0.00195	0.00167	0.00144	0.0007	0.00072	0.00079	<0.00050	0.00217	0.00184	0.00301	0.00165	0.00134	0.00118	0.00081	0.00057	0.00055	0.00051	<0.00050	<0.00050	-	0.00116
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	<0.30
Potassium (K)-Dissolved	1.79	1.66	1.48	0.913	0.805	0.664	1.63	1.32	1.54	1.83	1.64	1.77	1.38	0.874	0.538	0.567	0.535	1.01	1.08	-	0.945
Selenium (Se)-Dissolved	0.00233	0.00193	0.00213	0.00098	0.00086	0.00062	0.001	0.0017	0.00183	0.00196	0.00192	0.00189	0.00168	0.00124	0.00053	0.0006	0.00051	0.00061	0.00063	-	0.00109
Silicon (Si)-Dissolved	2.61	2.44	2.41	1.18	1.14	0.898	1.03	1.83	2.19	2.29	2.54	2.31	2.4	2.16	1.22	1.13	0.919	1.25	1.25	-	1.82
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Sodium (Na)-Dissolved	3.6	3.5	2.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.4	3.1	3.2	3	2.3	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0
Strontium (Sr)-Dissolved	0.419	0.436	0.388	0.145	0.142	0.109	0.118	0.251	0.266	0.346	0.389	0.385	0.365	0.312	0.123	0.15	0.115	0.125	0.124	-	0.181
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	0.000016	0.000012	0.000012	0.000014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	0.000011	0.000013	-	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00032	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Uranium (U)-Dissolved	0.000331	0.000376	0.000333	0.000052	0.00005	0.000028	0.000092	0.000245	0.0003	0.000365	0.00033	0.000363	0.000307	0.000149	0.000048	0.00006	0.000039	0.000071	0.00007	-	0.000124
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
Zinc (Zn)-Dissolved	0.0682	0.0438	0.0126	0.0079	0.0077	0.0121	<0.0030	0.0225	0.0212	0.0222	0.038	0.0258	0.0216	0.0091	0.0036	0.0068	0.0062	<0.0030	<0.0030	-	0.0113

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC													Replicate							
Sample ID	UR1	UR1	UR1	UR1	UR1	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR2	UR2	UR2
Date Sampled	26-Oct-11	27-Nov-11	1-Feb-11	5-Mar-11	31-Mar-11	2-May-11	4-Jun-11	4-Jul-11	1-Aug-11	4-Sep-11	1-Oct-11	26-Oct-11	27-Nov-11	27-Nov-11	1-Feb-11	5-Mar-11	31-Mar-11	4-Jul-11	4-Sep-11	31-Mar-11
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1079029-12	L1091310-2	L975149-2	L985810-2	L991777-3	L1002688-9	L1014013-2	L1026874-13	L1039955-2	L1054465-3	L1067383-2	L1079029-13	L1091310-12	L1091310-3	L975149-3	L985810-3	L991777-4	L1026874-12	L1054465-2	L991777-1
Physical Tests																				
Colour, True	<5.0	<5.0	<5.0	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	234	290	297	-	288	200	89.2	105	106	112	155	159	202	201	200	229	209	111	109	225
Hardness (as $CaCO_3$)	105	130	134	154	131	91.5	41.3	47.3	46.9	51.7	71.2	71.5	91.5	90.3	86.3	109	96.4	48.1	47.8	93.6
pH	8.06	8.16	8.01	-	7.83	8.08	7.81	7.78	8.55	8.26	8.05	8.07	8.17	8.16	7.99	8.07	7.86	7.71	8.2	7.85
Total Suspended Solids	16.2	5.1	<3.0	-	<3.0	<3.0	51.3	14.7	72.7	415	11.3	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	43.3	769	<3.0
Total Dissolved Solids	151	170	189	-	180	115	64	71	71	122	85	110	111	116	121	140	124	75	100	133
Turbidity (NTU)	17.5	10.3	3.08	-	6.3	0.44	46.7	25.1	35.7	380	10.7	3.94	0.76	0.86	0.89	0.39	0.55	40.9	465	2.8
Anions and Nutrients																				
Acidity (as $CaCO_3$)	2.6	1.8	2.3	-	5.6	3.1	3.8	2.3	<1.0	2.3	2.9	2.4	1.7	1.8	2.3	4.4	4.7	1.1	3.1	5.2
Alkalinity, Bicarbonate (as $CaCO_3$)	64.8	77.7	83.5	-	58.1	68.3	33.1	37.2	38.8	47.3	59.1	59.2	69.5	71.9	76.4	78.6	52.1	31.7	40.5	49.9
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0
Alkalinity, Total (as $CaCO_3$)	64.8	77.7	83.5	-	58.1	68.3	33.1	37.2	38.8	47.3	59.1	59.2	69.5	71.9	76.4	78.6	52.1	31.7	40.5	49.9
Ammonia, Total (as N)	0.0068	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0055	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0073	0.0077	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.073	0.095	0.078	-	0.061	0.024	0.021	0.024	0.023	0.024	0.034	0.035	0.041	0.041	0.035	0.032	0.028	0.05	0.032	0.045
Nitrate (as N)	0.083	0.0788	0.0908	-	0.115	0.174	0.0359	0.0235	0.0146	0.0264	0.0573	0.065	0.0648	0.0644	0.0859	0.0852	0.0934	0.0414	0.0419	0.146
Nitrite (as N)	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0019	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	0.086	0.124	0.09	<0.050	0.114	0.051	<0.050	<0.050	<0.050	<0.050	<0.050	0.057	0.096	0.138	<0.050
Total Nitrogen	0.12	0.08	0.08	0.109	0.16	0.26	0.16	0.1	0.05	0.14	0.11	0.09	<0.050	0.05	0.07	0.075	0.15	0.13	0.18	0.18
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0033	<0.0010
Phosphorus (P)-Total	0.0571	0.0351	0.0086	-	0.0281	0.0033	0.0907	0.017	0.0697	0.675	0.0191	0.0057	0.0021	0.0023	0.0039	<0.0020	0.005	0.0711	1.04	0.0115
Sulfate (SO_4)	52.2	68.1	70.6	-	66.3	30.2	10.9	14.1	13.1	10.4	22.8	22.5	30.8	30.8	30.4	37	32.6	20.9	13.5	41.2
Cyanides																				
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	0.002	<0.0011	<0.0010	<0.0010	0.0016	0.0011	0.0016	<0.0010	<0.0010	<0.0010	0.0016	0.0021	0.0011	0.0011	<0.0010	<0.0010	0.0011	<0.0010	0.0011	0.0013
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																				
Total Organic Carbon	1.17	0.68	0.55	<0.50	1.36	1.27	1.63	0.6	<0.50	2.3	1.05	1.42	0.7	0.77	0.88	<0.50	1.44	0.65	2.98	0.94
Total Metals																				
Aluminum (Al)-Total	0.573	0.426	0.125	0.137	0.194	0.0274	2.69	1.05	1.13	17	0.594	0.416	0.0508	0.047	0.0492	0.0151	0.0385	1.64	22.4	0.0918
Antimony (Sb)-Total	0.00125	0.00142	0.00173	0.00121	0.00135	0.00161	0.00108	0.00101	0.00102	0.00268	0.00159	0.00165	0.00213	0.00202	0.00278	0.00204	0.00196	0.00047	0.0017	0.00052
Arsenic (As)-Total	0.00275	0.00204	0.00069	0.00086	0.0012	0.00033	0.00229	0.00124	0.00172	0.0198	0.00077	0.00064	0.00034	0.00033	0.00037	0.00032	0.00035	0.00164	0.0176	0.00074
Barium (Ba)-Total	0.0406	0.0422	0.0375	0.0362	0.0354	0.0333	0.0531	0.0339	0.0368	0.297	0.0349	0.0347	0.0327	0.0333	0.0332	0.0357	0.0335	0.0466	0.355	0.039
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	0.00056	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00010	0.00055	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000703	0.000889	0.000573	0.000597	0.000544	0.00003	0.000069	0.000039	0.000044	0.000425	0.000048	0.00005	0.000025	0.000027	0.000021	0.000016	0.00002	0.000267	0.000728	0.000153
Calcium (Ca)-Total	37.4	45.3	45.5	52.9	46	29	13.6	14.7	15.4	30.5	23.3	24.6	31.1	29.4	29	37.7	30.3	16.6	31.6	33.4
Chromium (Cr)-Total	0.00059	0.0004	0.00013	0.00018	0.00019	<0.00030	0.0045	0.00195	0.0019	0.0297	0.00123	0.0009	0.0002	0.00018	0.00019	0.0002	0.00016	0.00193	0.0347	0.00015
Cobalt (Co)-Total	0.00102	0.00102	0.00053	0.00058	0.00059	<0.00010	0.00138	0.00056	0.00077	0.011	0.00035	0.00031	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00111	0.0155	0.00015
Copper (Cu)-Total	0.0638	0.0684	0.0222	0.0241	0.0313	0.00067	0.00754	0.00268	0.00327	0.0458	0.00159	0.00151	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0366	0.087	0.0125
Iron (Fe)-Total	1.94	1.75	0.49	0.605	0.831	0.092	3.44	1.3	1.52	23.6	0.733	0.59	0.082	0.083	0.129	0.063	0.138	2.36	32.6	0.345
Lead (Pb)-Total	0.000841	0.000795	0.000268	0.000328	0.000415	0.000073	0.00157	0.000777	0.00113	0.0105	0.000373	0.000364	<0.000050	0.000058	0.000056	<0.000050	0.000068	0.0013	0.019	0.000197
Lithium (Li)-Total	0.00173	0.00151	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00127	0.00091	0.0124	0.00151	0.00176	0.00133	0.00119	<0.0050	<0.0050	<0.0050	0.0012	0.0138	<0.0050
Magnesium (Mg)-Total	4.14	5.05	5.24	5.37	5.23	5.46	3.13	2.78	2.73	10.7	3.73	3.86	4.59	4.5	4.72	5.59	4.82	2.08	13.7	3.06
Manganese (Mn)-Total	0.0854	0.108	0.101	0.0896	0.0856	0.00865	0.0744	0.0332	0.0494	0.651	0.0236	0.0247	0.0102	0.0104	0.0135	0.00882	0.0109	0.073	0.835	0.0224
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	<0.000010	<0.000010	0.000067	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	0.000096
Molybdenum (Mo)-Total	0.00184	0.00206	0.0017	0.00179	0.00153	0.00083	0.000581	0.000628	0.00057	0.00135	0.00108	0.00103	0.00126	0.00118	0.00104	0.00105	0.00091	0.0014	0.00277	0.00227
Nickel (Ni)-Total	0.00153	0.00152	0.00096	0.00086	0.00087	<0.00050	0.00449	0.0017	0.0018	0.0283	0.00148	0.00133	0.00057	0.00057	<0.00050	<0.00050	<0.00050	0.0017	0.0289	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.77	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	1.15	<0.30

Table A2-4. 2011: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC													Replicate							
Sample ID	UR1	UR1	UR1	UR1	UR1	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR2	UR2	UR2
Date Sampled	26-Oct-11	27-Nov-11	1-Feb-11	5-Mar-11	31-Mar-11	2-May-11	4-Jun-11	4-Jul-11	1-Aug-11	4-Sep-11	1-Oct-11	26-Oct-11	27-Nov-11	27-Nov-11	1-Feb-11	5-Mar-11	31-Mar-11	4-Jul-11	4-Sep-11	31-Mar-11
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1079029-12	L1091310-2	L975149-2	L985810-2	L991777-3	L1002688-9	L1014013-2	L1026874-13	L1039955-2	L1054465-3	L1067383-2	L1079029-13	L1091310-12	L1091310-3	L975149-3	L985810-3	L991777-4	L1026874-12	L1054465-2	L991777-1
Total Metals *(cont'd)*																				
Potassium (K)-Total	1.09	1.22	1.09	1.15	0.942	0.494	0.909	0.594	0.603	4.55	0.688	0.589	0.576	0.569	0.508	0.598	0.518	0.979	5.18	1.12
Selenium (Se)-Total	0.00105	0.00131	0.00135	0.00142	0.00113	0.00067	0.00037	0.00038	0.00036	0.00097	0.00063	0.00051	0.00063	0.00065	0.00071	0.00083	0.00061	0.00042	0.00106	0.0007
Silicon (Si)-Total	3.04	2.78	2.37	2.29	2.35	2.14	7.36	3.16	3.13	32.1	3.36	2.8	2.08	2.08	2.12	1.99	2.03	4.62	37.8	2.69
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000038	<0.000020	0.000017	0.000253	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	0.000319	<0.000010
Sodium (Na)-Total	<2.0	2.2	2.7	3	2.8	2.4	<2.0	<2.0	<2.0	2.4	<2.0	<2.0	<2.0	<2.0	2.5	2.6	2.7	<2.0	3.2	2.4
Strontium (Sr)-Total	0.228	0.296	0.32	0.324	0.307	0.273	0.117	0.139	0.125	0.205	0.195	0.197	0.261	0.245	0.254	0.266	0.255	0.109	0.18	0.199
Thallium (Tl)-Total	0.000012	0.000011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000014	0.000015	0.000167	0.000013	0.00001	<0.000010	<0.000010	<0.00010	<0.00010	<0.00010	0.000018	0.000219	<0.00010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00021	<0.00010
Titanium (Ti)-Total	0.021	0.014	<0.010	<0.010	<0.010	<0.010	0.121	0.04	0.046	0.666	0.026	0.021	<0.010	<0.010	<0.010	<0.010	<0.010	0.101	1.6	<0.010
Uranium (U)-Total	0.00019	0.000231	0.000183	0.000226	0.000196	0.000034	0.000047	0.000031	0.000033	0.0003	0.000039	0.000036	0.000038	0.000037	0.000035	0.000037	0.000038	0.000221	0.00112	0.000297
Vanadium (V)-Total	0.0017	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	0.0096	0.0046	0.005	0.0763	0.0023	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0055	0.0824	<0.0010
Zinc (Zn)-Total	0.051	0.0656	0.037	0.0379	0.0366	<0.0030	0.0122	0.0072	0.0068	0.078	0.0058	0.0054	0.004	0.0041	<0.0030	<0.0030	<0.0030	0.0219	0.111	0.0122
Dissolved Metals																				
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.163	0.0647	0.0237	0.0279	0.0265	0.0076	0.0619	0.0303	0.108	0.0727	0.0306	0.0255	0.0317	0.007	0.0036	<0.0030	0.0081	0.0776	0.0885	0.016
Antimony (Sb)-Dissolved	0.00123	0.00134	0.00171	0.00114	0.00126	0.00162	0.00084	0.001	0.00095	0.00091	0.00161	0.00165	0.00198	0.00199	0.0027	0.002	0.00199	0.00038	0.00047	0.00052
Arsenic (As)-Dissolved	0.00092	0.00012	0.00016	0.00012	0.00018	0.00026	0.00027	0.00035	0.00046	0.00071	0.00033	0.00033	0.00035	0.00027	0.00026	0.00023	0.00027	0.00015	0.00058	0.00028
Barium (Ba)-Dissolved	0.0326	0.0346	0.0354	0.0351	0.0341	0.0319	0.0159	0.0179	0.0199	0.024	0.0258	0.0271	0.0312	0.032	0.0312	0.0358	0.033	0.0222	0.0266	0.0384
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000455	0.000408	0.000445	0.000444	0.000368	0.000026	0.000016	0.00002	0.000014	<0.000010	0.000034	0.000033	0.000021	0.000021	0.000018	0.000018	0.000017	0.000121	<0.000010	0.000117
Calcium (Ca)-Dissolved	35.5	44.3	45.2	53	44	27.8	13.2	15	15.1	17.1	22.8	22.8	29.4	28.9	27.4	35.1	30.5	16.8	17.1	32.6
Chromium (Cr)-Dissolved	0.00017	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	0.00018	0.00022	0.00023	0.00017	0.00014	0.0001	0.0001	<0.00010	<0.00010	0.00013	<0.00010	0.00014	<0.00010	<0.00010
Cobalt (Co)-Dissolved	0.00077	0.00069	0.0005	0.00046	0.00048	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00026	<0.00010	0.0001
Copper (Cu)-Dissolved	0.0221	0.00278	0.00279	0.00256	0.00395	<0.00050	0.00058	<0.00050	<0.00050	0.00095	0.00065	0.00055	<0.00050	<0.00050	<0.00050	<0.00050	0.00096	0.00178	0.00089	0.00309
Iron (Fe)-Dissolved	0.557	<0.030	<0.030	<0.030	<0.030	<0.030	0.057	0.031	0.096	0.033	0.031	0.033	0.072	<0.030	<0.030	<0.030	<0.030	0.032	0.056	<0.030
Lead (Pb)-Dissolved	0.000292	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000065	<0.000050	<0.000050	<0.000050	0.00007	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.0012	0.00133	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00069	<0.00050	<0.00050	0.00107	0.00113	0.00124	0.00117	<0.0050	<0.0050	<0.0050	<0.00050	<0.00050	<0.0050
Magnesium (Mg)-Dissolved	3.89	4.65	5.11	5.29	5.03	5.4	2.04	2.39	2.23	2.19	3.43	3.56	4.41	4.43	4.37	5.22	4.89	1.49	1.21	2.99
Manganese (Mn)-Dissolved	0.0724	0.0891	0.0954	0.0832	0.0758	0.0063	0.00807	0.00647	0.00756	0.000746	0.00992	0.0095	0.0107	0.00792	0.0113	0.00663	0.00902	0.0331	0.00281	0.0177
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00172	0.00188	0.00165	0.00169	0.00141	0.000806	0.000472	0.00065	0.000637	0.000625	0.00105	0.000957	0.00114	0.00113	0.000991	0.00101	0.00091	0.00145	0.00133	0.00227
Nickel (Ni)-Dissolved	0.00111	0.00101	0.00083	0.00079	0.00075	<0.00050	0.00065	<0.00050	<0.00050	<0.00050	0.00062	0.00059	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.988	1.12	1.06	1.16	0.906	0.487	0.332	0.343	0.355	0.511	0.505	0.482	0.544	0.548	0.487	0.551	0.522	0.642	1.13	1.1
Selenium (Se)-Dissolved	0.00103	0.00124	0.00132	0.00141	0.00112	0.00068	0.0003	0.00037	0.00037	0.00042	0.00059	0.00051	0.00062	0.00063	0.00068	0.00075	0.00062	0.0004	0.00043	0.00069
Silicon (Si)-Dissolved	2.28	2.12	2.24	2.1	2.16	2.02	1.3	1.14	1.04	1.26	1.86	1.98	1.96	1.94	2.03	1.91	1.95	1.43	1.32	2.58
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	2.1	2.6	2.8	2.7	2.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.3	2.6	2.7	<2.0	<2.0	2.4
Strontium (Sr)-Dissolved	0.226	0.285	0.311	0.316	0.297	0.269	0.112	0.141	0.123	0.129	0.189	0.183	0.248	0.24	0.242	0.26	0.254	0.107	0.0905	0.198
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.00015	0.000189	0.000157	0.000195	0.000159	0.000033	0.000014	0.000017	0.000018	0.000024	0.000029	0.000028	0.000034	0.000038	0.000033	0.000037	0.000038	0.000138	0.000161	0.000287
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0273	0.0153	0.0225	0.0202	0.0159	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0031	<0.0030	<0.0030	<0.0030	<0.0030	0.0032	<0.0030	0.0067

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake
QAQC																					
Sample ID	Adit	Adit	Adit	Adit	Adit	Adit	BJ (1.5m)	BJ (1.7m)	BJ (15m)	BJ (15m)	BJ (15m)	BJ (1m)	BJ (30m)	BJ (30m)	BJ (30m)	BJ (50m)	BJ (50m)	BJ (50m)	BJ (65m)	BJ (70m)	BJ (70m)
Date Sampled	17-Jan-12	29-Jun-12	4-Jul-12	9-Sep-12	29-Oct-12	13-Dec-12	30-Jun-12	12-Dec-12	30-Jun-12	8-Sep-12	12-Dec-12	8-Sep-12	30-Jun-12	8-Sep-12	12-Dec-12	30-Jun-12	8-Sep-12	12-Dec-12	8-Sep-12	30-Jun-12	12-Dec-12
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Excluded	Included	Exluded	Excluded	Excluded	Included	Excluded	Excluded	Included	Excluded	Excluded	Excluded	Included	Excluded
ALS Sample ID	L1105752-2	L1171618-3	L1174986-3	L1207295-1	L1232145-3	L1250701-27	L1171541-10	L1250701-19	L1171541-11	L1207289-5	L1250701-20	L1207289-4	L1171541-12	L1207289-6	L1250701-21	L1171541-13	L1207289-7	L1250701-22	L1207289-8	L1171541-14	L1250701-23
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	483	505	508	548	479	548	5.1	54.4	53.3	49.5	50	49.2	48.9	49.4	50.2	49.3	49.2	50.1	49.5	50.8	51.8
Hardness (as $CaCO_3$)	112	147	140	147	132	125	10.8	23.6	24.7	21.5	22.2	21.5	22.2	21.7	22.5	22.5	21.7	22.5	21.9	23.3	23.3
pH	8.1	8.03	8.08	8.09	8.13	8.3	6.5	7.69	7.45	7.74	7.11	7.75	7.51	7.74	7.87	7.53	7.71	7.96	7.7	7.52	7.97
Total Suspended Solids	46	4	<3.0	302	365	10100	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	310	336	356	352	315	371	<10	33	29	29	24	30	26	25	27	27	26	27	24	32	35
Turbidity (NTU)	61	4.58	4.93	291	223	>4000	0.32	0.46	0.22	0.85	0.27	0.98	0.26	0.64	0.19	0.18	0.61	1.05	0.52	0.31	1.77
Anions and Nutrients																					
Acidity (as $CaCO_3$)	3.5	2.1	2.6	2.7	2.5	<1.0	1.4	2.6	1.7	2	3.6	1.9	1.5	2	2.6	1.5	2	2	1.9	1.5	1.9
Alkalinity, Bicarbonate (as $CaCO_3$)	100	98.7	91.9	103	110	107	2.9	15.8	15.7	15	13.4	14.9	15.1	15.1	15.2	14.8	14.8	14.7	14.6	15.6	16.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	100	98.7	91.9	103	110	107	2.9	15.8	15.7	15	13.4	14.9	15.1	15.1	15.2	14.8	14.8	14.7	14.6	15.6	16.3
Ammonia, Total (as N)	0.0907	0.1	0.0697	1.41	0.515	1.78	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	1.13	1.82	1.84	1.52	1.29	2.59	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.367	0.344	0.354	0.343	0.322	0.407	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	0.0166	0.0217	0.0109	3.34	0.883	2.76	0.0065	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.008	<0.0050	0.0077	<0.0050	0.0198	0.015
Nitrite (as N)	0.0023	0.0025	0.001	0.0677	0.0355	0.452	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	0.102	0.109	1.4	0.6	1.4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	0.06	0.126	0.121	3.85	1.49	4.62	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	0.0021	<0.0010	<0.0010	0.0026	0.0018	0.0023	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.08	<0.0020	<0.0020	0.465	0.0088	11.7	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0029	<0.0020	<0.0020	0.0034
Sulfate (SO_4)	134	161	161	160	143	150	0.68	9.31	10.2	8.39	8.76	8.46	8.75	8.5	8.77	8.91	8.56	8.9	8.54	9.24	9.03
Cyanides																					
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	<0.50	<0.50	<0.50	1.44	1.16	1.77	<0.50	0.56	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals																					
Aluminum (Al)-Total	0.62	0.083	0.0751	3.13	2.81	43.1	0.0092	0.0093	0.006	0.0275	0.0168	0.04	0.005	0.026	0.0274	0.004	0.026	0.0476	0.0321	0.0105	0.0748
Antimony (Sb)-Total	0.0065	0.00267	0.00234	0.00864	0.02	0.03	<0.00010	0.00022	0.00025	0.0002	0.00021	0.00021	0.00025	0.00023	0.0002	0.00026	0.00021	0.00026	0.00021	0.00028	0.00029
Arsenic (As)-Total	0.102	0.0141	0.0151	0.0383	0.0483	0.898	0.0002	0.00049	0.00056	0.00065	0.00046	0.00069	0.00056	0.00066	0.00047	0.00057	0.00062	0.00052	0.00063	0.00065	0.00065
Barium (Ba)-Total	0.0486	0.0212	0.0217	0.226	0.351	7.77	0.0177	0.034	0.0339	0.0322	0.0328	0.0329	0.0326	0.033	0.0318	0.0325	0.0332	0.033	0.0331	0.0338	0.0347
Beryllium (Be)-Total	0.00012	<0.00010	<0.00010	0.00021	0.00032	0.0075	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0022	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	0.092	0.078	0.084	0.112	0.094	0.197	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000372	0.000692	0.000568	0.00038	0.001	0.0196	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	39.1	51.3	50.3	54.8	48.8	133	2.67	9.07	9.3	8.14	8.55	8.08	8.55	8.49	8.36	8.52	8.48	8.65	8.47	8.87	8.52
Chromium (Cr)-Total	0.00052	0.00016	<0.00010	0.00329	0.001	0.022	0.00011	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total	0.00071	0.00321	0.00261	0.00312	0.00309	0.0471	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	0.00568	0.00248	0.00129	0.0116	0.017	0.3	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00056	<0.00050	<0.00050	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.002
Iron (Fe)-Total	3.42	0.564	0.427	6.97	6.39	90.7	<0.030	<0.030	<0.030	<0.030	<0.030	0.036	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Total	0.0214	0.0103	0.00441	0.0445	0.0564	1.03	0.000055	0.0001	<0.000050	<0.000050	<0.000050	0.000054	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0003	<0.000050	<0.000050	0.0008
Lithium (Li)-Total	0.194	0.15	0.191	0.184	0.142	0.203	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	3.87	4.6	4.34	5.01	4.4	7.42	0.139	0.289	0.316	0.262	0.282	0.277	0.286	0.285	0.275	0.286	0.292	0.283	0.29	0.3	0.286
Manganese (Mn)-Total	0.368	0.578	0.517	0.643	0.403	4.34	0.0014	0.000756	0.00257	0.00403	0.00111	0.0046	0.00071	0.00388	0.00116	0.00086	0.00377	0.00257	0.00417	0.003	0.00512
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000050	0.000037	0.000054	0.000235	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.0032	0.00208	0.0022	0.00416	0.00371	0.0959	0.000103	0.000332	0.000355	0.00031	0.000341	0.000318	0.000363	0.000334	0.000321	0.000395	0.00032	0.000332	0.000317	0.00036	0.000307
Nickel (Ni)-Total	0.00061	0.00178	0.0015	0.00433	0.0019	0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	0.44	0.44	10.9	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake
QAQC																					
Sample ID	Adit	Adit	Adit	Adit	Adit	Adit	BJ (1.5m)	BJ (1.7m)	BJ (15m)	BJ (15m)	BJ (15m)	BJ (1m)	BJ (30m)	BJ (30m)	BJ (30m)	BJ (50m)	BJ (50m)	BJ (50m)	BJ (65m)	BJ (70m)	BJ (70m)
Date Sampled	17-Jan-12	29-Jun-12	4-Jul-12	9-Sep-12	29-Oct-12	13-Dec-12	30-Jun-12	12-Dec-12	30-Jun-12	8-Sep-12	12-Dec-12	8-Sep-12	30-Jun-12	8-Sep-12	12-Dec-12	30-Jun-12	8-Sep-12	12-Dec-12	8-Sep-12	30-Jun-12	12-Dec-12
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Excluded	Included	Exluded	Excluded	Excluded	Included	Excluded	Excluded	Included	Excluded	Excluded	Excluded	Included	Excluded
ALS Sample ID	L1105752-2	L1171618-3	L1174986-3	L1207295-1	L1232145-3	L1250701-27	L1171541-10	L1250701-19	L1171541-11	L1207289-5	L1250701-20	L1207289-4	L1171541-12	L1207289-6	L1250701-21	L1171541-13	L1207289-7	L1250701-22	L1207289-8	L1171541-14	L1250701-23
Total Metals *(cont'd)*																					
Potassium (K)-Total	2.6	2.22	2.25	4.68	4.35	30.2	<0.050	0.075	0.07	0.072	0.074	0.085	0.072	0.086	0.074	0.07	0.084	0.103	0.086	0.08	0.119
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	0.00046	0.0006	0.00772	<0.00010	<0.00010	<0.00010	0.0002	<0.00010	0.00015	<0.00010	0.00013	<0.00010	<0.00010	0.00013	<0.00010	0.00013	<0.00010	<0.00010
Silicon (Si)-Total	4.13	3.16	3.04	8.24	9.75	74	0.21	0.499	0.579	0.55	0.496	0.57	0.56	0.54	0.5	0.56	0.55	0.55	0.57	0.6	0.596
Silver (Ag)-Total	0.00139	0.000069	0.000024	0.00591	0.0135	0.144	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000014	<0.000010	<0.000010	0.000032
Sodium (Na)-Total	57.5	47.9	55.2	55.2	45.7	73.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	1.03	1.19	1.16	1.29	1.24	2.27	0.0226	0.056	0.0577	0.0523	0.0533	0.0509	0.0534	0.0529	0.0518	0.0535	0.0526	0.0541	0.0523	0.0558	0.0535
Thallium (Tl)-Total	0.000073	0.000096	0.00009	0.000185	0.000261	0.00365	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00064	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	0.065	0.06	0.271	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	0.000437	0.000482	0.000456	0.000672	0.0011	0.0117	<0.000010	0.000021	0.000025	0.000024	0.00002	0.000023	0.000022	0.000023	0.000019	0.000023	0.000022	0.000022	0.000023	0.000024	0.000024
Vanadium (V)-Total	0.001	<0.0010	<0.0010	0.0083	0.005	0.0685	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	0.0499	0.0995	0.0745	0.0576	0.151	2.24	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.23	0.013	0.0141	0.0661	0.052	0.114	0.0033	0.0032	<0.0030	0.0046	<0.0030	0.021	<0.0030	0.0036	<0.0030	<0.0030	0.004	0.0044	0.0041	0.005	0.0061
Antimony (Sb)-Dissolved	0.00665	0.00187	0.00187	0.0032	0.00655	0.0158	<0.00010	0.00021	0.00021	0.00019	0.0002	0.0002	0.00022	0.00021	0.00021	0.00022	0.00021	0.00022	0.00021	0.00025	0.00024
Arsenic (As)-Dissolved	0.109	0.0016	0.00356	0.00404	0.0115	0.0183	0.00022	0.00044	0.00053	0.00052	0.00038	0.00051	0.0005	0.00051	0.00038	0.00052	0.00048	0.0004	0.00045	0.00055	0.00039
Barium (Ba)-Dissolved	0.0396	0.0186	0.0202	0.0236	0.0195	0.0289	0.0204	0.0331	0.0339	0.0317	0.0319	0.0318	0.0319	0.0319	0.0323	0.0319	0.0321	0.0315	0.0319	0.0326	0.0325
Beryllium (Be)-Dissolved	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	0.086	0.08	0.082	0.108	0.088	0.154	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000342	0.000168	0.000054	<0.000010	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Dissolved	38.8	51.7	49.2	51.3	45.7	44.1	4.02	8.96	9.36	8.16	8.45	8.18	8.43	8.24	8.53	8.53	8.25	8.55	8.29	8.85	8.87
Chromium (Cr)-Dissolved	0.00022	0.00013	<0.00010	0.00011	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	0.00074	0.00296	0.0024	0.00067	0.00044	0.00044	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00507	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	3.26	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	0.0226	<0.000050	0.000086	0.000092	0.000233	0.0002	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.195	0.15	0.189	0.187	0.137	0.219	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	3.77	4.45	4.2	4.55	4.44	3.71	0.176	0.293	0.31	0.27	0.279	0.272	0.275	0.279	0.279	0.284	0.275	0.282	0.28	0.287	0.286
Manganese (Mn)-Dissolved	0.388	0.558	0.493	0.437	0.304	0.241	0.00148	0.000062	0.000488	0.00144	<0.000050	0.00178	0.0003	0.000337	<0.000050	0.00005	0.00018	0.000084	0.00015	0.00112	0.000514
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00257	0.00206	0.00214	0.00264	0.00251	0.00822	0.000142	0.000346	0.000342	0.000327	0.000326	0.000309	0.000331	0.00033	0.000318	0.000345	0.000302	0.000317	0.000307	0.000352	0.000321
Nickel (Ni)-Dissolved	<0.00050	0.00171	0.00141	0.00078	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	2.26	2.23	2.16	3.58	2.93	7.54	<0.050	0.073	0.071	0.073	0.069	0.075	0.074	0.075	0.072	0.079	0.077	0.081	0.075	0.083	0.087
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	0.00011	0.00012	0.00036	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	3.34	2.95	2.92	2.9	2.88	2.97	0.274	0.481	0.572	0.49	0.45	0.5	0.55	0.49	0.472	0.56	0.51	0.495	0.52	0.59	0.495
Silver (Ag)-Dissolved	0.000035	<0.000010	<0.000010	<0.000010	0.000012	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	55.5	48.2	51.6	55.5	43.7	72.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	1.02	1.19	1.12	1.27	1.21	1.4	0.0327	0.0549	0.0588	0.0506	0.0519	0.0504	0.0513	0.0507	0.0522	0.0519	0.0502	0.0527	0.05	0.0528	0.0552
Thallium (Tl)-Dissolved	0.000048	0.000092	0.000087	0.000056	0.000073	0.000251	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000433	0.000474	0.00045	0.000581	0.000804	0.00352	<0.000010	0.000018	0.000023	0.00002	0.00002	0.00002	0.000022	0.000019	0.000016	0.000021	0.000019	0.000019	0.000018	0.000022	0.000021
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0464	0.0732	0.0539	<0.0030	0	<0.0060	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Lake	Lake	Lake	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC		replicate						replicate		replicate		replicate					replicate		
Sample ID	BJ Shallow (1m)	BJ Shallow (1m)	BJ Shallow (6m)	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC
Date Sampled	8-Sep-12	8-Sep-12	8-Sep-12	12-Jan-12	26-Jan-12	20-Jun-12	21-Aug-12	21-Aug-12	27-Nov-12	27-Nov-12	13-Dec-12	13-Dec-12	27-Apr-12	5-Jun-12	11-Jun-12	29-Jun-12	29-Jun-12	4-Jul-12	9-Sep-12
Included/Excluded	Excluded	Excluded	Excluded	Excluded-Impacted	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1207289-1	L1207289-3	L1207289-2	L1104748-4	L1110404-2	L1166925-5	L1199717-2	L1199717-7	L1243651-1	L1243651-8	L1250701-28	L1250701-29	L1140759-11	L1158955-4	L1161793-4	L1171618-1	L1171618-5	L1174986-1	L1207295-3
Physical Tests																			
Colour, True	<5.0	<5.0	<5.0	<5	<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	49.3	48.7	49.2	65.2	64.9	56.5	48.7	49.2	54	53.8	57.1	56.3	41	77	60.5	47.5	47.6	48.1	53.9
Hardness (as $CaCO_3$)	21.4	21.5	22.2	27.9	29.9	24.8	21.4	21.4	23.9	23.9	24.5	24.9	15.3	31.6	26.2	21.3	21.1	20.8	23.2
pH	7.73	7.75	7.74	7.53	7.79	7.99	8.04	8.08	7.86	7.8	8.08	8.03	7.5	7.89	7.71	7.45	7.52	7.59	7.72
Total Suspended Solids	<3.0	<3.0	<3.0	10.7	<3	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	8.9	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	29	21	24	29	36	35	31	29	27	29	31	39	29	36	34	26	27	28	30
Turbidity (NTU)	1.03	1.16	1.17	7.29	0.46	2.55	0.79	0.75	0.45	0.35	0.22	0.24	14.9	1.13	0.5	0.77	0.7	0.56	4.18
Anions and Nutrients																			
Acidity (as $CaCO_3$)	2	2	2	2.5	3.4	5.1	2.5	2.3	1.8	2	1.8	1.8	2.3	4	2	1.7	1.5	2.9	2
Alkalinity, Bicarbonate (as $CaCO_3$)	14.7	14.9	14.9	16.1	18.4	16.4	14.1	14.1	15.9	15.7	17.4	16.9	6.5	15.7	15.9	13.8	13.7	13.3	13.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	14.7	14.9	14.9	16.1	18.4	16.4	14.1	14.1	15.9	15.7	17.4	16.9	6.5	15.7	15.9	13.8	13.7	13.3	13.3
Ammonia, Total (as N)	0.0055	<0.0050	<0.0050	0.0229	0.0099	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0299	0.0571	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.05	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.02	<0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.026	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	<0.0050	<0.0050	<0.0050	0.0089	0.0143	0.0154	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.072	0.0211	0.0131	0.028	0.019	0.0131	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.001	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0018	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	0.137	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.084	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	0.146	0.0155	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.06	<0.050	<0.050	0.029	0.019	0.013	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	0.0190	0.0024	0.0109	<0.0020	<0.0020	0.0022	<0.0020	<0.0020	<0.0020	0.0205	0.0053	<0.0020	<0.0020	<0.0020	<0.0020	0.0041
Sulfate (SO_4)	8.41	8.39	8.4	13.3	11.6	11.1	8.62	8.63	9.6	9.62	9.92	9.84	10.2	17.7	11.4	9.27	9.18	8.66	10.6
Cyanides																			
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	<0	<0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon				<0	<0														
Total Organic Carbon	<0.50	<0.50	<0.50	1.91	0.77	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.61	0.53	<0.50	0.6	<0.50	<0.50	<0.50
Total Metals																			
Aluminum (Al)-Total	0.05	0.0492	0.0489	0.266	0.0107	0.0273	0.039	0.042	0.0191	0.0193	0.0083	0.0085	0.887	0.069	0.0324	0.031	0.04	0.028	0.122
Antimony (Sb)-Total	0.00021	0.00021	0.0002	0.00065	<0.0005	0.0002	0.00021	0.00022	0.00023	0.00022	0.00021	0.00021	0.00044	0.00028	0.0002	0.00016	0.00016	0.00016	0.00024
Arsenic (As)-Total	0.00071	0.00068	0.00069	0.00254	0.00057	0.00076	0.00067	0.00065	0.00055	0.0005	0.00053	0.00055	0.00412	0.00113	0.00073	0.00064	0.0006	0.00065	0.00098
Barium (Ba)-Total	0.0335	0.0333	0.0332	0.052	0.041	0.0339	0.0315	0.0325	0.0345	0.0345	0.033	0.0339	0.0332	0.0358	0.0348	0.0295	0.0301	0.0314	0.0349
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	0.00057	<0.00050	<0.00050	<0.2	<0.2	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	0.000782	<0.000017	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000018	0.000094	<0.000010	<0.000010	<0.000010	<0.000010	0.00002
Calcium (Ca)-Total	8.3	8.27	8.13	10.7	11.0	9.54	8.05	8.31	9.16	9.09	9.14	9.44	5.78	12	10.4	8.16	7.97	8.16	9.19
Chromium (Cr)-Total	<0.00010	<0.00010	<0.00010	0.0035	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	0.0006	<0.00010	<0.00010	0.00017	0.00015	<0.00010	0.0001
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.0003	<0.0003	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00035	0.00041	<0.00010	<0.00010	<0.00010	<0.00010	0.00014
Copper (Cu)-Total	<0.00050	0.00063	<0.00050	0.0020	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00413	<0.00050	0.00131	0.00119	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	0.04	0.034	0.036	0.409	0.047	0.036	0.033	0.03	<0.030	<0.030	<0.030	<0.030	1.89	0.126	<0.030	<0.030	<0.030	<0.030	0.125
Lead (Pb)-Total	<0.000050	0.000064	0.000055	0.00307	<0.0005	0.000094	0.000052	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00129	0.000436	<0.000050	<0.000050	0.000055	<0.000050	0.000332
Lithium (Li)-Total	<0.00050	<0.00050	<0.00050	<0.005	<0.005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00088	0.00215	0.00066	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	0.28	0.279	0.28	0.42	0.38	0.337	0.268	0.28	0.293	0.302	0.295	0.289	0.295	0.445	0.336	0.278	0.28	0.269	0.31
Manganese (Mn)-Total	0.0048	0.00484	0.00482	0.0686	0.0141	0.0107	0.00481	0.0048	0.00184	0.00201	0.00572	0.00584	0.0408	0.0644	0.0084	0.00925	0.0096	0.0077	0.047
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010
Molybdenum (Mo)-Total	0.00034	0.000343	0.000322	<0.001	<0.001	0.000323	0.000309	0.000321	0.000358	0.000366	0.000426	0.000345	0.000265	0.000306	0.000298	0.000321	0.000275	0.000284	0.000313
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.3	<0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Lake	Lake	Lake	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC		replicate						replicate		replicate		replicate					replicate		
Sample ID	BJ Shallow (1m)	BJ Shallow (1m)	BJ Shallow (6m)	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC
Date Sampled	8-Sep-12	8-Sep-12	8-Sep-12	12-Jan-12	26-Jan-12	20-Jun-12	21-Aug-12	21-Aug-12	27-Nov-12	27-Nov-12	13-Dec-12	13-Dec-12	27-Apr-12	5-Jun-12	11-Jun-12	29-Jun-12	29-Jun-12	4-Jul-12	9-Sep-12
Included/Excluded	Excluded	Excluded	Excluded	Excluded-Impacted	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1207289-1	L1207289-3	L1207289-2	L1104748-4	L1110404-2	L1166925-5	L1199717-2	L1199717-7	L1243651-1	L1243651-8	L1250701-28	L1250701-29	L1140759-11	L1158955-4	L1161793-4	L1171618-1	L1171618-5	L1174986-1	L1207295-3
Total Metals *(cont'd)*																			
Potassium (K)-Total	0.091	0.085	0.086	<2	<2	0.079	0.078	0.081	0.09	0.09	0.108	0.071	0.426	0.166	0.091	0.068	0.063	0.069	0.132
Selenium (Se)-Total	0.00021	0.00014	0.00019	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.0001
Silicon (Si)-Total	0.58	0.57	0.58	1.18	0.688	0.689	0.59	0.6	0.506	0.493	0.52	0.54	1.62	0.945	0.813	0.6	0.59	0.6	0.74
Silver (Ag)-Total	<0.000010	0.000092	<0.000010	0.000207	<0.00002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000021	0.000201	0.000036	<0.000010	<0.000010	0.000015	<0.000010	0.000027
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.0531	0.0525	0.0518	0.0749	0.0713	0.0589	0.0511	0.051	0.0622	0.06	0.0576	0.0592	0.0363	0.0805	0.063	0.0509	0.0511	0.0507	0.0557
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.000013	<0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000048	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	0.00019	<0.00010	<0.00013	<0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.013	<0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	0.000023	0.000026	0.000023	<0.0002	<0.0002	0.000029	0.000023	0.000022	0.000021	0.000026	0.00002	0.000025	0.000031	0.00003	0.000025	0.000025	0.000024	0.000022	0.000024
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0013	<0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	<0.0030	0.0231	<0.0032	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0090	0.0109	0.0032	0.0033	<0.0030	<0.0030	<0.0030
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.004	0.0046	0.0048	<0.005	<0.005	0.0098	0.005	0.0049	<0.0030	<0.0030	<0.0030	0.0036	0.0051	0.0233	0.0106	0.011	0.012	0.0099	0.0169
Antimony (Sb)-Dissolved	0.0002	0.00019	0.0002	<0.0005	<0.0005	0.00019	0.00019	0.0002	0.00023	0.00022	0.0002	0.0002	0.0001	0.00023	0.00019	0.00014	0.00014	0.00016	0.0002
Arsenic (As)-Dissolved	0.00049	0.00053	0.00051	<0.0005	<0.0005	0.00047	0.0006	0.0005	0.00049	0.00046	0.00048	0.00048	<0.00010	0.0005	0.00059	0.00044	0.00043	0.00046	0.00031
Barium (Ba)-Dissolved	0.0313	0.0322	0.0305	0.037	0.040	0.0318	0.0368	0.0313	0.0344	0.0338	0.0338	0.0347	0.0188	0.0349	0.0334	0.0298	0.0297	0.0311	0.0313
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.2	<0.2	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.1	<0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	0.000473	<0.000017	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000082	<0.000010	<0.000010	<0.000010	<0.000010	0.000068
Calcium (Ca)-Dissolved	8.15	8.15	8.42	10.6	11.3	9.39	8.03	8.12	9.08	9.06	9.33	9.5	5.73	12	9.98	8.07	7.98	7.92	8.82
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	0.0017	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.0003	<0.0003	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00037	<0.00010	<0.00010	<0.00010	<0.00010	0.00021
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00055	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.0005	<0.0005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000065	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.00050	<0.00050	<0.00050	<0.005	<0.005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00199	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	0.264	0.271	0.27	0.37	0.38	0.319	0.315	0.266	0.291	0.296	0.304	0.296	0.228	0.428	0.319	0.279	0.282	0.26	0.292
Manganese (Mn)-Dissolved	0.00172	0.00189	0.00183	0.0364	0.0102	0.00754	0.00259	0.00212	0.000578	0.000687	0.00465	0.00475	0.0159	0.0615	0.00699	0.00701	0.00733	0.0054	0.0428
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000321	0.000319	0.000353	<0.001	<0.001	0.000308	0.000307	0.000307	0.000351	0.000347	0.000347	0.000343	<0.000050	0.000292	0.000283	0.000274	0.000267	0.000268	0.000304
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.3	<0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.073	0.071	0.067	<2	<2	0.074	0.097	0.07	0.088	0.087	0.109	0.075	0.11	0.16	0.083	0.066	0.069	0.066	0.087
Selenium (Se)-Dissolved	0.00016	<0.00010	<0.00010	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	0.5	0.49	0.5	0.623	0.692	0.641	0.51	0.53	0.468	0.47	0.528	0.529	0.418	0.861	0.743	0.57	0.57	0.56	0.52
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.00002	<0.00002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.051	0.0508	0.0518	0.0719	0.0708	0.0571	0.0499	0.0504	0.0603	0.0598	0.0582	0.0591	0.0352	0.0784	0.0592	0.0501	0.0494	0.0486	0.0535
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000013	<0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	0.00012	<0.00010	<0.00013	<0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.013	<0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000019	0.000018	0.00002	<0.0002	<0.0002	0.000021	0.000023	0.000018	0.00002	0.00002	0.000018	0.000021	<0.000010	0.000022	0.000021	0.000019	0.00002	0.000018	0.000021
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0013	<0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	0.0136	<0.0032	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0032	0.0088	<0.0030	<0.0030	<0.0030	<0.0030	0.0046

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC	replicate			replicate												
Sample ID	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	BJ 200m D/S	BJ 200m D/S
Date Sampled	29-Oct-12	29-Oct-12	27-Nov-12	27-Nov-12	29-Jun-12	4-Jul-12	21-Aug-12	9-Sep-12	29-Oct-12	27-Apr-12	9-Sep-12	29-Oct-12	27-Nov-12	13-Dec-12	5-Jun-12	11-Jun-12
Included/Excluded	Included	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Included
ALS Sample ID	L1232163-2	L1232163-5	L1243651-2	L1243651-7	L1171618-2	L1174986-2	L1199717-1	L1207295-2	L1232163-1	L1140759-10	L1207295-6	L1232163-3	L1243651-3	L1250701-26	L1158955-5	L1161793-5
Physical Tests																
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	52	50.4	54.3	53.9	98.4	101	77.7	113	347	54.1	79.3	132	86	195	63.7	71.8
Hardness (as $CaCO_3$)	22.7	22.8	23.8	23.9	37.1	38	29.4	43.4	157	22.4	28.6	44.5	31.9	53.5	28.7	29.4
pH	7.89	7.36	7.85	7.78	6.47	7.58	7.72	7.55	8.2	7.72	7.82	8.08	7.96	8.31	8.09	7.61
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	84	104	447	608	<3.0	18.2	51.6	291	68.7	1540	<3.0	14
Total Dissolved Solids	31	32	30	26	56	59	51	70	231	31	41	90	65	129	36	43
Turbidity (NTU)	0.8	0.66	0.57	0.75	64.6	87.3	389	487	1.55	7.13	36.6	235	75.3	2170	0.36	10.3
Anions and Nutrients																
Acidity (as $CaCO_3$)	2.4	2.5	1.9	2.1	2.3	2.9	3.8	2.1	1.8	2.2	1.9	2.1	1.9	<1.0	2.9	2.2
Alkalinity, Bicarbonate (as $CaCO_3$)	15.4	15	15.7	15.8	2.2	<2.0	4	7.5	104	15.1	18.5	32	20.5	47.1	16.6	15.4
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	15.4	15	15.7	15.8	2.2	<2.0	4	7.5	104	15.1	18.5	32	20.5	47.1	16.6	15.4
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	0.0878	0.0326	0.03	0.0384	0.0222	0.0097	0.246	0.15	0.0862	0.379	<0.0050	0.0217
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.75	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	0.053	0.047	0.039	0.047	0.199	<0.020	0.029	0.061	0.03	0.116	<0.020	0.024
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	0.0404	0.028	0.02	0.0242	<0.0050	0.0075	0.0912	0.2	0.116	0.531	0.0141	0.0192
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.012	0.0128	0.0647	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	0.156	0.102	0.176	0.316	0.1	<0.050	0.358	0.2	0.2	0.4	<0.050	0.072
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	0.198	0.13	0.195	0.34	0.056	<0.050	0.45	0.451	0.28	0.952	<0.050	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	0.0012	0.0011	<0.0010	0.0069	0.0015	0.0022	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	<0.0020	0.0895	0.106	0.618	0.716	0.0028	0.0402	0.086	0.0161	0.0207	1.71	<0.0020	0.0262
Sulfate (SO_4)	9.38	9.4	9.65	9.69	39.5	39.7	26.8	41	89.2	9.58	17.7	31.5	17.5	46	12.2	16.4
Cyanides																
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	0.71	0.52	1.02	2.5	0.55	1.04	1.5	0.68	0.89	0.78	<0.50	<0.50
Total Metals																
Aluminum (Al)-Total	0.0226	0.0222	0.025	0.0227	1.38	3.36	6.98	7.91	0.154	0.254	0.829	3.55	2.63	13.5	0.0358	0.428
Antimony (Sb)-Total	0.0002	0.00021	0.00023	0.00023	0.00034	0.00071	0.00323	0.00337	0.00293	0.00053	0.00078	0.01	0.00214	0.01	0.0002	0.00033
Arsenic (As)-Total	0.00049	0.00049	0.00057	0.00056	0.00266	0.00707	0.068	0.0858	0.0103	0.00207	0.00663	0.0268	0.00633	0.148	0.00076	0.00201
Barium (Ba)-Total	0.033	0.033	0.0351	0.0341	0.06	0.104	0.272	0.343	0.021	0.0402	0.0625	0.277	0.129	1.38	0.0359	0.0393
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00015	0.00024	0.00031	<0.00010	<0.00010	<0.00010	0.0003	0.00021	0.00212	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.038	<0.010	<0.010	0.023	0.011	0.055	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000010	0.000395	0.000403	0.000318	0.00036	0.000021	0.00004	0.000057	0.0008	0.0002	0.0031	0.000033	0.000076
Calcium (Ca)-Total	8.31	8.68	9.19	9.17	13.8	15.2	11.1	17.6	54	8.97	10.5	16.4	11.9	32.8	11	11.6
Chromium (Cr)-Total	<0.00010	<0.00010	<0.00010	<0.00010	0.00028	0.00051	0.00415	0.00185	<0.00010	0.00013	0.00041	0.001	0.0005	0.005	<0.00010	0.00024
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010	0.00305	0.00348	0.00443	0.00728	0.00013	0.0002	0.00063	0.002	0.0004	0.0076	0.00016	0.00045
Copper (Cu)-Total	<0.00050	0.001	<0.00050	<0.00050	0.00721	0.0124	0.0215	0.0193	0.001	0.00156	0.00224	0.014	0.00706	0.082	0.00077	0.00154
Iron (Fe)-Total	<0.030	<0.030	<0.030	<0.030	1.55	3.49	14.9	25.2	0.768	0.492	2	4.15	1.09	15.9	0.042	0.409
Lead (Pb)-Total	0.0001	0.0001	0.0001	0.0001	0.00155	0.00314	0.0307	0.0332	0.0018	0.00217	0.00385	0.0483	0.0133	0.172	0.0005	0.0011
Lithium (Li)-Total	<0.00050	<0.00050	<0.00050	<0.00050	0.00244	0.00399	0.00652	0.0118	0.0149	0.00051	0.00703	0.0208	0.00936	0.0517	<0.00050	0.00225
Magnesium (Mg)-Total	0.273	0.276	0.296	0.302	0.797	1.16	1.81	3.05	4.39	0.334	0.663	1.09	0.68	1.95	0.346	0.492
Manganese (Mn)-Total	0.00262	0.00266	0.00286	0.00271	0.383	0.392	0.573	0.979	0.0909	0.0198	0.0985	0.143	0.0692	0.753	0.0264	0.0648
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	0.000022	<0.000050	<0.000010	0.000288	<0.000010	<0.000010	0.000017	0.000046	0.000023	0.000154	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000318	0.000334	0.000353	0.000367	0.000102	0.000197	0.00132	0.00157	0.0011	0.000352	0.000517	0.00154	0.000724	0.0138	0.000323	0.000318
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	0.00137	0.00203	0.00215	0.00229	<0.00050	<0.00050	<0.00050	0.00123	<0.00050	0.0049	<0.00050	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.52	0.89	<0.30	<0.30	<0.30	0.31	<0.30	1.75	<0.30	<0.30

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC	replicate			replicate												
Sample ID	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	BJ 200m D/S	BJ 200m D/S
Date Sampled	29-Oct-12	29-Oct-12	27-Nov-12	27-Nov-12	29-Jun-12	4-Jul-12	21-Aug-12	9-Sep-12	29-Oct-12	27-Apr-12	9-Sep-12	29-Oct-12	27-Nov-12	13-Dec-12	5-Jun-12	11-Jun-12
Included/Excluded	Included	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Included
ALS Sample ID	L1232163-2	L1232163-5	L1243651-2	L1243651-7	L1171618-2	L1174986-2	L1199717-1	L1207295-2	L1232163-1	L1140759-10	L1207295-6	L1232163-3	L1243651-3	L1250701-26	L1158955-5	L1161793-5
Total Metals *(cont'd)*																
Potassium (K)-Total	0.086	0.078	0.088	0.088	0.493	1.1	2.91	2.2	1.35	0.179	0.528	2.69	1.9	10.3	0.092	0.273
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00085	0.00096	<0.00010	0.0001	0.00017	0.00039	0.00016	0.00124	0.00011	0.00011
Silicon (Si)-Total	0.518	0.508	0.508	0.516	2.5	6.23	10.3	9.59	3.7	0.984	2.02	9.25	6.7	36.7	0.836	1.56
Silver (Ag)-Total	<0.000010	0.000011	<0.000010	<0.000010	0.000091	0.000387	0.00329	0.00358	0.000167	0.000281	0.000418	0.00946	0.00145	0.0246	<0.000010	0.000093
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	7.4	<2.0	2.7	7.5	3.2	16.9	<2.0	<2.0
Strontium (Sr)-Total	0.0515	0.0549	0.0607	0.0606	0.0612	0.0719	0.0724	0.0989	1	0.0573	0.102	0.25	0.145	0.535	0.0684	0.0729
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.000010	0.000033	0.000079	0.000371	0.00025	0.000013	0.000014	0.000034	0.000274	0.000157	0.00115	<0.000010	0.000018
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00053	0.00016	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00025	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	0.017	0.051	0.104	0.073	<0.010	<0.010	0.021	0.059	0.058	0.24	<0.010	0.011
Uranium (U)-Total	0.00002	0.000019	0.000022	0.000021	0.000142	0.000176	0.000598	0.000432	0.000155	0.000042	0.000072	0.00049	0.000278	0.00232	0.000027	0.000044
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	0.0046	0.0126	0.0122	<0.0010	<0.0010	0.0016	0.0067	0.0043	0.0205	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	<0.0030	<0.0030	0.0381	0.0436	0.0468	0.0603	0.0043	<0.0090	0.0092	0.117	0.0223	0.359	0.0048	0.0106
Dissolved Metals																
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0041	0.004	0.0038	0.0031	0.0124	0.0274	0.022	0.0126	<0.0030	0.0078	0.0243	0.104	0.0423	0.127	0.0229	0.0292
Antimony (Sb)-Dissolved	0.00021	0.00021	0.00022	0.00021	0.00015	0.00015	0.00028	0.00022	0.00195	0.00023	0.00031	0.00156	0.00081	0.00297	0.00018	0.00023
Arsenic (As)-Dissolved	0.00044	0.00041	0.00046	0.00043	<0.00010	0.00012	0.00036	0.00021	0.00649	0.00035	0.00053	0.00265	0.00132	0.00698	0.00049	0.00041
Barium (Ba)-Dissolved	0.0336	0.0331	0.0343	0.0337	0.0318	0.0301	0.0282	0.0295	0.0165	0.0328	0.0319	0.032	0.0311	0.0336	0.0354	0.0318
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.039	<0.010	<0.010	0.018	<0.010	0.04	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	0.000367	0.000363	0.000059	0.000049	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	0.00003	0.000062
Calcium (Ca)-Dissolved	8.65	8.67	9.06	9.07	13.7	14.1	10.9	16.2	55.8	8.5	10.7	16.3	11.9	19.5	10.9	11.1
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	0.00211	0.00205	0.00043	0.0005	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	0.00014	0.00013	0.00029
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000104	<0.000050	0.000112	0.000177	<0.000050
Lithium (Li)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	0.00118	0.00134	0.00128	0.0021	0.0152	<0.00050	0.00646	0.0203	0.00942	0.0463	<0.00050	0.00174
Magnesium (Mg)-Dissolved	0.276	0.281	0.295	0.298	0.691	0.684	0.518	0.738	4.3	0.285	0.469	0.915	0.53	1.16	0.332	0.409
Manganese (Mn)-Dissolved	0.000387	0.000525	0.000867	0.000814	0.313	0.291	0.235	0.257	0.0803	0.00602	0.0502	0.0859	0.043	0.143	0.0224	0.0496
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00034	0.000336	0.000339	0.000345	<0.000050	<0.000050	0.000191	0.000185	0.0011	0.000323	0.000383	0.00071	0.000536	0.00165	0.000298	0.00029
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	0.00124	0.00126	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.083	0.084	0.081	0.084	0.229	0.199	0.43	0.419	1.35	0.093	0.282	0.681	0.406	1.72	0.094	0.164
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	0.00015	<0.00010	<0.00010
Silicon (Si)-Dissolved	0.479	0.484	0.46	0.463	0.954	0.95	0.7	0.747	3.53	0.566	0.628	0.921	0.625	1.32	0.787	0.814
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	7.4	<2.0	2.5	7.3	3.3	16.5	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0547	0.0542	0.0582	0.0597	0.0581	0.0635	0.061	0.0853	1.06	0.0537	0.0991	0.234	0.14	0.378	0.0664	0.0689
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	0.000014	0.000014	0.000022	0.000015	<0.000010	<0.000010	0.00001	0.000041	0.000015	0.000075	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000018	0.000017	0.000019	0.000019	0.000026	0.000028	<0.000010	<0.000010	0.000146	0.000015	0.000019	0.000209	0.000134	0.000594	0.000023	0.00002
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	0.0141	0.0157	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0045	0.0054

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC				replicate												
Sample ID	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 350m D/S	BJ 350m D/S	BJ 350m D/S	BJ 350m D/S	BJ Inter	BJ2	BJ2	BJ2
Date Sampled	20-Jun-12	29-Jun-12	4-Jul-12	4-Jul-12	21-Aug-12	30-Oct-12	27-Nov-12	13-Dec-12	29-Jun-12	4-Jul-12	21-Aug-12	30-Oct-12	9-Sep-12	26-Apr-12	29-Jun-12	4-Jul-12
Included/Excluded	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Excluded-Impacted	Excluded-Impacted	Exclude	Exclude	Exclude	Exclude	Exclude	Included	Excluded-Impacted	Excluded-Impacted
ALS Sample ID	L1166925-6	L1171541-7	L1174986-4	L1174986-7	L1199717-4	L1232145-1	L1243651-4	L1250701-25	L1171618-4	L1174986-5	L1199717-5	L1232145-2	L1207295-4	L1140759-9	L1171541-6	L1174986-6
Physical Tests																
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	65.1	55.6	55.5	54.1	52.2	93.7	84.1	197	53	54.1	51.9	90.2	58.1	96.6	59	58.8
Hardness (as $CaCO_3$)	27.7	23.9	22.7	22.5	22.1	32.4	31.4	55.7	21.8	22.5	22	31.8	23.8	35.2	25.3	23.9
pH	8.1	7.56	7.92	7.33	8.2	7.15	7.92	8.22	7.54	7.86	8.08	7.64	7.69	7.64	7.54	7.78
Total Suspended Solids	17.8	15.2	67.3	52	10.5	8	84.7	624	9.3	57.3	13.8	7.3	149	<3.0	269	21.3
Total Dissolved Solids	35	35	34	31	36	55	58	130	33	32	33	53	24	59	71	37
Turbidity (NTU)	14.4	12.5	41.1	29.8	9.47	3.55	82	765	8.52	37	8.25	6.97	111	2.94	20.4	17.1
Anions and Nutrients																
Acidity (as $CaCO_3$)	4.4	1.1	2.4	3.4	1.8	4.7	1.9	1.2	1.4	2.6	2.2	3.4	2.2	2.5	1.1	2.9
Alkalinity, Bicarbonate (as $CaCO_3$)	15.8	12.2	12.2	11.8	13.8	22.5	20.3	46.1	12.2	12.2	13.8	21.5	13.3	17.9	12.4	12.4
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	15.8	12.2	12.2	11.8	13.8	22.5	20.3	46.1	12.2	12.2	13.8	21.5	13.3	17.9	12.4	12.4
Ammonia, Total (as N)	0.0116	0.0096	0.0106	0.0148	<0.0050	0.057	0.0793	0.332	0.0082	0.0088	<0.0050	0.051	0.0066	0.0511	0.0098	0.0148
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.68	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	<0.50	<0.50
Fluoride (F)	0.022	0.02	0.02	<0.020	<0.020	0.037	0.029	0.115	0.021	<0.020	<0.020	0.036	<0.020	0.032	0.024	0.021
Nitrate (as N)	0.0191	0.0154	0.011	0.012	<0.0050	0.0628	0.111	0.494	0.025	0.0126	<0.0050	0.059	0.007	0.0117	0.0158	0.013
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0033	0.0123	0.0459	0.0013	<0.0010	<0.0010	0.0035	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	0.075	0.065	<0.050	0.1	0.1	0.4	<0.050	0.054	<0.050	0.1	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	0.086	0.077	<0.050	0.157	0.247	0.923	0.026	0.066	<0.050	0.159	0.05	0.12	<0.050	0.013
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.002	0.0022	<0.0010	<0.0010	0.0019	<0.0010	0.0017	0.0011	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.0319	0.0206	0.118	0.074	0.0171	0.0053	0.0243	0.63	0.0145	0.152	0.0262	0.0106	0.187	0.0023	0.0261	0.0731
Sulfate (SO_4)	15	12.9	12.5	12.4	9.98	20.8	17.1	47.4	12.6	12	9.96	20.6	12.9	24.9	15.3	14.1
Cyanides																
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																
Total Organic Carbon	0.5	0.51	<0.50	<0.50	<0.50	0.8	0.74	0.54	<0.50	<0.50	<0.50	0.55	0.95	1.96	0.75	<0.50
Total Metals																
Aluminum (Al)-Total	0.131	0.779	1.28	1.19	0.623	0.102	2.29	6.77	0.523	1.3	0.601	0.121	2.04	0.0699	0.878	0.804
Antimony (Sb)-Total	0.00032	0.00033	0.00065	0.00057	0.00033	0.00068	0.00196	0.01	0.00025	0.00113	0.00038	0.00068	0.001	0.00041	0.00046	0.00041
Arsenic (As)-Total	0.00174	0.00177	0.00759	0.00561	0.00213	0.00169	0.00603	0.0662	0.0014	0.0153	0.00241	0.00169	0.0143	0.00088	0.00536	0.00378
Barium (Ba)-Total	0.0403	0.0478	0.059	0.0542	0.0465	0.0368	0.123	0.545	0.0393	0.0572	0.0457	0.0368	0.0943	0.0363	0.0493	0.0478
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00038	0.00081	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	0.045	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000054	0.000059	0.000092	0.000071	0.000015	0.000021	0.0001	0.0011	0.000046	0.000099	0.000017	0.000019	0.000057	0.000064	0.000214	0.000161
Calcium (Ca)-Total	10.7	8.96	8.53	8.53	8.37	12.2	12.3	24.8	8.58	8.47	8.53	12.6	9.15	14	9.28	8.95
Chromium (Cr)-Total	0.00014	0.00013	0.00026	0.0002	0.00014	<0.00010	0.00049	0.002	0.00019	0.0003	0.00013	<0.00010	0.00051	0.00015	0.00057	0.00028
Cobalt (Co)-Total	0.00046	0.00052	0.00099	0.00077	0.0002	<0.00010	0.00036	0.00344	0.00042	0.00096	0.00022	<0.00010	0.00131	0.00049	0.00087	0.0007
Copper (Cu)-Total	0.00111	0.00136	0.00417	0.00289	0.0008	0.001	0.0156	0.025	0.00124	0.00567	0.0007	0.00058	0.00372	0.00085	0.00331	0.00269
Iron (Fe)-Total	0.257	0.652	2.79	1.88	0.576	0.077	1.03	6.36	0.419	3.34	0.657	0.083	5.29	0.043	1.05	1.07
Lead (Pb)-Total	0.000948	0.000755	0.00433	0.00344	0.000819	0.0011	0.0128	0.0792	0.000541	0.0116	0.00102	0.0011	0.00625	0.000069	0.00177	0.00175
Lithium (Li)-Total	0.00149	0.00098	0.00208	0.00165	0.00057	0.01	0.00909	0.0548	0.00112	0.00196	0.00065	0.00947	0.00195	0.00433	0.0015	0.00186
Magnesium (Mg)-Total	0.417	0.418	0.57	0.498	0.362	0.628	0.668	1.64	0.37	0.523	0.376	0.612	0.748	0.643	0.51	0.482
Manganese (Mn)-Total	0.066	0.0651	0.113	0.0927	0.0319	0.033	0.068	0.407	0.054	0.111	0.033	0.0331	0.161	0.135	0.109	0.0913
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	0.000018	0.00006	<0.000010	<0.000050	<0.000010	<0.000010	0.000069	<0.000010	<0.000010	<0.000050
Molybdenum (Mo)-Total	0.000277	0.000266	0.000374	0.000335	0.000322	0.000676	0.000737	0.00442	0.000239	0.000506	0.000333	0.000579	0.000595	0.000747	0.000329	0.000297
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00214	<0.00050	0.00073	<0.00050	<0.00050	<0.00050	<0.00050	0.00072	0.00053
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.72	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC				replicate												
Sample ID	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 350m D/S	BJ 350m D/S	BJ 350m D/S	BJ 350m D/S	BJ Inter	BJ2	BJ2	BJ2
Date Sampled	20-Jun-12	29-Jun-12	4-Jul-12	4-Jul-12	21-Aug-12	30-Oct-12	27-Nov-12	13-Dec-12	29-Jun-12	4-Jul-12	21-Aug-12	30-Oct-12	9-Sep-12	26-Apr-12	29-Jun-12	4-Jul-12
Included/Excluded	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Excluded-Impacted	Excluded-Impacted	Exclude	Exclude	Exclude	Exclude	Exclude	Included	Excluded-Impacted	Excluded-Impacted
ALS Sample ID	L1166925-6	L1171541-7	L1174986-4	L1174986-7	L1199717-4	L1232145-1	L1243651-4	L1250701-25	L1171618-4	L1174986-5	L1199717-5	L1232145-2	L1207295-4	L1140759-9	L1171541-6	L1174986-6
Total Metals *(cont'd)*																
Potassium (K)-Total	0.139	0.309	0.461	0.391	0.306	0.35	1.66	5.59	0.229	0.457	0.297	0.363	0.694	0.527	0.43	0.348
Selenium (Se)-Total	<0.00010	<0.00010	0.00014	0.00011	<0.00010	<0.00010	0.00015	0.00049	<0.00010	0.00017	0.0001	<0.00010	0.00028	0.00012	0.00015	0.00012
Silicon (Si)-Total	0.866	2.3	2.94	2.61	1.65	0.89	5.62	18.1	1.42	2.65	1.6	0.907	3.88	0.924	2.66	2.05
Silver (Ag)-Total	0.000013	0.000064	0.000456	0.000382	0.000104	0.00011	0.00116	0.00974	0.00005	0.001	0.000133	0.000077	0.000759	0.000013	0.000316	0.000247
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	3.9	3.2	18.4	<2.0	<2.0	<2.0	3.5	<2.0	2.2	<2.0	<2.0
Strontium (Sr)-Total	0.0692	0.0586	0.0562	0.0559	0.0544	0.142	0.143	0.455	0.0548	0.056	0.0548	0.135	0.0571	0.094	0.0565	0.0578
Thallium (Tl)-Total	<0.000010	0.000017	0.000034	0.000029	0.000023	0.000012	0.000142	0.000596	0.000013	0.000045	0.00002	0.000013	0.000061	<0.000010	0.000043	0.000024
Tin (Sn)-Total	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	0.029	0.033	0.028	0.016	<0.010	0.043	0.135	<0.010	0.027	0.013	<0.010	0.051	<0.010	0.021	0.014
Uranium (U)-Total	0.000044	0.000058	0.000091	0.00008	0.000034	0.000073	0.000292	0.00114	0.000053	0.000119	0.000054	0.00007	0.000124	0.000031	0.00006	0.000058
Vanadium (V)-Total	<0.0010	0.0011	0.0019	0.0015	0.001	<0.0010	0.0038	0.0105	<0.0010	0.0018	0.0011	<0.0010	0.0032	<0.0010	0.0014	0.0012
Zinc (Zn)-Total	0.0073	0.0092	0.0146	0.0115	0.0032	0.0052	0.02	0.144	0.008	0.0144	0.0033	0.0063	0.0117	<0.0060	0.0168	0.0127
Dissolved Metals																
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.013	0.0124	0.0206	0.011	0.0148	0.0095	0.036	0.107	0.013	0.565	0.0122	0.0095	0.013	0.0223	0.0121	0.045
Antimony (Sb)-Dissolved	0.00022	0.00018	0.00021	0.0002	0.0002	0.00061	0.00076	0.00247	0.00018	0.00036	0.0002	0.00058	0.00019	0.00036	0.00021	0.00022
Arsenic (As)-Dissolved	0.00037	0.00017	0.00023	0.00024	0.00038	0.00114	0.00121	0.00705	0.00021	0.00287	0.00037	0.00104	0.00029	0.00063	0.00028	0.0003
Barium (Ba)-Dissolved	0.0335	0.0293	0.0301	0.0293	0.0294	0.0311	0.0303	0.0352	0.0269	0.0388	0.0298	0.0316	0.0291	0.0339	0.0306	0.032
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.04	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000039	0.000043	0.000035	0.000039	<0.000010	<0.000010	<0.000010	<0.000010	0.000044	0.000048	<0.000010	<0.000010	<0.000010	0.000058	0.000141	0.000096
Calcium (Ca)-Dissolved	10.5	9	8.57	8.49	8.36	11.9	11.8	20.3	8.18	8.44	8.33	11.7	9.02	13.1	9.48	9.01
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	0.0002	0.00014	0.00015	0.00016	<0.00010	<0.00010	<0.00010	0.00017	0.0002	0.00035	<0.00010	<0.00010	<0.00010	0.00045	0.00021	0.00031
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00121	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.604	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000076	<0.000050	0.00199	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.00126	0.00084	0.00051	0.00054	<0.00050	0.0101	0.00861	0.0524	0.00068	0.00089	<0.00050	0.00962	<0.00050	0.00397	0.00093	0.00103
Magnesium (Mg)-Dissolved	0.388	0.334	0.31	0.314	0.291	0.612	0.505	1.21	0.322	0.339	0.294	0.597	0.314	0.595	0.402	0.354
Manganese (Mn)-Dissolved	0.044	0.0431	0.0441	0.044	0.0163	0.0303	0.0402	0.15	0.0388	0.0578	0.0156	0.0295	0.0369	0.127	0.0906	0.0656
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.0003	0.00024	0.000244	0.000238	0.000316	0.000625	0.000522	0.00141	0.000222	0.000243	0.000297	0.000524	0.000291	0.000701	0.00025	0.000249
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.114	0.095	0.113	0.106	0.09	0.307	0.376	1.38	0.094	0.205	0.087	0.298	0.113	0.477	0.136	0.146
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	0.709	0.621	0.62	0.6	0.531	0.696	0.604	1.3	0.61	1.84	0.54	0.72	0.51	0.801	0.678	0.66
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000151	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	3.8	3	17.6	<2.0	<2.0	<2.0	3.6	<2.0	2	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0658	0.0554	0.0548	0.0547	0.0528	0.139	0.135	0.384	0.0529	0.0546	0.0532	0.135	0.0537	0.0868	0.0557	0.0574
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	0.000064	<0.000010	0.000015	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000018	0.000015	<0.000010	<0.000010	0.000013	0.00006	0.00012	0.000409	0.000014	0.000034	0.000013	0.00006	<0.000010	0.000026	<0.000010	0.000014
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0038	<0.0030	<0.0030	<0.0030	0.0045	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Lake	Lake	Lake	Lake	Lake	Stream	Stream	Stream	Stream	Stream
QAQC																	
Sample ID	BJ2	BJ2	BJ2	BJ3	BJ3	SC0	SC0	SUL (14m)	SUL (14m)	SUL (14m)	SUL (2m)	SUL (2m)	SC1	SC1	SC1	SC1	SC1
Date Sampled	21-Aug-12	9-Sep-12	13-Dec-12	27-Nov-12	12-Dec-12	27-Nov-12	12-Dec-12	28-Jun-12	1-Aug-12	5-Oct-12	28-Jun-12	1-Aug-12	9-Jan-12	27-Feb-12	27-Mar-12	1-May-12	28-May-12
Included/Excluded	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Excluded-Impacted	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1199717-6	L1207295-5	L1250701-24	L1243651-6	L1250701-17	L1243651-5	L1250701-16	L1171583-10	L1190018-10	L1221662-1	L1171583-11	L1190018-20	L1103291-5	L1119935-7	L1131394-9	L1143005-4	L1155050-4
Physical Tests																	
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	54.7	78.9	183	88	201	281	342	138	78.6	143	131	69.8	378	416	429	410	271
Hardness (as $CaCO_3$)	23.1	29.3	53.9	33.5	61.1	139	168	62.6	35.3	63.8	59.3	32.1	175	202	202	200	130
pH	8.07	7.66	8.13	7.6	8.12	8.11	8.19	7.75	7.99	8.02	7.8	8.39	8.04	8.07	8.08	8.01	8.1
Total Suspended Solids	39.8	65.4	325	30	439	9.3	4.7	34	61.8	10	34.7	95.1	<3.0	<3.0	<3.0	<3.0	4.7
Total Dissolved Solids	34	38	105	75	150	176	213	109	60	102	96	59	236	260	296	276	177
Turbidity (NTU)	27.4	50.9	389	68	746	9.86	4.86	61.5	87.2	24	63.1	121	1	0.4	0.14	1.1	6.66
Anions and Nutrients																	
Acidity (as $CaCO_3$)	2.3	2.2	1.8	2.9	1.9	2	1.5	1.8	2.5	3.4	1.7	<1.0	3.4	2.6	2.7	4.3	3.8
Alkalinity, Bicarbonate (as $CaCO_3$)	14.2	16.8	44	22	47.6	63.6	69	30.6	18.8	29.2	29.1	26	78	78.7	82.3	81.3	60.8
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	14.2	16.8	44	22	47.6	63.6	69	30.6	18.8	29.2	29.1	26	78	78.7	82.3	81.3	60.8
Ammonia, Total (as N)	<0.0050	0.021	0.189	0.0711	0.262	0.0098	0.0083	0.0052	<0.0050	0.0051	0.0057	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	0.64	<0.50	0.77	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	0.032	0.095	0.029	0.094	0.052	0.064	0.037	<0.020	0.035	0.034	<0.020	0.068	0.082	0.085	0.067	0.059
Nitrate (as N)	<0.0050	0.104	0.268	0.149	0.489	0.0305	0.0394	0.0274	0.022	0.0282	0.029	0.0228	0.07	0.0578	0.0496	0.166	0.0685
Nitrite (as N)	<0.0010	0.0014	0.0352	0.0127	0.0471	0.0019	0.0023	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.123	0.155	0.2	0.1	0.3	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	0.123	0.26	0.517	0.287	0.852	<0.050	0.059	<0.050	0.05	<0.050	<0.050	<0.050	-	0.05	0.05	0.13	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	0.0011	0.0011	0.0015	<0.0010	<0.0010	<0.0010	0.0011	0.0012	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.0553	0.0975	0.25	0.0293	0.218	0.0068	0.0077	0.0457	0.0674	0.0155	0.0382	0.106	<0.0020	<0.0020	<0.0020	<0.0020	0.0071
Sulfate (SO_4)	11	19.6	43.8	18.1	48.4	82.4	105	36.5	16.5	39.2	33	13.1	112	135	144	130	78.3
Cyanides																	
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0011	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																	
Total Organic Carbon	0.96	1.36	1.18	0.81	<0.50	<0.50	<0.50	<0.50	0.62	<0.50	<0.50	0.63	<0.50	<0.50	<0.50	0.64	0.62
Total Metals																	
Aluminum (Al)-Total	1.66	1.26	6.99	2.16	10.6	0.638	0.382	3.03	3.07	1.04	1.95	3.75	0.02	0.01	0.0078	0.044	0.276
Antimony (Sb)-Total	0.00109	0.00096	0.01	0.00146	0.00363	0.00178	0.00163	0.00175	0.0016	0.00113	0.00162	0.00195	0.00144	0.00121	0.00124	0.00132	0.00155
Arsenic (As)-Total	0.0177	0.0115	0.0361	0.00424	0.0248	0.00163	0.00131	0.00442	0.00532	0.00176	0.0036	0.00789	0.0004	0.00023	0.00018	0.00057	0.00138
Barium (Ba)-Total	0.0754	0.0627	0.305	0.0892	0.39	0.0632	0.0582	0.0967	0.0936	0.0531	0.078	0.115	0.041	0.0384	0.0386	0.033	0.0336
Beryllium (Be)-Total	<0.00010	<0.00010	0.0005	0.00018	0.00075	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	0.036	0.011	0.039	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000145	0.00012	0.0005	0.0001	0.0003	0.0001	0.0001	0.000097	0.00009	0.0001	0.000086	0.000141	0.000048	0.000041	0.000049	0.000072	0.000094
Calcium (Ca)-Total	8.64	10.7	19.7	12.5	22.3	51.5	58.9	24.3	12.2	22.2	22.8	11.9	63.6	69.7	71.9	72.6	49
Chromium (Cr)-Total	0.00109	0.0007	0.002	0.00041	0.002	0.00021	0.00019	0.00184	0.00198	0.001	0.00149	0.00247	0.00011	<0.00010	0.00014	0.00012	0.00029
Cobalt (Co)-Total	0.00109	0.0009	0.00144	0.00023	0.00091	0.00072	0.00078	0.00134	0.00144	0.00068	0.00113	0.00194	0.00032	0.00025	0.00027	0.00046	0.00069
Copper (Cu)-Total	0.00504	0.0039	0.013	0.005	0.013	0.00346	0.004	0.0203	0.0196	0.013	0.0135	0.0132	0.0068	0.00622	0.00644	0.00656	0.0115
Iron (Fe)-Total	3.81	2.58	3.57	0.668	5.21	0.278	0.225	2.8	3.55	0.874	1.94	4.95	<0.030	<0.030	<0.030	0.056	0.359
Lead (Pb)-Total	0.00878	0.00549	0.0377	0.0074	0.0277	0.0009	0.0004	0.00303	0.0039	0.001	0.00273	0.00584	<0.000050	<0.000050	<0.000050	0.00011	0.000512
Lithium (Li)-Total	0.00192	0.00857	0.0426	0.0075	0.0378	0.00268	0.00265	0.00208	0.00203	0.00128	0.00159	0.00258	0.001	0.00189	0.00194	0.00174	0.00173
Magnesium (Mg)-Total	0.652	0.764	1.45	0.721	1.7	4.16	4.89	2.43	1.82	1.93	2.21	2.23	5	5.66	5.27	5.37	3.72
Manganese (Mn)-Total	0.126	0.133	0.213	0.0476	0.112	0.0637	0.0814	0.119	0.119	0.0716	0.0909	0.165	0.045	0.0328	0.0348	0.0769	0.104
Mercury (Hg)-Total	0.000023	0.000024	<0.000050	<0.000010	<0.000050	<0.000010	<0.000010	0.000025	0.000024	<0.000010	0.000016	0.000027	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000593	0.000613	0.00218	0.000618	0.00236	0.00189	0.00212	0.0011	0.000666	0.000979	0.00101	0.000691	0.00172	0.00145	0.0016	0.00194	0.00158
Nickel (Ni)-Total	0.0007	0.00059	0.001	<0.00050	0.00079	0.00101	0.00121	0.00154	0.00156	0.0008	0.00186	0.002	0.00067	0.00087	0.00083	0.00089	0.00084
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Lake**	**Lake**	**Lake**	**Lake**	**Lake**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**
QAQC																	
Sample ID	**BJ2**	**BJ2**	**BJ2**	**BJ3**	**BJ3**	**SC0**	**SC0**	**SUL (14m)**	**SUL (14m)**	**SUL (14m)**	**SUL (2m)**	**SUL (2m)**	**SC1**	**SC1**	**SC1**	**SC1**	**SC1**
Date Sampled	**21-Aug-12**	**9-Sep-12**	**13-Dec-12**	**27-Nov-12**	**12-Dec-12**	**27-Nov-12**	**12-Dec-12**	**28-Jun-12**	**1-Aug-12**	**5-Oct-12**	**28-Jun-12**	**1-Aug-12**	**9-Jan-12**	**27-Feb-12**	**27-Mar-12**	**1-May-12**	**28-May-12**
Included/Excluded	**Excluded-Impacted**	**Excluded-Impacted**	**Excluded-Impacted**	**Excluded-Impacted**	**Excluded-Impacted**	**Included**	**Excluded-Impacted**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L1199717-6**	**L1207295-5**	**L1250701-24**	**L1243651-6**	**L1250701-17**	**L1243651-5**	**L1250701-16**	**L1171583-10**	**L1190018-10**	**L1221662-1**	**L1171583-11**	**L1190018-20**	**L1103291-5**	**L1119935-7**	**L1131394-9**	**L1143005-4**	**L1155050-4**
Total Metals *(cont'd)*																	
Potassium (K)-Total	0.746	0.705	5.13	1.56	7.53	0.724	0.667	1.27	1.21	0.624	1.01	1.5	0.58	0.61	0.559	0.649	0.632
Selenium (Se)-Total	0.00031	0.00021	0.00027	0.00017	0.00019	0.00033	0.00027	0.00037	0.00024	0.00028	0.00032	0.00017	0.00072	0.00073	0.00068	0.00073	0.00055
Silicon (Si)-Total	3.08	2.84	29.7	5.6	112	2.2	2.13	6.14	7.93	2.59	4.75	9.17	1.92	1.99	2.05	1.91	1.97
Silver (Ag)-Total	0.000862	0.000879	0.00444	0.000618	0.00211	0.000043	0.000018	0.000064	0.000082	0.000027	0.000043	0.000133	<0.000010	<0.000010	<0.000010	<0.000010	0.00001
Sodium (Na)-Total	<2.0	3	14.7	3.1	15.9	<2.0	2.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0
Strontium (Sr)-Total	0.054	0.102	0.348	0.143	0.375	0.298	0.34	0.132	0.0789	0.128	0.125	0.0718	0.36	0.386	0.416	0.379	0.258
Thallium (Tl)-Total	0.000083	0.000052	0.000506	0.000128	0.000754	0.000018	0.000011	0.00005	0.00005	0.00002	0.00004	0.00006	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	0.00014	<0.00010	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.035	0.025	0.252	0.042	0.824	0.013	0.018	0.065	0.106	0.023	0.056	0.12	<0.010	<0.010	0.01	<0.010	0.017
Uranium (U)-Total	0.000117	0.000125	0.000628	0.000236	0.000885	0.000164	0.000159	0.000085	0.000069	0.000059	0.000079	0.000106	0.000109	0.000092	0.000105	0.000165	0.000094
Vanadium (V)-Total	0.0031	0.0022	0.0121	0.0038	0.0164	0.001	<0.0010	0.0078	0.0087	0.0026	0.0053	0.0104	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	0.0165	0.0128	0.0639	0.0114	0.0457	0.0067	0.0064	0.0149	0.0163	0.0091	0.013	0.0226	0.0073	0.0091	0.009	0.0086	0.007
Dissolved Metals																	
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0267	0.261	0.0608	0.0313	0.0929	0.0688	0.0624	0.0624	0.0983	0.0583	0.083	0.276	0.008	0.0052	0.0045	0.0089	0.255
Antimony (Sb)-Dissolved	0.00023	0.00042	0.00187	0.0008	0.00201	0.0016	0.00159	0.00091	0.00064	0.00093	0.001	0.00074	0.0014	0.00125	0.00128	0.00121	0.00138
Arsenic (As)-Dissolved	0.00053	0.00265	0.00484	0.00112	0.00502	0.00062	0.00059	0.00042	0.00061	0.00025	0.00053	0.00117	0.00036	0.00022	0.00023	0.00037	0.00107
Barium (Ba)-Dissolved	0.0249	0.0371	0.035	0.0325	0.0406	0.0495	0.0535	0.0305	0.0265	0.0303	0.0305	0.032	0.0401	0.039	0.0394	0.0313	0.0312
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	0.032	<0.010	0.031	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000015	0.000052	<0.000010	<0.000010	<0.000010	0.000092	0.00011	0.00003	0.000014	0.000035	0.000025	<0.000010	0.000046	0.000046	0.000049	0.000069	0.000087
Calcium (Ca)-Dissolved	8.72	10.8	19.8	12.4	22.1	49.1	59.2	22.4	12.7	22.7	21.1	11.5	62.2	71.4	71.5	71.4	46.4
Chromium (Cr)-Dissolved	<0.00010	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	0.00022	<0.00010	<0.00010	<0.00010	<0.00010	0.00017
Cobalt (Co)-Dissolved	<0.00010	0.0003	0.00015	<0.00010	0.00011	0.00054	0.00064	0.00012	<0.00010	0.00022	<0.00010	<0.00010	0.00028	0.00025	0.0003	0.00041	0.00059
Copper (Cu)-Dissolved	<0.00050	0.00068	<0.00050	<0.00050	<0.00050	0.00056	0.00082	<0.00050	<0.00050	0.001	<0.00050	0.00059	0.00585	0.00583	0.00678	0.00413	0.00811
Iron (Fe)-Dissolved	<0.030	0.555	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.202	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	0.00117	0.000053	<0.000050	0.000137	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00024	<0.000050	<0.000050	<0.000050	<0.000050	0.000385
Lithium (Li)-Dissolved	0.00071	0.00805	0.0419	0.00752	0.0376	0.00252	0.00253	<0.00050	<0.00050	0.00068	0.00054	<0.00050	0.001	0.00208	0.00188	0.00157	0.00176
Magnesium (Mg)-Dissolved	0.31	0.536	1.1	0.597	1.41	3.91	4.93	1.62	0.862	1.71	1.61	0.838	4.88	5.74	5.79	5.14	3.46
Manganese (Mn)-Dissolved	0.0381	0.0846	0.145	0.0317	0.0733	0.0497	0.0721	0.0341	0.00185	0.0502	0.0175	0.00591	0.042	0.0328	0.038	0.0722	0.0924
Mercury (Hg)-Dissolved	<0.000010	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00034	0.000417	0.00103	0.000501	0.00102	0.0018	0.00211	0.00097	0.00057	0.001	0.00101	0.00059	0.0017	0.0015	0.0016	0.00182	0.00148
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00085	0.00115	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00064	0.00088	0.00097	0.00083	0.00078
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.14	0.355	1.07	0.399	1.37	0.503	0.589	0.328	0.178	0.291	0.337	0.259	0.57	0.618	0.614	0.632	0.602
Selenium (Se)-Dissolved	<0.00010	0.00011	0.0001	<0.00010	0.00011	0.0003	0.0003	0.0003	0.00017	0.00026	0.00028	0.00013	0.00073	0.00076	0.00072	0.0007	0.0004
Silicon (Si)-Dissolved	0.57	1.19	1.24	0.669	1.44	1.37	1.6	0.956	0.537	0.852	0.95	1.01	1.89	2.02	2.13	1.78	1.37
Silver (Ag)-Dissolved	<0.000010	0.000109	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001
Sodium (Na)-Dissolved	<2.0	2.9	15.1	3.2	15.7	<2.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0535	0.101	0.33	0.143	0.35	0.287	0.336	0.125	0.0785	0.137	0.119	0.062	0.35	0.399	0.411	0.364	0.241
Thallium (Tl)-Dissolved	<0.000010	0.000015	0.00005	0.000014	0.000046	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010
Uranium (U)-Dissolved	0.000015	0.000052	0.000247	0.000108	0.000335	0.000107	0.000141	0	0	0	0	0	0.000102	0.000095	0.000105	0.000157	0.000087
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	0.0033	<0.0030	<0.0030	<0.0030	<0.0030	0	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0062	0.0085	0.0091	0.0062	0.0064

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC					Replicate									Replicate							
Sample ID	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC3	SC3	SC3	SC3
Date Sampled	28-Jun-12	1-Aug-12	5-Sep-12	5-Oct-12	5-Oct-12	2-Dec-12	9-Jan-12	27-Feb-12	27-Mar-12	1-May-12	28-May-12	28-Jun-12	1-Aug-12	5-Sep-12	5-Sep-12	5-Oct-12	2-Dec-12	9-Jan-12	27-Feb-12	27-Mar-12	1-May-12
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1171583-7	L1190018-4	L1206302-9	L1221669-21	L1221669-24	L1246043-7	L1103291-6	L1119935-6	L1131394-6	L1143005-5	L1155050-5	L1171583-4	L1190018-5	L1206302-12	L1206302-6	L1221669-22	L1246043-13	L1103291-7	L1119935-5	L1131394-5	L1143005-6
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	134	82.6	93.5	156	157	294	437	468	473	392	299	210	119	133	132	237	384	380	438	440	340
Hardness (as $CaCO_3$)	64	37.3	42.3	65.6	65.9	157	209	230	218	184	135	90.9	52.1	58.7	54.9	102	195	173	212	204	159
pH	7.57	7.9	7.9	7.99	8.06	8.02	8.03	8.08	8.09	8.14	7.89	7.39	7.86	7.86	7.74	7.92	8.01	8.1	8.16	8.17	8.15
Total Suspended Solids	24	68.4	19.4	3.5	4.1	<3.0	16.9	14	12.7	37.3	90.7	179	144	78.7	80.9	39	8	6	9.7	6.7	35.3
Total Dissolved Solids	106	56	68	109	98	192	270	308	326	246	197	140	71	82	84	152	258	230	291	294	232
Turbidity (NTU)	46.6	85.5	31.8	17.7	18.1	0.37	29.3	25	23.4	45.8	88.1	136	104	57	54.9	38.4	17.1	18.2	16	14.7	37.9
Anions and Nutrients																					
Acidity (as $CaCO_3$)	2.5	2.5	2.5	4.4	3.6	2.6	3.5	2.8	3	3.1	6	2.4	2.8	2.6	2.9	5.4	3	3.1	2.1	2	2.9
Alkalinity, Bicarbonate (as $CaCO_3$)	32.9	20.5	23.8	31.8	31.8	67	87.4	96.6	103	69.8	25.9	17.8	23.8	27.4	27.1	35.2	76.5	88.8	99.2	100	64.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	32.9	20.5	23.8	31.8	31.8	67	87.4	96.6	103	69.8	25.9	17.8	23.8	27.4	27.1	35.2	76.5	88.8	99.2	100	64.3
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0054	<0.0050	<0.0050	<0.0050	0.0058	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.034	<0.020	<0.020	0.031	0.031	0.054	0.188	0.19	0.189	0.176	0.208	0.143	0.057	0.059	0.055	0.129	0.178	0.144	0.157	0.158	0.137
Nitrate (as N)	0.0334	0.022	0.015	0.0402	0.04	0.0718	0.0763	0.0743	0.0654	0.315	0.192	0.055	0.025	0.0163	0.016	0.0711	0.0814	0.117	0.0961	0.0873	0.362
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.058	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.068
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	0.072	-	0.06	0.0654	0.29	0.18	<0.050	<0.050	<0.050	<0.050	0.11	0.081	-	0.09	0.0873	0.34
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010
Phosphorus (P)-Total	0.0266	0.0648	0.0283	0.0102	0.0103	<0.0020	0.1	0.08	0.0988	0.337	1.46	0.378	0.12	0.132	0.09	0.208	0.0374	0.05	0.055	0.055	0.262
Sulfate (SO_4)	34.7	16.3	20.7	41	40.6	91.6	136	148	151	126	115	79.3	31.8	35.7	35.7	76.5	126	107	130	134	101
Cyanides																					
Cyanide, Weak Acid Diss	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-		-	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0011	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-		-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	<0.50	0.53	0.74	1.09	<0.50	<0.50	<0.50	0.52	0.51	0.8	0.68	0.54	0.51	0.97
Total Metals																					
Aluminum (Al)-Total	2.11	3.5	1.54	0.811	1.12	0.0343	0.693	0.71	0.637	1.34	2.46	4.96	4.22	2.61	2.51	1.44	0.621	0.441	0.48	0.418	1.19
Antimony (Sb)-Total	0.00152	0.00163	0.00124	0.00112	0.00118	0.0013	0.00077	0.00067	0.00067	0.00089	0.00101	0.00114	0.00107	0.00075	0.00073	0.00073	0.00061	0.00061	0.00063	0.00067	0.00079
Arsenic (As)-Total	0.00318	0.00518	0.00316	0.00169	0.00179	0.00036	0.00593	0.00564	0.00512	0.0151	0.0786	0.0178	0.00626	0.00343	0.0035	0.0119	0.00272	0.00337	0.00361	0.00324	0.0116
Barium (Ba)-Total	0.0853	0.102	0.0557	0.0473	0.0546	0.0416	0.0426	0.047	0.0441	0.0472	0.054	0.116	0.117	0.0688	0.0694	0.0494	0.0445	0.0386	0.047	0.0448	0.0445
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00019	0.00021	0.0002	0.00021	0.0004	0.00036	0.00013	0.00011	0.0001	0.00016	0.00017	0.00011	0.00012	0.00013	0.00015
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.016	<0.010
Cadmium (Cd)-Total	0.000077	0.000087	0.000054	0.000045	0.000046	0.000075	0.00246	0.00265	0.00249	0.00215	0.00537	0.00323	0.0009	0.000776	0.000804	0.002	0.00272	0.00145	0.00162	0.00164	0.00162
Calcium (Ca)-Total	23.3	12.9	14.5	22.6	23.1	56.1	73.7	79.8	75.3	66.1	49.3	33.9	19	20.8	20.8	34.5	68.7	60.3	72.4	75.5	56.7
Chromium (Cr)-Total	0.00143	0.00229	0.00109	0.001	0.001	<0.00010	0.00021	0.0002	0.00023	0.00104	0.00145	0.00405	0.00346	0.00232	0.00233	0.001	0.00018	0.00026	0.0002	0.00028	0.00161
Cobalt (Co)-Total	0.001	0.00149	0.00079	0.00053	0.00056	0.00058	0.00269	0.00279	0.0026	0.00401	0.00686	0.00653	0.00308	0.00214	0.00208	0.00281	0.00276	0.00156	0.00176	0.00169	0.00306
Copper (Cu)-Total	0.0102	0.013	0.00684	0.00665	0.00701	0.00955	0.156	0.13	0.116	0.193	0.315	0.474	0.0966	0.0715	0.0709	0.161	0.142	0.0874	0.0771	0.072	0.148
Iron (Fe)-Total	2.03	3.56	1.74	0.797	0.87	<0.030	3.77	3.13	2.87	6.84	18.1	12.8	6.94	4.87	4.54	6.1	2.7	2.19	1.98	1.8	5.4
Lead (Pb)-Total	0.00213	0.00382	0.00178	0.0009	0.0009	<0.000050	0.00154	0.00138	0.0013	0.00267	0.0057	0.00689	0.00504	0.00232	0.00229	0.0022	0.00103	0.00093	0.00084	0.000815	0.00231
Lithium (Li)-Total	0.0015	0.00213	0.0013	0.00087	0.00083	0.00191	0.00193	0.00226	0.00204	0.00178	0.00227	0.00349	0.00256	0.00181	0.00171	0.00134	0.00222	0.0013	0.00183	0.00204	0.001
Magnesium (Mg)-Total	2.3	2.01	1.59	2.07	2.17	4.05	6.23	7.09	6.85	5.95	4.59	4.11	2.98	2.69	2.64	3.33	5.34	5.07	6.43	6.38	5.08
Manganese (Mn)-Total	0.0788	0.116	0.0698	0.0526	0.0548	0.074	0.34	0.367	0.341	0.333	0.305	0.44	0.226	0.153	0.153	0.185	0.301	0.207	0.23	0.226	0.247
Mercury (Hg)-Total	<0.000010	0.000018	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00104	0.000681	0.000743	0.000915	0.00096	0.00144	0.00331	0.00309	0.003	0.00317	0.00545	0.0033	0.00133	0.00145	0.0014	0.0023	0.00255	0.00268	0.00282	0.00291	0.0027
Nickel (Ni)-Total	0.00112	0.00145	0.0008	0.0006	0.0006	0.00089	0.00235	0.0022	0.00192	0.00307	0.00349	0.00531	0.00381	0.00254	0.00252	0.0023	0.00217	0.0017	0.0018	0.0016	0.00268
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.35	1.32	0.46	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC					Replicate									Replicate							
Sample ID	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC3	SC3	SC3	SC3
Date Sampled	28-Jun-12	1-Aug-12	5-Sep-12	5-Oct-12	5-Oct-12	2-Dec-12	9-Jan-12	27-Feb-12	27-Mar-12	1-May-12	28-May-12	28-Jun-12	1-Aug-12	5-Sep-12	5-Sep-12	5-Oct-12	2-Dec-12	9-Jan-12	27-Feb-12	27-Mar-12	1-May-12
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1171583-7	L1190018-4	L1206302-9	L1221669-21	L1221669-24	L1246043-7	L1103291-6	L1119935-6	L1131394-6	L1143005-5	L1155050-5	L1171583-4	L1190018-5	L1206302-12	L1206302-6	L1221669-22	L1246043-13	L1103291-7	L1119935-5	L1131394-5	L1143005-6
Total Metals *(cont'd)*																					
Potassium (K)-Total	1.1	1.41	0.692	0.599	0.78	0.45	1.97	2.24	2.09	1.75	1.41	1.98	1.8	1.38	1.36	1.39	1.88	1.65	2.16	2.08	1.51
Selenium (Se)-Total	0.00037	0.0002	0.00019	0.00037	0.00036	0.00069	0.00218	0.00235	0.00213	0.00295	0.00473	0.00189	0.0008	0.00083	0.00075	0.00188	0.00231	0.00166	0.00203	0.00205	0.00232
Silicon (Si)-Total	4.79	7.77	3.68	2.38	3.36	1.75	2.9	3	2.91	4.17	4.69	8.19	9.81	5.77	5.62	3.46	2.84	2.79	2.96	2.89	4.21
Silver (Ag)-Total	0.000038	0.000075	0.000045	0.000023	0.000024	<0.000010	<0.000010	<0.000010	<0.000010	0.000026	0.00005	0.000112	0.00009	0.000047	0.000047	0.000023	<0.000010	<0.000010	<0.000010	<0.000010	0.000028
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3	3.6	3.7	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.6	2.6	3.5	3.7	<2.0
Strontium (Sr)-Total	0.127	0.0777	0.0863	0.129	0.135	0.307	0.415	0.441	0.444	0.368	0.264	0.18	0.12	0.118	0.116	0.195	0.347	0.342	0.39	0.415	0.32
Thallium (Tl)-Total	0.000038	0.000058	0.000026	0.000015	0.00002	<0.000010	0.000015	0.000015	0.000015	0.00002	0.000029	0.000063	0.000067	0.000037	0.000036	0.000022	0.000014	0.000012	0.000013	0.000015	0.00002
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.046	0.098	0.042	0.02	0.03	<0.010	<0.010	0.014	0.011	0.05	0.08	0.185	0.24	0.163	0.159	0.054	<0.010	<0.010	0.014	0.011	0.051
Uranium (U)-Total	0.000081	0.000163	0.000048	0.000056	0.000057	0.000072	0.000537	0.000576	0.000611	0.000592	0.000611	0.000662	0.000289	0.000223	0.000209	0.000321	0.000437	0.000387	0.000448	0.000494	0.000479
Vanadium (V)-Total	0.006	0.0105	0.0045	0.0022	0.0031	<0.0010	0.0011	0.001	<0.0010	0.0035	0.007	0.0136	0.0127	0.009	0.0085	0.004	0.0011	<0.0010	<0.0010	<0.0010	0.0036
Zinc (Zn)-Total	0.0108	0.0152	0.008	0.0069	0.007	0.0071	0.171	0.184	0.174	0.153	0.426	0.212	0.0773	0.0634	0.0622	0.149	0.191	0.0989	0.114	0.114	0.116
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0481	0.069	0.058	0.0463	0.0413	0.0157	0.0441	0.0538	0.0972	0.0571	0.0049	0.0097	0.021	0.0278	0.0265	0.0257	0.0458	0.0563	0.049	0.0753	0.0665
Antimony (Sb)-Dissolved	0.00096	0.00069	0.00081	0.00092	0.00093	0.00124	0.00063	0.00059	0.00062	0.00055	0.00032	0.00036	0.00042	0.00042	0.00041	0.00048	0.00055	0.00055	0.00057	0.00061	0.0005
Arsenic (As)-Dissolved	0.00045	0.00058	0.00041	0.00036	0.00035	0.00028	<0.00010	<0.00010	0.00044	0.00025	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00018	0.00013	0.00016	0.00025
Barium (Ba)-Dissolved	0.0301	0.0281	0.0252	0.0294	0.0294	0.0411	0.0398	0.0423	0.0423	0.0297	0.0269	0.0386	0.0331	0.0291	0.0304	0.0318	0.0408	0.0355	0.0412	0.0415	0.0269
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.013	<0.010
Cadmium (Cd)-Dissolved	0.000029	0.000016	0.000021	0.000031	0.00003	0.000078	0.00128	0.00159	0.00155	0.000581	0.0037	0.00251	0.000413	0.000394	0.000302	0.00113	0.00171	0.000765	0.000874	0.000839	0.000365
Calcium (Ca)-Dissolved	22.8	13.4	15.1	23.2	23.4	56.3	73.8	80.7	76	64.8	47.2	32.1	18.6	20.9	19.3	35.9	69	61.3	74.9	71.6	56.3
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	0.00023	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	0.00016	0.00016	0.00052	0.00227	0.00238	0.00232	0.00233	0.00579	0.00435	0.00074	0.0006	0.00037	0.00213	0.00249	0.00129	0.00132	0.00139	0.0014
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	0.00064	0.00053	0.00791	0.00361	0.00452	0.0111	0.00327	0.00685	0.0179	0.00096	0.00079	0.00076	0.00303	0.00457	0.0052	0.00309	0.00296	0.003
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.187	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.054	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000089	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.00050	<0.00050	0.00053	<0.00050	<0.00050	0.00212	0.002	0.00228	0.00198	0.00154	0.00156	0.00129	<0.00050	0.00061	<0.00050	0.00084	0.00207	0.0015	0.00188	0.00174	0.001
Magnesium (Mg)-Dissolved	1.71	0.914	1.09	1.87	1.83	3.94	6.09	6.96	6.77	5.36	4.05	2.62	1.34	1.59	1.61	3.06	5.61	4.97	6.09	6.14	4.53
Manganese (Mn)-Dissolved	0.021	0.00569	0.0195	0.0323	0.0321	0.0693	0.318	0.344	0.326	0.255	0.262	0.328	0.0933	0.08	0.0739	0.159	0.301	0.191	0.201	0.207	0.168
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00101	0.000614	0.00069	0.000895	0.000923	0.00149	0.00277	0.0028	0.00287	0.00245	0.00166	0.00102	0.000992	0.00124	0.00119	0.00167	0.0025	0.00243	0.00267	0.0027	0.00208
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00098	0.00194	0.00197	0.00185	0.00162	0.00252	0.00233	0.00086	0.00065	<0.00050	0.00175	0.00203	0.0014	0.00146	0.00142	0.00116
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.34	0.186	0.156	0.309	0.3	0.437	1.94	2.21	2.08	1.54	1.12	1.04	0.698	0.776	0.785	1.18	1.87	1.62	2.03	1.98	1.33
Selenium (Se)-Dissolved	0.0003	0.00018	0.00018	0.00037	0.00036	0.00068	0.00203	0.00217	0.00227	0.00245	0.00208	0.00108	0.00056	0.00072	0.0007	0.00141	0.0022	0.00165	0.00197	0.00206	0.00205
Silicon (Si)-Dissolved	0.969	0.56	0.57	0.905	0.903	1.66	2.41	2.49	2.55	2.15	1.81	1.51	0.85	0.906	0.86	1.52	2.25	2.43	2.49	2.54	2.21
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.7	3.5	3.8	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.5	2.4	3.4	3.7	<2.0
Strontium (Sr)-Dissolved	0.123	0.0797	0.0839	0.126	0.133	0.314	0.407	0.444	0.448	0.355	0.251	0.166	0.111	0.112	0.111	0.195	0.392	0.338	0.401	0.408	0.3
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	0.000012	0.00001	0.000014	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000010	0.000013	0.000012	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000045	0.000021	0.000023	0.00004	0.000041	0.00007	0.000349	0.000426	0.000481	0.00036	<0.000010	0.000012	0.000019	0.000024	0.00002	0.00006	0.00032	0.000298	0.000382	0.000427	0.000318
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0068	0.0465	0.0632	0.0589	0.0153	0.261	0.125	0.0104	0.0109	0.0056	0.06	0.0853	0.0229	0.0323	0.0243	0.0085

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Lake	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC						L1246043-20									Replicate						Replicate
Sample ID	SC3	SC3	SC3	SC3	SC3	SC3	SUL (2m)	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1A	UR1A	UR1A
Date Sampled	28-May-12	27-Jun-12	1-Aug-12	5-Sep-12	5-Oct-12	2-Dec-12	5-Oct-12	9-Jan-12	30-Jan-12	27-Feb-12	27-Mar-12	1-May-12	28-May-12	27-Jun-12	27-Jun-12	1-Aug-12	5-Sep-12	5-Oct-12	9-Jan-12	27-Feb-12	27-Feb-12
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1155050-6	L1171873-3	L1190018-6	L1206302-5	L1221669-23	L1246043-20	L1221662-3	L1103291-2	L1111122-2	L1119935-2	L1131394-1	L1143005-1	L1155050-1	L1171873-1	L1171873-9	L1190018-1	L1206302-1	L1221669-11	L1103291-3	L1119935-3	L1119935-4
Physical Tests																					
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	275	196	125	133	234	363	146	259	321	331	335	229	170	138	137	114	126	183	180	230	229
Hardness (as $CaCO_3$)	127	89.2	55.5	59.7	104	181	66.4	116	146	160	158	106	78.2	63.8	62.6	50.9	58.5	87.6	80.5	109	109
pH	8.05	7.49	7.85	7.53	8.14	8.12	8.08	8.05	8.13	8.01	7.79	7.96	7.7	7.57	7.81	8.01	7.97	8.01	8.06	8.13	8.13
Total Suspended Solids	77.3	165	170	101	35.8	5.3	10.8	<3.0	4.3	3	4	16.7	55.3	132	149	120	52.9	19.3	<3.0	<3.0	<3.0
Total Dissolved Solids	180	136	80	78	150	242	94	156	181	204	218	144	107	97	95	74	91	112	98	126	137
Turbidity (NTU)	70.4	128	119	60.8	38.2	11.8	20.8	7.8	3.1	5.89	5.62	14.4	39.9	92.4	96.1	88	40.9	20.7	1.4	0.6	0.57
Anions and Nutrients																					
Acidity (as $CaCO_3$)	4.1	2.9	2.6	3.5	3	2.3	2.9	3.3	4.4	3	5.3	5.6	6.5	3.2	1.9	2.5	2.5	4.4	3	2	1.9
Alkalinity, Bicarbonate (as $CaCO_3$)	35.1	20.4	25.4	29	38.2	82.6	27	71.3	91.3	91	89.1	69.6	43.4	31.6	31.5	30.7	35.5	43.5	70	82.1	81.7
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	35.1	20.4	25.4	29	38.2	82.6	27	71.3	91.3	91	89.1	69.6	43.4	31.6	31.5	30.7	35.5	43.5	70	82.1	81.7
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0093	<0.0050	0.0151	<0.0050	0.0218	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.185	0.159	0.066	0.055	0.123	0.148	0.034	0.078	0.079	0.092	0.098	0.068	0.078	0.079	0.082	0.044	0.038	0.073	0.038	0.042	0.042
Nitrate (as N)	0.216	0.0731	0.03	0.02	0.092	0.105	0.0279	0.0816	0.067	0.0732	0.0604	0.215	0.15	0.0516	0.0507	0.024	0.0181	0.0757	0.0598	0.068	0.068
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0025	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	0.1	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.1	0.073	<0.050	<0.050
Total Nitrogen	0.23	<0.050	<0.050	0.05	0.15	0.105	<0.050	-	<0.050	0.06	0.111	0.2	0.09	<0.050	0.05	<0.050	<0.050	0.13	-	0.06	0.06
Orthophosphate-Dissolved (as P)	0.0016	0.0123	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	0.0031	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	1.01	0.437	0.203	0.15	0.216	0.0091	0.0114	0.0282	0.0104	0.008	0.0279	0.0915	0.291	0.234	0.342	0.164	0.0555	0.0961	0.004	<0.0020	<0.0020
Sulfate (SO_4)	96.2	71.4	33.6	35.2	71.3	112	40.3	56.7	73.7	80.3	84.4	49.3	39.4	35.5	35.4	23.2	26.4	44.3	26.6	37.6	37.6
Cyanides																					
Cyanide, Weak Acid Diss	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0019	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0011	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	0.74	<0.50	0.55	0.57	<0.50	<0.50	<0.50	0.91	0.53	0.6	0.79	1.33	1.26	0.71	0.87	0.73	0.6	0.76	1.06	0.63	0.73
Total Metals																					
Aluminum (Al)-Total	2.22	5.77	4.7	2.78	1.37	0.46	1.22	0.23	0.09	0.175	0.173	0.637	1.77	3.99	3.91	3.98	1.98	0.859	0.07	0.021	0.021
Antimony (Sb)-Total	0.001	0.00134	0.00104	0.00073	0.00068	0.00061	0.00117	0.00147	0.00158	0.00128	0.0013	0.00097	0.00105	0.00122	0.00111	0.00102	0.00082	0.00102	0.00218	0.00187	0.00189
Arsenic (As)-Total	0.054	0.0205	0.00673	0.00354	0.0106	0.00219	0.00194	0.00154	0.00073	0.00145	0.00154	0.00371	0.0152	0.00993	0.01	0.00557	0.00283	0.0052	0.00036	0.0003	0.0003
Barium (Ba)-Total	0.0561	0.139	0.128	0.0777	0.0484	0.0451	0.0569	0.0331	0.0469	0.0445	0.0415	0.0393	0.0479	0.0905	0.0891	0.105	0.0565	0.0404	0.029	0.0382	0.0378
Beryllium (Be)-Total	0.0003	0.00035	0.00017	0.0001	0.00014	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.0002	0.00019	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.00373	0.00289	0.000998	0.000778	0.0018	0.00208	0.0001	0.000536	0.000295	0.000608	0.000668	0.000515	0.001	0.0012	0.00118	0.000607	0.000388	0.0008	0.000024	0.000015	0.000015
Calcium (Ca)-Total	47.4	33.1	20.3	21.6	34.2	69.6	22.1	40	50.8	54.3	56.6	37	27.4	24.1	22.8	18.5	19.5	30.1	26.2	34.7	34.5
Chromium (Cr)-Total	0.00163	0.00502	0.00442	0.00254	0.001	0.00018	0.00084	0.00025	0.00013	0.00015	0.00021	0.00067	0.00284	0.00524	0.00541	0.0049	0.00237	0.001	0.00025	0.00015	0.00014
Cobalt (Co)-Total	0.00501	0.00698	0.00344	0.00218	0.00258	0.00215	0.00075	0.00064	0.0003	0.00066	0.00074	0.00099	0.00201	0.00395	0.00431	0.00271	0.00143	0.00133	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	0.22	0.408	0.116	0.0724	0.143	0.107	0.013	0.0331	0.0116	0.027	0.0299	0.0431	0.0615	0.157	0.158	0.0661	0.0349	0.0674	0.0006	<0.00050	<0.00050
Iron (Fe)-Total	12.9	13.8	7.94	5.14	5.47	1.96	1.01	0.94	0.33	0.716	0.741	2.04	5.1	7.92	7.85	6.51	3.41	2.76	0.14	0.05	0.05
Lead (Pb)-Total	0.00459	0.0075	0.00523	0.00258	0.002	0.000863	0.0011	0.00041	0.000154	0.000313	0.000336	0.000917	0.00198	0.00447	0.00448	0.00375	0.00164	0.0011	0.00009	<0.000050	<0.000050
Lithium (Li)-Total	0.00179	0.00401	0.00282	0.00182	0.00108	0.00191	0.00125	0.00076	0.001	0.00159	0.00195	0.00138	0.00237	0.00367	0.00338	0.00289	0.00156	0.00134	0.00066	0.00149	0.00151
Magnesium (Mg)-Total	4.25	4.54	3.29	2.75	3.23	5.35	1.98	4.31	5.21	5.83	5.98	4.12	3.68	4	4	3.3	2.74	3.47	4.01	5.51	5.42
Manganese (Mn)-Total	0.24	0.469	0.252	0.164	0.169	0.233	0.0768	0.085	0.0425	0.0891	0.104	0.0808	0.106	0.26	0.282	0.194	0.099	0.0874	0.014	0.0071	0.0069
Mercury (Hg)-Total	<0.000010	0.00002	0.000017	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000025	0.000017	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00433	0.00417	0.00143	0.00142	0.00218	0.00268	0.000992	0.00167	0.00209	0.00201	0.00197	0.00138	0.00178	0.00168	0.0016	0.0012	0.00116	0.0016	0.000973	0.00119	0.00118
Nickel (Ni)-Total	0.0033	0.00613	0.00411	0.00266	0.0024	0.00192	0.0008	0.00095	0.00078	0.00094	0.0009	0.00149	0.0037	0.00601	0.00659	0.00466	0.00245	0.0016	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total	0.91	0.51	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.32	0.36	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Lake	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC						L1246043-20									Replicate						Replicate
Sample ID	SC3	SC3	SC3	SC3	SC3	SC3	SUL (2m)	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1A	UR1A	UR1A
Date Sampled	28-May-12	27-Jun-12	1-Aug-12	5-Sep-12	5-Oct-12	2-Dec-12	5-Oct-12	9-Jan-12	30-Jan-12	27-Feb-12	27-Mar-12	1-May-12	28-May-12	27-Jun-12	27-Jun-12	1-Aug-12	5-Sep-12	5-Oct-12	9-Jan-12	27-Feb-12	27-Feb-12
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1155050-6	L1171873-3	L1190018-6	L1206302-5	L1221669-23	L1246043-20	L1221662-3	L1103291-2	L1111122-2	L1119935-2	L1131394-1	L1143005-1	L1155050-1	L1171873-1	L1171873-9	L1190018-1	L1206302-1	L1221669-11	L1103291-3	L1119935-3	L1119935-4
Total Metals *(cont'd)*																					
Potassium (K)-Total	1.41	2.01	1.85	1.42	1.29	1.83	0.692	0.967	1.49	1.45	1.37	0.936	1.03	1.44	1.41	1.45	1.12	0.923	0.51	0.654	0.643
Selenium (Se)-Total	0.00376	0.00184	0.00083	0.00079	0.00169	0.00215	0.00027	0.00096	0.00114	0.00129	0.00135	0.00117	0.00134	0.00096	0.00091	0.00068	0.00059	0.00121	0.00052	0.00077	0.00072
Silicon (Si)-Total	5.13	11.7	10.4	6.32	3.53	2.75	2.98	2.4	2.29	2.4	2.38	3.2	4.79	9.29	8.43	9.79	5.18	3.11	2.06	2.05	2.02
Silver (Ag)-Total	0.000046	0.000153	0.000089	0.000048	0.000021	<0.000010	0.000029	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	0.000035	0.000116	0.000076	0.000069	0.000035	0.000035	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	2.7	<2.0	2.3	2.6	3	3.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	2.7	2.7
Strontium (Sr)-Total	0.25	0.18	0.125	0.119	0.193	0.385	0.13	0.263	0.302	0.332	0.342	0.239	0.18	0.161	0.153	0.128	0.123	0.201	0.223	0.278	0.277
Thallium (Tl)-Total	0.00003	0.000076	0.000063	0.000039	0.00002	0.000013	0.00002	<0.000010	<0.000010	0.000011	<0.000010	0.000012	0.000024	0.000052	0.00005	0.000049	0.000029	0.000014	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.093	0.264	0.258	0.177	0.059	<0.010	0.028	<0.010	<0.010	<0.010	<0.010	0.026	0.065	0.159	0.152	0.21	0.115	0.036	<0.010	<0.010	<0.010
Uranium (U)-Total	0.000484	0.000653	0.000304	0.000212	0.000299	0.000408	0.000061	0.000167	0.000179	0.000225	0.000252	0.000173	0.000168	0.000287	0.000278	0.000207	0.00012	0.000162	0.000029	0.000043	0.000039
Vanadium (V)-Total	0.007	0.0171	0.0149	0.0096	0.0039	<0.0010	0.003	<0.0010	<0.0010	<0.0010	<0.0010	0.002	0.0061	0.0135	0.0138	0.0147	0.0073	0.0028	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	0.293	0.198	0.0845	0.0619	0.132	0.144	0.0091	0.0409	0.0209	0.0447	0.048	0.0384	0.0858	0.0859	0.0886	0.0532	0.0324	0.0655	0.0043	<0.0030	<0.0030
Dissolved Metals																					
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0577	0.0201	0.034	0.0575	0.0394	0.0525	0.0586	0.038	0.0205	0.0383	0.061	0.0499	0.0563	0.0449	0.0499	0.0593	0.0379	0.0448	0.0106	0.0041	0.0043
Antimony (Sb)-Dissolved	0.00046	0.00036	0.00038	0.00039	0.00044	0.00052	0.00095	0.00147	0.00157	0.00129	0.00129	0.00081	0.00077	0.00059	0.00057	0.0005	0.00059	0.00084	0.00221	0.00193	0.00194
Arsenic (As)-Dissolved	0.00134	<0.00010	0.00013	0.0001	<0.00010	<0.00010	0.00027	0.00019	0.00017	0.00018	0.0003	0.00024	0.00028	<0.00010	0.00011	0.00018	0.00011	0.0001	0.00029	0.00026	0.00025
Barium (Ba)-Dissolved	0.0212	0.0339	0.0322	0.029	0.0299	0.041	0.0312	0.0313	0.0451	0.0428	0.0406	0.0311	0.021	0.024	0.0255	0.0271	0.0261	0.0286	0.028	0.0374	0.0376
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.0008	0.00134	0.000322	0.000327	0.000666	0.00115	0.000036	0.000369	0.000251	0.000448	0.000479	0.000196	0.000249	0.000329	0.000297	0.000151	0.000167	0.000355	0.00002	0.000013	0.000014
Calcium (Ca)-Dissolved	45	31.7	19.9	21.3	36.8	64	23.7	39.5	50.2	54.7	53.9	35.6	26.6	21.8	21.3	17.8	20.2	29.9	25.7	35	35
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	0.00016	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	0.00266	0.00328	0.0006	0.00049	0.00162	0.00182	0.00023	0.00051	0.00025	0.00056	0.00065	0.00045	0.00069	0.00085	0.00071	0.00028	0.00022	0.00076	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00554	0.003	0.00081	0.00131	0.00172	0.00361	0.001	0.00479	0.00216	0.00287	0.00454	0.00428	0.00255	0.00161	0.00182	0.0008	0.00804	0.00229	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	0.264	<0.030	<0.030	0.042	<0.030	<0.030	<0.030	0.035	<0.030	<0.030	0.055	<0.030	0.039	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	0.000099	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000358	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.00125	0.00085	0.00052	0.00058	0.00074	0.00161	0.00071	0.00083	0.00101	0.00167	0.00152	0.00098	0.00111	0.00065	0.00103	0.00057	0.00056	0.00103	0.00073	0.00149	0.00149
Magnesium (Mg)-Dissolved	3.49	2.43	1.41	1.59	2.86	5.28	1.74	4.24	5.07	5.68	5.76	4.11	2.89	2.28	2.27	1.6	1.95	3.13	3.93	5.36	5.32
Manganese (Mn)-Dissolved	0.162	0.289	0.0962	0.0762	0.132	0.215	0.0508	0.077	0.038	0.0823	0.098	0.0547	0.0489	0.099	0.094	0.0516	0.037	0.0619	0.011	0.0062	0.0061
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.0026	0.00161	0.00107	0.00116	0.0018	0.00237	0.00102	0.00154	0.00202	0.00194	0.00193	0.00121	0.00134	0.00117	0.00117	0.000918	0.00109	0.00133	0.000942	0.00119	0.00119
Nickel (Ni)-Dissolved	0.00182	0.00173	0.0006	0.00054	0.00123	0.00165	<0.00050	0.00082	0.00071	0.00088	0.00085	0.00078	0.00072	0.00063	0.00053	<0.00050	<0.00050	0.00079	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	1.06	0.898	0.696	0.753	1.08	1.76	0.286	0.938	1.42	1.42	1.32	0.88	0.695	0.622	0.615	0.555	0.655	0.761	0.492	0.638	0.637
Selenium (Se)-Dissolved	0.00203	0.00105	0.00064	0.0007	0.00146	0.00202	0.00027	0.00102	0.00117	0.00132	0.00147	0.00096	0.00099	0.00065	0.00066	0.00053	0.00054	0.00098	0.00054	0.00075	0.00071
Silicon (Si)-Dissolved	1.67	1.31	0.87	1.02	1.53	2.31	0.875	2.15	2.1	2.25	2.26	2.14	1.72	1.23	1.24	0.9	0.966	1.59	1.91	2.01	2
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	2.5	<2.0	2.2	2.4	2.9	3.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.6	2.6
Strontium (Sr)-Dissolved	0.23	0.167	0.114	0.111	0.198	0.359	0.137	0.257	0.295	0.333	0.339	0.23	0.172	0.141	0.137	0.12	0.123	0.193	0.215	0.279	0.28
Thallium (Tl)-Dissolved	0.000011	0.000011	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.00008	0.000019	0.000032	0.000034	0.000123	0.000305	0	0.000133	0.000168	0.0002	0.000231	0.000128	0.000072	0.000054	0.000056	0.000047	0.000043	0.0001	0.000031	0.000039	0.00004
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0303	0.0433	0.0055	0.0074	0.02	0.0515	<0.0030	0.0158	0.0132	0.0206	0.0193	0.0065	0.0094	0.0087	0.0049	<0.0030	0.0045	0.02	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC											
Sample ID	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR2	UR2	UR2	UR2
Date Sampled	27-Mar-12	1-May-12	28-May-12	28-Jun-12	1-Aug-12	5-Sep-12	5-Oct-12	9-Jan-12	27-Mar-12	28-Jun-12	5-Sep-12
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1131394-3	L1143005-2	L1155050-2	L1171583-2	L1190018-2	L1206302-3	L1221669-13	L1103291-16	L1131394-2	L1171583-1	L1206302-2
Physical Tests											
Colour, True	<5.0	5.8	5.4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	237	158	107	93.3	94.3	97.1	138	201	266	115	94
Hardness (as $CaCO_3$)	109	70.9	51.5	45.2	43.9	47.3	66.9	89	119	52.4	43
pH	8.13	8.17	8.14	7.92	8.08	8.06	8.06	8.06	8.06	7.89	7.97
Total Suspended Solids	<3.0	8.7	47.3	50	59.8	27.3	3.7	3.6	<3.0	116	37.5
Total Dissolved Solids	142	91	66	76	76	74	84	120	165	80	70
Turbidity (NTU)	0.25	3.8	31.7	47.5	53.8	26.7	4.64	3.7	0.55	75.5	28.9
Anions and Nutrients											
Acidity (as $CaCO_3$)	2.3	3.2	2.9	1.3	2	2.1	3.4	3	2.9	1.4	2.2
Alkalinity, Bicarbonate (as $CaCO_3$)	87.7	63.1	41.7	35.5	35.7	37.6	46.4	69	86.4	34.1	29.9
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	87.7	63.1	41.7	35.5	35.7	37.6	46.4	69	86.4	34.1	29.9
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.67	<0.50	<0.50
Fluoride (F)	0.042	0.035	0.026	0.023	<0.020	<0.020	0.031	0.059	0.066	0.054	0.033
Nitrate (as N)	0.0576	0.174	0.116	0.039	0.02	0.017	0.0712	0.132	0.101	0.08	0.0284
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.052	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	0.11	0.15	0.07	<0.050	<0.050	<0.050	0.12	0.132	0.101	<0.050	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	0.0012	0.0012	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	<0.0010
Phosphorus (P)-Total	<0.0020	0.016	0.0797	0.0956	0.103	0.0742	0.01	0.0091	0.0037	0.189	0.0586
Sulfate (SO_4)	40	21.5	12.9	11.6	10.9	12.9	20.3	36	53.6	22.1	16.4
Cyanides											
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0018	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon											
Total Organic Carbon	0.74	1.65	1.66	0.79	0.68	0.55	1	0.93	0.72	0.7	0.6
Total Metals											
Aluminum (Al)-Total	0.0106	0.274	1.78	2.26	2.57	1.8	0.229	0.121	0.035	3.67	1.59
Antimony (Sb)-Total	0.00198	0.00102	0.00106	0.00088	0.00091	0.00099	0.00125	0.00058	0.0006	0.00061	0.00039
Arsenic (As)-Total	0.00028	0.00057	0.00132	0.00227	0.0033	0.00284	0.00059	0.001	0.00051	0.00461	0.00143
Barium (Ba)-Total	0.0381	0.0297	0.0446	0.0514	0.0557	0.045	0.0289	0.0372	0.0473	0.0748	0.0453
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010
Cadmium (Cd)-Total	0.000014	0.000062	0.000099	0.000085	0.000079	0.00005	0.000035	0.000152	0.000135	0.000429	0.000162
Calcium (Ca)-Total	35.2	23.9	16.9	15.9	14.8	15.4	21.4	32.5	42.3	20.1	15
Chromium (Cr)-Total	0.00018	0.00055	0.00368	0.00435	0.00469	0.0032	0.00048	0.00024	0.0002	0.00547	0.00205
Cobalt (Co)-Total	<0.00010	0.00026	0.00103	0.0015	0.00149	0.00109	0.00021	0.00022	0.00015	0.00263	0.00103
Copper (Cu)-Total	<0.00050	0.00148	0.0044	0.00574	0.00629	0.00496	0.00124	0.0104	0.00486	0.0651	0.0157
Iron (Fe)-Total	0.035	0.53	2.49	3.41	3.83	2.67	0.356	0.38	0.14	6.16	2.37
Lead (Pb)-Total	<0.000050	0.00031	0.00114	0.00164	0.00178	0.00131	0.0003	0.0002	0.000056	0.00268	0.00251
Lithium (Li)-Total	0.00119	0.00133	0.00234	0.00229	0.0021	0.00159	0.00108	<0.00050	0.00077	0.00218	0.00106
Magnesium (Mg)-Total	5.32	3.76	3.43	3.12	3.02	3	3.4	2.69	3.55	3.12	1.91
Manganese (Mn)-Total	0.00711	0.0183	0.06	0.0821	0.09	0.0618	0.0135	0.033	0.0272	0.162	0.0628
Mercury (Hg)-Total	<0.000010	<0.000010	0.000012	0.000015	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00127	0.000678	0.000544	0.000718	0.000683	0.000727	0.000879	0.00246	0.00277	0.00178	0.00132
Nickel (Ni)-Total	<0.00050	0.00115	0.00882	0.00477	0.0042	0.00298	0.001	<0.00050	<0.00050	0.00502	0.00187
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-5. 2012: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC											
Sample ID	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR1A	UR2	UR2	UR2	UR2
Date Sampled	27-Mar-12	1-May-12	28-May-12	28-Jun-12	1-Aug-12	5-Sep-12	5-Oct-12	9-Jan-12	27-Mar-12	28-Jun-12	5-Sep-12
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1131394-3	L1143005-2	L1155050-2	L1171583-2	L1190018-2	L1206302-3	L1221669-13	L1103291-16	L1131394-2	L1171583-1	L1206302-2
Total Metals *(cont'd)*											
Potassium (K)-Total	0.633	0.445	0.733	0.883	0.943	0.754	0.466	1.17	1.39	1.35	0.941
Selenium (Se)-Total	0.00085	0.0006	0.00039	0.00041	0.0004	0.00046	0.00053	0.00061	0.00084	0.0006	0.00039
Silicon (Si)-Total	2.02	2.84	5.28	5.77	7.22	4.89	2.15	2.83	2.64	7.92	4.22
Silver (Ag)-Total	<0.000010	<0.000010	0.000031	0.000038	0.000036	0.000028	0.000027	<0.000010	<0.000010	0.000055	0.00002
Sodium (Na)-Total	2.8	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	2.7	<2.0	<2.0
Strontium (Sr)-Total	0.285	0.205	0.15	0.129	0.13	0.127	0.187	0.19	0.232	0.112	0.0897
Thallium (Tl)-Total	<0.000010	<0.000010	0.000024	0.000028	0.000027	0.000021	<0.000010	<0.000010	<0.000010	0.000036	0.000018
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	0.014	0.061	0.079	0.14	0.09	0.013	<0.010	<0.010	0.216	0.116
Uranium (U)-Total	0.000048	0.000033	0.000043	0.000051	0.000064	0.000043	0.000033	0.000281	0.00034	0.000291	0.00022
Vanadium (V)-Total	<0.0010	0.0012	0.0063	0.009	0.0112	0.0076	0.0011	<0.0010	<0.0010	0.0122	0.0052
Zinc (Zn)-Total	<0.0030	0.0067	0.0128	0.0131	0.0141	0.0098	0.005	0.0192	0.0101	0.0387	0.0158
Dissolved Metals											
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0035	0.0184	0.17	0.131	0.133	0.046	0.0179	0.021	0.0194	0.0839	0.054
Antimony (Sb)-Dissolved	0.00208	0.00094	0.00089	0.00065	0.00063	0.00078	0.00119	0.00052	0.00062	0.00034	0.0003
Arsenic (As)-Dissolved	0.00024	0.00024	0.00027	0.00034	0.00048	0.00036	0.00032	0	0.0003	0.00022	0.00015
Barium (Ba)-Dissolved	0.0387	0.0242	0.0201	0.0176	0.0189	0.0191	0.0255	0.0349	0.0487	0.0229	0.0211
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.011	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000015	0.000041	0.000039	0.000014	0.000014	<0.000010	0.000027	0.000128	0.000124	0.000103	0.000074
Calcium (Ca)-Dissolved	35	22.6	16.3	14.7	14.5	15.3	21.4	31.2	41.9	18.5	15.3
Chromium (Cr)-Dissolved	0.0001	<0.00010	0.0004	0.00028	0.00035	0.00015	<0.00010	<0.00010	<0.00010	0.00014	0.0001
Cobalt (Co)-Dissolved	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	0.00014	0.0002	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	0.00092	0.00055	<0.00050	<0.00050	0.00073	0.00313	0.00154	0.0025	0.00072
Iron (Fe)-Dissolved	<0.030	<0.030	0.16	0.106	0.121	0.044	<0.030	<0.030	<0.030	0.042	0.035
Lead (Pb)-Dissolved	<0.000050	<0.000050	0.000102	0.000078	0.000077	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.0011	0.00098	0.00106	0.00058	0.00054	0.00061	0.00095	0.001	0.00071	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	5.27	3.53	2.6	2.07	1.89	2.2	3.25	2.6	3.6	1.51	1.2
Manganese (Mn)-Dissolved	0.00658	0.0046	0.0126	0.00841	0.00942	0.00225	0.00517	0.029	0.0261	0.035	0.0178
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00122	0.000616	0.000447	0.000634	0.000619	0.000683	0.000821	0.00227	0.00283	0.00252	0.00142
Nickel (Ni)-Dissolved	<0.00050	0.00061	0.00087	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00055	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.638	0.382	0.355	0.4	0.374	0.339	0.417	1.14	1.44	0.75	0.635
Selenium (Se)-Dissolved	0.00081	0.00049	0.00034	0.00031	0.00034	0.00037	0.00047	0.00057	0.00091	0.00041	0.00032
Silicon (Si)-Dissolved	2.03	2.12	2.06	1.48	1.12	0.97	1.65	2.49	2.7	1.65	1.2
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	2.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.8	<2.0	<2.0
Strontium (Sr)-Dissolved	0.283	0.193	0.143	0.121	0.121	0.118	0.182	0.18	0.234	0.104	0.0835
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000049	0.000025	0.00002	0.00002	0.000019	0.000017	0.00003	0.000256	0.000351	0.000127	0.00012
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0088	0.0073	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Lake	Lake	Lake	Lake	Lake	Lake	Lake
QAQC					Replicate														
Sample ID	Adit	Adit	Adit	Adit	Adit	Adit	Adit	Adit	Adit	Adit	Adit	Adit	BJ (1 m)	BJ (1 m)	BJ (1 m)	BJ (15 m)	BJ (15 m)	BJ (15 m)	BJ (15 m)
Date Sampled	29-Jan-13	20-Feb-13	14-Mar-13	27-Apr-13	27-Apr-13	19-May-13	23-Jun-13	16-Jul-13	13-Aug-13	21-Sep-13	22-Oct-13	19-Nov-13	16-Jul-13	9-Aug-13	24-Oct-13	15-Mar-13	16-Jul-13	9-Aug-13	24-Oct-13
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1264309-8	L1271673-13	L1279839-22	L1294990-1	L1294990-4	L1304309-11	L1322393-3	L1334719-15	L1348329-5	L1366991-10	L1383767-7	L1395276-7	L1334719-8	L1346151-10	L1384314-1	L1279841-2	L1334719-9	L1346151-11	L1384314-2
Physical Tests																			
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	8.3	<5.0	<5.0
Conductivity (uS/cm)	517	546	544	543	540	552	518	505	524	543	534	568	51.9	51.6	55.2	50.3	52.3	51.4	56.2
Hardness (as $CaCO_3$)	104	104	114	108	105	111	119	124	102	88.7	106	97.4	22.2	22.5	24.4	23.6	22.2	22.8	24.1
pH	8.24	8.27	8.23	8.28	8.29	8.26	8.17	8.14	8.27	8.20	8.25	8.28	7.77	8.17	7.27	7.68	7.78	8.15	7.47
Total Suspended Solids	65.8	51.6	46.3	33.8	31.1	38.8	35.5	185	132	614	59.5	59.7	<3.0	3.4	2.7	<3.0	<3.0	2.9	2.8
Total Dissolved Solids	335	349	360	347	356	375	310	316	349	359	352	378	33	34	40	34	26	36	29
Turbidity (NTU)	50.0	38.4	37.7	33.2	33.6	37.9	1.16	8.62	73.5	27.4	30.4	8.38	3.96	2.93	8.54	0.17	4.13	3.61	9.30
Anions and Nutrients																			
Acidity (as $CaCO_3$)	1.5	1.0	1.5	<1.0	<1.0	<1.0	1.4	2.2	<1.0	1.2	<1.0	<1.0	2.3	2.1	1.2	2.8	2.1	2.3	1.5
Alkalinity, Bicarbonate (as $CaCO_3$)	111	122	118	119	120	127	114	121	127	124	123	129	14.7	15.4	16.7	14.2	14.8	15.8	16.6
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	111	122	118	119	120	127	114	121	127	124	123	129	14.7	15.4	16.7	14.2	14.8	15.8	16.6
Ammonia, Total (as N)	0.711	0.901	0.868	0.706	0.695	0.588	0.472	0.169	0.297	0.208	0.145	0.123	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	2.26	2.80	2.41	2.54	2.54	2.61	2.05	1.67	2.15	2.90	1.76	1.66	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.401	0.428	0.428	0.430	0.420	0.429	0.405	0.402	0.430	0.477	0.444	0.448	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	1.47	1.96	1.31	1.40	1.40	1.24	1.76	1.14	1.10	1.22	0.752	0.695	0.0340	0.0113	0.0497	<0.0050	0.0366	0.0373	0.0510
Nitrite (as N)	0.362	0.513	0.462	0.464	0.462	0.556	0.293	0.120	0.192	0.104	0.0869	0.175	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	1.05	1.18	1.02	1.04	0.86	0.97	0.65	0.37	0.58	0.46	0.24	<0.21	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	2.88	3.65	2.78	2.91	2.73	2.77	2.70	1.64	1.88	1.78	1.08	1.05	<0.050	<0.050	0.058	<0.050	0.055	0.071	0.053
Orthophosphate-Dissolved (as P)	0.0042	0.0019	0.0021	0.0020	0.0019	0.0010	0.0016	0.0011	<0.0010	<0.0010	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.0363	0.0452	0.0343	0.0183	0.0187	0.0093	0.0328	0.157	0.131	0.717	0.0452	0.0680	0.0025	0.0023	0.0045	<0.0020	0.0023	0.0024	0.0048
Sulfate (SO_4)	143	147	156	150	150	154	145	135	132	139	145	153	8.89	8.79	9.99	8.82	8.98	9.16	9.95
Cyanides																			
Cyanide, Weak Acid Diss	0.0035	0.0036	0.0022	0.0019	0.0017	<0.0010	0.0022	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	0.0051	0.0047	0.0032	0.0030	0.0027	0.0014	0.0027	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																			
Organic / Inorganic Carbon	1.39	1.07	1.34	0.93	0.69	<0.50	1.4	0.61	0.90	0.90	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Organic Carbon																			
Total Metals																			
Aluminum (Al)-Total	0.675	1.01	0.403	0.380	0.249	0.609	0.625	4.33	2.30	7.43	1.30	0.880	0.272	0.176	0.942	0.0052	0.298	0.155	0.473
Antimony (Sb)-Total	0.00551	0.00990	0.0111	0.0159	0.0169	0.0130	0.00989	0.00869	0.00918	0.0129	0.00826	0.00875	0.00038	0.00033	0.00054	0.00023	0.00039	0.00040	0.00052
Arsenic (As)-Total	0.0223	0.0185	0.0193	0.0131	0.0139	0.0101	0.0121	0.0267	0.0278	0.121	0.0180	0.0184	0.00071	0.00083	0.00099	0.00044	0.00072	0.00062	0.00097
Barium (Ba)-Total	0.0671	0.0617	0.0360	0.0461	0.0435	0.0619	0.0968	0.193	0.130	0.283	0.0974	0.0645	0.0431	0.0401	0.0546	0.0327	0.0446	0.0394	0.0513
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	0.00012	0.00032	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	0.101	0.110	0.119	0.119	0.123	0.109	0.085	0.108	0.106	0.105	0.106	0.095	0.019	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000052	0.000017	0.000019	0.000037	0.000043	0.000034	0.000030	0.000077	0.000106	0.000808	0.000062	0.000066	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	38.7	35.6	38.2	34.6	35.1	36.9	39.3	43.8	35.1	38.7	35.2	32.4	8.77	8.51	9.39	9.38	8.83	8.76	8.90
Chromium (Cr)-Total	0.00065	0.00086	0.00036	0.00021	0.00016	0.00029	0.00023	0.00142	0.00109	0.00424	0.00054	0.00037	0.00014	<0.00010	0.00018	<0.00010	0.00014	0.00025	0.00012
Cobalt (Co)-Total	0.00027	0.00026	0.00027	0.00019	0.00020	0.00047	0.00034	0.00087	0.00090	0.00438	0.00072	0.00063	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	0.00525	0.00396	0.0180	0.00339	0.00460	0.00762	0.00525	0.0116	0.0107	0.0545	0.00490	0.00373	0.00176	0.00091	0.00092	<0.00050	<0.00050	0.00163	0.00082
Iron (Fe)-Total	0.616	0.485	0.206	0.174	0.147	0.374	0.532	2.78	2.79	13.1	0.870	0.836	0.081	0.056	0.206	<0.030	0.078	0.057	0.162
Lead (Pb)-Total	0.00552	0.00271	0.00383	0.00145	0.00155	0.00197	0.00104	0.00475	0.00515	0.0277	0.00253	0.00302	0.000211	0.000133	0.000887	<0.000050	0.000223	0.000179	0.000988
Lithium (Li)-Total	0.206	0.224	0.242	0.263	0.265	0.220	0.208	0.209	0.235	0.247	0.249	0.233	<0.00050	<0.00050	0.00114	<0.00050	<0.00050	<0.00050	0.00108
Magnesium (Mg)-Total	4.06	4.13	4.83	4.57	4.78	4.96	4.63	5.31	4.49	6.44	4.22	4.46	0.314	0.289	0.345	0.290	0.318	0.299	0.325
Manganese (Mn)-Total	0.168	0.173	0.132	0.124	0.129	0.210	0.244	0.312	0.231	0.578	0.244	0.156	0.00611	0.00729	0.00767	0.000360	0.00610	0.00492	0.00767
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000036	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00326	0.00385	0.00359	0.00376	0.00414	0.00470	0.00522	0.00652	0.00720	0.00988	0.00544	0.00517	0.000344	0.000328	0.000389	0.000369	0.000343	0.000341	0.000404
Nickel (Ni)-Total	0.00091	0.00149	0.00183	0.00119	0.00131	0.00136	0.00107	0.00138	0.00151	0.00559	0.00119	0.00094	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.62	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Lake	Lake	Lake	Lake	Lake	Lake	Lake
QAQC					Replicate														
Sample ID	Adit	Adit	Adit	Adit	Adit	Adit	Adit	Adit	Adit	Adit	Adit	Adit	BJ (1 m)	BJ (1 m)	BJ (1 m)	BJ (15 m)	BJ (15 m)	BJ (15 m)	BJ (15 m)
Date Sampled	29-Jan-13	20-Feb-13	14-Mar-13	27-Apr-13	27-Apr-13	19-May-13	23-Jun-13	16-Jul-13	13-Aug-13	21-Sep-13	22-Oct-13	19-Nov-13	16-Jul-13	9-Aug-13	24-Oct-13	15-Mar-13	16-Jul-13	9-Aug-13	24-Oct-13
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1264309-8	L1271673-13	L1279839-22	L1294990-1	L1294990-4	L1304309-11	L1322393-3	L1334719-15	L1348329-5	L1366991-10	L1383767-7	L1395276-7	L1334719-8	L1346151-10	L1384314-1	L1279841-2	L1334719-9	L1346151-11	L1384314-2
Total Metals *(cont'd)*																			
Potassium (K)-Total	4.01	5.72	5.31	5.67	5.82	6.41	5.98	7.42	6.40	7.90	4.47	3.75	0.229	0.137	0.316	0.076	0.234	0.171	0.249
Selenium (Se)-Total	<0.00010	<0.00010	0.00014	0.00018	0.00020	0.00017	0.00026	0.00045	0.00060	0.00253	0.00032	0.00050	<0.00010	<0.00010	0.00016	<0.00010	<0.00010	<0.00010	0.00015
Silicon (Si)-Total	4.00	5.13	3.49	3.94	3.41	3.98	3.77	11.9	9.27	11.9	5.75	4.80	0.908	0.755	2.60	0.479	0.983	0.773	1.20
Silver (Ag)-Total	0.000523	0.000101	0.000148	0.000061	0.000055	0.000163	0.000139	0.000559	0.000718	0.00739	0.000552	0.000353	0.000010	<0.000010	0.000072	<0.000010	0.000013	<0.000010	0.000066
Sodium (Na)-Total	67.8	80.6	71.1	68.5	69.9	76.5	68.6	59.3	74.0	82.7	76.7	83.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	1.18	1.10	1.24	1.22	1.29	1.25	1.29	1.31	1.15	1.13	1.21	1.22	0.0612	0.0593	0.0745	0.0596	0.0618	0.0626	0.0717
Thallium (Tl)-Total	<0.00010	<0.00010	0.00042	<0.00010	<0.00010	<0.00010	<0.00010	0.00017	<0.00010	0.00024	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	0.013	0.017	<0.010	<0.010	<0.010	<0.010	0.012	0.069	0.057	0.070	0.020	0.017	<0.010	<0.010	0.014	<0.010	<0.010	<0.010	<0.010
Titanium (Ti)-Total	0.000582	0.000478	0.000582	0.00123	0.00126	0.00120	0.000947	0.000828	0.000933	0.00128	0.000718	0.00101	0.000035	0.000032	0.000063	0.000019	0.000036	0.000032	0.000051
Uranium (U)-Total	0.0015	0.0021	0.0010	<0.0010	<0.0010	0.0013	0.0019	0.0111	0.0063	0.0187	0.0035	0.0024	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Vanadium (V)-Total	0.0148	0.0102	0.0339	0.0059	0.0060	0.0076	0.0064	0.0169	0.0200	0.0875	0.0102	0.0092	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zinc (Zn)-Total																			
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0233	0.0274	0.0238	0.0159	0.0166	0.0286	0.0323	0.0510	0.0488	0.0543	0.0410	0.0275	0.0138	0.0125	0.0116	0.0038	0.0110	0.0061	0.0135
Antimony (Sb)-Dissolved	0.00539	0.0101	0.0111	0.0168	0.0164	0.0131	0.0101	0.00931	0.00997	0.0133	0.00847	0.00871	0.00035	0.00031	0.00046	0.00021	0.00034	0.00036	0.00045
Arsenic (As)-Dissolved	0.0177	0.0169	0.0184	0.0117	0.0115	0.00657	0.00903	0.0100	0.0134	0.00968	0.0125	0.0131	0.00041	0.00062	0.00046	0.00042	0.00041	0.00043	0.00043
Barium (Ba)-Dissolved	0.0222	0.0264	0.0169	0.0318	0.0327	0.0421	0.0708	0.0518	0.0545	0.0483	0.0530	0.0385	0.0346	0.0350	0.0422	0.0320	0.0340	0.0348	0.0417
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	0.110	0.107	0.120	0.121	0.122	0.111	0.091	0.094	0.109	0.104	0.107	0.096	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	0.000025	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Dissolved	35.0	34.9	37.6	35.3	34.5	36.6	40.2	41.9	34.0	29.0	35.9	31.8	8.41	8.56	9.29	8.98	8.39	8.66	9.15
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	0.00013	0.00020	0.00015	0.00015	0.00032	0.00019	0.00011	0.00010	0.00017	0.00040	0.00031	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	0.00060	<0.00050	0.00072	<0.00050	<0.00050	<0.00050	0.00077	0.00083	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	0.000056	0.000100	<0.000050	0.000100	0.000092	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	<0.000050	0.000059	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.210	0.227	0.236	0.263	0.267	0.221	0.218	0.223	0.258	0.248	0.259	0.254	<0.00050	<0.00050	0.00105	<0.00050	<0.00050	<0.00050	0.00098
Magnesium (Mg)-Dissolved	3.91	4.01	4.78	4.68	4.64	4.73	4.51	4.71	4.10	3.97	4.08	4.33	0.287	0.285	0.303	0.286	0.292	0.291	0.299
Manganese (Mn)-Dissolved	0.119	0.116	0.104	0.115	0.114	0.180	0.217	0.159	0.110	0.125	0.204	0.118	0.00185	0.00102	0.000999	0.000163	0.00126	0.000148	0.000763
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00301	0.00373	0.00354	0.00402	0.00394	0.00475	0.00529	0.00640	0.00758	0.00912	0.00544	0.00522	0.000307	0.000325	0.000362	0.000345	0.000298	0.000321	0.000360
Nickel (Ni)-Dissolved	0.00051	0.00106	0.00135	0.00115	0.00113	0.00123	0.00080	0.00060	0.00064	<0.00050	0.00076	0.00074	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	3.69	5.48	5.16	5.84	5.70	6.21	5.84	5.90	5.85	6.34	3.95	3.55	0.118	0.101	0.147	0.084	0.120	0.114	0.147
Selenium (Se)-Dissolved	<0.00010	<0.00010	0.00015	0.00018	0.00018	0.00013	0.00017	0.00021	0.00022	0.00038	0.00024	0.00041	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	0.00013
Silicon (Si)-Dissolved	2.95	3.09	2.98	3.02	3.03	3.07	3.00	2.99	3.13	2.99	3.26	3.22	0.502	0.502	0.538	0.447	0.480	0.479	0.525
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	66.0	80.6	73.4	70.0	69.7	76.4	70.7	59.6	75.0	82.2	75.6	84.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	1.10	1.08	1.22	1.28	1.26	1.23	1.27	1.26	1.18	1.04	1.19	1.30	0.0561	0.0575	0.0718	0.0569	0.0556	0.0596	0.0716
Thallium (Tl)-Dissolved	0.000041	0.000075	0.000117	0.000161	0.000149	0.000048	0.000044	0.000037	0.000050	0.000071	0.000042	0.000038	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000491	0.000433	0.000567	0.00121	0.00117	0.00109	0.000917	0.000696	0.000856	0.000582	0.000687	0.00102	0.000025	0.000022	0.000030	0.000020	0.000023	0.000022	0.000030
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	0.0037	0.0052	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Stream	Stream
QAQC		Replicate				Replicate													
Sample ID	BJ (2.5 m)	BJ (2.5 m)	BJ (30 m)	BJ (30 m)	BJ (30 m)	BJ (30 m)	BJ (30 m)	BJ (50 m)	BJ (50 m)	BJ (50 m)	BJ (50 m)	BJ (70 m)	BJ (75 m)	BJ (75 m)	BJ (75 m)	BJ Shallow (1 m)	BJ Shallow (8 m)	TRIB 2	TRIB 3
Date Sampled	15-MAR-13	15-MAR-13	15-MAR-13	16-JUL-13	09-AUG-13	09-AUG-13	24-OCT-13	15-MAR-13	16-JUL-13	09-AUG-13	24-OCT-13	09-AUG-13	15-MAR-13	16-JUL-13	24-OCT-13	10-AUG-13	10-AUG-13	20-NOV-13	19-NOV-13
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1279841-1	L1279841-6	L1279841-3	L1334719-10	L1346151-12	L1346151-15	L1384314-3	L1279841-4	L1334719-11	L1346151-13	L1384314-4	L1346151-14	L1279841-5	L1334719-12	L1384314-5	L1346151-19	L1346151-20	L1395276-11	L1395276-5
Physical Tests																			
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	52.1	54.6	51.7	53.6	52.6	53.1	56.7	53.6	54.3	54.0	57.0	55.0	54.5	54.5	60.7	52.9	52.3	112	244
Hardness (as $CaCO_3$)	23.8	25.3	23.4	22.2	23.5	23.3	24.2	24.7	22.8	23.9	24.2	23.7	24.2	23.5	25.3	22.5	22.7	51.2	105
pH	7.37	7.76	7.71	7.79	8.12	8.10	7.47	7.75	7.78	8.11	7.51	8.10	7.76	7.78	7.51	7.67	7.62	7.54	7.65
Total Suspended Solids	<3.0	<3.0	<3.0	4.7	3.2	2.6	3.6	<3.0	3.3	4.1	5.7	5.9	6.0	4.0	15.9	2.4	6.0	<1.0	<1.0
Total Dissolved Solids	34	37	31	28	35	38	32	32	26	35	36	40	33	27	42	35	34	74	160
Turbidity (NTU)	0.28	0.23	1.23	4.54	2.69	3.81	8.23	4.02	5.17	6.37	11.0	5.59	6.78	5.35	19.6	4.63	5.44	0.12	0.42
Anions and Nutrients																			
Acidity (as $CaCO_3$)	3.4	2.6	2.8	2.2	2.4	2.6	1.6	2.9	2.2	2.6	1.5	2.6	2.8	2.3	1.0	2.6	2.4	2.9	3.2
Alkalinity, Bicarbonate (as $CaCO_3$)	15.6	15.6	14.9	15.0	4.4	15.2	16.7	14.7	15.3	15.4	16.9	15.8	16.0	15.4	17.0	15.7	15.5	32.0	46.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	15.6	15.6	14.9	15.0	4.4	15.2	16.7	14.7	15.3	15.4	16.9	15.8	16.0	15.4	17.0	15.7	15.5	32.0	46.3
Ammonia, Total (as N)	0.0093	0.0051	0.0068	<0.0050	<0.0050	<0.0050	<0.0050	0.0114	<0.0050	<0.0050	<0.0050	<0.0050	0.0131	<0.0050	<0.0050	<0.0050	<0.0050	0.0060	0.0074
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.028	0.043
Nitrate (as N)	<0.0050	<0.0050	0.0164	0.0429	0.0447	0.0452	0.0492	0.0257	0.0462	0.0500	0.0526	0.0539	0.0288	0.0478	0.0676	0.0094	0.0178	0.0148	0.0483
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	0.059	0.068	<0.050	0.055	<0.050	0.062	0.053	0.077	0.062	<0.050	0.063	0.066	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	0.0030	0.0023	0.0029	0.0050	0.0022	0.0032	0.0034	0.0058	0.0040	0.0049	0.0040	0.0085	0.0029	0.0045	<0.0020	<0.0020
Sulfate (SO_4)	8.94	9.51	9.08	9.20	9.38	9.40	10.1	9.26	9.39	9.64	10.1	9.80	9.43	9.49	10.5	8.78	8.83	22.0	73.2
Cyanides																			
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																			
Organic / Inorganic Carbon	1.07	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.63	<0.50	<0.50	<0.50
Total Organic Carbon																			
Total Metals																			
Aluminum (Al)-Total	0.0044	0.0038	0.0421	0.243	0.305	0.371	0.279	0.219	0.293	0.495	0.318	0.569	0.377	0.362	0.533	0.244	0.355	0.0057	0.0134
Antimony (Sb)-Total	0.00022	0.00023	0.00030	0.00041	0.00044	0.00041	0.00051	0.00044	0.00045	0.00046	0.00055	0.00050	0.00048	0.00045	0.00068	0.00032	0.00034	0.00029	0.00017
Arsenic (As)-Total	0.00058	0.00063	0.00057	0.00075	0.00071	0.00069	0.00104	0.00087	0.00083	0.00077	0.00116	0.00099	0.00101	0.00082	0.00177	0.00082	0.00082	0.00188	0.00017
Barium (Ba)-Total	0.0352	0.0351	0.0362	0.0433	0.0422	0.0436	0.0535	0.0437	0.0449	0.0468	0.0553	0.0502	0.0481	0.0455	0.0682	0.0417	0.0430	0.0441	0.0763
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000016	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	9.32	9.86	9.43	8.88	9.08	8.93	9.31	10.0	8.99	8.92	9.35	9.25	10.0	8.76	9.63	8.54	8.52	19.3	40.3
Chromium (Cr)-Total	0.00022	<0.00010	<0.00010	0.00013	0.00010	0.00011	0.00012	0.00015	0.00016	0.00014	0.00012	0.00014	0.00032	0.00015	0.00016	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00096	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	<0.030	<0.030	<0.030	0.073	0.078	0.088	0.171	0.052	0.094	0.125	0.208	0.142	0.084	0.094	0.330	0.067	0.110	<0.030	<0.030
Lead (Pb)-Total	<0.000050	<0.000050	0.000141	0.000242	0.000217	0.000238	0.000911	0.000559	0.000295	0.000282	0.00114	0.000608	0.000854	0.000302	0.00213	0.000143	0.000188	<0.000050	<0.000050
Lithium (Li)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00111	0.00056	<0.00050	<0.00050	0.00122	0.00059	0.00056	<0.00050	0.00151	<0.00050	<0.00050	0.00097	0.00118
Magnesium (Mg)-Total	0.307	0.322	0.301	0.311	0.319	0.318	0.339	0.346	0.336	0.333	0.349	0.339	0.375	0.327	0.386	0.286	0.301	0.434	1.79
Manganese (Mn)-Total	0.000634	0.000450	0.00241	0.00611	0.00508	0.00522	0.00778	0.0176	0.00692	0.00654	0.00890	0.00985	0.0273	0.00740	0.0119	0.00810	0.00925	0.000647	0.00349
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000365	0.000369	0.000378	0.000345	0.000353	0.000341	0.000394	0.000398	0.000351	0.000341	0.000391	0.000363	0.000399	0.000349	0.000398	0.000346	0.000352	0.000638	0.00111
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Stream	Stream
QAQC		Replicate				Replicate													
Sample ID	BJ (2.5 m)	BJ (2.5 m)	BJ (30 m)	BJ (30 m)	BJ (30 m)	BJ (30 m)	BJ (30 m)	BJ (50 m)	BJ (50 m)	BJ (50 m)	BJ (50 m)	BJ (70 m)	BJ (75 m)	BJ (75 m)	BJ (75 m)	BJ Shallow (1 m)	BJ Shallow (8 m)	TRIB 2	TRIB 3
Date Sampled	15-MAR-13	15-MAR-13	15-MAR-13	16-JUL-13	09-AUG-13	09-AUG-13	24-OCT-13	15-MAR-13	16-JUL-13	09-AUG-13	24-OCT-13	09-AUG-13	15-MAR-13	16-JUL-13	24-OCT-13	10-AUG-13	10-AUG-13	20-NOV-13	19-NOV-13
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1279841-1	L1279841-6	L1279841-3	L1334719-10	L1346151-12	L1346151-15	L1384314-3	L1279841-4	L1334719-11	L1346151-13	L1384314-4	L1346151-14	L1279841-5	L1334719-12	L1384314-5	L1346151-19	L1346151-20	L1395276-11	L1395276-5
Total Metals *(cont'd)*																			
Potassium (K)-Total	0.075	0.078	0.123	0.229	0.221	0.241	0.288	0.253	0.261	0.290	0.307	0.297	0.343	0.272	0.441	0.147	0.178	0.069	0.212
Selenium (Se)-Total	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	0.00010	<0.00010	0.00016	<0.00010	<0.00010	0.00010	0.00015	<0.00010	<0.00010	0.00027	0.00012
Silicon (Si)-Total	0.550	0.561	0.580	0.919	0.981	1.10	1.64	0.980	1.05	1.33	2.07	1.50	1.34	1.08	2.21	0.873	1.02	1.36	0.573
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	0.000012	0.000087	0.000020	0.000016	0.000016	0.000093	0.000027	0.000035	0.000014	0.000185	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.4
Strontium (Sr)-Total	0.0628	0.0618	0.0607	0.0625	0.0657	0.0656	0.0741	0.0640	0.0620	0.0663	0.0746	0.0704	0.0664	0.0626	0.0787	0.0633	0.0640	0.104	0.361
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Titanium (Ti)-Total	0.000025	0.000025	0.000028	0.000034	0.000039	0.000038	0.000044	0.000033	0.000043	0.000040	0.000050	0.000057	0.000036	0.000038	0.000060	0.000032	0.000040	0.000062	0.000125
Uranium (U)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010
Vanadium (V)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0032	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zinc (Zn)-Total																			
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	<0.0030	<0.0030	0.0047	0.0108	0.0118	0.0065	0.0172	0.0089	0.0085	0.0067	0.0136	0.0096	0.0105	0.0095	0.0189	0.0103	0.0129	<0.0030	0.0035
Antimony (Sb)-Dissolved	0.00020	0.00022	0.00028	0.00038	0.00039	0.00039	0.00045	0.00037	0.00038	0.00045	0.00046	0.00042	0.00037	0.00039	0.00052	0.00031	0.00034	0.00025	0.00015
Arsenic (As)-Dissolved	0.00055	0.00060	0.00047	0.00047	0.00047	0.00043	0.00046	0.00060	0.00042	0.00041	0.00045	0.00050	0.00066	0.00044	0.00049	0.00061	0.00053	0.00179	0.00014
Barium (Ba)-Dissolved	0.0342	0.0343	0.0335	0.0386	0.0422	0.0356	0.0424	0.0355	0.0358	0.0363	0.0423	0.0368	0.0380	0.0351	0.0464	0.0356	0.0361	0.0435	0.0768
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Dissolved	9.04	9.64	8.88	8.36	8.82	8.86	9.17	9.39	8.62	9.08	9.20	8.98	9.15	8.93	9.61	8.56	8.61	19.8	39.1
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00103	<0.00050	<0.00050	<0.00050	0.00107	<0.00050	<0.00050	<0.00050	0.00124	<0.00050	<0.00050	0.00078	0.00103
Magnesium (Mg)-Dissolved	0.298	0.309	0.293	0.330	0.358	0.291	0.303	0.303	0.301	0.303	0.307	0.303	0.315	0.300	0.309	0.276	0.283	0.433	1.75
Manganese (Mn)-Dissolved	0.000216	0.000180	0.000698	0.00117	0.000430	0.000313	0.000782	0.0128	0.00119	0.000388	0.000853	0.000452	0.0210	0.00131	0.000412	0.000582	0.000424	0.000071	0.00190
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000339	0.000400	0.000339	0.000332	0.000327	0.000335	0.000372	0.000369	0.000326	0.000352	0.000366	0.000332	0.000348	0.000324	0.000368	0.000337	0.000332	0.000635	0.00105
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.081	0.079	0.095	0.151	0.167	0.122	0.152	0.116	0.128	0.132	0.149	0.134	0.123	0.131	0.162	0.099	0.109	0.066	0.207
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	0.00026	0.00011
Silicon (Si)-Dissolved	0.525	0.558	0.481	0.487	0.488	0.494	0.543	0.499	0.499	0.491	0.527	0.489	0.515	0.500	0.536	0.518	0.480	1.33	0.539
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.3
Strontium (Sr)-Dissolved	0.0597	0.0632	0.0559	0.0551	0.0616	0.0627	0.0713	0.0607	0.0578	0.0646	0.0716	0.0662	0.0594	0.0614	0.0779	0.0596	0.0615	0.104	0.337
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000021	0.000025	0.000022	0.000024	0.000024	0.000025	0.000031	0.000024	0.000026	0.000030	0.000033	0.000031	0.000023	0.000027	0.000038	0.000026	0.000027	0.000056	0.000119
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	0.0049	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC														Replicate			Replicate	Replicate	
Sample ID	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB3	TRIB3	TRIB3	TRIB3	TRIB3	TRIB3	TRIB3	TRIB3	TRIB3
Date Sampled	31-JAN-13	19-FEB-13	13-MAR-13	24-APR-13	19-MAY-13	22-JUN-13	15-JUL-13	09-AUG-13	21-SEP-13	23-OCT-13	19-MAY-13	23-JUN-13	15-JUL-13	15-JUL-13	15-AUG-13	21-SEP-13	21-SEP-13	22-OCT-13	22-OCT-13
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1264309-12	L1271673-5	L1279839-6	L1294452-8	L1304309-3	L1321448-6	L1334719-5	L1346151-8	L1366991-7	L1384222-7	L1304309-8	L1322393-4	L1334719-6	L1334719-7	L1350233-2	L1366991-12	L1366991-14	L1383767-12	L1383767-3
Physical Tests																			
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	115	117	114	110	78.6	51.9	72.6	78.8	79.6	88.3	166	29.0	25.9	25.6	24.5	75.8	78.2	75.8	77.3
Hardness (as $CaCO_3$)	50.4	52.1	52.4	51.6	35.3	24.1	30.8	35.8	36.2	39.1	64.8	12.1	10.8	10.7	10.3	32.2	33.0	33.4	34.3
pH	7.98	8.00	7.92	7.99	7.68	7.73	7.82	8.09	6.86	7.59	6.40	7.47	7.81	7.77	7.58	7.90	7.95	7.60	7.64
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<1.0	<1.0	<1.0	<3.0	6.7	88.5	85.3	76.8	292	306	21.5	22.9
Total Dissolved Solids	74	72	70	61	55	30	40	50	50	58	123	22	19	17	16	60	62	45	47
Turbidity (NTU)	0.28	0.16	0.25	0.20	0.29	0.53	0.28	0.17	0.19	0.15	1.25	15.7	23.7	22.2	71.2	346	213	13.8	14.1
Anions and Nutrients																			
Acidity (as $CaCO_3$)	2.4	2.2	3.0	1.6	1.9	1.3	2.4	3.2	4.7	1.1	3.9	1.6	1.8	1.9	1.5	2.4	2.3	2.0	1.9
Alkalinity, Bicarbonate (as $CaCO_3$)	35.4	35.6	34.8	37.5	24.8	16.1	20.7	23.8	23.3	25.2	3.4	3.3	5.7	5.9	5.7	19.4	20.2	17.4	17.4
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	35.4	35.6	34.8	37.5	24.8	16.1	20.7	23.8	23.3	25.2	3.4	3.3	5.7	5.9	5.7	19.4	20.2	17.4	17.4
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0062	<0.0050	<0.0050	<0.0050	<0.0050	0.0427	0.0481	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.024	0.024	0.024	0.023	<0.020	<0.020	0.021	0.024	0.022	0.024	0.090	<0.020	<0.020	<0.020	<0.020	0.026	0.028	0.026	0.027
Nitrate (as N)	0.0323	0.0302	0.0365	0.0464	0.0259	0.0068	<0.0050	<0.0050	<0.0050	<0.0050	0.106	<0.0050	0.0083	0.0066	<0.0050	0.0203	0.0182	0.0352	0.0360
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.284	0.341	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.103	<0.050	<0.050	<0.050	<0.050	0.304	0.360	<0.050	<0.050
Orthophosphate-Dissolved (as P)	0.0023	0.0016	0.0016	0.0023	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0031	0.0025	<0.0010	<0.0010
Phosphorus (P)-Total	0.0023	0.0020	0.0023	0.0026	<0.0020	0.0026	<0.0020	0.0022	<0.0020	<0.0020	<0.0020	0.0403	0.175	0.154	0.0462	0.380	0.324	0.0273	0.0175
Sulfate (SO_4)	21.0	21.0	21.4	20.7	13.8	8.58	13.2	15.1	15.5	17.4	70.7	8.90	4.59	4.61	3.67	14.1	14.2	17.6	18.4
Cyanides																			
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																			
Organic / Inorganic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.0	<0.50	<0.50	0.51	<0.50	0.77	<0.50	<0.50
Total Organic Carbon																			
Total Metals																			
Aluminum (Al)-Total	0.0091	0.0064	0.0057	0.0060	0.0181	0.0272	0.0168	0.0107	0.0145	0.0109	0.343	0.570	2.56	2.22	2.92	7.24	6.60	0.746	0.605
Antimony (Sb)-Total	0.00026	0.00027	0.00027	0.00026	0.00020	0.00018	0.00023	0.00027	0.00023	0.00025	<0.00010	0.00011	0.00019	0.00017	0.00020	0.00092	0.00097	0.00020	0.00019
Arsenic (As)-Total	0.00202	0.00192	0.00198	0.00187	0.00119	0.00170	0.00181	0.00247	0.00216	0.00192	0.00019	0.00232	0.00307	0.00274	0.00342	0.0198	0.0184	0.00174	0.00154
Barium (Ba)-Total	0.0515	0.0522	0.0559	0.0533	0.0370	0.0266	0.0357	0.0381	0.0397	0.0384	0.0292	0.0236	0.0858	0.0915	0.0887	0.369	0.355	0.0638	0.0595
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	0.00020	0.00022	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000181	0.000022	0.000018	0.000020	0.000017	0.000142	0.000157	0.000030	0.000025
Calcium (Ca)-Total	20.2	20.2	20.8	19.9	13.9	9.59	12.9	13.9	14.8	15.3	24.6	4.04	4.49	4.33	3.97	13.4	14.3	12.0	12.8
Chromium (Cr)-Total	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	0.00011	0.00026	0.00023	0.00034	0.00425	0.00391	0.00026	0.00018
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00512	0.00067	0.00089	0.00081	0.00084	0.00303	0.00282	0.00068	0.00063
Copper (Cu)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00385	0.00135	0.00229	0.00238	0.00200	0.0141	0.0138	0.00153	0.00163
Iron (Fe)-Total	<0.030	<0.030	<0.030	<0.030	<0.030	0.032	<0.030	<0.030	<0.030	<0.030	0.233	1.07	1.87	1.60	1.87	7.55	7.51	0.752	0.668
Lead (Pb)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000104	0.000435	0.000949	0.000875	0.000953	0.00591	0.00631	0.000408	0.000438
Lithium (Li)-Total	<0.00050	<0.00050	0.00064	0.00080	0.00056	<0.00050	0.00050	<0.00050	<0.00050	<0.00050	0.00192	<0.00050	0.00125	0.00090	0.00225	0.00492	0.00468	0.00119	0.00086
Magnesium (Mg)-Total	0.464	0.475	0.504	0.511	0.351	0.221	0.279	0.311	0.332	0.360	1.61	0.363	0.612	0.528	0.574	2.18	2.06	0.801	0.758
Manganese (Mn)-Total	0.000589	0.000422	0.000375	0.000581	0.00162	0.00541	0.00250	0.00126	0.00195	0.00118	0.440	0.0712	0.106	0.102	0.0940	0.364	0.353	0.0807	0.0745
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000025	0.000013	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000729	0.000719	0.000704	0.000744	0.000358	0.000323	0.000445	0.000537	0.000526	0.000510	<0.000050	0.000296	0.000399	0.000346	0.000515	0.00491	0.00487	0.000805	0.000829
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00128	<0.00050	<0.00050	<0.00050	<0.00050	0.00168	0.00147	<0.00050	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.31	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC														Replicate			Replicate	Replicate	
Sample ID	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB2	TRIB3	TRIB3	TRIB3	TRIB3	TRIB3	TRIB3	TRIB3	TRIB3	TRIB3
Date Sampled	31-JAN-13	19-FEB-13	13-MAR-13	24-APR-13	19-MAY-13	22-JUN-13	15-JUL-13	09-AUG-13	21-SEP-13	23-OCT-13	19-MAY-13	23-JUN-13	15-JUL-13	15-JUL-13	15-AUG-13	21-SEP-13	21-SEP-13	22-OCT-13	22-OCT-13
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1264309-12	L1271673-5	L1279839-6	L1294452-8	L1304309-3	L1321448-6	L1334719-5	L1346151-8	L1366991-7	L1384222-7	L1304309-8	L1322393-4	L1334719-6	L1334719-7	L1350233-2	L1366991-12	L1366991-14	L1383767-12	L1383767-3
Total Metals *(cont'd)*																			
Potassium (K)-Total	0.088	0.090	0.103	0.103	0.088	0.067	0.064	<0.050	0.065	0.088	0.153	0.157	0.650	0.564	0.609	3.18	2.95	0.271	0.249
Selenium (Se)-Total	0.00029	0.00030	0.00031	0.00028	0.00015	0.00016	0.00019	0.00021	0.00022	0.00022	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00013	<0.00010	<0.00010
Silicon (Si)-Total	1.46	1.48	1.49	1.48	1.09	0.773	0.894	1.01	1.07	1.16	0.853	1.06	4.27	4.27	4.93	15.7	11.9	1.76	1.50
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000014	<0.000010	0.000016	0.000021	0.000019	0.000024	0.00320	0.00330	0.000035	0.000035
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.137	0.132	0.136	0.139	0.0818	0.0493	0.0657	0.0737	0.0800	0.0843	0.189	0.0323	0.0521	0.0470	0.0493	0.130	0.135	0.144	0.156
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.052	0.053	0.062	0.149	0.100	0.015	0.014
Titanium (Ti)-Total	0.000070	0.000069	0.000075	0.000079	0.000030	0.000022	0.000032	0.000039	0.000040	0.000045	0.000184	0.000082	0.000106	0.000110	0.000121	0.000322	0.000358	0.000123	0.000130
Uranium (U)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0034	0.0032	0.0036	0.0096	0.0088	0.0011	<0.0010
Vanadium (V)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0359	0.0053	0.0080	0.0073	0.0079	0.0360	0.0414	0.0064	0.0059
Zinc (Zn)-Total																			
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	<0.0030	0.0059	<0.0030	<0.0030	0.0085	0.0074	0.0085	0.0096	0.0059	0.0070	0.140	0.0033	0.0195	0.0107	0.0184	0.867	0.313	0.0143	0.0137
Antimony (Sb)-Dissolved	0.00026	0.00026	0.00025	0.00023	0.00018	0.00015	0.00022	0.00025	0.00022	0.00022	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00055	0.00059	0.00012	0.00012
Arsenic (As)-Dissolved	0.00187	0.00194	0.00193	0.00187	0.00112	0.00132	0.00173	0.00234	0.00195	0.00176	<0.00010	<0.00010	0.00013	<0.00010	0.00027	0.00096	0.00091	<0.00010	<0.00010
Barium (Ba)-Dissolved	0.0525	0.0519	0.0542	0.0526	0.0362	0.0254	0.0354	0.0378	0.0377	0.0383	0.0297	0.0131	0.0230	0.0221	0.0236	0.0724	0.0494	0.0507	0.0484
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000172	0.000020	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	0.000018	0.000019
Calcium (Ca)-Dissolved	19.4	20.1	20.2	19.9	13.6	9.31	11.9	13.8	14.0	15.1	23.4	4.38	3.98	3.96	3.83	11.7	12.1	12.2	12.6
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	0.00013	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00496	0.00037	<0.00010	<0.00010	<0.00010	0.00015	0.00011	0.00024	0.00024
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00366	<0.00050	0.00058	<0.00050	<0.00050	0.00074	0.00053	<0.00050	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.141	<0.030	<0.030	<0.030	<0.030	0.201	0.133	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000070	<0.000050	<0.000050	<0.000050	<0.000050	0.000179	0.000133	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.00050	0.00055	0.00055	0.00058	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	0.00055	0.00179	<0.00050	<0.00050	<0.00050	<0.00050	0.00077	0.00065	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	0.457	0.476	0.489	0.492	0.350	0.205	0.277	0.303	0.314	0.356	1.56	0.276	0.207	0.207	0.191	0.717	0.682	0.709	0.690
Manganese (Mn)-Dissolved	0.000091	0.000114	0.000100	0.000285	0.000672	0.00124	0.000709	0.000307	0.000286	0.000204	0.411	0.0546	0.0226	0.0220	0.0273	0.124	0.118	0.0534	0.0521
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000790	0.000699	0.000684	0.000676	0.000334	0.000308	0.000423	0.000519	0.000498	0.000473	<0.000050	0.000115	0.000257	0.000234	0.000299	0.00392	0.00382	0.000742	0.000774
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00129	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.088	0.098	0.098	0.101	0.087	0.063	0.063	0.050	0.070	0.096	0.150	0.053	0.074	<0.050	0.052	0.849	0.653	0.119	0.113
Selenium (Se)-Dissolved	0.00029	0.00031	0.00029	0.00028	0.00015	0.00012	0.00027	0.00020	0.00018	0.00021	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	1.42	1.47	1.43	1.43	1.06	0.713	0.876	0.967	0.952	1.10	0.792	0.186	0.171	0.164	0.153	2.45	1.93	0.494	0.481
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000072	0.000043	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.126	0.128	0.127	0.134	0.0848	0.0475	0.0612	0.0744	0.0739	0.0829	0.175	0.0310	0.0411	0.0402	0.0435	0.112	0.114	0.138	0.145
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	0.000040	0.000022	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.023	0.017	<0.010	<0.010
Uranium (U)-Dissolved	0.000067	0.000067	0.000069	0.000069	0.000027	0.000017	0.000027	0.000034	0.000035	0.000040	0.000157	<0.000010	<0.000010	<0.000010	0.000011	0.000098	0.000091	0.000024	0.000021
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0351	<0.0030	0.0042	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC		Replicate		Replicate														
Sample ID	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S
Date Sampled	29-JAN-13	29-JAN-13	20-FEB-13	20-FEB-13	14-MAR-13	15-MAR-13	25-APR-13	19-MAY-13	28-MAY-13	06-JUN-13	06-JUN-13	13-JUN-13	23-JUN-13	16-JUL-13	13-AUG-13	21-SEP-13	22-OCT-13	20-NOV-13
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Excluded-Impacted	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted
ALS Sample ID	L1264309-10	L1264309-4	L1271673-10	L1271673-14	L1279839-13	L1279839-19	L1294452-11	L1304309-14	L1309095-1	L1313730-10	L1313730-9	L1317318-9	L1321448-14	L1334719-14	L1348329-6	L1366991-11	L1383767-8	L1395276-13
Physical Tests																		
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	54.5	55.4	55.4	55.9	56.3	-	58.0	57.7	52.2	50.5	50.4	46.4	41.0	52.2	52.9	56.4	59.8	61.4
Hardness (as $CaCO_3$)	23.8	24.1	24.4	24.3	25.0	-	25.4	24.3	23.2	21.6	21.6	20.4	17.8	22.5	24.1	24.5	25.1	26.1
pH	7.56	7.73	7.75	7.80	7.89	-	7.74	7.70	6.84	7.87	7.87	7.58	7.64	6.66	7.95	7.93	7.79	7.92
Total Suspended Solids	<3.0	3.2	<3.0	<3.0	<3.0	-	<3.0	<3.0	9.3	9.8	11.1	26.0	6.8	4.0	3.6	17.9	13.0	2.4
Total Dissolved Solids	37	41	30	28	38	-	40	43	34	33	31	31	22	29	37	32	39	43
Turbidity (NTU)	1.03	0.25	0.23	0.29	0.35	-	0.89	4.29	15.3	11.8	11.1	27.8	6.93	4.59	6.44	18.0	15.7	3.85
Anions and Nutrients																		
Acidity (as $CaCO_3$)	2.9	2.9	2.1	1.9	2.8	-	1.9	1.9	5.2	2.8	2.1	1.4	1.4	4.6	1.8	2.0	1.6	2.0
Alkalinity, Bicarbonate (as $CaCO_3$)	16.7	16.7	17.2	17.6	17.0	-	18.1	17.6	14.1	12.3	12.6	12.5	12.5	14.6	15.1	15.6	17.2	17.4
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	16.7	16.7	17.2	17.6	17.0	-	18.1	17.6	14.1	12.3	12.6	12.5	12.5	14.6	15.1	15.6	17.2	17.4
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	0.0064	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0066	0.0096
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.023	<0.020	<0.020	<0.020
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	0.0170	0.0128	0.0128	0.0092	0.0099	0.0078	<0.0050	0.0334	0.0078	0.0113	0.0456	0.0492
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	0.106	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	0.119	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.068	0.052
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	0.0025	<0.0020	<0.0020	<0.0020	-	<0.0020	0.0052	0.0143	0.0171	0.0159	0.0320	0.0081	0.0030	0.0037	0.0142	0.0101	0.0029
Sulfate (SO_4)	9.64	9.63	9.42	9.43	9.82	-	10.6	10.2	10.0	8.71	8.69	8.35	7.01	9.15	8.61	9.83	10.4	10.6
Cyanides																		
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																		
Organic / Inorganic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Organic Carbon																		
Total Metals																		
Aluminum (Al)-Total	0.0280	0.0155	0.0094	0.0108	0.0065	-	0.0172	0.121	0.789	0.426	0.307	1.07	0.283	0.229	0.244	0.871	0.632	0.298
Antimony (Sb)-Total	0.00022	0.00023	0.00022	0.00022	0.00022	-	0.00024	0.00023	0.00033	0.00027	0.00026	0.00041	0.00019	0.00037	0.00035	0.00051	0.00059	0.00053
Arsenic (As)-Total	0.00072	0.00064	0.00060	0.00059	0.00063	-	0.00066	0.00111	0.00212	0.00224	0.00208	0.00452	0.00105	0.00075	0.00088	0.00232	0.00167	0.00067
Barium (Ba)-Total	0.0371	0.0361	0.0351	0.0342	0.0373	-	0.0365	0.0383	0.0472	0.0412	0.0407	0.0543	0.0358	0.0402	0.0430	0.0557	0.0600	0.0519
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	0.000012	0.000013	<0.000010	0.000022	<0.000010	<0.000010	<0.000010	0.000016	0.000012	<0.000010
Calcium (Ca)-Total	9.07	9.13	9.47	9.17	9.81	-	9.40	9.67	8.96	8.18	8.09	7.67	7.13	8.41	9.23	9.30	9.77	9.96
Chromium (Cr)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	0.00012	0.00011	0.00030	0.00023	0.00017	0.00041	0.00010	0.00012	0.00012	0.00035	0.00029	0.00012
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	0.00025	0.00022	0.00020	0.00049	0.00012	<0.00010	<0.00010	0.00027	0.00013	<0.00010
Copper (Cu)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.0015	0.00091	0.00085	0.00209	<0.00050	0.00067	<0.00050	0.00114	0.00083	<0.00050
Iron (Fe)-Total	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	0.122	0.591	0.616	0.504	1.38	0.246	0.091	0.091	0.627	0.375	0.056
Lead (Pb)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	0.000220	0.000559	0.000631	0.000570	0.00173	0.000263	0.000228	0.000139	0.000941	0.00104	0.000352
Lithium (Li)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	0.00059	<0.00050	<0.00050	0.00087	<0.00050	<0.00050	0.00111	0.00130	0.00130	0.00146
Magnesium (Mg)-Total	0.308	0.309	0.306	0.300	0.307	-	0.315	0.332	0.393	0.364	0.349	0.471	0.276	0.305	0.299	0.428	0.395	0.356
Manganese (Mn)-Total	0.00333	0.00318	0.00231	0.00247	0.00137	-	0.0133	0.0154	0.0389	0.0360	0.0360	0.0801	0.0216	0.00791	0.00912	0.0425	0.0209	0.00448
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000016	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000380	0.000361	0.000367	0.000374	0.000363	-	0.000380	0.000355	<0.00035	0.000312	0.000284	0.000326	0.000255	0.000337	0.000361	0.000403	0.000387	0.000369
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC		Replicate		Replicate														
Sample ID	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S
Date Sampled	29-JAN-13	29-JAN-13	20-FEB-13	20-FEB-13	14-MAR-13	15-MAR-13	25-APR-13	19-MAY-13	28-MAY-13	06-JUN-13	06-JUN-13	13-JUN-13	23-JUN-13	16-JUL-13	13-AUG-13	21-SEP-13	22-OCT-13	20-NOV-13
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Excluded-Impacted	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted
ALS Sample ID	L1264309-10	L1264309-4	L1271673-10	L1271673-14	L1279839-13	L1279839-19	L1294452-11	L1304309-14	L1309095-1	L1313730-10	L1313730-9	L1317318-9	L1321448-14	L1334719-14	L1348329-6	L1366991-11	L1383767-8	L1395276-13
Total Metals *(cont'd)*																		
Potassium (K)-Total	0.082	0.083	0.073	0.079	0.082	-	0.135	0.126	0.391	0.206	0.188	0.452	0.169	0.199	0.174	0.442	0.415	0.294
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	-	<0.00010	0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	0.00010	0.00010	<0.00010
Silicon (Si)-Total	0.617	0.614	0.585	0.540	0.624	-	0.599	0.916	2.00	1.32	1.13	2.16	1.00	0.808	1.08	1.98	1.83	1.08
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	0.000014	0.000045	0.000057	0.000049	0.000169	0.000021	0.000011	<0.000010	0.000096	0.000081	0.000023
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.0606	0.0584	0.0617	0.0591	0.0628	-	0.0625	0.0630	0.0541	0.0512	0.0520	0.0497	0.0487	0.0586	0.0631	0.0651	0.0731	0.0744
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	0.016	<0.010	<0.010	0.018	<0.010	<0.010	<0.010	0.010	<0.010	<0.010
Titanium (Ti)-Total	0.000027	0.000024	0.000025	0.000028	0.000023	-	0.000025	0.000028	0.000037	0.000032	0.000029	0.000051	0.000032	0.000034	0.000038	0.000047	0.000053	0.000045
Uranium (U)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	0.0018	<0.0010	<0.0010	<0.0010	0.0013	0.0014	<0.0010
Vanadium (V)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	0.0036	<0.0030	<0.0030	0.0057	<0.0030	<0.0030	<0.0030	0.0050	<0.0030	<0.0030
Zinc (Zn)-Total																		
Dissolved Metals																		
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	-	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	0.0100	0.0121	0.0083	0.0099	0.0122	0.0082	0.0091	0.0100	0.0149	0.0147	0.0103
Antimony (Sb)-Dissolved	0.00020	0.00021	0.00021	0.00021	0.00021	-	0.00021	0.00021	0.00020	0.00017	0.00018	0.00017	0.00015	0.00035	0.00032	0.00035	0.00047	0.00051
Arsenic (As)-Dissolved	0.00053	0.00052	0.00056	0.00055	0.00061	-	0.00057	0.00065	0.00033	0.00041	0.00040	0.00033	0.00038	0.00042	0.00063	0.00033	0.00035	0.00044
Barium (Ba)-Dissolved	0.0357	0.0364	0.0346	0.0352	0.0362	-	0.0362	0.0335	0.0298	0.0324	0.0310	0.0276	0.0275	0.0345	0.0346	0.0351	0.0420	0.0418
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Dissolved	9.05	9.16	9.27	9.22	9.53	-	9.65	9.24	8.81	8.22	8.20	7.76	6.77	8.55	9.22	9.28	9.52	9.91
Chromium (Cr)-Dissolved	0.00022	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00016
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	0.00055	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00057	<0.00050	<0.00050	0.00098	0.00053	0.00114
Magnesium (Mg)-Dissolved	0.299	0.298	0.298	0.300	0.300	-	0.311	0.306	0.294	0.272	0.264	0.260	0.227	0.289	0.268	0.315	0.312	0.321
Manganese (Mn)-Dissolved	0.00261	0.00216	0.00188	0.00194	0.000884	-	0.0111	0.00758	0.0153	0.00997	0.00933	0.0177	0.00867	0.00291	0.000642	0.00887	0.00378	0.00136
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000431	0.000366	0.000353	0.000351	0.000350	-	0.000345	0.000322	0.000298	0.000269	0.000272	0.000262	0.000234	0.000327	0.000343	0.000357	0.000362	0.000432
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.080	0.080	0.076	0.078	0.076	-	0.131	0.089	0.093	0.088	0.085	0.090	0.052	0.117	0.102	0.113	0.158	0.156
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	-	0.00011	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	0.00012
Silicon (Si)-Dissolved	0.575	0.568	0.539	0.556	0.599	-	0.586	0.681	0.537	0.593	0.598	0.494	0.446	0.497	0.514	0.483	0.557	0.549
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0579	0.0589	0.0588	0.0592	0.0609	-	0.0629	0.0584	0.0550	0.0499	0.0509	0.0477	0.0416	0.0572	0.0606	0.0624	0.0674	0.0734
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000021	0.000022	0.000020	0.000024	0.000024	-	0.000023	0.000022	0.000013	0.000013	0.000014	<0.000010	0.000011	0.000024	0.000023	0.000018	0.000028	0.000036
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	0.0051	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC	Replicate				Replicate		Replicate							
Sample ID	BJ U/S	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek
Date Sampled	20-NOV-13	24-JUN-13	16-JUL-13	14-AUG-13	14-AUG-13	23-SEP-13	23-OCT-13	23-OCT-13	30-JAN-13	15-MAR-13	25-APR-13	19-MAY-13	23-JUN-13	24-JUN-13
Included/Excluded	Excluded-Impacted	Included	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted
ALS Sample ID	L1395276-15	L1323906-1	L1335330-1	L1350233-3	L1350233-4	L1368502-3	L1384222-10	L1384222-9	L1264309-11	L1279839-20	L1294452-10	L1304309-13	L1321448-17	L1323906-2
Physical Tests														
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.6	30.2	11.3	<5.0	-	<5.0
Conductivity (uS/cm)	59.1	44.9	54.3	52.7	50.3	57.5	60.5	60.6	457	597	579	151	-	62.0
Hardness (as $CaCO_3$)	25.8	18.6	23.1	23.6	23.1	23.8	25.7	25.7	160	155	189	51.9	-	22.2
pH	6.86	7.75	7.95	7.61	7.47	7.73	7.47	7.44	7.71	7.85	7.89	7.23	-	7.13
Total Suspended Solids	2.5	8.9	<3.0	6.2	4.4	8.1	10.0	10.1	7.2	<3.0	5.3	277	-	158
Total Dissolved Solids	43	28	46	35	39	36	36	38	289	316	357	104	-	38
Turbidity (NTU)	4.08	7.36	5.21	4.74	4.37	6.78	11.9	13.0	3.02	19.8	5.45	294	-	127
Anions and Nutrients														
Acidity (as $CaCO_3$)	4.0	1.4	1.4	1.8	1.7	1.3	1.0	1.1	5.1	7.6	3.6	2.0	-	1.8
Alkalinity, Bicarbonate (as $CaCO_3$)	17.4	12.1	15.4	13.7	15.2	15.1	16.7	<2.0	49.5	120	72.4	6.4	-	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0
Alkalinity, Total (as $CaCO_3$)	17.4	12.1	15.4	13.7	15.2	15.1	16.7	<2.0	49.5	120	72.4	6.4	-	<2.0
Ammonia, Total (as N)	0.0083	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	4.83	21.1	7.66	0.168	-	0.105
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	9.27	19.4	43.8	4.27	-	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.136	0.208	0.136	0.062	-	0.038
Nitrate (as N)	0.0484	<0.0050	0.0349	0.0061	0.0060	0.0201	0.0470	0.0477	0.117	0.248	0.591	0.181	-	0.0203
Nitrite (as N)	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0256	0.0228	0.0278	0.0011	-	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	5.96	22.4	9.71	0.302	-	0.205
Total Nitrogen	0.060	<0.050	0.055	<0.050	<0.050	<0.050	0.057	0.061	6.10	22.6	10.3	0.485	-	0.225
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.594	2.67	1.09	<0.0010	-	<0.0010
Phosphorus (P)-Total	0.0031	0.0082	0.0040	0.0030	0.0026	0.0085	0.0079	0.0082	0.809	2.70	1.35	0.362	-	0.247
Sulfate (SO_4)	10.6	7.76	9.02	8.54	8.53	10.8	11.3	11.2	157	147	154	53.6	-	24.1
Cyanides														
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
CN-THIO Thiocyanate														
Organic / Inorganic Carbon	<0.50	<0.50	<0.50	0.64	<0.50	<0.50	<0.50	<0.50	3.92	14.3	7.28	0.53	-	1.12
Total Organic Carbon														
Total Metals														
Aluminum (Al)-Total	0.140	0.475	0.332	0.208	0.256	0.422	0.564	0.567	0.233	0.219	0.183	4.36	-	3.58
Antimony (Sb)-Total	0.00050	0.00024	0.00042	0.00031	0.00033	0.00042	0.00054	0.00055	0.00035	0.00044	0.00051	0.00185	-	0.00141
Arsenic (As)-Total	0.00063	0.00131	0.00091	0.00085	0.00085	0.00131	0.00135	0.00136	0.00239	0.00368	0.00296	0.0243	-	0.0208
Barium (Ba)-Total	0.0459	0.0392	0.0436	0.0432	0.0452	0.0467	0.0563	0.0544	0.0292	0.0252	0.0231	0.153	-	0.130
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00017	-	0.00015
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.061	0.208	0.122	<0.010	-	<0.010
Cadmium (Cd)-Total	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	0.000036	0.000017	0.000012	0.000215	0.000251	0.000183	0.000445	-	0.000285
Calcium (Ca)-Total	9.87	7.64	8.67	8.69	9.21	9.72	9.80	9.56	62.4	49.9	68.3	20.0	-	8.94
Chromium (Cr)-Total	<0.00010	0.00014	0.00014	0.00013	<0.00010	0.00016	0.00020	0.00019	0.00025	0.00044	0.00027	0.00087	-	0.00081
Cobalt (Co)-Total	<0.00010	0.00016	<0.00010	<0.00010	<0.00010	0.00026	0.00015	0.00014	0.00132	0.00127	0.00140	0.00472	-	0.00345
Copper (Cu)-Total	<0.00050	0.00065	<0.00050	<0.00050	0.00050	0.00103	0.00074	0.00075	0.00253	0.00559	0.00352	0.0114	-	0.00852
Iron (Fe)-Total	0.036	0.324	0.135	0.063	0.084	0.311	0.285	0.285	0.292	0.262	0.361	8.22	-	7.29
Lead (Pb)-Total	0.000302	0.000425	0.000307	0.000126	0.000173	0.000738	0.000950	0.000959	0.000231	0.000283	0.000401	0.0118	-	0.0103
Lithium (Li)-Total	0.00140	0.00074	0.00189	0.00070	0.00084	<0.00050	0.00116	0.00088	0.00340	0.00435	0.00372	0.00476	-	0.00391
Magnesium (Mg)-Total	0.325	0.287	0.331	0.298	0.305	0.371	0.405	0.385	3.20	3.83	3.20	1.68	-	1.14
Manganese (Mn)-Total	0.00385	0.0263	0.0109	0.00976	0.0101	0.0364	0.0213	0.0215	0.482	0.446	0.645	0.745	-	0.438
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	0.000013	<0.000010	0.000062	-	0.000057
Molybdenum (Mo)-Total	0.000379	0.000290	0.000335	0.000321	0.000355	0.000390	0.000425	0.000376	0.000200	0.000224	0.000288	0.000520	-	0.000480
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00147	0.00226	0.00146	0.00201	-	0.00123
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.86	3.09	1.18	0.31	-	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC	Replicate				Replicate		Replicate							
Sample ID	BJ U/S	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	BJ U/S of CC	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek
Date Sampled	20-NOV-13	24-JUN-13	16-JUL-13	14-AUG-13	14-AUG-13	23-SEP-13	23-OCT-13	23-OCT-13	30-JAN-13	15-MAR-13	25-APR-13	19-MAY-13	23-JUN-13	24-JUN-13
Included/Excluded	Excluded-Impacted	Included	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted
ALS Sample ID	L1395276-15	L1323906-1	L1335330-1	L1350233-3	L1350233-4	L1368502-3	L1384222-10	L1384222-9	L1264309-11	L1279839-20	L1294452-10	L1304309-13	L1321448-17	L1323906-2
Total Metals *(cont'd)*														
Potassium (K)-Total	0.204	0.230	0.268	0.139	0.177	0.281	0.405	0.393	3.11	8.48	4.49	1.47	-	1.22
Selenium (Se)-Total	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00012	0.00018	0.00026	0.00028	0.00046	-	0.00034
Silicon (Si)-Total	0.775	1.29	1.08	0.783	0.896	1.33	1.19	1.46	1.70	1.47	1.46	7.13	-	9.42
Silver (Ag)-Total	<0.000010	0.000047	0.000014	<0.000010	<0.000010	0.000063	0.000093	0.000080	0.000081	0.000062	0.000077	0.00107	-	0.00122
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	14.6	26.0	29.5	3.6	-	<2.0
Strontium (Sr)-Total	0.0706	0.0472	0.0590	0.0619	0.0644	0.0667	0.0730	0.0717	0.399	0.244	0.284	0.0816	-	0.0394
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00017	0.00051	0.00017	0.00014	-	0.00014
Tin (Sn)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.060	-	0.084
Titanium (Ti)-Total	0.000038	0.000029	0.000045	0.000032	0.000032	0.000051	0.000054	0.000060	0.000020	0.000027	0.000021	0.000220	-	0.000183
Uranium (U)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	0.0054	-	0.0052
Vanadium (V)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0059	<0.0030	<0.0030	0.0778	0.0693	0.0295	0.0602	-	0.0390
Zinc (Zn)-Total														
Dissolved Metals														
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	-	LAB
Aluminum (Al)-Dissolved	0.0105	0.0101	0.0108	0.0083	0.0095	0.0215	0.0216	0.0179	0.0201	0.0752	0.0848	0.0208	-	0.159
Antimony (Sb)-Dissolved	0.00048	0.00015	0.00036	0.00032	0.00031	0.00032	0.00047	0.00042	0.00040	0.00045	0.00044	0.00040	-	0.00011
Arsenic (As)-Dissolved	0.00045	0.00031	0.00045	0.00060	0.00062	0.00029	0.00037	0.00035	0.00196	0.00348	0.00245	0.00028	-	0.00037
Barium (Ba)-Dissolved	0.0410	0.0280	0.0344	0.0365	0.0365	0.0369	0.0397	0.0404	0.0234	0.0205	0.0203	0.0358	-	0.0374
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.062	0.208	0.122	<0.010	-	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000022	<0.000010	0.000014	0.000051	0.000132	0.000146	0.000290	-	0.000197
Calcium (Ca)-Dissolved	9.82	7.08	8.77	9.00	8.81	9.04	9.75	9.75	58.7	56.0	70.8	19.3	-	8.17
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00027	<0.00010	<0.00010	-	0.00011
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00124	0.00117	0.00133	0.00213	-	0.00146
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	0.00338	0.00248	<0.00050	-	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.105	0.095	<0.030	-	0.110
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000120	0.000089	<0.000050	-	0.000131
Lithium (Li)-Dissolved	0.00110	<0.00050	0.00167	0.00051	0.00077	<0.00050	0.00106	0.00108	0.00322	0.00468	0.00385	0.00094	-	<0.00050
Magnesium (Mg)-Dissolved	0.316	0.232	0.296	0.277	0.276	0.298	0.327	0.333	3.24	3.73	3.08	0.922	-	0.426
Manganese (Mn)-Dissolved	0.00133	0.00979	0.00421	0.000575	0.000545	0.0191	0.00851	0.0146	0.480	0.423	0.643	0.487	-	0.234
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Dissolved	0.000378	0.000254	0.000343	0.000356	0.000369	0.000327	0.000366	0.000360	0.000199	0.000235	0.000241	0.000071	-	<0.000050
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00138	0.00218	0.00142	0.00126	-	0.00068
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.57	2.80	1.06	<0.30	-	<0.30
Potassium (K)-Dissolved	0.150	0.078	0.119	0.097	0.096	0.115	0.176	0.179	3.00	8.22	4.33	0.494	-	0.242
Selenium (Se)-Dissolved	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00010	0.00013	0.00024	0.00026	0.00012	-	<0.00010
Silicon (Si)-Dissolved	0.541	0.460	0.476	0.499	0.499	0.525	0.540	0.545	1.58	1.38	1.39	1.08	-	0.934
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000026	0.000017	<0.000010	-	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	14.5	24.3	29.5	3.4	-	<2.0
Strontium (Sr)-Dissolved	0.0697	0.0456	0.0584	0.0609	0.0613	0.0612	0.0700	0.0706	0.384	0.276	0.291	0.0758	-	0.0343
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	0.000057	0.000051	0.000034	0.000027	-	0.000016
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00021	<0.00010	<0.00010	-	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Uranium (U)-Dissolved	0.000033	<0.000010	0.000022	0.000024	0.000024	0.000021	0.000032	0.000034	0.000013	0.000029	0.000017	<0.000010	-	0.000023
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0545	0.0454	0.0229	0.0142	-	0.0083

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC															
Sample ID	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF
Date Sampled	17-JUL-13	17-JUL-13	13-AUG-13	23-SEP-13	23-OCT-13	20-NOV-13	29-JAN-13	20-FEB-13	19-MAY-13	28-MAY-13	06-JUN-13	13-JUN-13	23-JUN-13	16-JUL-13	14-AUG-13
Included/Excluded	Excluded-Impacted	Excluded-Impacted	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Included	Included
ALS Sample ID	L1335330-7	L1335330-9	L1348329-8	L1368502-2	L1384222-8	L1395276-12	L1264309-7	L1271673-11	L1304309-10	L1309095-7	L1313730-7	L1317318-7	L1322393-1	L1334719-17	L1350233-1
Physical Tests															
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	12.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	84.2	84.4	32.1	180	215	460	56.4	79.8	96.9	57.2	88.9	61.0	46.4	80.4	87.4
Hardness (as $CaCO_3$)	31.3	30.5	12.7	69.0	81.7	130	23.6	27.4	31.4	24.5	32.3	22.2	18.4	33.5	26.4
pH	6.45	5.90	7.74	6.85	4.88	7.70	7.79	7.82	7.79	7.89	7.94	7.56	7.75	7.85	7.72
Total Suspended Solids	96.7	96.0	29.6	32.1	324	7.9	<3.0	<3.0	33.5	68.7	157	96.0	15.5	17.3	8.8
Total Dissolved Solids	59	57	23	119	141	274	37	46	69	37	58	39	27	39	50
Turbidity (NTU)	72.6	74.2	31.2	22.6	348	5.22	0.98	2.48	32.3	71.3	135	86.4	13.3	8.66	6.02
Anions and Nutrients															
Acidity (as $CaCO_3$)	3.9	4.5	1.8	2.2	5.7	5.3	2.8	2.0	1.9	3.8	1.5	1.7	1.5	2.3	1.9
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	2.7	2.1	<2.0	68.9	17.3	21.8	21.4	12.0	22.9	13.0	11.3	19.5	24.7
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	2.7	2.1	<2.0	68.9	17.3	21.8	21.4	12.0	22.9	13.0	11.3	19.5	24.7
Ammonia, Total (as N)	0.0227	0.0187	0.0289	0.383	0.081	8.01	0.0148	0.0652	0.0524	0.0126	0.0292	0.0149	0.0088	0.0160	0.145
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	1.85	0.94	17.9	<0.50	<0.50	0.67	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.042	0.043	<0.020	0.081	0.132	0.158	<0.020	0.030	0.040	0.020	0.051	0.030	<0.020	0.035	0.037
Nitrate (as N)	0.0170	0.0182	0.0123	0.303	0.141	0.632	<0.0050	0.0827	0.102	0.0228	0.0854	0.0463	0.0167	0.0866	0.0508
Nitrite (as N)	<0.0010	<0.0010	<0.0010	0.0041	0.0016	0.0463	<0.0010	0.0204	0.0293	<0.0010	0.0249	0.0101	0.0029	0.0064	0.0191
Total Kjeldahl Nitrogen	0.059	0.057	<0.050	0.55	0.128	7.75	<0.050	0.071	0.105	<0.050	0.064	<0.050	<0.050	<0.050	0.219
Total Nitrogen	0.076	0.076	0.057	0.859	0.271	8.43	<0.050	0.174	0.236	0.055	0.174	0.081	0.051	0.134	0.289
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	0.0020	<0.0010	<0.0010	0.702	0.0021	0.0036	<0.0010	<0.0010	0.0026	<0.0010	<0.0010	<0.0010	0.0081
Phosphorus (P)-Total	0.178	0.0686	0.0229	0.0771	0.605	1.11	0.0027	0.0061	0.0377	0.131	0.150	0.155	0.0278	0.0221	0.0242
Sulfate (SO_4)	33.7	33.7	9.86	73.5	93.8	124	10.0	16.0	22.8	12.7	18.0	13.3	9.17	17.2	16.6
Cyanides															
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate															
Organic / Inorganic Carbon	<0.50	1.10	<0.50	1.14	1.34	11.0	<0.50	<0.50	<0.50	<0.50	2.34	0.79	1.4	<0.50	0.94
Total Organic Carbon															
Total Metals															
Aluminum (Al)-Total	3.25	2.84	0.903	1.32	5.53	0.186	0.0191	0.0504	0.659	2.21	3.32	3.19	0.875	0.695	0.391
Antimony (Sb)-Total	0.00118	0.00129	0.00020	0.00034	0.00320	0.00033	0.00023	0.00056	0.00112	0.00085	0.00143	0.00109	0.00042	0.00083	0.00087
Arsenic (As)-Total	0.0119	0.0152	0.00200	0.00442	0.0408	0.00121	0.00070	0.00126	0.00410	0.00830	0.0161	0.0147	0.00357	0.00286	0.00185
Barium (Ba)-Total	0.0860	0.0815	0.0380	0.0659	0.190	0.0294	0.0353	0.0347	0.0509	0.0900	0.113	0.102	0.0486	0.0529	0.0470
Beryllium (Be)-Total	0.00014	0.00016	<0.00010	0.00012	0.00032	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	0.020	0.013	0.635	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.016
Cadmium (Cd)-Total	0.000415	0.000429	0.000061	0.000590	0.00117	0.000308	<0.000010	<0.000010	0.000067	0.000085	0.000163	0.000073	0.000032	0.000036	<0.000010
Calcium (Ca)-Total	10.5	11.1	4.81	21.3	29.0	53.0	9.27	10.1	11.7	9.39	13.8	8.41	6.96	10.6	10.6
Chromium (Cr)-Total	0.00053	0.00051	0.00016	0.00026	0.00129	0.00021	<0.00010	<0.00010	0.00020	<0.00050	0.00104	0.00069	0.00025	0.00023	0.00019
Cobalt (Co)-Total	0.00442	0.00468	0.00066	0.00443	0.0106	0.00172	<0.00010	<0.00010	0.00064	0.00113	0.00151	0.00134	0.00044	0.00033	<0.00010
Copper (Cu)-Total	0.00881	0.00960	0.00197	0.00752	0.0272	0.00416	0.00061	<0.00050	0.00180	<0.0045	0.00606	0.00411	0.00140	0.00108	0.00075
Iron (Fe)-Total	4.20	4.75	0.942	1.34	12.4	0.200	0.036	<0.030	0.931	2.77	4.60	4.41	0.936	0.466	0.135
Lead (Pb)-Total	0.00541	0.00768	0.000655	0.00137	0.0213	0.000295	0.000157	0.000165	0.00244	0.00424	0.00728	0.00581	0.00128	0.000769	0.000250
Lithium (Li)-Total	0.00323	0.00493	0.00113	0.00342	0.00641	0.00307	<0.00050	0.00806	0.0120	0.00166	0.0138	0.00413	0.00131	0.0111	0.0174
Magnesium (Mg)-Total	1.07	1.06	0.352	1.40	2.73	2.53	0.305	0.444	0.664	0.683	1.33	0.853	0.393	0.613	0.609
Manganese (Mn)-Total	0.479	0.533	0.124	0.614	1.05	0.711	0.00568	0.0108	0.104	0.158	0.255	0.191	0.0643	0.0507	0.0222
Mercury (Hg)-Total	0.000035	0.000048	<0.000010	<0.000010	0.000060	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	0.000052	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000202	0.000301	0.000073	0.000136	0.00105	0.000218	0.000340	0.000466	0.000558	<0.00045	0.000687	0.000544	0.000300	0.000628	0.00135
Nickel (Ni)-Total	0.00142	0.00153	<0.00050	0.00244	0.00496	0.00236	<0.00050	<0.00050	<0.00050	0.00057	0.00112	0.00066	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	0.42	1.15	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC															
Sample ID	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF	BJ OF
Date Sampled	17-JUL-13	17-JUL-13	13-AUG-13	23-SEP-13	23-OCT-13	20-NOV-13	29-JAN-13	20-FEB-13	19-MAY-13	28-MAY-13	06-JUN-13	13-JUN-13	23-JUN-13	16-JUL-13	14-AUG-13
Included/Excluded	Excluded-Impacted	Excluded-Impacted	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Included	Included
ALS Sample ID	L1335330-7	L1335330-9	L1348329-8	L1368502-2	L1384222-8	L1395276-12	L1264309-7	L1271673-11	L1304309-10	L1309095-7	L1313730-7	L1317318-7	L1322393-1	L1334719-17	L1350233-1
Total Metals *(cont'd)*															
Potassium (K)-Total	1.03	0.911	0.272	0.846	1.84	4.37	0.087	0.284	0.624	0.802	1.32	1.27	0.425	0.682	0.604
Selenium (Se)-Total	0.00017	0.00019	<0.00010	0.00017	0.00074	0.00018	<0.00010	0.00010	0.00013	0.00016	0.00030	0.00022	<0.00010	0.00010	<0.00010
Silicon (Si)-Total	6.16	5.14	3.44	3.63	8.44	2.18	0.599	0.688	1.93	4.42	6.01	4.63	1.98	1.84	1.35
Silver (Ag)-Total	0.000956	0.000925	0.000039	0.000154	0.00371	0.000059	0.000017	<0.000010	0.000221	0.000482	0.000730	0.000595	0.000124	0.000092	0.000032
Sodium (Na)-Total	<2.0	<2.0	<2.0	2.2	<2.0	18.9	<2.0	3.1	4.5	<2.0	4.5	<2.0	<2.0	3.9	5.7
Strontium (Sr)-Total	0.0482	0.0505	0.0259	0.0874	0.134	0.191	0.0593	0.0972	0.131	0.0585	0.140	0.0648	0.0527	0.125	0.138
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	0.00010	0.00046	0.00026	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	0.065	0.051	0.040	0.023	0.063	<0.010	<0.010	<0.010	0.014	0.050	0.054	0.045	0.014	<0.010	0.015
Titanium (Ti)-Total	0.000233	0.000254	0.000039	0.000108	0.000524	0.000035	0.000025	0.000037	0.000112	0.000107	0.000204	0.000135	0.000052	0.000087	0.000077
Uranium (U)-Total	0.0044	0.0040	0.0012	0.0016	0.0075	<0.0010	<0.0010	<0.0010	<0.0010	0.0035	0.0063	0.0051	0.0015	0.0014	<0.0010
Vanadium (V)-Total	0.0444	0.0437	0.0079	0.0827	0.127	0.0386	<0.0030	<0.0030	0.0105	0.0158	0.0344	0.0162	0.0060	0.0063	0.0037
Zinc (Zn)-Total															
Dissolved Metals															
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0321	0.0446	0.0251	0.0243	1.01	0.0245	<0.0030	0.0049	0.0200	0.321	0.0574	0.0183	0.0121	0.0292	0.0120
Antimony (Sb)-Dissolved	<0.00010	<0.00010	<0.00010	0.00014	0.00011	0.00025	0.00020	0.00051	0.00079	0.00027	0.00073	0.00028	0.00020	0.00085	0.00079
Arsenic (As)-Dissolved	0.00010	0.00014	0.00034	0.00011	0.00054	0.00106	0.00048	0.00110	0.00064	0.00095	0.00105	0.00033	0.00029	0.00068	0.00137
Barium (Ba)-Dissolved	0.0263	0.0280	0.0170	0.0430	0.0410	0.0247	0.0351	0.0335	0.0326	0.0414	0.0315	0.0327	0.0263	0.0343	0.0364
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	0.00022	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	0.017	0.010	0.562	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014
Cadmium (Cd)-Dissolved	0.000391	0.000393	0.000049	0.000602	0.00115	0.000081	<0.000010	<0.000010	0.000038	0.000034	<0.000010	0.000017	0.000018	0.000023	<0.000010
Calcium (Ca)-Dissolved	11.4	11.2	4.73	25.5	29.8	47.8	8.92	10.3	11.7	9.24	12.1	8.35	6.93	12.5	9.66
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	0.00297	0.00302	0.00032	0.00421	0.00883	0.00163	<0.00010	<0.00010	0.00028	0.00027	<0.00010	0.00011	0.00010	0.00014	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	0.00214	0.0110	0.00118	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	0.036	0.031	<0.030	<0.030	<0.030	0.038	<0.030	<0.030	<0.030	0.231	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	0.000100	<0.000050	<0.000050	<0.000050	<0.000050	0.000296	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.00261	0.00252	<0.00050	0.00262	0.00341	0.00255	<0.00050	0.00791	0.00987	<0.00050	0.00999	0.00224	0.00071	0.0124	0.0156
Magnesium (Mg)-Dissolved	0.664	0.636	0.212	1.26	1.77	2.46	0.311	0.429	0.552	0.351	0.519	0.331	0.265	0.532	0.546
Manganese (Mn)-Dissolved	0.416	0.405	0.109	0.588	0.871	0.696	0.00439	0.00904	0.0708	0.0678	0.0852	0.0524	0.0292	0.0381	0.00262
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	<0.000050	<0.000050	<0.000050	0.000083	<0.000050	0.000134	0.000351	0.000453	0.000489	0.000274	0.000453	0.000286	0.000258	0.000700	0.00122
Nickel (Ni)-Dissolved	0.00111	0.00118	<0.00050	0.00233	0.00404	0.00229	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	0.85	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.147	0.150	0.095	0.582	0.375	4.29	0.089	0.258	0.408	0.271	0.414	0.171	0.116	0.411	0.487
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	0.00011	0.00012	0.00012	<0.00010	<0.00010	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	0.705	0.703	0.268	1.76	1.93	2.07	0.584	0.618	0.833	1.30	0.771	0.554	0.447	0.652	0.660
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000019	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	2.2	<2.0	18.7	<2.0	2.9	4.0	<2.0	3.9	<2.0	<2.0	3.8	5.3
Strontium (Sr)-Dissolved	0.0486	0.0480	0.0234	0.101	0.127	0.167	0.0555	0.0934	0.112	0.0544	0.123	0.0598	0.0505	0.139	0.129
Thallium (Tl)-Dissolved	<0.000010	0.000015	<0.000010	0.000033	0.000021	0.000035	<0.000010	<0.000010	<0.000010	0.000014	0.000011	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000035	0.000032	<0.000010	0.000019	0.000236	0.000018	0.000022	0.000034	0.000044	0.000017	0.000085	<0.000010	0.000011	0.000058	0.000054
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0157	0.0162	<0.0030	0.0700	0.102	0.0259	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC	Replicate						Replicate		Replicate		Replicate	Replicate			Replicate	
Sample ID	BJ OF	BJ OF	BJ OF	BJ OF	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S
Date Sampled	21-SEP-13	21-SEP-13	22-OCT-13	19-NOV-13	29-JAN-13	19-FEB-13	19-FEB-13	14-MAR-13	14-MAR-13	27-APR-13	27-APR-13	19-MAY-13	19-MAY-13	28-MAY-13	28-MAY-13	06-JUN-13
Included/Excluded	Excluded-Impacted	Excluded-Impacted	Included	Excluded-Impacted	Included	Included	Included	Included	Included	Included	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted
ALS Sample ID	L1366991-13	L1366991-9	L1383767-6	L1395276-6	L1264309-6	L1271673-8	L1271673-9	L1279839-11	L1279839-12	L1294990-2	L1294990-3	L1304309-15	L1304309-9	L1309095-3	L1309095-8	L1313730-6
Physical Tests																
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	80.8	65.0	102	125	56.7	86.6	99.4	146	148	107	105	81.0	81.7	62.3	61.9	75.1
Hardness (as $CaCO_3$)	31.4	26.8	34.9	30.5	25.2	29.8	31.8	40.6	41.2	31.8	32.7	29.6	29.7	25.1	25.2	28.1
pH	7.92	7.54	7.71	7.93	7.77	7.87	7.87	7.91	7.97	7.94	7.90	7.77	7.72	7.90	7.88	7.93
Total Suspended Solids	90.3	24.8	17.1	8.5	8.5	3.8	5.2	3.9	<3.0	5.8	5.8	28.8	30.1	106	49.2	76.4
Total Dissolved Solids	44	35	63	79	37	49	57	99	98	65	65	55	61	42	39	49
Turbidity (NTU)	24.3	14.6	16.4	4.47	3.68	3.33	5.16	3.23	3.56	4.07	4.54	32.1	35.2	35.4	43.2	75.6
Anions and Nutrients																
Acidity (as $CaCO_3$)	2.3	3.3	1.9	2.0	2.7	1.8	2.0	2.9	2.4	1.6	1.9	2.0	1.9	3.7	3.5	1.6
Alkalinity, Bicarbonate (as $CaCO_3$)	20.0	16.2	24.5	31.1	17.2	22.8	25.6	34.0	34.5	27.2	26.8	19.5	18.9	14.5	14.2	18.5
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	20.0	16.2	24.5	31.1	17.2	22.8	25.6	34.0	34.5	27.2	26.8	19.5	18.9	14.5	14.2	18.5
Ammonia, Total (as N)	0.0149	0.0106	0.0235	0.0344	0.0140	0.0552	0.0687	0.223	0.225	0.0732	0.0690	0.0359	0.0369	0.0174	0.0235	0.0225
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.52	0.53	<0.50	<0.50	0.64	0.71	<0.50	0.53	<0.50
Fluoride (F)	0.031	0.022	0.047	0.065	<0.020	0.036	0.046	0.080	0.082	0.049	0.048	0.029	0.029	0.023	0.024	0.041
Nitrate (as N)	0.0496	0.0312	0.107	0.128	0.0053	0.0656	0.0945	0.315	0.319	0.145	0.142	0.0644	0.0679	0.0398	0.0410	0.0594
Nitrite (as N)	0.0032	0.0014	0.0081	0.0239	<0.0010	0.0197	0.0293	0.0884	0.0909	0.0431	0.0412	0.0122	0.0130	0.0067	0.0070	0.0145
Total Kjeldahl Nitrogen	0.070	<0.050	<0.050	<0.050	<0.050	0.117	0.101	0.24	0.24	0.069	0.055	0.067	0.071	<0.050	<0.050	0.050
Total Nitrogen	0.123	0.070	0.149	0.175	<0.050	0.202	0.225	0.640	0.653	0.257	0.238	0.143	0.152	0.076	0.079	0.124
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	0.0021	0.0014	0.0014	0.0023	0.0022	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.133	0.0343	0.0143	0.0117	0.0066	0.0062	0.0061	0.0054	0.0067	0.0067	0.0076	0.0364	0.0289	0.0707	0.0802	0.0452
Sulfate (SO_4)	16.3	13.9	23.6	28.2	10.0	17.8	21.3	35.1	35.8	23.5	23.2	18.2	18.5	13.9	13.9	14.6
Cyanides																
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																
Organic / Inorganic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.87
Total Organic Carbon																
Total Metals																
Aluminum (Al)-Total	1.87	0.655	0.618	0.450	0.110	0.0988	0.0825	0.0725	0.0875	0.0845	0.0621	0.884	0.830	1.94	1.41	2.14
Antimony (Sb)-Total	0.00111	0.00059	0.00114	0.00144	0.00027	0.00067	0.00080	0.00220	0.00229	0.00164	0.00151	0.00092	0.00087	0.00085	0.00085	0.00088
Arsenic (As)-Total	0.0134	0.00347	0.00287	0.00246	0.00102	0.00186	0.00224	0.00375	0.00384	0.00212	0.00198	0.00533	0.00480	0.00613	0.00671	0.00865
Barium (Ba)-Total	0.0922	0.0537	0.0616	0.0552	0.0412	0.0365	0.0371	0.0351	0.0356	0.0352	0.0365	0.0546	0.0547	0.0798	0.0664	0.0876
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	0.010	<0.010	0.016	0.015	<0.010	0.010	0.012	0.023	0.024	0.013	0.012	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000156	0.000076	0.000062	0.000016	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	0.000013	0.000080	0.000076	0.000069	0.000072	0.000092
Calcium (Ca)-Total	10.8	10.2	12.7	12.8	9.28	10.9	11.3	14.9	15.1	11.7	12.3	11.0	10.9	9.73	9.33	11.3
Chromium (Cr)-Total	0.00080	0.00031	0.00030	0.00014	0.00010	0.00011	<0.00010	0.00011	0.00011	<0.00010	<0.00010	0.00027	0.00026	0.00032	0.00036	0.00063
Cobalt (Co)-Total	0.00100	0.00057	0.00044	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00070	0.00068	0.00078	0.00084	0.00093
Copper (Cu)-Total	0.00547	0.00263	0.00144	<0.00050	0.00054	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00216	0.00272	<0.0045	<0.0045	0.00359
Iron (Fe)-Total	2.01	0.743	0.440	0.139	0.099	0.074	0.070	<0.030	<0.030	0.100	0.094	1.36	1.23	1.81	2.04	2.60
Lead (Pb)-Total	0.00418	0.00140	0.00121	0.000631	0.000573	0.000352	0.000359	0.000196	0.000219	0.000492	0.000443	0.00310	0.00368	0.00327	0.00411	0.00389
Lithium (Li)-Total	0.0107	0.00271	0.0182	0.0269	<0.00050	0.0135	0.0188	0.0398	0.0411	0.0224	0.0196	0.00683	0.00655	0.00368	0.00356	0.00785
Magnesium (Mg)-Total	0.944	0.500	0.708	0.806	0.327	0.522	0.596	1.10	1.12	0.710	0.674	0.627	0.605	0.600	0.594	0.916
Manganese (Mn)-Total	0.127	0.0769	0.0660	0.0289	0.00855	0.0149	0.0176	0.0283	0.0285	0.0259	0.0265	0.104	0.103	0.105	0.111	0.162
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000689	0.000430	0.000721	0.000901	0.000373	0.000550	0.000589	0.000913	0.000938	0.000664	0.000651	0.000525	0.000500	0.000423	0.000421	0.000470
Nickel (Ni)-Total	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00062
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC	Replicate						Replicate		Replicate		Replicate	Replicate			Replicate	
Sample ID	BJ OF	BJ OF	BJ OF	BJ OF	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S
Date Sampled	21-SEP-13	21-SEP-13	22-OCT-13	19-NOV-13	29-JAN-13	19-FEB-13	19-FEB-13	14-MAR-13	14-MAR-13	27-APR-13	27-APR-13	19-MAY-13	19-MAY-13	28-MAY-13	28-MAY-13	06-JUN-13
Included/Excluded	Excluded-Impacted	Excluded-Impacted	Included	Excluded-Impacted	Included	Included	Included	Included	Included	Included	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted
ALS Sample ID	L1366991-13	L1366991-9	L1383767-6	L1395276-6	L1264309-6	L1271673-8	L1271673-9	L1279839-11	L1279839-12	L1294990-2	L1294990-3	L1304309-15	L1304309-9	L1309095-3	L1309095-8	L1313730-6
Total Metals *(cont'd)*																
Potassium (K)-Total	1.06	0.401	0.677	0.740	0.160	0.375	0.455	1.01	1.04	0.670	0.627	0.576	0.552	0.885	0.665	0.960
Selenium (Se)-Total	0.00032	0.00013	0.00011	0.00015	<0.00010	0.00011	<0.00010	0.00012	0.00013	0.00011	0.00012	0.00020	0.00016	0.00014	0.00018	0.00018
Silicon (Si)-Total	3.53	1.47	1.96	1.84	0.733	0.893	0.866	1.20	1.22	0.904	0.874	2.07	2.16	3.96	3.06	4.37
Silver (Ag)-Total	0.000856	0.000195	0.000125	0.000055	0.000037	0.000027	0.000018	0.000015	0.000019	0.000049	0.000037	0.000314	0.000298	0.000597	0.000386	0.000372
Sodium (Na)-Total	3.7	<2.0	6.4	9.6	<2.0	5.2	6.9	13.5	13.4	7.5	7.0	2.7	2.7	<2.0	<2.0	2.7
Strontium (Sr)-Total	0.106	0.0762	0.153	0.207	0.0625	0.121	0.146	0.262	0.268	0.167	0.159	0.0963	0.0959	0.0734	0.0698	0.0995
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	0.025	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	0.016	0.044	0.036	0.030
Titanium (Ti)-Total	0.000143	0.000070	0.000115	0.000163	0.000030	0.000053	0.000058	0.000108	0.000118	0.000127	0.000116	0.000093	0.000097	0.000126	0.000082	0.000114
Uranium (U)-Total	0.0042	0.0012	0.0013	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	0.0014	0.0033	0.0025	0.0040
Vanadium (V)-Total	0.0204	0.0112	0.0082	<0.0030	0.0035	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0114	0.0118	0.0124	0.0128	0.0192
Zinc (Zn)-Total																
Dissolved Metals																
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0612	0.0273	0.0267	0.0097	0.0031	0.0047	0.0051	0.0069	0.0060	0.0047	0.0049	0.0760	0.0160	0.0165	0.0198	0.0433
Antimony (Sb)-Dissolved	0.00085	0.00043	0.00102	0.00117	0.00021	0.00061	0.00079	0.00215	0.00219	0.00164	0.00155	0.00056	0.00057	0.00032	0.00035	0.00047
Arsenic (As)-Dissolved	0.00085	0.00029	0.00089	0.00165	0.00058	0.00146	0.00192	0.00350	0.00358	0.00150	0.00140	0.00072	0.00053	0.00035	0.00038	0.00069
Barium (Ba)-Dissolved	0.0324	0.0357	0.0439	0.0414	0.0345	0.0335	0.0340	0.0323	0.0322	0.0339	0.0335	0.0359	0.0341	0.0320	0.0325	0.0329
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	0.011	<0.010	0.013	0.013	<0.010	0.011	0.012	0.023	0.024	0.015	0.014	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000022	0.000041	0.000036	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000037	0.000035	0.000030	0.000030	<0.000010
Calcium (Ca)-Dissolved	11.7	10.1	12.9	11.0	9.60	11.1	11.8	14.5	14.7	11.6	12.0	11.1	11.1	9.44	9.50	10.6
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	0.00013	0.00019	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00028	0.00027	0.00019	0.00018	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.048	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000106	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.00994	0.00215	0.0173	0.0231	<0.00050	0.0137	0.0197	0.0388	0.0405	0.0230	0.0213	0.00602	0.00603	0.00214	0.00260	0.00537
Magnesium (Mg)-Dissolved	0.504	0.366	0.632	0.735	0.307	0.521	0.598	1.06	1.11	0.710	0.687	0.486	0.474	0.359	0.370	0.410
Manganese (Mn)-Dissolved	0.0651	0.0473	0.0512	0.0237	0.00560	0.0126	0.0158	0.0262	0.0269	0.0245	0.0238	0.0665	0.0639	0.0475	0.0490	0.0705
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000669	0.000384	0.000686	0.000757	0.000347	0.000522	0.000617	0.000864	0.000885	0.000660	0.000674	0.000431	0.000416	0.000318	0.000326	0.000356
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.378	0.191	0.442	0.507	0.092	0.331	0.427	0.939	0.990	0.669	0.635	0.323	0.295	0.167	0.176	0.271
Selenium (Se)-Dissolved	0.00011	<0.00010	0.00010	0.00013	<0.00010	<0.00010	<0.00010	0.00012	0.00010	0.00012	0.00012	0.00011	<0.00010	<0.00010	0.00010	<0.00010
Silicon (Si)-Dissolved	0.666	0.545	0.811	0.816	0.571	0.704	0.766	1.01	1.01	0.793	0.784	0.860	0.786	0.603	0.615	0.704
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000017	<0.000010	<0.000010
Sodium (Na)-Dissolved	3.6	<2.0	6.1	9.4	<2.0	4.7	6.5	12.6	12.9	7.3	7.0	2.6	2.7	<2.0	<2.0	2.3
Strontium (Sr)-Dissolved	0.111	0.0734	0.151	0.173	0.0615	0.121	0.143	0.252	0.258	0.164	0.163	0.0904	0.0931	0.0671	0.0697	0.0942
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000023	0.000022	0.000017	0.000016	0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000050	0.000023	0.000068	0.000120	0.000023	0.000043	0.000053	0.000107	0.000105	0.000104	0.000101	0.000037	0.000032	0.000017	0.000016	0.000055
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	0.0036	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC																	Replicate	
Sample ID	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200M D/S	BJ 350m D/S	BJ 350m D/S	BJ 350m D/S	BJ 350m D/S	BJ 350m D/S	VOK Creek	VOK Creek	VOK Creek	VOK CREEK	BJ2	BJ2
Date Sampled	13-JUN-13	24-JUN-13	16-JUL-13	13-AUG-13	23-SEP-13	23-OCT-13	20-NOV-13	22-JUN-13	17-JUL-13	13-AUG-13	22-SEP-13	23-OCT-13	14-AUG-13	21-SEP-13	23-OCT-13	20-NOV-13	29-JAN-13	29-JAN-13
Included/Excluded	Excluded-Impacted	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included
ALS Sample ID	L1317318-6	L1323906-3	L1334719-19	L1348329-4	L1368502-1	L1384222-5	L1395276-9	L1321448-2	L1335330-3	L1348329-3	L1367845-5	L1384222-4	L1350233-5	L1366991-8	L1384222-6	L1395276-10	L1264309-3	L1264309-5
Physical Tests																		
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	61.6	46.8	65.1	55.0	67.4	91.3	146	48.0	67.3	67.2	137	91.9	55.1	208	214	158	108	107
Hardness (as $CaCO_3$)	23.7	19.3	26.9	23.5	27.7	33.7	36.3	19.0	25.3	27.7	43.9	34.8	12.7	65.1	76.2	67.3	32.8	32.6
pH	7.56	7.62	7.84	7.89	7.85	7.56	7.95	7.56	7.79	7.88	6.90	7.44	4.74	4.15	4.50	7.84	7.75	7.84
Total Suspended Solids	86.0	23.7	15.3	5.3	17.6	21.2	8.6	14.8	5.2	9.5	216	18.7	200	68.9	20.2	5.4	5.2	<3.0
Total Dissolved Solids	40	30	31	39	57	53	96	27	45	46	88	55	29	123	138	101	54	68
Turbidity (NTU)	76.4	13.3	8.02	5.59	9.70	23.6	2.92	10.8	5.51	6.10	181	21.0	172	66.5	20.6	3.39	0.69	1.36
Anions and Nutrients																		
Acidity (as $CaCO_3$)	1.6	1.5	2.3	2.0	1.1	1.5	2.2	1.5	1.9	2.2	2.5	1.6	5.5	18.0	10.4	2.6	3.1	2.6
Alkalinity, Bicarbonate (as $CaCO_3$)	13.4	11.5	15.4	12.6	14.9	20.6	36.0	11.4	17.0	19.1	3.5	18.1	<2.0	<2.0	<2.0	26.3	27.0	27.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	13.4	11.5	15.4	12.6	14.9	20.6	36.0	11.4	17.0	19.1	3.5	18.1	<2.0	<2.0	<2.0	26.3	27.0	27.0
Ammonia, Total (as N)	0.0665	<0.0050	0.0054	0.0064	0.0085	0.0157	0.0396	0.0050	<0.0050	0.0113	0.0117	0.0119	<0.0050	0.0052	<0.0050	0.0066	0.0756	0.0764
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.030	0.021	0.025	0.023	0.022	0.042	0.084	<0.020	0.024	0.032	0.057	0.042	0.043	0.112	0.134	0.033	0.049	0.049
Nitrate (as N)	0.0454	0.0115	0.0411	0.0126	0.0446	0.0851	0.123	0.0096	0.0461	0.0360	0.0548	0.0771	<0.0050	0.0441	0.0270	0.0143	0.155	0.156
Nitrite (as N)	0.0087	0.0018	0.0030	0.0018	0.0032	0.0052	0.0214	0.0014	0.0032	0.0061	0.0045	0.0046	<0.0010	<0.0010	<0.0010	<0.0010	0.0325	0.0321
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.059	0.092	0.054	<0.050	<0.050	<0.050	<0.050	0.110	0.110
Total Nitrogen	0.094	<0.050	0.091	0.051	0.095	0.127	0.192	<0.050	0.073	0.101	0.151	0.136	<0.050	0.053	<0.050	<0.050	0.297	0.298
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0024	0.0021
Phosphorus (P)-Total	0.132	0.0299	0.0213	0.0048	0.0191	0.0220	0.0158	0.0241	0.0066	0.0094	0.320	0.0213	0.326	0.118	0.0241	0.0093	0.0038	0.0058
Sulfate (SO_4)	13.3	9.71	14.1	9.80	14.5	22.9	32.8	10.3	14.2	13.1	55.9	25.0	17.1	82.1	94.6	46.8	24.0	24.0
Cyanides																		
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																		
Organic / Inorganic Carbon	0.53	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.20	<0.50	0.63	<0.50	<0.50	<0.50	<0.50	<0.50
Total Organic Carbon																		
Total Metals																		
Aluminum (Al)-Total	2.67	1.05	0.804	0.341	0.524	0.750	0.120	0.430	0.427	0.299	4.38	0.717	5.99	4.42	1.90	0.140	0.0408	0.0294
Antimony (Sb)-Total	0.00115	0.00043	0.00065	0.00041	0.00056	0.00100	0.00173	0.00031	0.00061	0.00067	0.00224	0.00088	0.00197	0.00096	0.00033	0.00029	0.00076	0.00074
Arsenic (As)-Total	0.0130	0.00375	0.00253	0.00122	0.00209	0.00301	0.00292	0.00283	0.00165	0.00210	0.0387	0.00295	0.0473	0.0186	0.00523	0.00189	0.00231	0.00242
Barium (Ba)-Total	0.0983	0.0515	0.0541	0.0423	0.0507	0.0599	0.0415	0.0386	0.0446	0.0412	0.154	0.0556	0.127	0.107	0.0348	0.0277	0.0372	0.0365
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00027	<0.00010	0.00023	0.00044	0.00036	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.013
Cadmium (Cd)-Total	0.000075	0.000036	0.000044	<0.000010	0.000070	0.000098	0.000013	0.000075	0.000045	0.000026	0.00118	0.000316	0.000789	0.00381	0.00424	0.000060	<0.000010	<0.000010
Calcium (Ca)-Total	9.07	7.62	10.2	9.96	10.9	12.3	12.5	7.09	9.46	10.1	15.8	12.5	4.70	22.4	26.8	24.6	12.2	12.1
Chromium (Cr)-Total	0.00066	0.00028	0.00021	0.00015	0.00023	0.00023	<0.00010	0.00018	0.00015	0.00019	0.00143	0.00024	0.00112	0.00078	0.00036	<0.00010	<0.00010	0.00010
Cobalt (Co)-Total	0.00119	0.00048	0.00047	<0.00010	0.00047	0.00076	<0.00010	0.00047	0.00027	0.00014	0.00568	0.00123	0.00296	0.0103	0.0104	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	0.00397	0.00150	0.00126	<0.00050	0.00183	0.00226	0.00269	0.00136	0.00076	0.00080	0.0196	0.00397	0.0121	0.0300	0.0334	0.00092	<0.00050	<0.00050
Iron (Fe)-Total	3.79	1.15	0.532	0.156	0.442	0.630	0.106	0.675	0.222	0.239	9.82	0.622	7.19	4.69	2.42	0.353	<0.030	<0.030
Lead (Pb)-Total	0.00564	0.00176	0.000852	0.000249	0.00124	0.00154	0.000838	0.00104	0.000520	0.000542	0.0146	0.00133	0.0185	0.00664	0.00272	0.000489	0.000188	0.000169
Lithium (Li)-Total	0.00671	0.00140	0.00530	0.00246	0.00253	0.0108	0.0385	0.00168	0.00737	0.00863	0.0101	0.00833	0.00447	0.00553	0.00429	0.00104	0.0211	0.0205
Magnesium (Mg)-Total	0.869	0.409	0.503	0.330	0.443	0.701	0.897	0.366	0.466	0.419	1.73	0.713	0.940	2.06	1.91	1.73	0.678	0.670
Manganese (Mn)-Total	0.178	0.0660	0.0555	0.0195	0.0626	0.0919	0.0277	0.0620	0.0382	0.0245	0.652	0.138	0.250	1.04	1.08	0.00395	0.0206	0.0205
Mercury (Hg)-Total	0.000030	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000057	<0.000010	0.000021	0.000029	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000559	0.000314	0.000522	0.000412	0.000445	0.000640	0.00101	0.000252	0.000494	0.000591	0.00101	0.000559	0.000907	0.000353	0.000149	0.000152	0.000636	0.000626
Nickel (Ni)-Total	0.00066	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00364	0.00084	0.00233	0.00780	0.00845	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.31	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC																	Replicate	
Sample ID	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200m D/S	BJ 200M D/S	BJ 350m D/S	BJ 350m D/S	BJ 350m D/S	BJ 350m D/S	BJ 350m D/S	VOK Creek	VOK Creek	VOK Creek	VOK CREEK	BJ2	BJ2
Date Sampled	13-JUN-13	24-JUN-13	16-JUL-13	13-AUG-13	23-SEP-13	23-OCT-13	20-NOV-13	22-JUN-13	17-JUL-13	13-AUG-13	22-SEP-13	23-OCT-13	14-AUG-13	21-SEP-13	23-OCT-13	20-NOV-13	29-JAN-13	29-JAN-13
Included/Excluded	Excluded-Impacted	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included
ALS Sample ID	L1317318-6	L1323906-3	L1334719-19	L1348329-4	L1368502-1	L1384222-5	L1395276-9	L1321448-2	L1335330-3	L1348329-3	L1367845-5	L1384222-4	L1350233-5	L1366991-8	L1384222-6	L1395276-10	L1264309-3	L1264309-5
Total Metals *(cont'd)*																		
Potassium (K)-Total	1.22	0.450	0.523	0.263	0.394	0.668	0.667	0.223	0.410	0.396	1.61	0.565	1.53	1.51	0.483	0.263	0.468	0.452
Selenium (Se)-Total	0.00022	0.00011	0.00010	<0.00010	0.00012	0.00013	0.00013	0.00011	0.00010	<0.00010	0.00058	0.00015	0.00043	0.00039	0.00041	0.00026	<0.00010	<0.00010
Silicon (Si)-Total	4.28	2.21	1.99	1.37	1.62	1.78	1.06	1.13	1.27	1.21	11.1	1.70	7.77	5.94	3.31	1.25	0.856	0.868
Silver (Ag)-Total	0.000565	0.000174	0.000068	0.000033	0.000143	0.000186	0.000049	0.000075	0.000034	0.000023	0.00151	0.000185	0.000969	0.000353	0.000237	0.000028	0.000012	<0.000010
Sodium (Na)-Total	<2.0	<2.0	2.1	<2.0	<2.0	5.0	13.2	<2.0	<2.0	2.8	2.7	3.6	<2.0	<2.0	<2.0	<2.0	6.9	7.2
Strontium (Sr)-Total	0.0833	0.0490	0.0921	0.0698	0.0772	0.132	0.232	0.0478	0.0849	0.0970	0.0949	0.115	0.0222	0.0927	0.108	0.144	0.171	0.169
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00016	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	0.038	0.016	0.016	<0.010	0.016	0.011	<0.010	<0.010	<0.010	<0.010	0.098	<0.010	0.078	0.044	0.012	<0.010	<0.010	<0.010
Titanium (Ti)-Total	0.000196	0.000060	0.000068	0.000043	0.000060	0.000119	0.000186	0.000045	0.000060	0.000070	0.000353	0.000120	0.000273	0.000540	0.000446	0.000046	0.000065	0.000070
Uranium (U)-Total	0.0052	0.0016	0.0013	<0.0010	0.0011	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	0.0064	0.0012	0.0058	0.0042	<0.0010	<0.0010	<0.0010	<0.0010
Vanadium (V)-Total	0.0163	0.0072	0.0075	0.0032	0.0108	0.0115	0.0037	0.0077	0.0053	0.0046	0.0881	0.0230	0.0643	0.205	0.228	0.0044	<0.0030	<0.0030
Zinc (Zn)-Total																		
Dissolved Metals																		
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0182	0.0145	0.0267	0.0158	0.0337	0.0355	0.0106	0.0153	0.0261	0.0245	0.0140	0.0393	0.166	1.29	1.39	0.0249	0.0048	0.0047
Antimony (Sb)-Dissolved	0.00036	0.00017	0.00054	0.00036	0.00045	0.00087	0.00175	0.00019	0.00059	0.00061	0.00053	0.00075	<0.00010	<0.00010	<0.00010	0.00022	0.00069	0.00070
Arsenic (As)-Dissolved	0.00039	0.00028	0.00046	0.00074	0.00031	0.00046	0.00222	0.00032	0.00061	0.00096	0.00016	0.00029	0.00047	0.00047	0.00021	0.00014	0.00214	0.00206
Barium (Ba)-Dissolved	0.0310	0.0276	0.0334	0.0309	0.0377	0.0438	0.0390	0.0285	0.0339	0.0325	0.0402	0.0415	0.0362	0.0416	0.0264	0.0259	0.0349	0.0357
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00034	0.00035	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.014
Cadmium (Cd)-Dissolved	0.000014	0.000023	0.000027	<0.000010	0.000048	0.000066	<0.000010	0.000053	0.000032	0.000015	0.000797	0.000220	0.000714	0.00389	0.00422	0.000044	<0.000010	<0.000010
Calcium (Ca)-Dissolved	8.87	7.30	10.1	8.93	10.5	12.5	13.1	7.13	9.42	10.4	16.2	12.9	4.48	23.1	27.4	24.1	12.0	12.0
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	0.00016	<0.00010	0.00019	0.00023	<0.00010	0.00020	0.00015	<0.00010	0.00251	0.00062	0.00214	0.0101	0.0103	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00074	<0.00050	<0.00050	<0.00050	0.00741	0.0285	0.0326	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.067	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000529	0.00101	0.000736	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.00446	0.00051	0.00447	0.00209	0.00189	0.00981	0.0382	0.00135	0.00569	0.00858	0.00406	0.00798	0.00186	0.00474	0.00437	0.00113	0.0207	0.0209
Magnesium (Mg)-Dissolved	0.381	0.255	0.416	0.297	0.368	0.625	0.895	0.284	0.431	0.390	0.837	0.638	0.359	1.79	1.89	1.74	0.679	0.668
Manganese (Mn)-Dissolved	0.0556	0.0282	0.0376	0.00750	0.0484	0.0739	0.0242	0.0382	0.0296	0.0140	0.433	0.118	0.194	1.02	1.08	0.00120	0.0197	0.0197
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000319	0.000221	0.000439	0.000348	0.000410	0.000619	0.00101	0.000225	0.000491	0.000564	0.000300	0.000511	<0.000050	<0.000050	<0.000050	0.000144	0.000570	0.000608
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00204	0.00055	0.00164	0.00755	0.00829	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.225	0.095	0.246	0.160	0.195	0.405	0.639	0.096	0.264	0.301	0.378	0.344	0.117	0.330	0.338	0.233	0.458	0.450
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00011	0.00011	<0.00010	<0.00010	<0.00010	0.00015	0.00012	<0.00010	0.00029	0.00033	0.00026	<0.00010	<0.00010
Silicon (Si)-Dissolved	0.573	0.479	0.560	0.496	0.615	0.781	0.914	0.497	0.559	0.576	0.986	0.821	0.398	2.25	2.45	1.03	0.820	0.820
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	0.000041	0.000028	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	4.7	13.2	<2.0	<2.0	2.7	2.4	3.6	<2.0	<2.0	<2.0	<2.0	7.1	7.1
Strontium (Sr)-Dissolved	0.0760	0.0472	0.0862	0.0693	0.0730	0.133	0.231	0.0480	0.0849	0.0990	0.0896	0.120	0.0199	0.0919	0.106	0.149	0.157	0.161
Thallium (Tl)-Dissolved	<0.000010	<0.000010	0.000016	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	0.000016	0.000012	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	<0.000010	0.000011	0.000036	0.000029	0.000030	0.000060	0.000175	0.000012	0.000039	0.000049	0.000010	0.000046	0.000077	0.000450	0.000408	0.000024	0.000065	0.000065
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0086	0.0047	0.0431	0.198	0.231	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC																
Sample ID	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ 2	BJ2	BJ3
Date Sampled	19-FEB-13	14-MAR-13	15-MAR-13	25-APR-13	19-MAY-13	28-MAY-13	06-JUN-13	13-JUN-13	22-JUN-13	23-JUN-13	17-JUL-13	13-AUG-13	22-SEP-13	20-NOV-13	23-OCT-13	31-JAN-13
Included/Excluded	Included	Included	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Excluded-Impacted	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included
ALS Sample ID	L1271673-7	L1279839-10	L1279839-21	L1294452-9	L1304309-6	L1309095-4	L1313730-5	L1317318-5	L1321448-1	L1321448-18	L1335330-2	L1348329-2	L1367845-4	L1395276-8	L1384222-3	L1264309-13
Physical Tests																
Colour, True	<5.0	<5.0	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	-	<5.0	<5.0	<5.0	<5.0	<5.0	21.0
Conductivity (uS/cm)	92.6	150	-	145	71.5	59.9	66.3	56.8	49.8	-	63.4	70.4	87.7	135	91.7	90.9
Hardness (as $CaCO_3$)	31.6	41.8	-	42.2	28.3	24.5	26.1	22.2	19.4	-	24.4	25.9	33.7	36.2	34.3	31.9
pH	7.83	7.71	-	7.94	7.67	7.84	7.76	7.48	7.59	-	7.78	8.13	7.34	7.94	7.36	7.87
Total Suspended Solids	<3.0	<3.0	-	3.3	115	37.9	35.1	76.0	22.8	-	6.0	8.0	288	2.3	32.8	3.2
Total Dissolved Solids	50	99	-	95	47	37	42	37	30	-	46	44	63	87	59	58
Turbidity (NTU)	0.95	0.82	-	5.03	62.5	24.2	34.8	65.8	10.5	-	5.63	4.90	288	1.68	29.2	1.89
Anions and Nutrients																
Acidity (as $CaCO_3$)	1.6	3.0	-	1.7	1.9	6.7	5.5	1.7	1.5	-	1.8	1.2	2.0	2.2	1.6	2.6
Alkalinity, Bicarbonate (as $CaCO_3$)	24.1	34.5	-	36.4	16.6	12.2	13.2	11.1	11.0	-	15.7	17.9	21.9	33.4	17.1	23.8
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	24.1	34.5	-	36.4	16.6	12.2	13.2	11.1	11.0	-	15.7	17.9	21.9	33.4	17.1	23.8
Ammonia, Total (as N)	0.0483	0.220	-	0.118	0.0274	0.0167	0.0123	0.0128	0.0066	-	0.0053	0.0066	0.0153	0.0445	0.112	0.0372
Bromide (Br)	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	0.52	-	0.56	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	0.52	<0.50	<0.50	<0.50
Fluoride (F)	0.037	0.080	-	0.075	0.023	0.024	0.034	0.026	<0.020	-	0.022	0.031	0.035	0.071	0.038	0.034
Nitrate (as N)	0.0836	0.380	-	0.305	0.0523	0.0363	0.0354	0.0277	0.0166	-	0.0215	0.0243	0.0603	0.120	0.0732	0.0777
Nitrite (as N)	0.0193	0.0854	-	0.0603	0.0036	0.0034	0.0062	0.0039	0.0044	-	0.0019	0.0084	0.0068	0.0109	0.0038	0.0102
Total Kjeldahl Nitrogen	0.059	0.21	-	0.15	0.074	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	0.118	0.056	0.160	0.050
Total Nitrogen	0.162	0.675	-	0.513	0.130	0.066	0.072	0.078	<0.050	-	0.067	0.074	0.185	0.187	0.237	0.138
Orthophosphate-Dissolved (as P)	0.0012	0.0020	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	0.0019	<0.0010	0.0011	0.0018
Phosphorus (P)-Total	0.0056	0.0042	-	0.0063	0.140	0.0552	0.0275	0.136	0.0377	-	0.0085	0.0113	0.356	0.0072	0.0575	0.0034
Sulfate (SO_4)	19.2	36.4	-	35.3	16.3	15.0	14.8	13.5	11.3	-	13.7	13.2	22.5	30.1	25.2	19.4
Cyanides																
Cyanide, Weak Acid Diss	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																
Organic / Inorganic Carbon	<0.50	<0.50	-	<0.50	<0.50	<0.50	0.83	0.77	<0.50	-	<0.50	<0.50	1.70	<0.50	<0.50	<0.50
Total Organic Carbon																
Total Metals																
Aluminum (Al)-Total	0.0516	0.0258	-	0.0994	1.23	1.12	0.987	2.45	0.468	-	0.378	0.257	4.42	0.118	0.673	0.0634
Antimony (Sb)-Total	0.00066	0.00219	-	0.00268	0.00127	0.00062	0.00054	0.00106	0.00044	-	0.00055	0.00058	0.00242	0.00152	0.00072	0.00055
Arsenic (As)-Total	0.00155	0.00302	-	0.00222	0.0118	0.00542	0.00476	0.0137	0.00458	-	0.00165	0.00232	0.0367	0.00211	0.00290	0.00186
Barium (Ba)-Total	0.0361	0.0363	-	0.0387	0.102	0.0599	0.0558	0.0964	0.0412	-	0.0415	0.0387	0.171	0.0462	0.0556	0.0377
Beryllium (Be)-Total	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	0.00019	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	0.023	-	0.020	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	0.020	0.018	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	-	0.000031	0.000198	0.000215	0.000154	0.000167	0.000133	-	0.000073	0.000032	0.000352	0.000013	0.000368	<0.000010
Calcium (Ca)-Total	11.5	15.2	-	15.1	10.5	9.32	9.82	8.54	7.67	-	9.73	10.1	12.6	13.3	12.6	11.9
Chromium (Cr)-Total	<0.00010	<0.00010	-	0.00016	0.00052	<0.00050	0.00033	0.00059	0.00027	-	0.00019	0.00020	0.00144	<0.00010	0.00020	0.00012
Cobalt (Co)-Total	<0.00010	<0.00010	-	0.00017	0.00109	0.00101	0.00074	0.00129	0.00064	-	0.00030	0.00015	0.00343	<0.00010	0.00132	<0.00010
Copper (Cu)-Total	<0.00050	<0.00050	-	0.00058	0.00400	<0.0035	0.00262	0.00459	0.00225	-	0.00098	0.00115	0.0125	<0.00050	0.00428	<0.00050
Iron (Fe)-Total	0.035	<0.030	-	0.113	2.91	1.43	1.31	3.50	0.963	-	0.221	0.267	10.5	0.047	0.660	0.033
Lead (Pb)-Total	0.000227	0.000062	-	0.000712	0.00942	0.00309	0.00205	0.00539	0.00199	-	0.000509	0.000590	0.0166	0.000207	0.00139	0.000206
Lithium (Li)-Total	0.0131	0.0389	-	0.0369	0.00448	0.00253	0.00396	0.00408	0.00197	-	0.00446	0.00691	0.00935	0.0358	0.00663	0.0129
Magnesium (Mg)-Total	0.549	1.04	-	1.13	0.685	0.547	0.624	0.752	0.384	-	0.435	0.414	1.67	0.892	0.695	0.618
Manganese (Mn)-Total	0.0193	0.0305	-	0.0613	0.142	0.126	0.114	0.170	0.0812	-	0.0456	0.0261	0.474	0.0279	0.145	0.0104
Mercury (Hg)-Total	<0.000010	<0.000010	-	<0.000010	0.000013	<0.000010	<0.000010	0.000031	<0.000010	-	<0.000010	<0.000010	0.000088	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000498	0.000867	-	0.000890	0.000490	<0.00035	0.000319	0.000441	0.000290	-	0.000419	0.000532	0.00114	0.00105	0.000466	0.000574
Nickel (Ni)-Total	<0.00050	<0.00050	-	<0.00050	0.00070	0.00068	0.00058	0.00079	<0.00050	-	0.00057	<0.00050	0.00200	<0.00050	0.00093	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	<0.30	<0.30	0.33	<0.30	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC																
Sample ID	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ2	BJ 2	BJ2	BJ3
Date Sampled	19-FEB-13	14-MAR-13	15-MAR-13	25-APR-13	19-MAY-13	28-MAY-13	06-JUN-13	13-JUN-13	22-JUN-13	23-JUN-13	17-JUL-13	13-AUG-13	22-SEP-13	20-NOV-13	23-OCT-13	31-JAN-13
Included/Excluded	Included	Included	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Excluded-Impacted	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included
ALS Sample ID	L1271673-7	L1279839-10	L1279839-21	L1294452-9	L1304309-6	L1309095-4	L1313730-5	L1317318-5	L1321448-1	L1321448-18	L1335330-2	L1348329-2	L1367845-4	L1395276-8	L1384222-3	L1264309-13
Total Metals *(cont'd)*																
Potassium (K)-Total	0.357	0.940	-	1.17	0.707	0.536	0.585	1.10	0.287	-	0.341	0.335	1.66	0.631	0.508	0.327
Selenium (Se)-Total	0.00011	0.00012	-	0.00014	0.00026	0.00012	0.00014	0.00020	0.00011	-	<0.00010	0.00010	0.00059	0.00011	0.00017	0.00011
Silicon (Si)-Total	0.884	1.08	-	1.17	2.82	2.65	2.58	3.90	1.22	-	1.15	0.978	14.9	1.12	1.69	0.950
Silver (Ag)-Total	0.000016	0.000015	-	0.000056	0.000934	0.000259	0.000204	0.000674	0.000168	-	0.000030	0.000034	0.00202	0.000019	0.000281	0.000013
Sodium (Na)-Total	5.2	13.7	-	11.5	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	2.5	2.4	12.3	2.9	4.7
Strontium (Sr)-Total	0.125	0.256	-	0.265	0.0778	0.0629	0.0709	0.0622	0.0563	-	0.0797	0.0869	0.0862	0.222	0.104	0.147
Thallium (Tl)-Total	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	0.00018	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.010	<0.010	-	<0.010	0.035	0.032	0.017	0.036	0.012	-	<0.010	<0.010	0.162	<0.010	<0.010	<0.010
Titanium (Ti)-Total	0.000053	0.000105	-	0.000240	0.000130	0.000084	0.000073	0.000123	0.000061	-	0.000054	0.000068	0.000231	0.000125	0.000111	0.000056
Uranium (U)-Total	<0.0010	<0.0010	-	<0.0010	0.0022	0.0018	0.0020	0.0042	0.0011	-	<0.0010	<0.0010	0.0072	<0.0010	0.0010	<0.0010
Vanadium (V)-Total	<0.0030	<0.0030	-	0.0033	0.0265	0.0192	0.0154	0.0194	0.0106	-	0.0068	0.0053	0.0453	<0.0030	0.0253	<0.0030
Zinc (Zn)-Total																
Dissolved Metals																
Dissolved Metals Filtration Locatio	LAB	LAB		LAB	LAB	LAB	LAB	LAB	LAB		LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0037	0.0047	-	0.0095	0.379	0.0192	0.0217	0.0149	0.0291	-	0.0378	0.0234	0.0241	0.0068	0.0346	0.0044
Antimony (Sb)-Dissolved	0.00062	0.00214	-	0.00265	0.00046	0.00026	0.00030	0.00026	0.00021	-	0.00047	0.00061	0.00059	0.00152	0.00057	0.00050
Arsenic (As)-Dissolved	0.00131	0.00307	-	0.00147	0.00202	0.00031	0.00037	0.00034	0.00038	-	0.00058	0.00107	0.00037	0.00176	0.00036	0.00148
Barium (Ba)-Dissolved	0.0342	0.0374	-	0.0361	0.0487	0.0304	0.0324	0.0315	0.0274	-	0.0294	0.0313	0.0327	0.0411	0.0418	0.0340
Beryllium (Be)-Dissolved	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	0.024	-	0.021	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	0.018	0.018	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	-	0.000020	0.000057	0.000144	0.000094	0.000069	0.000079	-	0.000050	0.000032	0.000059	<0.000010	0.000299	<0.000010
Calcium (Ca)-Dissolved	11.7	15.0	-	15.1	10.6	9.20	9.79	8.30	7.25	-	9.11	9.73	12.7	13.2	12.7	11.8
Chromium (Cr)-Dissolved	<0.00010	<0.00010	-	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	0.00017	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	-	0.00014	0.00034	0.00046	0.00029	0.00018	0.00029	-	0.00018	0.00016	0.00022	<0.00010	0.00085	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	-	<0.00050	0.00072	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	-	<0.030	0.319	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	-	<0.000050	0.00138	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.0138	0.0382	-	0.0362	0.00357	0.00177	0.00272	0.00206	0.00181	-	0.00423	0.00643	0.00364	0.0329	0.00612	0.0125
Magnesium (Mg)-Dissolved	0.553	1.08	-	1.13	0.458	0.379	0.392	0.352	0.314	-	0.407	0.378	0.490	0.821	0.635	0.600
Manganese (Mn)-Dissolved	0.0183	0.0314	-	0.0569	0.0712	0.0770	0.0745	0.0683	0.0553	-	0.0364	0.0120	0.148	0.0230	0.135	0.00862
Mercury (Hg)-Dissolved	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000511	0.000855	-	0.000899	0.000297	0.000255	0.000278	0.000239	0.000230	-	0.000396	0.000467	0.000452	0.000889	0.000423	0.000506
Nickel (Ni)-Dissolved	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00076	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.342	0.980	-	1.12	0.343	0.152	0.196	0.168	0.120	-	0.212	0.252	0.355	0.559	0.339	0.293
Selenium (Se)-Dissolved	<0.00010	0.00011	-	0.00012	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	0.00012	0.00012	0.00012	<0.00010
Silicon (Si)-Dissolved	0.753	1.01	-	0.976	1.51	0.669	0.718	0.588	0.528	-	0.524	0.453	0.721	0.921	0.836	0.787
Silver (Ag)-Dissolved	<0.000010	<0.000010	-	<0.000010	0.000059	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	5.1	12.7	-	11.3	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	2.4	2.4	12.0	2.8	4.4
Strontium (Sr)-Dissolved	0.125	0.250	-	0.259	0.0765	0.0601	0.0711	0.0591	0.0514	-	0.0737	0.0867	0.0842	0.209	0.105	0.137
Thallium (Tl)-Dissolved	<0.000010	0.000022	-	0.000032	0.000021	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000040	0.000103	-	0.000213	0.000036	0.000017	0.000031	<0.000010	0.000015	-	0.000033	0.000048	0.000014	0.000113	0.000029	0.000049
Vanadium (V)-Dissolved	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	-	<0.0030	0.0057	0.0051	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	0.0073	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**
QAQC																	
Sample ID	**BJ3**	**BJ3**	**BJ3**	**BJ3**	**BJ3**	**BJ3**	**BJ3**	**BJ3**	**BJ3**	**BJ3**	**BJ3**	**BJ3**	**BJ 3**	**SC0**	**SC0**	**SC0**	**SC0**
Date Sampled	**19-FEB-13**	**13-MAR-13**	**24-APR-13**	**19-MAY-13**	**28-MAY-13**	**06-JUN-13**	**13-JUN-13**	**22-JUN-13**	**15-JUL-13**	**07-AUG-13**	**21-SEP-13**	**22-OCT-13**	**19-NOV-13**	**31-JAN-13**	**19-FEB-13**	**14-MAR-13**	**24-APR-13**
Included/Excluded	**Included**	**Included**	**Included**	**Included**	**Excluded-Impacted**	**Excluded-Impacted**	**Excluded-Impacted**	**Included**	**Included**	**Included**	**Excluded-Impacted**	**Excluded-Impacted**	**Excluded-Impacted**	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L1271673-4**	**L1279839-5**	**L1294452-7**	**L1304309-5**	**L1309095-5**	**L1313730-4**	**L1317318-4**	**L1321448-4**	**L1334719-4**	**L1346151-1**	**L1366991-5**	**L1383767-1**	**L1395276-4**	**L1264309-14**	**L1271673-3**	**L1279839-23**	**L1294452-6**
Physical Tests																	
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	21.2	<5.0	<5.0	<5.0
Conductivity (uS/cm)	96.1	150	128	74.8	60.6	66.1	58.1	50.3	67.4	66.5	80.9	85.7	117	329	355	382	420
Hardness (as $CaCO_3$)	32.4	43.4	41.0	29.1	24.7	26.3	23.1	19.4	26.5	24.9	30.1	34.6	34.6	156	168	188	218
pH	8.00	7.96	7.98	7.83	7.53	6.87	7.54	7.63	7.81	8.30	7.84	7.33	7.95	8.11	8.01	8.15	8.07
Total Suspended Solids	<3.0	<3.0	<3.0	77.5	33.2	24.4	54.7	21.5	9.3	3.3	23.1	12.1	1.7	<3.0	<3.0	6.3	22.0
Total Dissolved Solids	53	96	75	50	37	44	41	26	35	44	49	57	70	214	227	263	290
Turbidity (NTU)	1.71	0.41	0.92	46.1	20.5	23.5	50.3	12.3	4.59	3.73	10.3	9.68	1.77	2.95	2.23	5.63	21.5
Anions and Nutrients																	
Acidity (as $CaCO_3$)	1.9	2.5	1.6	1.4	1.6	6.1	1.8	1.4	2.3	1.2	2.5	2.7	2.2	2.4	3.0	2.7	2.2
Alkalinity, Bicarbonate (as $CaCO_3$)	24.6	34.6	32.8	18.5	12.9	13.6	12.8	12.0	16.8	21.3	16.3	19.0	30.5	75.3	79.3	82.3	91.2
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	24.6	34.6	32.8	18.5	12.9	13.6	12.8	12.0	16.8	21.3	16.3	19.0	30.5	75.3	79.3	82.3	91.2
Ammonia, Total (as N)	0.0410	0.231	0.0763	0.0249	0.0121	0.0077	0.0099	<0.0050	<0.0050	<0.0050	0.0067	<0.0050	0.0246	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	0.51	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.036	0.073	0.058	0.024	0.024	0.035	0.028	<0.020	0.025	0.028	0.032	0.033	0.055	0.061	0.059	0.061	0.059
Nitrate (as N)	0.0919	0.540	0.345	0.0587	0.0352	0.0313	0.0288	0.0127	0.0061	<0.0050	0.0458	0.0628	0.103	0.0210	0.0347	0.0385	0.113
Nitrite (as N)	0.0070	0.0387	0.0074	0.0029	0.0033	0.0041	0.0041	0.0035	0.0019	<0.0010	0.0027	0.0020	0.0046	<0.0010	0.0013	<0.0010	0.0019
Total Kjeldahl Nitrogen	0.055	0.26	<0.087	0.083	<0.050	<0.050	<0.050	<0.050	<0.050	0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	0.154	0.834	0.436	0.144	0.064	0.061	0.066	<0.050	<0.050	0.060	0.088	0.092	0.142	<0.050	<0.050	<0.050	0.092
Orthophosphate-Dissolved (as P)	0.0013	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.0041	0.0041	0.0028	0.110	0.0462	0.0348	0.0935	0.0280	0.0104	0.0054	0.0280	0.0107	0.0045	0.0039	0.0027	0.0093	0.0295
Sulfate (SO_4)	19.4	35.9	30.4	16.5	14.8	14.5	13.1	10.7	14.5	13.4	19.6	21.2	25.0	96.8	106	122	143
Cyanides																	
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																	
Organic / Inorganic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.68	1.1	<0.50	0.65	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Organic Carbon																	
Total Metals																	
Aluminum (Al)-Total	0.0584	0.0109	0.0259	0.999	0.926	0.622	1.78	0.598	0.951	0.390	0.913	0.521	0.0852	0.174	0.114	0.197	0.878
Antimony (Sb)-Total	0.00063	0.00223	0.00207	0.00109	0.00069	0.00051	0.00090	0.00046	0.00072	0.00062	0.00085	0.00078	0.00109	0.00151	0.00153	0.00150	0.00200
Arsenic (As)-Total	0.00148	0.00298	0.00141	0.0100	0.00591	0.00408	0.0109	0.00490	0.00363	0.00236	0.00503	0.00300	0.00184	0.00115	0.00097	0.00127	0.00332
Barium (Ba)-Total	0.0375	0.0419	0.0350	0.0807	0.0567	0.0454	0.0753	0.0420	0.0602	0.0417	0.0583	0.0538	0.0386	0.0500	0.0465	0.0498	0.0672
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	0.010	0.022	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	0.015	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	0.000024	0.000165	0.000236	0.000114	0.000141	0.000097	0.000073	0.000022	0.000235	0.000214	0.000014	0.000078	0.000046	0.000045	0.000065
Calcium (Ca)-Total	12.1	16.1	14.5	10.7	10.7	9.78	8.57	7.06	10.2	9.33	11.3	13.3	12.6	58.0	59.9	71.7	77.1
Chromium (Cr)-Total	<0.00010	<0.00010	<0.00010	0.00040	<0.00070	0.00029	0.00045	0.00022	0.00028	0.00015	0.00034	0.00021	<0.00010	0.00012	<0.00010	0.00022	0.00062
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	0.00094	0.00096	0.00050	0.00101	0.00052	0.00030	<0.00010	0.00091	0.00072	<0.00010	0.00040	0.00023	0.00025	0.00050
Copper (Cu)-Total	<0.00050	<0.00050	<0.00050	0.00347	<0.0040	0.00173	0.00490	0.00190	0.00129	0.00076	0.00311	0.00259	<0.00050	0.00184	0.00118	0.00162	0.00701
Iron (Fe)-Total	0.032	<0.030	<0.030	2.10	1.24	0.936	2.62	0.936	0.501	0.151	0.997	0.424	0.033	0.122	0.096	0.206	1.13
Lead (Pb)-Total	0.000205	0.000069	0.000142	0.00754	0.00263	0.00140	0.00390	0.00184	0.00105	0.000381	0.00181	0.00119	0.000185	0.000176	0.000141	0.000299	0.00107
Lithium (Li)-Total	0.0122	0.0351	0.0247	0.00433	0.00280	0.00342	0.00384	0.00233	0.00483	0.00507	0.00649	0.00668	0.0223	0.00247	0.00313	0.00362	0.00427
Magnesium (Mg)-Total	0.607	1.17	1.02	0.701	0.602	0.583	0.704	0.437	0.579	0.456	0.695	0.639	0.800	4.67	4.86	5.72	6.27
Manganese (Mn)-Total	0.0141	0.0169	0.0140	0.129	0.123	0.0854	0.139	0.0722	0.0441	0.0165	0.111	0.0896	0.0151	0.0496	0.0598	0.119	0.0892
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	0.000010	<0.000010	<0.000010	0.000018	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000511	0.000846	0.000800	0.000462	<0.00045	0.000346	0.000413	0.000283	0.000462	0.000476	0.000580	0.000463	0.000722	0.00239	0.00220	0.00248	0.00228
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	0.00062	0.00070	<0.00050	0.00070	<0.00050	<0.00050	<0.00050	0.00055	0.00058	<0.00050	0.00079	0.00056	0.00065	0.00094
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC																	
Sample ID	BJ3	BJ3	BJ3	BJ3	BJ3	BJ3	BJ3	BJ3	BJ3	BJ3	BJ3	BJ3	BJ 3	SC0	SC0	SC0	SC0
Date Sampled	19-FEB-13	13-MAR-13	24-APR-13	19-MAY-13	28-MAY-13	06-JUN-13	13-JUN-13	22-JUN-13	15-JUL-13	07-AUG-13	21-SEP-13	22-OCT-13	19-NOV-13	31-JAN-13	19-FEB-13	14-MAR-13	24-APR-13
Included/Excluded	Included	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Excluded-Impacted	Included	Included	Included	Included
ALS Sample ID	L1271673-4	L1279839-5	L1294452-7	L1304309-5	L1309095-5	L1313730-4	L1317318-4	L1321448-4	L1334719-4	L1346151-1	L1366991-5	L1383767-1	L1395276-4	L1264309-14	L1271673-3	L1279839-23	L1294452-6
Total Metals *(cont'd)*																	
Potassium (K)-Total	0.353	0.920	0.860	0.579	0.505	0.426	0.832	0.311	0.638	0.420	0.593	0.439	0.467	0.639	0.657	0.788	1.04
Selenium (Se)-Total	0.00011	0.00012	0.00013	0.00018	0.00013	0.00013	0.00017	0.00012	0.00013	0.00011	0.00014	0.00013	0.00012	0.00022	0.00022	0.00017	0.00036
Silicon (Si)-Total	0.877	1.05	0.959	2.23	2.28	1.78	3.10	1.44	2.38	0.929	1.98	1.55	1.03	1.79	1.57	1.79	3.81
Silver (Ag)-Total	<0.000010	<0.000010	0.000014	0.000629	0.000227	0.000141	0.000404	0.000171	0.000076	0.000019	0.000171	0.000129	0.000013	<0.000010	<0.000010	<0.000010	0.000032
Sodium (Na)-Total	4.4	12.8	9.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.3	2.4	2.5	8.3	3.0	3.1	3.6	3.4
Strontium (Sr)-Total	0.129	0.256	0.216	0.0829	0.0739	0.0736	0.0631	0.0506	0.0878	0.0889	0.0961	0.111	0.176	0.368	0.346	0.394	0.444
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.010	<0.010	<0.010	0.023	0.027	<0.010	0.027	0.011	0.013	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	0.048
Titanium (Ti)-Total	0.000043	0.000106	0.000148	0.000121	0.000091	0.000051	0.000096	0.000046	0.000072	0.000069	0.000107	0.000090	0.000090	0.000158	0.000146	0.000192	0.000226
Uranium (U)-Total	<0.0010	<0.0010	<0.0010	0.0017	0.0016	0.0012	0.0030	<0.0010	0.0019	<0.0010	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0028
Vanadium (V)-Total	<0.0030	<0.0030	<0.0030	0.0220	0.0192	0.0101	0.0163	0.0097	0.0071	0.0032	0.0179	0.0162	<0.0030	0.0043	<0.0030	0.0043	0.0060
Zinc (Zn)-Total																	
Dissolved Metals																	
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0062	0.0043	0.0050	0.0232	0.0307	0.0989	0.0184	0.0183	0.0251	0.0215	0.0344	0.0339	0.0083	0.0482	0.0280	0.0256	0.0190
Antimony (Sb)-Dissolved	0.00062	0.00209	0.00204	0.00044	0.00030	0.00034	0.00030	0.00025	0.00056	0.00057	0.00063	0.00062	0.00109	0.00140	0.00152	0.00134	0.00180
Arsenic (As)-Dissolved	0.00128	0.00289	0.00130	0.00084	0.00060	0.00232	0.00061	0.00072	0.00110	0.00139	0.00030	0.00054	0.00157	0.00070	0.00063	0.00066	0.00062
Barium (Ba)-Dissolved	0.0347	0.0407	0.0377	0.0328	0.0285	0.0365	0.0319	0.0267	0.0325	0.0308	0.0370	0.0414	0.0370	0.0467	0.0439	0.0445	0.0476
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	0.010	0.022	0.017	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	0.000030	0.000116	0.000118	0.000056	0.000060	0.000048	0.000014	0.000134	0.000162	0.000010	0.000070	0.000045	0.000035	0.000043
Calcium (Ca)-Dissolved	12.0	15.5	14.8	10.8	9.19	9.78	8.60	7.23	9.88	9.28	11.1	12.9	12.5	55.3	59.6	66.2	77.1
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	0.00014	0.00034	0.00046	0.00012	0.00018	0.00013	<0.00010	0.00021	0.00024	<0.00010	0.00032	0.00018	0.00014	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00147	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00066	<0.00050	<0.00050	0.00060
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	0.166	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000714	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.0124	0.0337	0.0246	0.00368	0.00191	0.00279	0.00238	0.00188	0.00372	0.00583	0.00541	0.00585	0.0221	0.00237	0.00308	0.00296	0.00342
Magnesium (Mg)-Dissolved	0.596	1.13	1.01	0.519	0.415	0.443	0.392	0.326	0.449	0.430	0.562	0.585	0.793	4.30	4.72	5.40	6.09
Manganese (Mn)-Dissolved	0.0117	0.0150	0.0109	0.0410	0.0633	0.0767	0.0546	0.0402	0.0287	0.00454	0.0777	0.0752	0.0112	0.0440	0.0546	0.0933	0.0484
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000495	0.000799	0.000784	0.000322	0.000275	0.000214	0.000270	0.000237	0.000411	0.000496	0.000512	0.000416	0.000707	0.00229	0.00215	0.00229	0.00224
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00074	0.00055	0.00051	0.00053
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.322	0.905	0.859	0.248	0.154	0.194	0.176	0.118	0.239	0.277	0.281	0.239	0.443	0.585	0.625	0.675	0.753
Selenium (Se)-Dissolved	0.00011	0.00012	0.00011	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00010	0.00011	0.00016	0.00021	0.00015	0.00035
Silicon (Si)-Dissolved	0.772	0.995	0.908	0.820	0.679	0.730	0.606	0.536	0.554	0.305	0.570	0.770	0.830	1.45	1.37	1.43	1.51
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	4.8	12.1	9.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.2	2.3	2.4	8.4	2.7	3.0	3.5	3.2
Strontium (Sr)-Dissolved	0.131	0.245	0.214	0.0856	0.0628	0.0735	0.0632	0.0519	0.0852	0.0889	0.0904	0.103	0.169	0.337	0.357	0.361	0.414
Thallium (Tl)-Dissolved	0.000014	0.000017	0.000025	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000045	0.000101	0.000145	0.000021	0.000019	0.000049	<0.000010	0.000013	0.000033	0.000042	0.000026	0.000039	0.000079	0.000138	0.000151	0.000171	0.000202
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	0.0036	0.0106	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0031	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Lake	Lake	Lake	Lake	Lake	Lake
QAQC				Replicate														
Sample ID	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SUL (14 m)	SUL (14 m)	SUL (14 m)	SUL (2 m)	SUL (2 m)	SUL (2 m)
Date Sampled	19-MAY-13	28-MAY-13	06-JUN-13	13-JUN-13	13-JUN-13	22-JUN-13	22-JUN-13	15-JUL-13	13-AUG-13	21-SEP-13	22-OCT-13	19-NOV-13	14-MAR-13	15-JUL-13	10-AUG-13	14-MAR-13	15-JUL-13	10-AUG-13
Included/Excluded	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Included	Included	Included	Included	Included	Included	Excluded-Impacted	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1304309-4	L1309095-6	L1313730-3	L1317318-10	L1317318-3	L1321448-3	L1321448-9	L1334719-3	L1348329-1	L1366991-6	L1383767-2	L1395276-3	L1279839-16	L1334719-2	L1346151-17	L1279839-15	L1334719-1	L1346151-16
Physical Tests																		
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	174	129	139	109	109	71.4	71.3	72.6	58.7	85.5	134	280	400	95.1	64.0	364	91.9	53.3
Hardness (as $CaCO_3$)	82.6	58.8	62.8	49.3	49.3	32.1	32.8	32.1	27.2	38.2	62.0	131	197	40.9	29.0	180	41.0	24.0
pH	8.09	8.17	7.49	7.92	7.70	8.09	7.52	7.98	8.04	8.04	7.80	7.97	7.82	7.81	6.75	7.99	7.79	8.18
Total Suspended Solids	102	295	77.1	471	473	308	319	120	136	197	304	7.2	<3.0	52.7	53.7	<3.0	39.3	74.4
Total Dissolved Solids	116	87	91	73	64	46	47	49	48	57	85	189	280	54	44	252	46	39
Turbidity (NTU)	91.4	218	91.0	373	394	243	244	31.5	76.6	229	193	6.84	1.20	6.74	48.9	0.66	17.4	62.9
Anions and Nutrients																		
Acidity (as $CaCO_3$)	1.3	2.4	9.2	1.5	1.9	<1.0	<1.0	1.9	1.5	1.8	2.1	2.5	3.4	2.6	5.9	3.7	2.5	1.8
Alkalinity, Bicarbonate (as $CaCO_3$)	44.0	39.0	32.5	29.8	30.0	19.1	18.4	18.3	19.4	24.9	31.6	58.2	61.8	19.2	16.2	69.3	18.8	16.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	44.0	39.0	32.5	29.8	30.0	19.1	18.4	18.3	19.4	24.9	31.6	58.2	61.8	19.2	16.2	69.3	18.8	16.3
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0065	0.0107	<0.0050	<0.0050	0.0077	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.037	0.034	0.046	0.030	0.029	0.020	0.022	0.022	<0.020	<0.020	0.024	0.048	0.120	0.025	0.023	0.078	0.028	<0.020
Nitrate (as N)	0.0391	0.0333	0.0241	0.0170	0.0179	<0.0050	0.0149	0.0126	0.0074	0.0160	0.0222	0.0265	0.0268	0.0158	0.0085	0.0320	0.0176	0.0080
Nitrite (as N)	<0.0010	0.0012	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.068	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	0.107	0.057	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	0.0014	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.0540	0.544	0.0978	0.738	0.700	0.492	0.498	0.208	0.215	0.314	0.443	0.0076	<0.0020	0.0547	0.0463	<0.0020	0.0524	0.0730
Sulfate (SO_4)	43.4	30.0	33.8	23.3	22.9	12.8	12.8	14.2	8.89	18.1	30.9	84.2	150	24.1	14.6	122	22.2	9.61
Cyanides																		
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																		
Organic / Inorganic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	1.5	<0.50	<0.50	0.59	0.63	<0.50	<0.50	0.57	<0.50	<0.50	0.88	<0.50
Total Organic Carbon																		
Total Metals																		
Aluminum (Al)-Total	3.97	6.98	3.07	10.9	12.2	8.01	7.90	3.50	4.46	6.82	7.59	0.403	0.163	2.25	1.27	0.0253	3.71	2.99
Antimony (Sb)-Total	0.00290	0.00378	0.00262	0.00685	0.00696	0.00473	0.00460	0.00214	0.00278	0.00353	0.00497	0.00179	0.00121	0.00140	0.00107	0.00124	0.00145	0.00156
Arsenic (As)-Total	0.0111	0.0221	0.0115	0.0344	0.0354	0.0255	0.0246	0.0102	0.0164	0.0171	0.0202	0.00126	0.00018	0.00443	0.00353	0.00036	0.00614	0.00644
Barium (Ba)-Total	0.107	0.189	0.0981	0.299	0.348	0.233	0.233	0.112	0.151	0.194	0.223	0.0605	0.0424	0.0765	0.0544	0.0450	0.132	0.0890
Beryllium (Be)-Total	<0.00010	0.00021	<0.00010	0.00030	0.00033	0.00025	0.00023	<0.00010	0.00012	0.00016	0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000185	0.000362	0.000209	0.000642	0.000647	0.000375	0.000403	0.000171	0.000206	0.000278	0.000349	0.000056	0.000227	0.000108	0.000074	0.000120	0.000128	0.000097
Calcium (Ca)-Total	32.5	28.7	23.3	28.9	30.1	20.6	20.0	13.4	12.1	16.8	28.6	44.4	72.4	14.9	10.2	62.1	14.6	9.08
Chromium (Cr)-Total	0.00298	0.00584	0.00243	0.00983	0.0106	0.00579	0.00589	0.00261	0.00392	0.00490	0.00639	0.00020	<0.00010	0.00151	0.00094	<0.00010	0.00379	0.00186
Cobalt (Co)-Total	0.00231	0.00474	0.00241	0.00841	0.00861	0.00574	0.00547	0.00210	0.00323	0.00397	0.00540	0.00046	0.00307	0.00131	0.00106	0.00122	0.00168	0.00150
Copper (Cu)-Total	0.0192	0.0430	0.0192	0.0862	0.0886	0.0386	0.0383	0.0158	0.0301	0.0337	0.0415	0.00175	0.0780	0.0256	0.0209	0.0206	0.0234	0.0133
Iron (Fe)-Total	5.19	10.2	5.31	21.2	22.5	13.9	13.2	4.89	7.46	9.67	13.9	0.329	0.182	2.41	1.67	<0.030	2.42	3.35
Lead (Pb)-Total	0.00618	0.0127	0.00547	0.0215	0.0238	0.0129	0.0135	0.00566	0.00750	0.0101	0.0129	0.000331	<0.000050	0.00290	0.00244	<0.000050	0.00285	0.00373
Lithium (Li)-Total	0.00393	0.00584	0.00371	0.00986	0.0107	0.00781	0.00740	0.00230	0.00375	0.00549	0.00806	0.00373	0.00358	0.00131	0.00105	0.00307	0.00146	0.00180
Magnesium (Mg)-Total	3.71	4.66	3.11	7.39	7.84	4.86	4.78	2.19	2.63	4.10	5.66	3.88	5.92	1.74	1.13	5.12	2.35	1.55
Manganese (Mn)-Total	0.181	0.440	0.200	0.772	0.796	0.524	0.508	0.188	0.275	0.348	0.462	0.0470	0.499	0.121	0.0989	0.202	0.155	0.129
Mercury (Hg)-Total	0.000024	<0.000010	<0.000010	0.000255	0.000074	0.000094	0.000077	<0.000010	0.000023	0.000043	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000014	<0.000010
Molybdenum (Mo)-Total	0.00146	0.00121	0.00115	0.00182	0.00190	0.00133	0.00132	0.000736	0.000722	0.00104	0.00182	0.00178	0.00166	0.000694	0.000413	0.00189	0.000690	0.000503
Nickel (Ni)-Total	0.00276	0.00496	0.00244	0.00842	0.00899	0.00526	0.00503	0.00202	0.00326	0.00370	0.00559	0.00067	0.00242	0.00134	0.00097	0.00122	0.00371	0.00157
Phosphorus (P)-Total	<0.30	0.46	<0.30	0.67	0.71	0.46	0.46	<0.30	<0.30	0.34	0.35	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Lake	Lake	Lake	Lake	Lake	Lake
QAQC				Replicate														
Sample ID	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SC0	SUL (14 m)	SUL (14 m)	SUL (14 m)	SUL (2 m)	SUL (2 m)	SUL (2 m)
Date Sampled	19-MAY-13	28-MAY-13	06-JUN-13	13-JUN-13	13-JUN-13	22-JUN-13	22-JUN-13	15-JUL-13	13-AUG-13	21-SEP-13	22-OCT-13	19-NOV-13	14-MAR-13	15-JUL-13	10-AUG-13	14-MAR-13	15-JUL-13	10-AUG-13
Included/Excluded	Included	Included	Included	Excluded-Impacted	Excluded-Impacted	Included	Included	Included	Included	Included	Included	Excluded-Impacted	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1304309-4	L1309095-6	L1313730-3	L1317318-10	L1317318-3	L1321448-3	L1321448-9	L1334719-3	L1348329-1	L1366991-6	L1383767-2	L1395276-3	L1279839-16	L1334719-2	L1346151-17	L1279839-15	L1334719-1	L1346151-16
Total Metals *(cont'd)*																		
Potassium (K)-Total	1.58	2.30	1.15	3.18	3.44	2.14	2.27	1.28	1.42	2.13	2.17	0.575	0.607	1.01	0.537	0.596	1.60	0.865
Selenium (Se)-Total	0.00045	0.00041	0.00036	0.00050	0.00058	0.00037	0.00033	0.00017	0.00023	0.00025	0.00043	0.00029	0.00037	0.00021	0.00014	0.00027	0.00020	0.00011
Silicon (Si)-Total	9.38	12.8	7.61	16.4	18.4	15.6	13.5	7.63	11.6	13.9	14.4	2.19	2.27	4.97	2.89	1.67	6.76	6.19
Silver (Ag)-Total	0.000147	0.000304	0.000156	0.000507	0.000529	0.000419	0.000319	0.000261	0.000192	0.000245	0.000274	<0.000010	<0.000010	0.000069	0.000039	<0.000010	0.000061	0.000076
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.5	2.3	<2.0	<2.0	2.6	<2.0	<2.0
Strontium (Sr)-Total	0.179	0.159	0.129	0.149	0.160	0.112	0.110	0.0772	0.0650	0.0994	0.161	0.251	0.424	0.0934	0.0635	0.347	0.0894	0.0520
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	0.00015	0.00016	<0.00010	<0.00010	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00017	<0.00010
Tin (Sn)-Total	0.150	0.210	0.113	0.280	0.329	0.259	0.229	0.133	0.225	0.223	0.204	0.019	<0.010	0.068	0.037	<0.010	0.106	0.092
Titanium (Ti)-Total	0.000193	0.000201	0.000110	0.000321	0.000270	0.000258	0.000209	0.000100	0.000109	0.000171	0.000174	0.000111	0.000064	0.000068	0.000041	0.000106	0.000077	0.000055
Uranium (U)-Total	0.0124	0.0244	0.0100	0.0403	0.0427	0.0242	0.0234	0.0109	0.0152	0.0211	0.0251	<0.0010	<0.0010	0.0064	0.0038	<0.0010	0.0104	0.0074
Vanadium (V)-Total	0.0239	0.0487	0.0263	0.0901	0.0918	0.0581	0.0580	0.0230	0.0319	0.0407	0.0544	0.0039	0.0304	0.0157	0.0119	0.0128	0.0201	0.0175
Zinc (Zn)-Total																		
Dissolved Metals																		
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0674	0.174	0.0791	0.0980	0.238	0.117	0.280	0.0815	0.136	0.125	0.104	0.0656	0.0299	0.0345	0.0636	0.0145	0.0432	0.136
Antimony (Sb)-Dissolved	0.00134	0.00118	0.00115	0.00121	0.00135	0.00098	0.00094	0.00064	0.00061	0.00084	0.00171	0.00169	0.00115	0.00058	0.00048	0.00127	0.00063	0.00049
Arsenic (As)-Dissolved	0.00094	0.00140	0.00109	0.00102	0.00127	0.00124	0.00139	0.00088	0.00104	0.00104	0.00108	0.00074	<0.00010	0.00016	0.00023	0.00030	0.00023	0.00071
Barium (Ba)-Dissolved	0.0303	0.0330	0.0309	0.0331	0.0427	0.0365	0.0361	0.0239	0.0252	0.0358	0.0475	0.0537	0.0416	0.0283	0.0226	0.0448	0.0272	0.0215
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000018	0.000011	0.000024	<0.000010	0.000010	<0.000010	0.000015	<0.000010	<0.000010	<0.000010	<0.000010	0.000049	0.000226	0.000036	0.000019	0.000126	0.000033	<0.000010
Calcium (Ca)-Dissolved	29.6	21.1	22.4	17.5	17.5	11.5	11.7	11.6	9.95	13.6	21.9	46.0	69.5	14.6	10.4	63.7	14.7	8.67
Chromium (Cr)-Dissolved	<0.00010	0.00015	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00024	0.00297	0.00019	<0.00010	0.00117	0.00016	<0.00010
Copper (Cu)-Dissolved	<0.00050	0.00052	<0.00050	<0.00050	0.00092	<0.00050	0.00058	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0481	0.00060	<0.00050	0.0186	0.00060	<0.00050
Iron (Fe)-Dissolved	0.033	0.065	<0.030	<0.030	0.045	<0.030	<0.030	<0.030	0.050	0.039	0.035	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.062
Lead (Pb)-Dissolved	<0.000050	0.000084	<0.000050	<0.000050	0.000197	<0.000050	0.000187	<0.000050	0.000074	0.000052	0.000052	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000086
Lithium (Li)-Dissolved	0.00140	0.00080	0.00085	0.00066	0.00073	0.00064	<0.00050	<0.00050	<0.00050	0.00053	0.00074	0.00415	0.00333	<0.00050	<0.00050	0.00299	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	2.11	1.48	1.67	1.38	1.36	0.847	0.849	0.780	0.576	1.06	1.76	3.94	5.73	1.06	0.703	5.10	1.04	0.568
Manganese (Mn)-Dissolved	0.00528	0.00340	0.00978	0.000573	0.00494	0.000547	0.00330	0.00134	0.00150	0.00102	0.000808	0.0285	0.490	0.0513	0.0246	0.203	0.0427	0.00349
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000030	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00129	0.000956	0.00102	0.00107	0.00108	0.000728	0.000726	0.000543	0.000489	0.000680	0.00141	0.00181	0.00158	0.000562	0.000402	0.00196	0.000577	0.000371
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00057	0.00235	<0.00050	<0.00050	0.00120	0.00096	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.412	0.390	0.334	0.358	0.396	0.203	0.294	0.155	0.154	0.208	0.377	0.486	0.590	0.175	0.126	0.603	0.179	0.133
Selenium (Se)-Dissolved	0.00035	0.00025	0.00027	0.00023	0.00023	0.00015	0.00017	0.00014	<0.00010	0.00016	0.00027	0.00030	0.00036	0.00017	0.00011	0.00030	0.00018	<0.00010
Silicon (Si)-Dissolved	1.13	1.06	1.02	0.797	0.899	0.582	0.593	0.455	0.421	0.517	0.811	1.28	2.18	0.569	0.355	1.67	0.554	0.437
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.5	2.1	<2.0	<2.0	2.6	<2.0	<2.0
Strontium (Sr)-Dissolved	0.157	0.119	0.126	0.0976	0.101	0.0651	0.0724	0.0645	0.0551	0.0765	0.126	0.272	0.429	0.0846	0.0620	0.357	0.0816	0.0471
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000074	0.000056	0.000055	0.000039	0.000046	0.000032	0.000037	0.000033	0.000018	0.000034	0.000056	0.000112	0.000045	0.000012	<0.000010	0.000106	0.000016	0.000015
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	0.0031	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0293	<0.0030	<0.0030	0.0129	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Lake	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC	Replicate																			
Sample ID	SUL (2 m)	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC3	SC3	SC3	SC3
Date Sampled	10-AUG-13	9-Feb-13	4-Mar-13	31-Mar-13	1-May-13	5-Jun-13	1-Jul-13	31-Jul-13	9-Feb-13	4-Mar-13	31-Mar-13	1-May-13	5-Jun-13	1-Jul-13	1-Jul-13	31-Jul-13	9-Feb-13	4-Mar-13	31-Mar-13	5-Jun-13
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1346151-18	L1267868-16	L1275970-14	L1285027-22	L1297319-6	L1313500-1	L1328124-9	L1341914-1	L1267868-13	L1275970-15	L1285027-24	L1297319-5	L1313500-3	L1328124-10	L1328124-12	L1341914-2	L1267868-12	L1275970-16	L1285027-16	L1313500-12
Physical Tests																				
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	57.5	368	391	390	418	148	75.7	60.8	443	460	450	435	195	95.8	96.2	74.4	405	422	419	195
Hardness (as $CaCO_3$)	24.2	180	180	190	208	70.9	35.9	27.3	212	211	221	212	73.7	43.9	45	32.6	195	194	204	90.9
pH	7.95	8.22	7.87	8.11	8.08	7.89	7.9	7.89	8.25	8.05	8.2	8.14	7.13	7.1	7.77	7.77	8.31	8.14	8.22	7.69
Total Suspended Solids	61.7	<3.0	<3.0	<3.0	<3.0	17	101	98.3	10.5	9.8	8	10.7	108	271	285	326	7.2	7.8	5.3	104
Total Dissolved Solids	40	236	252	269	290	98	55	40	281	301	307	294	133	60	62	46	254	273	282	131
Turbidity (NTU)	67.3	0.27	0.3	0.17	0.24	47.2	57.8	106	23.4	16.4	19.6	22.8	107	13.7	4.11	170	14.8	12.5	12.6	108
Anions and Nutrients																				
Acidity (as $CaCO_3$)	2.5	1.5	2.6	2	2.4	3.4	2.4	<1.0	<1.0	2	1.6	2.1	8.8	4	3	1.1	<1.0	1.5	1	4.8
Alkalinity, Bicarbonate (as $CaCO_3$)	15.9	74.3	77.9	78.5	76.7	34.9	21.5	16.8	95.8	103	95.5	92.1	17.2	23.6	23.4	18.5	91.3	99.9	96.2	18
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	15.9	74.3	77.9	78.5	76.7	34.9	21.5	16.8	95.8	103	95.5	92.1	17.2	23.6	23.4	18.5	91.3	99.9	96.2	18
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0078	<0.0050	<0.0050	0.0059	<0.0050	0.005	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	0.065	0.074	0.075	0.089	0.042	<0.020	<0.020	0.177	0.185	0.189	0.162	0.141	0.043	0.044	0.038	0.144	0.154	0.155	0.169
Nitrate (as N)	0.0088	0.0841	0.0743	0.07	0.0912	0.0382	0.016	0.0097	0.082	0.102	0.0743	0.287	0.0709	0.0173	0.017	0.01	0.129	0.145	0.124	0.0874
Nitrite (as N)	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.059	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	0.079	0.067	0.057	0.09	<0.050	<0.050	<0.050	0.08	0.089	0.066	0.295	0.075	<0.050	<0.050	<0.050	0.125	0.128	0.11	0.094
Orthophosphate-Dissolved (as P)	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	0.0154	<0.0010
Phosphorus (P)-Total	0.0774	<0.0020	<0.0020	<0.0020	<0.0020	0.0359	0.0623	0.157	0.0724	0.0404	0.0599	0.096	0.687	0.338	0.332	0.512	0.0408	0.0324	0.0395	0.745
Sulfate (SO_4)	9.72	115	125	131	147	38.7	14.5	9.8	136	142	148	140	76.7	23.1	23.1	15.2	117	123	129	76
Cyanides																				
Cyanide, Weak Acid Diss	<0.0010																			
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																				
Organic / Inorganic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	<0.50	<0.50	0.54	<0.50	<0.50	0.59
Total Organic Carbon																				
Total Metals																				
Aluminum (Al)-Total	2.81	0.0138	0.0151	0.0118	0.0255	2.02	4.41	4.71	0.561	0.495	0.576	0.532	3.58	8.01	7.86	8.78	0.378	0.338	0.347	3.3
Antimony (Sb)-Total	0.00164	0.00116	0.00115	0.00114	0.00105	0.00174	0.00218	0.00244	0.00065	0.00063	0.00069	0.00063	0.00112	0.00161	0.00162	0.00174	0.00059	0.00058	0.00062	0.00103
Arsenic (As)-Total	0.00622	0.00033	0.00032	0.0003	0.00025	0.00426	0.00856	0.00997	0.00458	0.00261	0.00276	0.00293	0.0289	0.011	0.0109	0.0116	0.00267	0.00221	0.00192	0.0316
Barium (Ba)-Total	0.0832	0.0439	0.0422	0.0403	0.0412	0.0716	0.113	0.119	0.0444	0.0459	0.0443	0.0431	0.0756	0.181	0.176	0.22	0.0428	0.0413	0.0415	0.0738
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00013	0.00019	0.00017	0.00021	0.00014	0.00026	0.00021	0.00021	0.00021	0.00014	<0.00010	0.00012	0.0003
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010
Cadmium (Cd)-Total	0.000093	0.000049	0.000053	0.000041	0.000114	0.000088	0.000145	0.000145	0.00261	0.00222	0.00241	0.00169	0.00276	0.00078	0.000798	0.000635	0.00175	0.00152	0.00161	0.00294
Calcium (Ca)-Total	8.81	66.8	65	70.1	78.2	24.8	13.2	10.3	76.7	75.4	81.8	77	30.6	18.4	18.7	15.6	70.4	66.9	74.2	32.7
Chromium (Cr)-Total	0.00181	<0.00010	<0.00010	<0.00010	<0.00020	0.00124	0.00257	0.00351	0.00012	0.00016	0.00014	<0.00020	0.00229	0.00702	0.00684	0.00826	0.00012	0.00032	0.0001	0.00201
Cobalt (Co)-Total	0.00142	0.00029	0.00031	0.00023	0.00094	0.00109	0.00211	0.00254	0.00252	0.00249	0.00251	0.00248	0.00534	0.00595	0.00602	0.00624	0.0016	0.0016	0.00162	0.00557
Copper (Cu)-Total	0.0131	0.0055	0.00612	0.00526	0.0214	0.0109	0.0158	0.0195	0.122	0.101	0.109	0.106	0.281	0.0941	0.0929	0.0636	0.0808	0.0676	0.0657	0.301
Iron (Fe)-Total	3.45	<0.030	<0.030	<0.030	0.053	2.28	5.28	6.09	2.92	2.27	2.76	2.93	12.4	13.2	13.2	13.9	1.85	1.67	1.72	12.8
Lead (Pb)-Total	0.00364	<0.000050	<0.000050	<0.000050	<0.000050	0.00241	0.00544	0.00602	0.00101	0.000889	0.00107	0.00101	0.00508	0.00812	0.0081	0.0102	0.000702	0.000664	0.000667	0.00525
Lithium (Li)-Total	0.00182	0.00168	0.00234	0.00251	0.00328	0.002	0.00304	0.00331	0.00152	0.00224	0.00224	0.00232	0.00232	0.00445	0.00458	0.00459	0.00113	0.0015	0.00196	0.0026
Magnesium (Mg)-Total	1.51	5.14	5.24	5.48	6.09	2.43	2.44	2.47	6.45	7.07	6.86	6.65	3.37	5.14	5.05	4.91	5.8	5.95	6.32	3.37
Manganese (Mn)-Total	0.124	0.0424	0.0444	0.0349	0.141	0.101	0.181	0.2	0.321	0.345	0.342	0.303	0.27	0.386	0.381	0.4	0.216	0.218	0.222	0.284
Mercury (Hg)-Total	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000021	0.000033	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000021	0.000021	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000509	0.00165	0.00163	0.00168	0.00156	0.00114	0.000784	0.000701	0.00293	0.00261	0.00287	0.00244	0.00363	0.00152	0.00155	0.00153	0.00263	0.00248	0.00254	0.00379
Nickel (Ni)-Total	0.00157	0.00084	0.00082	0.00073	0.00138	0.00128	0.00209	0.00274	0.00196	0.00192	0.00179	0.00214	0.00325	0.00669	0.00658	0.00714	0.00157	0.00154	0.00145	0.00321
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.63	0.45	0.45	0.55	<0.30	<0.30	<0.30	0.67

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Lake	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC	Replicate																			
Sample ID	SUL (2 m)	SC1	SC1	SC1	SC1	SC1	SC1	SC1	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC2	SC3	SC3	SC3	SC3
Date Sampled	10-AUG-13	9-Feb-13	4-Mar-13	31-Mar-13	1-May-13	5-Jun-13	1-Jul-13	31-Jul-13	9-Feb-13	4-Mar-13	31-Mar-13	1-May-13	5-Jun-13	1-Jul-13	1-Jul-13	31-Jul-13	9-Feb-13	4-Mar-13	31-Mar-13	5-Jun-13
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1346151-18	L1267868-16	L1275970-14	L1285027-22	L1297319-6	L1313500-1	L1328124-9	L1341914-1	L1267868-13	L1275970-15	L1285027-24	L1297319-5	L1313500-3	L1328124-10	L1328124-12	L1341914-2	L1267868-12	L1275970-16	L1285027-16	L1313500-12
Total Metals *(cont'd)*																				
Potassium (K)-Total	0.810	0.575	0.584	0.607	0.634	0.839	1.3	1.67	2.01	2	2	1.89	1.49	2.5	2.5	2.91	1.83	1.77	1.81	1.38
Selenium (Se)-Total	0.00013	0.00071	0.0006	0.00057	0.00064	0.00035	0.00021	0.00018	0.00238	0.00239	0.00221	0.00262	0.00216	0.00072	0.00073	0.0007	0.0021	0.002	0.00195	0.00221
Silicon (Si)-Total	6.42	1.83	1.8	1.81	1.97	5.02	10.1	9.65	2.66	2.85	2.75	2.7	6.42	14.4	14.5	16.3	2.71	2.74	2.72	6.43
Silver (Ag)-Total	0.000096	<0.000010	<0.000010	<0.000010	<0.000010	0.000055	0.000116	0.000137	<0.000010	<0.000010	<0.000010	<0.000010	0.000063	0.000175	0.000175	0.000218	<0.000010	<0.000010	<0.000010	0.000067
Sodium (Na)-Total	<2.0	2.2	2.5	2.4	2.5	<2.0	<2.0	<2.0	3.6	4.2	3.8	3.1	<2.0	<2.0	<2.0	<2.0	3.6	3.8	3.8	<2.0
Strontium (Sr)-Total	0.0502	0.378	0.368	0.392	0.436	0.141	0.0784	0.0578	0.421	0.441	0.463	0.441	0.176	0.109	0.111	0.089	0.393	0.398	0.412	0.188
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	0.00012	0.00014	<0.00010	<0.00010	<0.00010	0.00013
Tin (Sn)-Total	0.101	<0.010	<0.010	<0.010	<0.010	0.055	0.164	0.153	<0.010	<0.010	<0.010	<0.010	0.141	0.488	0.516	0.541	<0.010	<0.010	<0.010	0.137
Titanium (Ti)-Total	0.000055	0.000099	0.000111	0.000114	0.000087	0.000074	0.000094	0.000089	0.00055	0.000563	0.000586	0.000531	0.000485	0.00033	0.000317	0.000417	0.000438	0.000453	0.000482	0.000502
Uranium (U)-Total	0.0071	<0.0010	<0.0010	<0.0010	<0.0010	0.0051	0.0107	0.0143	<0.0010	<0.0010	<0.0010	<0.0010	0.0099	0.0304	0.0297	0.032	<0.0010	<0.0010	<0.0010	0.0095
Vanadium (V)-Total	0.0204	0.0062	0.0072	0.0057	0.0154	0.0121	0.0229	0.0253	0.183	0.16	0.164	0.118	0.204	0.0823	0.0818	0.0743	0.12	0.108	0.108	0.218
Zinc (Zn)-Total																				
Dissolved Metals																				
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.115	0.0089	0.0084	0.0074	0.0186	0.045	0.087	0.0666	0.062	0.0702	0.0681	0.0657	0.0067	0.0381	0.0452	0.0665	0.0716	0.0807	0.0825	0.0265
Antimony (Sb)-Dissolved	0.00050	0.00115	0.0011	0.00116	0.00102	0.00112	0.00071	0.00055	0.00053	0.00051	0.00055	0.00051	0.00027	0.00042	0.00042	0.00035	0.0005	0.0005	0.00052	0.00034
Arsenic (As)-Dissolved	0.00067	0.00028	0.00028	0.00026	0.00017	0.00057	0.00059	0.00052	<0.00010	<0.00010	0.0001	0.00014	<0.00010	0.00016	0.00017	0.00017	0.00011	0.00016	0.00016	0.00026
Barium (Ba)-Dissolved	0.0209	0.0431	0.0421	0.04	0.0398	0.0292	0.0278	0.0218	0.0423	0.0426	0.0414	0.0398	0.0336	0.0342	0.0364	0.0333	0.0399	0.0409	0.0397	0.0296
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010
Cadmium (Cd)-Dissolved	<0.000010	0.000048	0.000046	0.000061	0.000103	0.000039	<0.000010	<0.000010	0.0013	0.00122	0.00121	0.000769	0.00217	0.000101	0.000067	0.000046	0.000831	0.000759	0.000764	0.0014
Calcium (Ca)-Dissolved	8.77	64	63.5	67.3	73.6	25.4	12.9	9.96	74.4	73.7	77.8	74.6	25.6	15.8	16.2	11.9	68.9	68.2	71.9	32.5
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	0.00026	0.00025	0.00021	0.0009	0.0001	<0.00010	<0.00010	0.00204	0.00205	0.00204	0.00194	0.00387	0.00017	<0.00010	<0.00010	0.00125	0.00122	0.00129	0.00359
Copper (Cu)-Dissolved	<0.00050	0.00454	0.00487	0.00388	0.0152	<0.00050	<0.00050	<0.00050	0.0034	0.00434	0.00318	0.00372	0.0101	<0.00050	0.00053	<0.00050	0.00293	0.00334	0.00258	0.00388
Iron (Fe)-Dissolved	0.043	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.07
Lead (Pb)-Dissolved	0.000058	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.00050	0.00145	0.0022	0.00226	0.00298	0.0008	<0.00050	<0.00050	0.00135	0.00216	0.00194	0.00219	0.00073	<0.00050	<0.00050	<0.00050	0.00094	0.00153	0.00164	0.00106
Magnesium (Mg)-Dissolved	0.562	4.95	5.18	5.28	5.9	1.79	0.925	0.593	6.27	6.61	6.54	6.3	2.38	1.1	1.12	0.74	5.58	5.85	5.98	2.38
Manganese (Mn)-Dissolved	0.00331	0.0371	0.0397	0.0312	0.139	0.0311	0.00103	0.00143	0.303	0.32	0.313	0.279	0.206	0.0449	0.0266	0.0263	0.198	0.195	0.203	0.21
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000374	0.00156	0.00155	0.00168	0.00148	0.00109	0.000552	0.000406	0.00253	0.00235	0.00249	0.00217	0.000979	0.000871	0.000873	0.000663	0.00232	0.00224	0.0023	0.00204
Nickel (Ni)-Dissolved	<0.00050	0.00081	0.00073	0.00076	0.00128	<0.00050	<0.00050	<0.00050	0.00159	0.00162	0.00149	0.00163	0.00172	<0.00050	<0.00050	<0.00050	0.0012	0.00122	0.00126	0.00143
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.131	0.56	0.578	0.587	0.628	0.342	0.194	0.141	1.97	1.93	1.92	1.84	0.97	0.788	0.812	0.795	1.76	1.75	1.78	0.867
Selenium (Se)-Dissolved	<0.00010	0.00067	0.0006	0.0006	0.00062	0.00023	0.00015	<0.00010	0.00224	0.00234	0.00206	0.0025	0.00114	0.00043	0.00043	0.0003	0.00202	0.00196	0.00188	0.00119
Silicon (Si)-Dissolved	0.389	1.76	1.79	1.79	2.06	1.07	0.506	0.314	2.29	2.36	2.28	2.33	1.37	0.602	0.622	0.448	2.35	2.43	2.39	1.33
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	2.1	2.4	2.4	2.3	<2.0	<2.0	<2.0	3.5	4	3.7	2.9	<2.0	<2.0	<2.0	<2.0	3.4	3.7	3.6	<2.0
Strontium (Sr)-Dissolved	0.0473	0.356	0.353	0.392	0.418	0.14	0.0719	0.0517	0.414	0.432	0.444	0.421	0.137	0.0829	0.0862	0.0603	0.378	0.386	0.408	0.179
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	0.000011	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000014	0.000091	0.000102	0.000114	0.000082	0.00005	0.000023	0.000012	0.000413	0.000469	0.000452	0.000407	<0.000010	0.000018	0.000019	0.000015	0.000364	0.000383	0.00037	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	0.0056	0.0062	0.0051	0.0148	<0.0030	<0.0030	<0.0030	0.0436	0.0485	0.0397	0.0224	0.13	<0.0030	<0.0030	<0.0030	0.0252	0.0241	0.0222	0.0625

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC																			
Sample ID	SC3	SC3	SC3	UR1	UR1	UR1	UR1	UR1	UR1A	UR1A	UR1A	UR1A	UR2	UR2	UR2	UR2	UR2	UR2	UR2
Date Sampled	5-Jun-13	4-Sep-13	4-Sep-13	9-Feb-13	4-Mar-13	31-Mar-13	5-Jun-13	3-Sep-13	9-Feb-13	4-Mar-13	31-Mar-13	5-Jun-13	9-Feb-13	4-Mar-13	4-Mar-13	31-Mar-13	31-Mar-13	4-Jun-13	2-Sep-13
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1313500-7	L1359396-7	L1359396-8	L1267868-8	L1275970-21	L1285027-17	L1313500-6	L1359396-3	L1267868-11	L1275970-17	L1285027-15	L1313500-8	L1267868-6	L1275970-22	L1275970-27	L1285027-20	L1285027-34	L1313121-25	L1359396-1
Physical Tests																			
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	195	92.8	92.9	304	308	332	125	105	213	222	236	84.6	235	247	246	259	261	110	82.4
Hardness (as $CaCO_3$)	73.5	41.4	41.8	147	140	160	57.4	47.6	101	98.8	112	41.1	111	112	114	123	122	51.1	37.7
pH	7.73	8	8.13	8.27	8.04	8.24	7.91	8.13	8.31	8.15	8.22	8	8.27	8.11	8.12	8.17	8.21	7.82	8.2
Total Suspended Solids	104	91.7	126	4.8	<3.0	<3.0	44.3	72.7	<3.0	<3.0	<3.0	16.3	<3.0	<3.0	3.1	<3.0	<3.0	45.1	60.3
Total Dissolved Solids	131	56	60	182	184	220	88	65	122	131	147	59	139	121	141	171	169	78	77
Turbidity (NTU)	97.7	78.8	98.9	6.98	4.92	4.53	48.1	61.6	0.32	0.38	0.37	14.8	1.43	1.23	1.27	1.05	1.01	35.3	48.5
Anions and Nutrients																			
Acidity (as $CaCO_3$)	4.7	5.2	3.1	<1.0	1.8	1.1	3.5	3	<1.0	3.4	1.1	3	<1.0	1.8	1.7	1.9	1.3	12.4	2.1
Alkalinity, Bicarbonate (as $CaCO_3$)	16	23.4	23.3	86.8	88.6	91.1	29	29.8	77.7	82.2	85.6	30.4	73.2	80.4	75.3	82.4	81.3	31.7	27.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	16	23.4	23.3	86.8	88.6	91.1	29	29.8	77.7	82.2	85.6	30.4	73.2	80.4	75.3	82.4	81.3	31.7	27.3
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	0.021	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	0.65	0.73	0.73	0.79	0.79	<0.50	<0.50
Fluoride (F)	0.171	0.034	0.034	0.083	0.087	0.1	0.077	0.03	0.037	0.045	0.045	0.031	0.057	0.067	0.066	0.07	0.068	0.066	0.028
Nitrate (as N)	0.0878	0.0128	0.0129	0.102	0.0968	0.0903	0.0622	0.0168	0.0806	0.0829	0.0815	0.0478	0.158	0.162	0.163	0.142	0.141	0.111	0.0232
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	0.087	<0.050	<0.050	0.091	0.096	0.085	0.073	<0.050	0.079	0.075	0.073	0.057	0.145	0.161	0.155	0.132	0.137	0.117	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0016	<0.0010
Phosphorus (P)-Total	0.748	0.202	0.181	0.0213	0.0057	0.0163	0.286	0.128	<0.0020	<0.0020	<0.0020	0.0398	0.0044	0.0026	0.0024	0.0043	0.0042	0.148	0.0772
Sulfate (SO_4)	76.2	20.7	20.7	72.9	71.3	85.9	33.7	20.4	33.8	35.4	40.9	11.1	46.1	48.2	48.2	55.9	55.5	23.5	13.5
Cyanides																			
Cyanide, Weak Acid Diss																			
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate																			
Organic / Inorganic Carbon	<0.50	<0.50	<0.50	0.59	<0.50	0.54	0.55	<0.50	0.78	<0.50	<0.50	0.7	0.6	<0.50	<0.50	<0.50	0.67	0.9	<0.50
Total Organic Carbon																			
Total Metals																			
Aluminum (Al)-Total	3.13	4.31	3.86	0.178	0.142	0.16	1.63	2.79	0.0137	0.0116	0.0095	0.931	0.0435	0.0441	0.0463	0.0452	0.0453	1.78	2.85
Antimony (Sb)-Total	0.0009	0.00086	0.00088	0.00111	0.00131	0.00111	0.00078	0.00076	0.00155	0.0017	0.00172	0.00073	0.00049	0.0005	0.00054	0.00053	0.00053	0.00053	0.00046
Arsenic (As)-Total	0.0308	0.00441	0.00415	0.00149	0.00103	0.00097	0.0107	0.00354	0.00032	0.00034	0.00034	0.00108	0.00051	0.00051	0.00051	0.00051	0.00051	0.00606	0.00211
Barium (Ba)-Total	0.0698	0.123	0.124	0.0417	0.0413	0.0409	0.0414	0.0793	0.0371	0.0352	0.0425	0.0276	0.0442	0.0432	0.0432	0.0471	0.0481	0.0451	0.0667
Beryllium (Be)-Total	0.00028	0.00013	0.00013	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.01	<0.010	<0.010
Cadmium (Cd)-Total	0.00294	0.000446	0.000476	0.000817	0.000594	0.000731	0.000966	0.00032	0.000018	0.000019	0.000018	0.000064	0.000172	0.000151	0.000149	0.000187	0.000178	0.000445	0.000129
Calcium (Ca)-Total	29.2	16.6	16	51.6	51.6	56.9	19.1	16.8	32.4	32.5	37.7	13	40.3	39.3	40.6	44.3	44.2	17.4	13.6
Chromium (Cr)-Total	0.00198	0.00342	0.00334	0.0001	0.00014	0.00011	0.00187	0.00303	0.0001	<0.00010	0.00012	0.00184	<0.00010	0.00011	<0.00010	0.0001	0.00011	0.00221	0.00337
Cobalt (Co)-Total	0.00545	0.00261	0.00237	0.00072	0.00062	0.00075	0.00227	0.00173	<0.00010	<0.00010	<0.00010	0.00068	0.00014	0.00013	0.00013	0.00017	0.00016	0.00139	0.00142
Copper (Cu)-Total	0.296	0.0404	0.0386	0.0364	0.0262	0.0297	0.0965	0.0264	0.00066	<0.00050	<0.00050	0.00287	0.00704	0.00675	0.00668	0.00685	0.00714	0.0417	0.0127
Iron (Fe)-Total	12.4	6.2	5.94	0.886	0.693	0.763	5.14	4.1	0.053	0.046	0.048	1.45	0.17	0.173	0.171	0.174	0.172	3.62	3.41
Lead (Pb)-Total	0.00467	0.00367	0.00391	0.000311	0.000275	0.00029	0.00217	0.00234	0.00005	<0.000050	<0.000050	0.00077	0.000075	0.000073	0.00007	0.000074	0.000081	0.00143	0.00201
Lithium (Li)-Total	0.0022	0.00218	0.00204	0.00102	0.00145	0.00161	0.00139	0.00155	0.00084	0.00126	0.00177	0.00088	<0.00050	0.00072	0.00051	0.00067	<0.00050	0.00138	0.00122
Magnesium (Mg)-Total	3.3	2.81	2.72	5.4	5.45	5.82	2.72	2.6	5.01	5.2	5.77	2.39	3.33	3.6	3.29	3.67	3.69	2.3	2.15
Manganese (Mn)-Total	0.277	0.194	0.179	0.0974	0.0861	0.106	0.116	0.127	0.00757	0.00715	0.00942	0.0328	0.0199	0.0193	0.019	0.0235	0.0236	0.0751	0.09
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00338	0.00114	0.00111	0.00179	0.0021	0.00185	0.00153	0.000985	0.00111	0.00106	0.00115	0.000545	0.00279	0.00265	0.0032	0.00284	0.00285	0.00183	0.00132
Nickel (Ni)-Total	0.00319	0.00285	0.0027	0.00091	0.00081	0.00087	0.00256	0.00269	<0.00050	<0.00050	<0.00050	0.00227	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0022	0.00257
Phosphorus (P)-Total	0.66	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table A2-6. 2013: Brucejack, Sulphurets, and Unuk River Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**
QAQC																			
Sample ID	**SC3**	**SC3**	**SC3**	**UR1**	**UR1**	**UR1**	**UR1**	**UR1**	**UR1A**	**UR1A**	**UR1A**	**UR1A**	**UR2**	**UR2**	**UR2**	**UR2**	**UR2**	**UR2**	**UR2**
Date Sampled	**5-Jun-13**	**4-Sep-13**	**4-Sep-13**	**9-Feb-13**	**4-Mar-13**	**31-Mar-13**	**5-Jun-13**	**3-Sep-13**	**9-Feb-13**	**4-Mar-13**	**31-Mar-13**	**5-Jun-13**	**9-Feb-13**	**4-Mar-13**	**4-Mar-13**	**31-Mar-13**	**31-Mar-13**	**4-Jun-13**	**2-Sep-13**
Included/Excluded	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L1313500-7**	**L1359396-7**	**L1359396-8**	**L1267868-8**	**L1275970-21**	**L1285027-17**	**L1313500-6**	**L1359396-3**	**L1267868-11**	**L1275970-17**	**L1285027-15**	**L1313500-8**	**L1267868-6**	**L1275970-22**	**L1275970-27**	**L1285027-20**	**L1285027-34**	**L1313121-25**	**L1359396-1**
Total Metals *(cont'd)*																			
Potassium (K)-Total	1.31	1.76	1.54	1.2	1.1	1.25	0.779	1.22	0.571	0.562	0.635	0.504	1.3	1.33	1.3	1.39	1.4	0.943	1.22
Selenium (Se)-Total	0.00223	0.00057	0.00063	0.00138	0.00128	0.00142	0.00089	0.00054	0.0007	0.00068	0.00078	0.0003	0.00086	0.00081	0.00078	0.00086	0.00094	0.00058	0.00032
Silicon (Si)-Total	5.96	10.1	8.03	2.32	2.35	2.39	3.83	6.04	2.01	2.06	2.19	3.05	2.69	2.83	2.8	2.71	2.75	5.15	7.29
Silver (Ag)-Total	0.000059	0.000075	0.00007	<0.000010	<0.000010	<0.000010	0.000029	0.000052	<0.000010	<0.000010	<0.000010	0.000018	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000036	0.000032
Sodium (Na)-Total	<2.0	<2.0	<2.0	3.4	3.5	3.6	<2.0	<2.0	3.2	3.4	3.7	<2.0	2.9	3	3	3	3.1	<2.0	<2.0
Strontium (Sr)-Total	0.164	0.0914	0.0882	0.324	0.324	0.359	0.135	0.103	0.268	0.275	0.313	0.121	0.227	0.233	0.233	0.251	0.248	0.108	0.079
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	0.125	0.254	0.238	<0.010	<0.010	<0.010	0.066	0.144	<0.010	<0.010	<0.010	0.036	<0.010	<0.010	<0.010	<0.010	<0.010	0.114	0.188
Titanium (Ti)-Total	0.000446	0.000342	0.000197	0.000217	0.000206	0.00025	0.000176	0.000123	0.000038	0.000041	0.000045	0.000027	0.000329	0.000357	0.000366	0.000384	0.000375	0.000235	0.000273
Uranium (U)-Total	0.0093	0.0144	0.0131	<0.0010	<0.0010	<0.0010	0.0056	0.01	<0.0010	<0.0010	<0.0010	0.0038	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0058	0.0089
Vanadium (V)-Total	0.216	0.0461	0.0471	0.0567	0.0447	0.0499	0.0768	0.0309	<0.0030	0.003	<0.0030	0.0102	0.012	0.0121	0.012	0.0129	0.0132	0.0385	0.0171
Zinc (Zn)-Total																			
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0093	0.0432	0.0407	0.0578	0.056	0.0865	0.0351	0.0329	0.0037	0.0041	0.0033	0.0412	0.022	0.0226	0.0228	0.0266	0.0246	0.0733	0.312
Antimony (Sb)-Dissolved	0.00025	0.00033	0.00033	0.00099	0.00118	0.00108	0.00051	0.00041	0.00157	0.00164	0.00165	0.00063	0.00046	0.00046	0.00053	0.00051	0.00048	0.00032	0.00025
Arsenic (As)-Dissolved	<0.00010	0.00011	0.00011	0.00014	0.00016	0.00037	0.00015	0.00012	0.0003	0.00027	0.00025	0.00022	0.00023	0.00028	0.00029	0.00031	0.00026	0.00035	0.00028
Barium (Ba)-Dissolved	0.0299	0.037	0.037	0.0394	0.0384	0.0403	0.0204	0.0291	0.0373	0.036	0.0404	0.0151	0.0427	0.0424	0.0422	0.0461	0.0459	0.0219	0.03
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	0.01	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.00135	0.000133	0.00013	0.000461	0.00038	0.000503	0.000282	0.000111	0.000019	0.000018	0.000018	0.000027	0.000139	0.000124	0.000134	0.000158	0.000149	0.000136	0.000049
Calcium (Ca)-Dissolved	25.6	14.9	15.1	50.4	47.3	54.8	19.5	16.6	32.3	31.1	36	13.1	39.4	39	40.3	43.2	42.9	17.8	13.3
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00013	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	0.00014	0.00029
Cobalt (Co)-Dissolved	0.00352	0.00016	0.00014	0.00061	0.00052	0.00066	0.00089	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	0.00012	0.00013	0.00014	0.00015	0.00031	0.00016
Copper (Cu)-Dissolved	0.0025	<0.00050	<0.00050	0.00267	0.00246	0.00898	0.00175	<0.00050	<0.00050	<0.00050	<0.00050	0.00055	0.00187	0.00175	0.00179	0.0025	0.00185	0.00174	0.00136
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	0.184	<0.030	<0.030	<0.030	<0.030	<0.030	0.032	<0.030	<0.030	<0.030	<0.030	<0.030	0.035	0.28
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000072	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000198
Lithium (Li)-Dissolved	0.00069	<0.00050	<0.00050	0.00089	0.00156	0.0015	<0.00050	<0.00050	0.00083	0.00129	0.00154	<0.00050	<0.00050	0.00076	<0.00050	0.00058	<0.00050	0.00061	<0.00050
Magnesium (Mg)-Dissolved	2.36	1	0.999	5.14	5.39	5.68	2.13	1.48	4.92	5.14	5.5	2.02	3.14	3.47	3.3	3.59	3.54	1.62	1.08
Manganese (Mn)-Dissolved	0.207	0.0432	0.0431	0.0889	0.0781	0.099	0.0672	0.032	0.00702	0.00609	0.00879	0.00668	0.0184	0.0175	0.018	0.0219	0.0219	0.0282	0.0175
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00165	0.000814	0.000844	0.00166	0.00151	0.00171	0.00117	0.000843	0.00101	0.00103	0.0011	0.000509	0.00262	0.00256	0.003	0.00273	0.00276	0.00172	0.00125
Nickel (Ni)-Dissolved	0.00141	<0.00050	<0.00050	0.00076	0.00072	0.00082	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.872	0.684	0.685	1.15	1.08	1.22	0.516	0.57	0.565	0.557	0.607	0.308	1.25	1.31	1.3	1.36	1.35	0.663	0.672
Selenium (Se)-Dissolved	0.00127	0.00044	0.00044	0.00136	0.00126	0.0015	0.00066	0.00047	0.00075	0.00074	0.00077	0.00028	0.00085	0.00084	0.00081	0.00093	0.00087	0.00049	0.00026
Silicon (Si)-Dissolved	1.28	0.663	0.648	2.12	2.19	2.2	1.23	0.711	1.97	2.02	2.02	1.3	2.54	2.75	2.68	2.6	2.65	1.6	1.67
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	3.2	3.4	3.4	<2.0	<2.0	3.1	3.3	3.4	<2.0	2.7	2.9	2.9	2.9	3	<2.0	<2.0
Strontium (Sr)-Dissolved	0.139	0.0756	0.0762	0.312	0.314	0.347	0.135	0.0969	0.259	0.259	0.294	0.118	0.209	0.215	0.228	0.241	0.239	0.104	0.0733
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013
Uranium (U)-Dissolved	<0.000010	0.000016	0.000018	0.000183	0.00018	0.000229	0.000026	0.000026	0.000038	0.00004	0.000043	0.000013	0.000318	0.000346	0.000356	0.000358	0.000361	0.000099	0.000124
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0596	<0.0030	<0.0030	0.0171	0.0148	0.024	0.0091	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0086	0.0077	0.0077	0.0088	0.0078	0.0052	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Appendix 3

Water Quality Data for Off-Site Ancillary Project Infrastructure Sampling Sites, 2010-2013

Table A3-1. 2010: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Table A3-3. 2012: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Table A3-4. 2013: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Table A3-1. 2010: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC														replicate					replicate	
Sample ID	BR1	BR1	BR1	BR1	BR1	BR1	BR1	BR1	BR1	BR1	BR2	BR2	BR2	BR2	BR2	BR2	BR2	BR2	BR2	BR2
Date Sampled	20-May-10	1-Jun-10	8-Jun-10	21-Jun-10	22-Jul-10	26-Aug-10	21-Sep-10	19-Oct-10	15-Nov-10	14-Dec-10	20-May-10	1-Jun-10	8-Jun-10	8-Jun-10	21-Jun-10	22-Jul-10	26-Aug-10	21-Sep-10	19-Oct-10	19-Oct-10
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L889248-2	L893465-1	L896218-1	L900776-1	L912512-1	L927354-6	L939078-1	L945638-1	L955657-1	L964080-1	L889248-3	L893465-2	L896218-2	L896218-7	L900776-2	L912512-2	L927354-7	L939078-2	L945638-10	L945638-2
Physical Tests																				
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.8	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	8.4	10.5
Conductivity (uS/cm)	179	159	148	103	68.2	66.6	132	132	164	177	106	101	114	113	99.3	90.9	105	144	142	142
Hardness (as $CaCO_3$)	89.2	71.8	67.7	48.3	33.1	32.1	59.8	56.9	72.1	90.2	51.9	45.4	52.4	55.7	46.3	45.1	50.0	67.1	66.9	65.8
pH	8.01	7.24	7.66	7.92	7.84	7.61	8.06	8.19	8.01	8.03	7.92	7.53	7.65	7.18	7.96	7.95	7.87	8.05	8.18	8.24
Total Suspended Solids	15.5	52.8	32.6	94.3	144	159	229	178	13.1	4.0	27.0	34.3	30.1	34.1	64.8	96.3	61.1	6.0	3.3	3.3
Total Dissolved Solids	120	111	118	90	55	50	90	105	114	118	69	70	84	77	73	72	82	89	96	95
Turbidity (NTU)	22.1	82.9	86.8	154	190	178	75.7	274	75.3	22.8	22.2	40.7	50.7	53.2	91.0	108	62.7	5.35	3.41	3.32
Anions and Nutrients																				
Acidity (as $CaCO_3$)	2.3	4.9	3.2	2.6	1.5	3.8	2.3	3.5	2.7	6.8	2.1	3.4	2.9	2.6	2.6	1.6	4.0	2.6	3.7	2.4
Alkalinity, Bicarbonate (as $CaCO_3$)	62.8	50.8	52.3	37.1	28.1	27.9	47.7	47.3	58.6	61.3	38.7	36.9	41.6	46.9	41.2	37.6	42.4	49.3	48.8	48.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<2.0	<2.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<2.0	<2.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	62.8	50.8	52.3	37.1	28.1	27.9	47.7	47.3	58.6	61.3	38.7	36.9	41.6	46.9	41.2	37.6	42.4	49.3	48.8	48.3
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	0.0308	<0.0050	0.0060	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.030	0.024	0.025	<0.020	<0.020	<0.020	<0.020	<0.020	0.035	0.037	0.029	0.025	0.026	0.027	<0.020	<0.020	<0.020	0.020	0.021	0.020
Nitrate (as N)	0.100	0.0572	0.0479	0.0288	0.0138	0.0076	0.0106	0.0491	0.0684	0.0726	0.666	0.196	0.125	0.126	0.0480	0.0322	0.0303	0.0534	0.375	0.379
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	0.063	<0.050	<0.050	<0.050	0.055	0.069	0.071	<0.050	<0.050	0.136	0.084	<0.050	<0.050	0.092	<0.050	<0.050	<0.050	0.075	0.051
Total Nitrogen	0.100	0.120	0.070	0.070	<0.050	0.063	0.080	0.120	0.080	0.070	0.802	0.280	0.170	0.150	0.140	<0.050	0.060	0.080	0.450	0.430
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	0.0256	0.0881	0.0762	0.121	0.171	0.127	0.223	0.190	0.0462	0.0128	0.0429	0.0714	0.0565	0.0674	0.111	0.134	0.0733	0.0110	0.0083	0.0079
Sulfate (SO_4)	32.8	26.9	23.5	14.5	7.57	7.07	7.12	17.4	23.8	27.4	13.5	12.3	14.0	14.0	11.4	9.77	12.5	18.6	17.8	17.9
Cyanides																				
Cyanide, Weak Acid Diss	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	0.0013	0.0011	<0.0010	0.0012	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	0.0021	0.0018	0.0016	0.0015	0.0010	0.0011	<0.0010	<0.0010	0.0029	0.0029
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																				
Total Organic Carbon	0.83	0.95	0.79	0.71	1.09	2.18	0.98	1.45	1.45	0.56	2.11	1.36	1.14	0.92	0.58	0.84	2.06	0.56	2.52	2.33
Total Metals																				
Aluminum (Al)-Total	1.14	3.59	4.14	6.14	7.62	5.48	9.16	8.42	3.15	1.08	1.50	1.81	2.62	2.86	3.38	4.64	2.74	0.577	0.159	0.191
Antimony (Sb)-Total	0.00039	0.00053	0.00066	0.00087	0.00087	0.00083	0.00136	0.00134	0.00067	0.00049	0.00022	0.00030	0.00045	0.00046	0.00047	0.00057	0.00040	0.00022	0.00013	0.00013
Arsenic (As)-Total	0.00090	0.00207	0.00258	0.00363	0.00398	0.00423	0.00645	0.00707	0.00205	0.00096	0.00130	0.00170	0.00227	0.00230	0.00305	0.00318	0.00254	0.00079	0.00033	0.00032
Barium (Ba)-Total	0.0700	0.102	0.117	0.142	0.142	0.119	0.188	0.205	0.0917	0.0597	0.0451	0.0571	0.0735	0.0770	0.0909	0.110	0.0857	0.0520	0.0309	0.0316
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	0.011	<0.020	0.013	0.012	<0.010	0.011	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000039	0.000078	0.000092	0.000159	0.000165	0.000162	0.000241	0.000262	0.000065	0.000032	0.000099	0.000112	0.000170	0.000176	0.000199	0.000133	0.000086	0.000028	0.000040	0.000037
Calcium (Ca)-Total	32.1	26.3	25.7	17.3	12.1	12.7	22.6	21.7	25.5	31.6	16.8	15.9	18.7	19.6	14.9	15.5	18.4	24.7	20.1	21.1
Chromium (Cr)-Total	0.00095	0.00343	0.00531	0.00870	0.00926	0.00793	0.0158	0.0137	0.00434	0.00165	0.00121	0.00153	0.00237	0.00248	0.00255	0.00292	0.00171	0.00040	0.00037	0.00041
Cobalt (Co)-Total	0.00059	0.00162	0.00192	0.00309	0.00363	0.00325	0.00557	0.00522	0.00146	0.00049	0.00067	0.00084	0.00124	0.00129	0.00177	0.00198	0.00114	0.00024	0.00011	0.00010
Copper (Cu)-Total	0.00189	0.00475	0.00654	0.0106	0.0119	0.0124	0.0198	0.0199	0.00573	0.00253	0.00192	0.00206	0.00301	0.00306	0.00367	0.00358	0.00216	0.00080	0.00134	0.00087
Iron (Fe)-Total	1.20	3.63	4.37	7.25	9.29	7.05	12.9	12.6	3.24	1.09	1.52	2.10	3.01	2.91	4.26	5.67	3.16	0.562	0.193	0.199
Lead (Pb)-Total	0.000763	0.00189	0.00231	0.00412	0.00471	0.00392	0.00609	0.00592	0.00150	0.000546	0.000588	0.000882	0.00110	0.00111	0.00185	0.00225	0.00120	0.000300	0.000084	0.000076
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0069	0.0061	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	3.94	3.67	3.85	3.72	3.88	3.30	6.23	6.74	3.34	2.91	3.38	2.50	3.21	3.29	2.58	2.67	2.34	2.67	3.61	3.70
Manganese (Mn)-Total	0.0471	0.112	0.117	0.178	0.207	0.186	0.292	0.284	0.0682	0.0232	0.0542	0.0705	0.0885	0.0942	0.133	0.155	0.0937	0.0195	0.00933	0.00965
Mercury (Hg)-Total	<0.000010	<0.000010	0.000011	0.000015	0.000024	0.000017	0.000019	0.000023	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	0.000012	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00139	0.00127	0.00130	0.00111	0.000823	0.000767	0.00145	0.00147	0.00134	0.00137	0.000408	0.000470	0.000744	0.000729	0.000726	0.000774	0.000913	0.000904	0.000445	0.000462
Nickel (Ni)-Total	0.00107	0.00322	0.00389	0.00622	0.00701	0.00579	0.0107	0.0100	0.00284	0.00167	0.00176	0.00165	0.00233	0.00243	0.00277	0.00277	0.00148	<0.00050	0.00094	0.00088

Table A3-1. 2010: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**
QAQC														**replicate**					**replicate**	
Sample ID	**BR1**	**BR1**	**BR1**	**BR1**	**BR1**	**BR1**	**BR1**	**BR1**	**BR1**	**BR1**	**BR2**	**BR2**	**BR2**	**BR2**	**BR2**	**BR2**	**BR2**	**BR2**	**BR2**	**BR2**
Date Sampled	**20-May-10**	**1-Jun-10**	**8-Jun-10**	**21-Jun-10**	**22-Jul-10**	**26-Aug-10**	**21-Sep-10**	**19-Oct-10**	**15-Nov-10**	**14-Dec-10**	**20-May-10**	**1-Jun-10**	**8-Jun-10**	**8-Jun-10**	**21-Jun-10**	**22-Jul-10**	**26-Aug-10**	**21-Sep-10**	**19-Oct-10**	**19-Oct-10**
Included/Excluded	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L889248-2**	**L893465-1**	**L896218-1**	**L900776-1**	**L912512-1**	**L927354-6**	**L939078-1**	**L945638-1**	**L955657-1**	**L964080-1**	**L889248-3**	**L893465-2**	**L896218-2**	**L896218-7**	**L900776-2**	**L912512-2**	**L927354-7**	**L939078-2**	**L945638-10**	**L945638-2**
Total Metals *(cont'd)*																				
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	0.770	1.48	1.71	2.22	2.11	1.55	2.38	2.06	1.31	0.813	0.612	0.760	1.09	1.22	1.31	1.88	1.15	0.425	0.220	0.243
Selenium (Se)-Total	0.00053	0.00056	0.00043	0.00045	<0.00020	0.00036	0.00060	0.00066	0.00054	0.00055	<0.00020	0.00027	0.00028	0.00043	0.00031	<0.00020	<0.00020	0.00039	0.00038	0.00038
Silicon (Si)-Total	2.95	7.31	10.1	13.0	16.9	9.09	24.4	20.7	7.32	3.34	4.31	4.77	6.91	7.17	6.73	9.73	5.23	2.32	2.53	2.70
Silver (Ag)-Total	<0.000010	0.000040	0.000062	0.000099	0.000081	0.000065	0.000121	0.000112	0.000027	0.000013	<0.000020	0.000024	0.000027	0.000035	0.000047	0.000049	0.000023	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.215	0.145	0.149	0.0977	0.0688	0.0704	0.123	0.139	0.155	0.165	0.174	0.125	0.160	0.163	0.126	0.109	0.138	0.191	0.199	0.200
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.036	0.125	0.150	0.232	0.344	0.172	0.417	0.396	0.099	0.031	0.030	0.049	0.068	0.069	0.061	0.136	0.040	0.016	<0.010	<0.010
Uranium (U)-Total	0.000134	0.000194	0.000189	0.000208	0.000187	0.000121	0.000205	0.000144	0.000133	0.000118	0.000046	0.000062	0.000083	0.000131	0.000117	0.000140	0.000087	0.000063	0.000026	0.000026
Vanadium (V)-Total	0.0025	0.0090	0.0124	0.0198	0.0203	0.0165	0.0297	0.0261	0.0096	0.0033	0.0029	0.0041	0.0065	0.0071	0.0077	0.0103	0.0059	0.0013	<0.0010	<0.0010
Zinc (Zn)-Total	0.0048	0.0109	0.0149	0.0222	0.0246	0.0266	0.0375	0.0392	0.0114	0.0058	0.0088	0.0083	0.0171	0.0176	0.0177	0.0157	0.0108	<0.0030	<0.0030	<0.0030
Dissolved Metals																				
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0149	0.0225	0.0613	0.0301	0.0940	0.0361	0.0627	0.0668	0.0195	1.05	0.0313	0.0277	0.0708	0.0941	0.0562	0.100	0.0590	0.0204	0.0258	0.0266
Antimony (Sb)-Dissolved	0.00034	0.00029	0.00032	0.00036	0.00032	0.00030	0.00061	0.00051	0.00044	0.00049	0.00011	0.00012	0.00013	0.00014	0.00014	0.00018	0.00017	0.00017	0.00012	0.00012
Arsenic (As)-Dissolved	0.00030	0.00035	0.00041	0.00032	0.00032	0.00057	0.00034	0.00045	0.00036	0.00083	0.00020	0.00027	0.00035	0.00036	0.00037	0.00034	0.00035	0.00037	0.00021	0.00021
Barium (Ba)-Dissolved	0.0381	0.0373	0.0354	0.0282	0.0242	0.0215	0.0370	0.0324	0.0382	0.0598	0.0217	0.0223	0.0249	0.0255	0.0238	0.0281	0.0312	0.0385	0.0286	0.0283
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000014	0.000012	0.000013	0.000013	0.000010	0.000019	0.000018	0.000022	0.000012	0.000028	0.000037	0.000036	0.000046	0.000049	0.000031	0.000010	0.000014	0.000019	0.000028	0.000034
Calcium (Ca)-Dissolved	30.2	24.9	23.6	16.9	11.8	11.6	21.4	20.1	25.4	31.4	16.0	14.9	17.2	18.3	15.6	15.7	17.4	22.8	20.8	20.4
Chromium (Cr)-Dissolved	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	0.00017	<0.00010	0.00116	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	0.00014	0.00020
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00036	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00043	0.00031	0.00027	0.00019	0.00024	0.00136	<0.00050	0.00055	<0.00050	0.00159	0.00059	0.00037	0.00032	0.00042	0.00031	0.00016	0.00015	<0.00050	0.00086	0.00061
Iron (Fe)-Dissolved	<0.030	<0.030	0.042	<0.030	0.058	<0.030	0.045	0.062	<0.030	0.831	<0.030	<0.030	0.054	0.069	0.040	0.060	0.034	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000051	<0.000050	0.000330	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	3.33	2.32	2.16	1.47	0.889	0.785	1.53	1.61	2.13	2.88	2.92	1.98	2.32	2.44	1.80	1.44	1.57	2.48	3.62	3.57
Manganese (Mn)-Dissolved	0.00478	0.00192	0.00269	0.00160	0.00150	0.00358	0.00174	0.00266	0.00151	0.0159	0.00604	0.00790	0.00965	0.0103	0.00659	0.00135	0.00572	0.00123	0.00315	0.00314
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00130	0.00112	0.00108	0.000901	0.000672	0.000595	0.00124	0.00118	0.00130	0.00139	0.000353	0.000406	0.000530	0.000512	0.000530	0.000616	0.000778	0.000875	0.000428	0.000424
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00099	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00069	0.00071
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.467	0.412	0.422	0.348	0.269	0.313	0.443	0.427	0.447	0.895	0.199	0.156	0.175	0.198	0.182	0.186	0.174	0.187	0.190	0.193
Selenium (Se)-Dissolved	0.00037	0.00046	0.00048	0.00026	<0.00020	<0.00020	0.00062	0.00051	0.00054	0.00063	0.00021	0.00033	0.00021	0.00034	<0.00020	<0.00020	<0.00020	0.00039	0.00040	0.00039
Silicon (Si)-Dissolved	1.24	1.07	1.13	0.812	0.636	0.505	0.913	1.06	1.22	3.55	2.01	1.64	1.76	1.72	1.30	0.947	0.997	1.33	2.39	2.39
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.200	0.136	0.136	0.0864	0.0630	0.0571	0.109	0.120	0.151	0.173	0.163	0.123	0.148	0.153	0.117	0.112	0.132	0.186	0.199	0.194
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.026	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000111	0.000111	0.000095	0.000064	0.000033	0.000027	0.000082	0.000065	0.000098	0.000090	0.000027	0.000028	0.000031	0.000033	0.000030	0.000035	0.000047	0.000053	0.000024	0.000024
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0033	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0030	<0.0030	0.0034	0.0013	<0.0010	0.0011	0.0015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-1. 2010: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC																				
Sample ID	BR2	BR2	ST1	ST1	ST1	ST1	ST1	ST1	ST1	ST2	ST2	ST2	ST2	ST2	ST2	ST2	TC1	TC2	TC2	TC2
Date Sampled	15-Nov-10	14-Dec-10	21-Jun-10	22-Jul-10	27-Aug-10	21-Sep-10	19-Oct-10	15-Nov-10	14-Dec-10	21-Jun-10	22-Jul-10	27-Aug-10	21-Sep-10	19-Oct-10	15-Nov-10	14-Dec-10	21-Jun-10	19-Oct-10	15-Nov-10	20-May-10
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L955657-2	L964080-2	L900776-3	L912512-3	L927354-10	L939078-3	L945638-3	L955657-3	L964080-3	L900776-6	L912512-4	L927354-8	L939078-5	L945638-5	L955657-5	L964080-5	L900776-5	L945638-6	L955657-6	L889248-6
Physical Tests																				
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	12.5	6.0	<5.0	<5.0	<5.0	<5.0	<5.0	9.9	<5.0	<5.0	<5.0	5.8	<5.0	<5.0
Conductivity (uS/cm)	218	193	91.1	123	151	155	78.6	101	121	101	89.2	105	144	136	166	194	106	200	240	177
Hardness (as $CaCO_3$)	97.4	96.1	40.4	57.1	67.0	69.0	35.0	43.1	57.1	49.1	44.2	50.1	67.8	62.5	78.1	103	53.4	91.4	120	85.8
pH	8.12	8.11	7.71	7.78	7.73	7.77	8.29	7.72	8.00	7.97	7.93	7.86	8.05	8.21	8.07	8.15	8.00	8.20	8.18	8.04
Total Suspended Solids	23.6	<3.0	<3.0	<3.0	4.6	<3.0	4.8	19.1	5.0	192	107	78.1	10.5	3.3	<3.0	<3.0	93.8	5.3	<3.0	160
Total Dissolved Solids	145	117	58	77	86	93	52	59	68	80	68	76	89	76	89	105	74	122	143	116
Turbidity (NTU)	54.9	0.54	5.72	3.33	2.30	0.75	2.87	2.39	2.97	236	115	87.9	8.89	2.81	0.75	0.67	85.6	7.49	3.24	120
Anions and Nutrients																				
Acidity (as $CaCO_3$)	2.0	5.7	2.7	1.7	4.6	3.0	1.2	2.4	6.3	2.5	1.7	3.9	2.3	2.9	1.8	5.0	2.4	3.5	1.5	2.7
Alkalinity, Bicarbonate (as $CaCO_3$)	85.8	66.6	23.4	26.3	34.5	36.2	21.0	27.4	27.9	43.8	36.4	42.0	49.4	47.2	63.4	69.8	45.1	68.8	82.4	60.1
Alkalinity, Carbonate (as $CaCO_3$)	<1.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	<1.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0
Alkalinity, Total (as $CaCO_3$)	85.8	66.6	23.4	26.3	34.5	36.2	21.0	27.4	27.9	43.8	36.4	42.0	49.4	47.2	63.4	69.8	45.1	68.8	82.4	60.1
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.038	0.042	<0.020	<0.020	<0.020	0.022	<0.020	0.029	0.031	<0.020	<0.020	<0.020	0.021	0.021	0.041	0.043	<0.020	0.025	0.047	0.032
Nitrate (as N)	0.0571	0.236	0.0187	<0.0050	0.0082	0.0097	0.0489	0.0055	0.0359	0.0529	0.0311	0.0355	0.0562	0.392	0.327	0.249	<0.0050	0.0197	0.0093	0.0565
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	0.051	<0.050	<0.050	<0.050	<0.050	0.065	<0.050	0.097	<0.050	<0.050	<0.050	<0.050	0.093	<0.050	<0.050	<0.050	<0.050	0.084
Total Nitrogen	0.090	0.230	0.070	<0.050	<0.050	<0.050	0.090	0.070	0.070	0.150	<0.050	0.070	0.090	0.420	0.420	0.250	<0.050	0.050	<0.050	0.140
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	0.0386	<0.0020	0.0087	0.0048	0.0037	0.0035	0.0089	0.0163	0.0129	0.367	0.132	0.0985	0.0210	0.0103	0.0043	0.0022	0.131	0.0106	0.0059	0.138
Sulfate (SO_4)	27.1	30.8	19.2	31.8	38.8	35.7	14.4	20.9	29.8	11.0	9.65	12.3	19.2	17.6	23.5	30.9	11.4	31.9	43.4	30.5
Cyanides																				
Cyanide, Weak Acid Diss	<0.0010	<0.0010	-	0.0010	<0.0010	<0.0010	<0.0010	0.0023	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0011	-	<0.0010	<0.0010	-
Cyanide, Total	<0.0010	<0.0010	0.0013	0.0014	0.0011	<0.0010	0.0038	0.0022	0.0010	0.0015	0.0011	<0.0010	<0.0010	0.0029	0.0016	<0.0010	<0.0010	0.0018	<0.0010	0.0011
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																				
Total Organic Carbon	<0.50	0.87	1.09	0.56	2.03	1.20	3.21	2.22	1.52	0.84	0.74	1.92	0.60	2.62	1.28	0.91	<0.50	1.42	1.01	1.94
Total Metals																				
Aluminum (Al)-Total	3.00	0.0399	0.226	0.211	0.134	0.0280	0.246	0.0795	0.0940	7.31	4.69	2.96	0.465	0.169	0.0403	0.0472	3.20	0.244	0.122	6.55
Antimony (Sb)-Total	0.00062	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00115	0.00060	0.00046	0.00022	0.00014	0.00014	0.00018	0.00048	0.00025	0.00026	0.00146
Arsenic (As)-Total	0.00216	0.00033	0.00013	0.00012	0.00017	0.00023	0.00020	0.00026	0.00028	0.00728	0.00351	0.00282	0.00082	0.00032	0.00025	0.00039	0.00355	0.00038	0.00029	0.00627
Barium (Ba)-Total	0.101	0.0434	0.0171	0.0188	0.0230	0.0290	0.0149	0.0196	0.0249	0.160	0.113	0.0901	0.0508	0.0291	0.0323	0.0446	0.0972	0.0314	0.0354	0.141
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000081	0.000010	0.000028	<0.000010	<0.000010	<0.000010	0.000012	0.000112	0.000021	0.000665	0.000143	0.000096	0.000036	0.000040	0.000015	0.000018	0.000133	0.000075	0.000090	0.00109
Calcium (Ca)-Total	36.8	33.5	10.4	15.2	18.6	20.3	9.05	11.3	15.6	17.0	15.5	18.3	24.6	19.4	25.1	35.4	17.9	28.8	37.9	28.9
Chromium (Cr)-Total	0.00411	0.00022	0.00059	0.00059	0.00052	0.00017	0.00083	0.00049	0.00050	0.00670	0.00295	0.00188	0.00037	0.00042	0.00038	0.00021	0.00115	0.00038	0.00028	0.00558
Cobalt (Co)-Total	0.00149	<0.00010	0.00019	0.00023	0.00026	0.00049	0.00028	0.00049	0.00039	0.00498	0.00210	0.00124	0.00025	0.00012	<0.00010	<0.00010	0.00160	0.00014	<0.00010	0.00305
Copper (Cu)-Total	0.00557	<0.00050	0.00075	<0.00060	0.00050	<0.00050	0.00155	0.00106	0.00086	0.0109	0.00399	0.00227	0.00074	0.00123	0.00054	<0.00050	0.00282	0.00088	<0.00050	0.00854
Iron (Fe)-Total	3.35	0.052	0.268	0.235	0.183	0.237	0.313	0.535	0.530	10.9	5.94	3.49	0.514	0.202	0.039	0.066	4.35	0.288	0.103	7.23
Lead (Pb)-Total	0.00180	<0.000050	0.000104	0.000064	0.000063	<0.000050	0.000085	0.000084	0.000186	0.00465	0.00239	0.00141	0.000313	0.000086	0.000164	0.000188	0.00223	0.000112	0.000073	0.00292
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0059	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0060
Magnesium (Mg)-Total	4.00	4.65	3.03	4.88	5.87	5.91	3.12	3.51	4.46	3.76	2.73	2.34	2.71	3.78	3.92	4.73	2.51	5.17	6.14	6.32
Manganese (Mn)-Total	0.0813	0.00215	0.00929	0.0248	0.0290	0.0938	0.0319	0.0907	0.0785	0.405	0.164	0.110	0.0223	0.00883	0.00243	0.00307	0.145	0.0145	0.00845	0.368
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000044	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	0.000036
Molybdenum (Mo)-Total	0.00129	0.000753	0.000562	0.000723	0.000870	0.000461	0.000309	0.000185	0.000320	0.00124	0.000765	0.000886	0.000904	0.000435	0.000522	0.000734	0.000950	0.00110	0.00139	0.00195
Nickel (Ni)-Total	0.00290	0.00067	0.00106	0.00084	0.00092	0.00166	0.00154	0.00172	0.00189	0.00833	0.00298	0.00155	<0.00050	0.00095	<0.00050	0.00066	0.00109	0.00096	<0.00050	0.0105

Table A3-1. 2010: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**
Station Type	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**
QAQC																				
Sample ID	**BR2**	**BR2**	**ST1**	**ST1**	**ST1**	**ST1**	**ST1**	**ST1**	**ST1**	**ST2**	**ST2**	**ST2**	**ST2**	**ST2**	**ST2**	**ST2**	**TC1**	**TC2**	**TC2**	**TC2**
Date Sampled	**15-Nov-10**	**14-Dec-10**	**21-Jun-10**	**22-Jul-10**	**27-Aug-10**	**21-Sep-10**	**19-Oct-10**	**15-Nov-10**	**14-Dec-10**	**21-Jun-10**	**22-Jul-10**	**27-Aug-10**	**21-Sep-10**	**19-Oct-10**	**15-Nov-10**	**14-Dec-10**	**21-Jun-10**	**19-Oct-10**	**15-Nov-10**	**20-May-10**
Included/Excluded	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L955657-2**	**L964080-2**	**L900776-3**	**L912512-3**	**L927354-10**	**L939078-3**	**L945638-3**	**L955657-3**	**L964080-3**	**L900776-6**	**L912512-4**	**L927354-8**	**L939078-5**	**L945638-5**	**L955657-5**	**L964080-5**	**L900776-5**	**L945638-6**	**L955657-6**	**L889248-6**
Total Metals *(cont'd)*																				
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.35	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	1.30	0.246	0.210	0.236	0.232	0.279	0.223	0.234	0.220	2.21	1.89	1.27	0.364	0.220	0.214	0.268	1.69	0.339	0.349	2.11
Selenium (Se)-Total	0.00063	0.00050	0.00041	0.00045	0.00073	0.00060	0.00032	0.00027	0.00054	0.00058	<0.00020	<0.00020	0.00035	0.00040	0.00040	0.00048	0.00045	0.00124	0.00150	0.00208
Silicon (Si)-Total	7.78	2.60	1.71	1.47	1.58	1.89	2.19	1.94	2.04	14.3	9.55	5.32	2.12	2.60	2.39	2.53	7.19	2.29	2.34	16.2
Silver (Ag)-Total	0.000033	<0.000010	0.000024	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000129	0.000047	0.000027	<0.000010	<0.000010	<0.000010	<0.000010	0.000043	<0.000010	<0.000010	0.000103
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.196	0.289	0.110	0.144	0.190	0.194	0.0984	0.108	0.138	0.130	0.110	0.137	0.198	0.192	0.227	0.291	0.105	0.249	0.286	0.242
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	<0.00010	0.00024
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.131	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.165	0.129	0.038	0.010	<0.010	<0.010	<0.010	0.085	<0.010	<0.010	0.166
Uranium (U)-Total	0.000161	0.000051	<0.000010	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	0.000180	0.000116	0.000085	0.000065	0.000025	0.000035	0.000051	0.000148	0.000066	0.000099	0.000201
Vanadium (V)-Total	0.0091	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0178	0.0105	0.0065	0.0011	<0.0010	<0.0010	<0.0010	0.0071	<0.0010	<0.0010	0.0142
Zinc (Zn)-Total	0.0119	<0.0030	0.0013	<0.0010	0.0046	<0.0030	<0.0030	<0.0030	<0.0030	0.0542	0.0163	0.0116	<0.0030	0.0032	<0.0030	<0.0030	0.0119	0.0051	0.0037	0.0868
Dissolved Metals																				
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0205	0.0149	0.0236	0.0063	0.0047	0.0031	0.0500	0.0047	0.0076	0.0436	0.117	0.139	0.0227	0.0261	0.0103	0.0156	0.0346	0.0214	0.0059	0.0317
Antimony (Sb)-Dissolved	0.00039	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	0.00019	0.00017	0.00018	0.00011	0.00013	0.00017	0.00014	0.00022	0.00024	0.00022
Arsenic (As)-Dissolved	0.00032	0.00033	<0.00010	<0.00010	0.00011	0.00021	0.00014	0.00018	0.00011	0.00042	0.00037	0.00039	0.00038	0.00020	0.00026	0.00035	0.00034	0.00020	0.00020	0.00023
Barium (Ba)-Dissolved	0.0461	0.0397	0.0133	0.0167	0.0205	0.0268	0.0129	0.0193	0.0230	0.0231	0.0276	0.0324	0.0385	0.0264	0.0323	0.0402	0.0307	0.0272	0.0323	0.0200
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000015	0.000010	<0.000010	<0.000010	<0.000010	0.000020	<0.000010	0.000042	0.000016	0.000018	0.000011	0.000016	0.000019	0.000031	0.000012	0.000012	0.000027	0.000056	0.000072	0.000060
Calcium (Ca)-Dissolved	34.6	31.2	10.9	15.0	17.7	18.7	9.06	11.3	15.6	16.7	15.4	17.5	23.1	19.0	24.7	33.9	18.3	28.1	37.9	27.1
Chromium (Cr)-Dissolved	0.00012	<0.00010	<0.00020	<0.00050	<0.00020	<0.00010	0.00023	<0.00010	<0.00010	<0.00020	<0.00050	<0.00020	<0.00010	0.00018	0.00013	<0.00010	<0.00020	0.00011	<0.00010	<0.00020
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00027	0.00016	0.00039	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	0.00029	0.00019	0.00017	<0.00050	0.00093	<0.00050	<0.00050	0.00038	0.00016	0.00017	<0.00050	0.00068	<0.00050	<0.00050	0.00012	<0.00050	<0.00050	0.00045
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	0.076	0.066	0.112	0.071	<0.030	0.066	0.080	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	2.70	4.43	3.22	4.74	5.55	5.43	3.00	3.60	4.43	1.78	1.43	1.55	2.49	3.66	3.97	4.46	1.84	5.14	6.07	4.38
Manganese (Mn)-Dissolved	0.00141	0.000368	0.000212	0.0136	0.0209	0.0767	0.0258	0.0819	0.0260	0.000601	0.00143	0.00371	0.00133	0.00219	0.000997	0.000357	0.00268	0.00252	0.00154	0.000726
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00124	0.000681	0.000538	0.000748	0.000777	0.000437	0.000282	0.000169	0.000273	0.000550	0.000593	0.000773	0.000871	0.000401	0.000539	0.000679	0.000747	0.00112	0.00136	0.000999
Nickel (Ni)-Dissolved	<0.00050	0.00053	<0.00050	<0.00050	<0.00050	0.00153	0.00103	0.00148	0.00127	<0.00050	<0.00050	<0.00050	<0.00050	0.00074	<0.00050	<0.00050	<0.00050	0.00057	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.489	0.236	0.177	0.191	0.192	0.254	0.182	0.204	0.195	0.191	0.193	0.200	0.189	0.180	0.200	0.239	0.266	0.260	0.314	0.272
Selenium (Se)-Dissolved	0.00057	0.00052	0.00045	0.00036	0.00053	0.00056	0.00035	0.00026	0.00057	<0.00020	<0.00020	<0.00020	0.00047	0.00039	0.00041	0.00047	0.00049	0.00130	0.00149	0.00158
Silicon (Si)-Dissolved	1.49	2.48	1.40	1.14	1.34	1.79	1.90	1.88	1.99	1.29	0.941	1.08	1.40	2.35	2.37	2.49	0.896	1.97	2.08	1.52
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.180	0.299	0.105	0.147	0.180	0.181	0.0987	0.111	0.150	0.119	0.109	0.128	0.189	0.185	0.232	0.297	0.0996	0.252	0.280	0.218
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000110	0.000036	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	0.000033	0.000035	0.000047	0.000048	0.000024	0.000037	0.000035	0.000064	0.000060	0.000094	0.000067
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0010	<0.0010	<0.0010	<0.0030	<0.0030	<0.0030	<0.0030	<0.0010	<0.0010	0.0011	<0.0030	<0.0030	<0.0030	<0.0030	<0.0010	<0.0030	<0.0030	0.0016

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-1. 2010: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream		stream	stream	stream	stream	stream	stream	stream		stream	stream	stream	stream	stream	stream	stream
QAQC	replicate	replicate			replicate								replicate							replicate
Sample ID	TC2	TC2	TC2	TC2	TC2	TC2	TC2	TC2	TC3	TC3	TC3	TC3	TC3	TC3	TC3	TC3	TC3	TD1	TD1	TD1
Date Sampled	20-May-10	21-Jun-10	21-Jun-10	22-Jul-10	22-Jul-10	27-Aug-10	21-Sep-10	14-Dec-10	20-May-10	21-Jun-10	22-Jul-10	27-Aug-10	21-Sep-10	21-Sep-10	19-Oct-10	15-Nov-10	14-Dec-10	20-May-10	1-Jun-10	1-Jun-10
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Excluded	Excluded	Excluded
ALS Sample ID	L889248-8	L900776-10	L900776-7	L912512-6	L912512-8	L927354-9	L939078-6	L964080-6	L889248-7	L900776-8	L912512-7	L927354-11	L939078-10	L939078-7	L945638-7	L955657-7	L964080-7	L889248-1	L893465-4	L893465-7
Physical Tests																				
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7.1	<5.0	<5.0	<5.0	<5.0	<5.0	13.1	5.7	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	177	113	113	88.4	88.4	113	167	266	129	121	102	137	186	186	148	206	252	133	93.3	93.8
Hardness (as $CaCO_3$)	85.2	54.0	54.5	44.8	44.0	53.4	78.7	149	62.4	59.7	50.6	65.2	91.2	90.0	67.9	101	137	64.2	42.0	41.3
pH	8.09	7.90	8.00	7.87	7.93	7.85	8.09	8.15	8.02	7.98	7.94	7.93	8.10	8.10	8.27	8.13	8.00	7.98	7.92	7.91
Total Suspended Solids	154	205	157	153	108	31.6	11.0	<3.0	67.0	96.3	124	30.1	10.0	11.0	5.8	3.1	5.0	48.0	51.3	38.8
Total Dissolved Solids	117	90	109	73	67	83	104	163	85	91	74	86	115	112	94	113	151	86	76	88
Turbidity (NTU)	138	183	181	136	119	26.1	8.38	1.40	61.7	107	89.0	14.8	5.08	4.57	6.60	2.75	2.96	33.8	73.3	77.6
Anions and Nutrients																				
Acidity (as $CaCO_3$)	2.1	2.7	2.4	1.7	1.6	3.8	2.2	5.0	2.3	2.6	1.7	4.0	2.2	2.2	1.7	1.8	6.8	2.1	2.8	2.7
Alkalinity, Bicarbonate (as $CaCO_3$)	60.2	44.6	45.0	35.7	36.2	40.4	62.4	89.2	45.2	47.8	42.2	50.6	64.7	71.6	54.3	80.1	97.5	46.0	40.0	43.7
Alkalinity, Carbonate (as $CaCO_3$)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0
Alkalinity, Total (as $CaCO_3$)	60.2	44.6	45.0	35.7	36.2	40.4	62.4	89.2	45.2	47.8	42.2	50.6	64.7	71.6	54.3	80.1	97.5	46.0	40.0	43.7
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0107	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.031	<0.020	<0.020	<0.020	<0.020	<0.020	0.021	0.047	0.029	0.025	<0.020	0.023	0.025	<0.020	0.021	0.044	0.048	<0.020	<0.020	<0.020
Nitrate (as N)	0.0574	<0.0050	<0.0050	0.0051	0.0317	<0.0050	<0.0050	0.0089	0.245	0.0100	0.0051	<0.0050	<0.0050	<0.0050	0.138	0.0920	0.0544	0.232	0.0782	0.0794
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.073	0.070	0.060	<0.050	<0.050	<0.050	<0.050	<0.050	0.055	0.060	<0.050	0.050	<0.050	<0.050	<0.050	0.058	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	0.130	0.070	0.060	<0.050	<0.050	<0.050	<0.050	<0.050	0.300	0.070	<0.050	0.050	<0.050	<0.050	0.180	0.150	0.060	0.240	0.110	0.120
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	0.139	0.261	0.254	0.186	0.159	0.0240	0.0145	<0.0020	0.0763	0.098	0.121	0.0184	0.0114	0.0108	0.0111	0.0067	0.0092	0.0553	0.0773	0.0790
Sulfate (SO_4)	30.3	14.1	14.2	10.8	9.69	17.2	27.2	51.4	17.9	15.9	13.6	19.7	25.0	18.7	19.3	28.8	35.4	19.6	8.84	8.81
Cyanides																				
Cyanide, Weak Acid Diss	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	-	-	-
Cyanide, Total	<0.0010	<0.0010	<0.0010	0.0010	0.0014	<0.0010	<0.0010	<0.0010	0.0025	<0.0010	0.0011	0.0010	<0.0010	<0.0010	0.0037	0.0018	0.0014	0.0014	0.0016	0.0014
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																				
Total Organic Carbon	1.95	<0.50	0.76	1.19	0.73	1.88	<0.50	0.94	2.48	0.71	1.07	1.60	0.65	0.68	2.91	1.61	1.28	1.00	0.76	0.74
Total Metals																				
Aluminum (Al)-Total	5.77	4.96	5.58	5.00	4.60	1.08	0.354	0.0517	3.15	3.46	3.55	0.767	0.303	0.303	0.250	0.107	0.0603	2.42	3.52	3.45
Antimony (Sb)-Total	0.00141	0.00153	0.00151	0.00096	0.00060	0.00047	0.00037	0.00028	0.00068	0.00090	0.00081	0.00037	0.00029	0.00028	0.00015	0.00016	0.00016	0.00032	0.00034	0.00033
Arsenic (As)-Total	0.00611	0.00741	0.00753	0.00497	0.00342	0.00158	0.00075	0.00031	0.00331	0.00449	0.00428	0.00147	0.00097	0.00074	0.00067	0.00085	0.00123	0.00151	0.00191	0.00200
Barium (Ba)-Total	0.131	0.115	0.126	0.101	0.109	0.0454	0.0405	0.0384	0.0830	0.0852	0.0817	0.0407	0.0417	0.0416	0.0257	0.0350	0.0486	0.159	0.147	0.147
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.020	<0.020
Cadmium (Cd)-Total	0.00105	0.00119	0.00123	0.000548	0.000142	0.000190	0.000115	0.000089	0.000418	0.000593	0.000488	0.000216	0.000120	0.000110	0.000072	0.000074	0.000105	0.000126	0.000144	0.000147
Calcium (Ca)-Total	28.9	19.1	20.3	16.5	15.4	18.9	28.1	48.5	20.6	19.0	17.6	21.8	31.5	31.9	20.7	32.9	46.7	23.0	15.6	16.0
Chromium (Cr)-Total	0.00511	0.00492	0.00533	0.00309	0.00293	0.00067	0.00038	0.00023	0.00271	0.00308	0.00249	0.00051	0.00027	0.00024	0.00050	0.00023	0.00024	0.00046	0.00069	0.00070
Cobalt (Co)-Total	0.00294	0.00324	0.00339	0.00215	0.00210	0.00051	0.00023	<0.00010	0.00144	0.00182	0.00162	0.00042	0.00023	0.00015	0.00018	0.00016	0.00022	0.00085	0.00117	0.00120
Copper (Cu)-Total	0.00823	0.00944	0.00943	0.00526	0.00393	0.00147	0.00103	0.00056	0.00424	0.00489	0.00460	0.00136	0.00078	<0.00050	0.00099	0.00051	<0.00050	0.00189	0.00222	0.00226
Iron (Fe)-Total	6.90	9.19	8.79	6.10	5.94	1.28	0.458	0.063	3.54	4.64	4.59	1.12	0.559	0.394	0.468	0.408	0.548	1.97	3.06	3.01
Lead (Pb)-Total	0.00280	0.00382	0.00377	0.00259	0.00236	0.000622	0.000288	<0.000050	0.00130	0.00196	0.00193	0.000502	0.000224	0.000127	0.000117	0.000072	0.000079	0.00144	0.00202	0.00193
Lithium (Li)-Total	0.0056	0.0054	0.0059	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	6.06	2.97	3.34	2.59	2.66	2.24	3.33	6.65	4.37	3.12	2.94	2.94	4.37	4.27	4.02	5.51	6.50	3.39	2.30	2.28
Manganese (Mn)-Total	0.362	0.287	0.319	0.190	0.163	0.0567	0.0248	0.00464	0.202	0.164	0.157	0.0701	0.0669	0.0504	0.0344	0.0777	0.149	0.0969	0.117	0.119
Mercury (Hg)-Total	0.000020	0.000061	0.000051	0.000041	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	0.000040	0.000028	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00196	0.00224	0.00210	0.00132	0.000791	0.00127	0.00172	0.00151	0.000926	0.00141	0.00123	0.00115	0.00145	0.00153	0.000599	0.000834	0.000989	0.000646	0.000635	0.000619
Nickel (Ni)-Total	0.0102	0.00922	0.00968	0.00462	0.00279	0.00119	0.00066	0.00085	0.00503	0.00492	0.00379	0.00107	0.00084	0.00058	0.00109	0.00077	0.00099	0.00064	0.00070	0.00071

Table A3-1. 2010: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream		stream	stream	stream	stream	stream	stream	stream		stream	stream	stream	stream	stream	stream	stream
QAQC	replicate	replicate			replicate								replicate							replicate
Sample ID	TC2	TC2	TC2	TC2	TC2	TC2	TC2	TC2	TC3	TC3	TC3	TC3	TC3	TC3	TC3	TC3	TC3	TD1	TD1	TD1
Date Sampled	20-May-10	21-Jun-10	21-Jun-10	22-Jul-10	22-Jul-10	27-Aug-10	21-Sep-10	14-Dec-10	20-May-10	21-Jun-10	22-Jul-10	27-Aug-10	21-Sep-10	21-Sep-10	19-Oct-10	15-Nov-10	14-Dec-10	20-May-10	1-Jun-10	1-Jun-10
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Excluded	Excluded	Excluded
ALS Sample ID	L889248-8	L900776-10	L900776-7	L912512-6	L912512-8	L927354-9	L939078-6	L964080-6	L889248-7	L900776-8	L912512-7	L927354-11	L939078-10	L939078-7	L945638-7	L955657-7	L964080-7	L889248-1	L893465-4	L893465-7
Total Metals *(cont'd)*																				
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	1.91	2.00	2.19	2.37	1.84	0.650	0.409	0.393	1.18	1.57	1.66	0.533	0.418	0.409	0.323	0.314	0.323	1.26	1.88	1.89
Selenium (Se)-Total	0.00198	0.00132	0.00145	0.00055	<0.00020	0.00072	0.00106	0.00136	0.00077	0.00083	0.00057	0.00054	0.00076	0.00088	0.00057	0.00076	0.00076	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	13.5	10.7	11.4	11.8	9.94	2.45	1.70	2.22	7.40	8.41	8.68	2.31	2.00	2.09	2.64	2.73	2.94	5.11	7.55	7.47
Silver (Ag)-Total	0.000102	0.000156	0.000156	0.000078	0.000048	0.000017	<0.000010	<0.000010	0.000050	0.000079	0.000067	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	0.000031	0.000025
Sodium (Na)-Total	<2.0	33.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.243	0.115	0.129	0.0913	0.110	0.123	0.184	0.297	0.190	0.136	0.118	0.156	0.219	0.226	0.188	0.254	0.309	0.203	0.115	0.117
Thallium (Tl)-Total	0.00023	0.00027	0.00027	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00017	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010
Titanium (Ti)-Total	0.127	0.111	0.114	0.128	0.118	0.015	<0.010	<0.010	0.061	0.085	0.092	0.012	<0.010	0.010	<0.010	<0.010	<0.010	0.069	0.107	0.102
Uranium (U)-Total	0.000203	0.000241	0.000240	0.000185	0.000115	0.000095	0.000101	0.000109	0.000095	0.000163	0.000136	0.000090	0.000077	0.000074	0.000027	0.000044	0.000059	0.000138	0.000166	0.000184
Vanadium (V)-Total	0.0126	0.0141	0.0154	0.0123	0.0100	0.0027	<0.0010	<0.0010	0.0071	0.0094	0.0091	0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0050	0.0078	0.0076
Zinc (Zn)-Total	0.0817	0.0838	0.0829	0.0404	0.0163	0.0116	0.0048	0.0040	0.0347	0.0416	0.0341	0.0119	0.0050	0.0032	0.0042	0.0032	0.0041	0.0113	0.0122	0.0123
Dissolved Metals																				
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0493	0.0672	0.0360	1.17	0.106	0.0359	0.0158	0.0282	0.0273	0.0404	0.0683	0.0201	0.0060	0.0605	0.0306	0.0079	0.0100	0.0257	0.0495	0.101
Antimony (Sb)-Dissolved	0.00023	0.00028	0.00027	0.00040	0.00018	0.00025	0.00031	0.00028	0.00014	0.00021	0.00021	0.00020	0.00023	0.00026	0.00013	0.00013	0.00015	0.00017	0.00015	0.00017
Arsenic (As)-Dissolved	0.00023	0.00037	0.00035	0.00120	0.00037	0.00025	0.00027	0.00023	0.00026	0.00036	0.00032	0.00032	0.00032	0.00083	0.00034	0.00059	0.00079	0.00030	0.00037	0.00040
Barium (Ba)-Dissolved	0.0202	0.0177	0.0172	0.0395	0.0274	0.0234	0.0317	0.0384	0.0194	0.0187	0.0205	0.0256	0.0344	0.0369	0.0219	0.0323	0.0462	0.0866	0.0601	0.0612
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000063	0.000034	0.000034	0.000123	0.000013	0.000040	0.000058	0.000068	0.000084	0.000044	0.000057	0.000069	0.000068	0.000129	0.000050	0.000054	0.000053	0.000046	0.000051	0.000053
Calcium (Ca)-Dissolved	26.8	18.4	18.6	15.3	15.3	18.1	26.4	48.6	19.3	19.7	16.9	21.5	29.7	29.5	20.6	31.6	44.7	21.4	14.6	14.4
Chromium (Cr)-Dissolved	<0.00020	<0.00050	<0.00020	0.00074	<0.00020	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00050	<0.00020	<0.00010	<0.00010	0.00019	0.00012	<0.00010	<0.00020	<0.00020	<0.00020
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	0.00035	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00043	0.00016	0.00016	0.00085	0.00018	<0.00010	<0.00050	<0.00050	0.00066	0.00029	0.00018	0.00015	<0.00050	0.00084	0.00063	<0.00050	<0.00050	0.00030	0.00032	0.00034
Iron (Fe)-Dissolved	0.040	0.030	<0.030	0.869	0.073	<0.030	<0.030	<0.030	0.048	<0.030	0.045	<0.030	<0.030	0.333	0.084	0.131	0.203	<0.030	0.035	0.087
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	0.000456	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000195	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000071
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	4.41	1.93	1.98	1.61	1.42	1.97	3.11	6.60	3.45	2.57	2.08	2.80	4.15	3.96	4.01	5.31	6.28	2.64	1.35	1.32
Manganese (Mn)-Dissolved	0.00105	0.000840	0.000601	0.0314	0.00168	0.00135	0.000632	0.00157	0.0156	0.00132	0.00246	0.0162	0.0265	0.0613	0.0218	0.0658	0.119	0.0155	0.0251	0.0257
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00101	0.00109	0.00105	0.000842	0.000611	0.00120	0.00177	0.00151	0.000514	0.000901	0.000800	0.00111	0.00143	0.00131	0.000592	0.000784	0.000952	0.000582	0.000524	0.000522
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	0.00077	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00055	0.00073	<0.00050	0.00063	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.280	0.244	0.236	0.670	0.189	0.187	0.254	0.374	0.239	0.240	0.192	0.216	0.276	0.284	0.255	0.275	0.300	0.367	0.283	0.307
Selenium (Se)-Dissolved	0.00141	0.00093	0.00084	0.00053	<0.00020	0.00074	0.00119	0.00159	0.00065	0.00066	0.00048	0.00053	0.00087	0.00092	0.00060	0.00074	0.00084	<0.00020	<0.00020	<0.00020
Silicon (Si)-Dissolved	1.59	1.04	1.03	3.93	0.982	0.798	1.08	2.35	1.86	1.36	1.04	1.16	1.49	1.54	2.29	2.49	2.91	1.07	0.909	1.07
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	0.000016	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.222	0.109	0.109	0.0894	0.110	0.117	0.178	0.313	0.174	0.131	0.113	0.154	0.210	0.210	0.190	0.247	0.316	0.187	0.109	0.106
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	0.046	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000073	0.000065	0.000060	0.000098	0.000036	0.000065	0.000093	0.000096	0.000031	0.000050	0.000043	0.000056	0.000063	0.000068	0.000024	0.000042	0.000047	0.000085	0.000062	0.000067
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	0.0032	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0019	<0.0010	<0.0010	0.0078	<0.0010	<0.0010	<0.0030	<0.0030	0.0017	<0.0010	<0.0010	<0.0010	0.0038	0.0040	<0.0030	<0.0030	<0.0030	<0.0010	<0.0010	0.0012

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-1. 2010: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	lake	lake	wetland	wetland
QAQC							replicate						
Sample ID	TD1	TD1	TD1	TD1	TD1	TD1	TD1	TD1	TD1	TL1 (deep)	Tl1 (shallow)	WL1	WL1
Date Sampled	8-Jun-10	21-Jun-10	22-Jul-10	26-Aug-10	21-Sep-10	19-Oct-10	15-Nov-10	15-Nov-10	14-Dec-10	25-Aug-10	25-Aug-10	28-Aug-10	28-Aug-10
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included	Excluded
ALS Sample ID	L896218-4	L900776-4	L912512-5	L927354-5	L939078-4	L945638-4	L955657-10	L955657-4	L964080-4	L927354-4	L927354-3	L927354-12	L927354-12
Physical Tests													
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.9	<5.0	<5.0	<5.0
Conductivity (uS/cm)	91.8	78.0	63.7	72.8	110	133	165	164	204	155	143	141	141
Hardness (as $CaCO_3$)	42.9	37.8	31.9	35.0	53.3	59.0	79.3	76.0	106	71.9	66.2	73.2	73.2
pH	7.07	7.83	7.85	7.67	7.86	8.20	8.00	8.07	8.10	7.82	7.98	7.97	7.97
Total Suspended Solids	33.6	29.8	54.8	38.6	5.5	6.3	<3.0	<3.0	<3.0	6.6	<3.0	25.1	25.1
Total Dissolved Solids	64	70	49	63	80	83	88	89	111	94	95	167	167
Turbidity (NTU)	50.4	46.1	47.5	42.1	11.2	9.56	2.71	2.27	0.52	1.78	0.44	55.6	55.6
Anions and Nutrients													
Acidity (as $CaCO_3$)	2.6	2.6	1.5	3.9	2.7	3.4	2.1	1.8	5.6	5.7	4.1	4.5	4.5
Alkalinity, Bicarbonate (as $CaCO_3$)	42.5	30.2	23.0	29.4	37.8	46.7	59.6	58.3	64.9	62.6	54.8	61.6	61.6
Alkalinity, Carbonate (as $CaCO_3$)	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as $CaCO_3$)	42.5	30.2	23.0	29.4	37.8	46.7	59.6	58.3	64.9	62.6	54.8	61.6	61.6
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	0.0060	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.025	0.025	0.035	0.061	0.063	<0.020	<0.020
Nitrate (as N)	0.0441	0.0159	0.0086	0.0104	0.0079	0.170	0.148	0.149	0.167	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	0.090	<0.050	0.061	<0.050	0.130	0.120	<0.050	<0.050
Total Nitrogen	0.060	0.060	<0.050	<0.050	<0.050	0.260	0.190	0.210	0.160	0.130	0.120	<0.050	<0.050
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	0.0494	0.0548	0.0704	0.0387	0.0106	0.0101	0.0024	0.0022	<0.0020	0.0111	0.0039	0.0273	0.0273
Sulfate (SO_4)	9.64	7.47	6.17	8.52	15.7	16.6	24.9	25.0	37.1	18.4	19.3	12.7	12.7
Cyanides													
Cyanide, Weak Acid Diss	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	0.0012	<0.0010	0.0011	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	0.0026	0.0021	0.0016	0.0016
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon													
Total Organic Carbon	0.69	<0.50	<0.50	1.62	0.78	2.79	0.73	0.76	0.53	3.98	3.73	2.13	2.13
Total Metals													
Aluminum (Al)-Total	2.90	1.91	2.90	2.33	1.15	0.470	0.126	0.107	0.0177	0.0727	0.0079	1.23	1.23
Antimony (Sb)-Total	0.00032	0.00029	0.00035	0.00027	0.00026	0.00018	0.00018	0.00020	0.00023	<0.00010	<0.00010	0.00045	0.00045
Arsenic (As)-Total	0.00149	0.00152	0.00207	0.00156	0.00103	0.00055	0.00046	0.00041	0.00046	0.00031	0.00013	0.00168	0.00168
Barium (Ba)-Total	0.131	0.107	0.117	0.105	0.107	0.111	0.104	0.103	0.111	0.0205	0.0168	0.0627	0.0627
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	0.013	<0.020	0.013	0.014	0.011	0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000171	0.000192	0.000191	0.000216	0.000171	0.000137	0.000088	0.000079	0.000085	0.000012	<0.000010	0.000184	0.000184
Calcium (Ca)-Total	16.2	12.5	11.3	12.3	19.3	19.3	27.5	26.6	36.8	20.4	18.6	25.6	25.6
Chromium (Cr)-Total	0.00064	0.00037	0.00059	0.00034	0.00026	0.00023	0.00017	0.00011	0.00016	<0.00050	<0.00050	0.00100	0.00100
Cobalt (Co)-Total	0.00088	0.00078	0.00102	0.00076	0.00040	0.00016	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00049	0.00049
Copper (Cu)-Total	0.00178	0.00142	0.00185	0.00171	0.00130	0.00078	<0.00050	<0.00050	<0.00050	0.00025	0.00019	0.00145	0.00145
Iron (Fe)-Total	2.15	1.81	2.62	1.93	0.896	0.389	0.078	0.074	0.051	0.125	<0.030	1.50	1.50
Lead (Pb)-Total	0.00154	0.00156	0.00194	0.00135	0.000932	0.000300	0.000092	0.000103	<0.000050	0.000198	<0.000050	0.000502	0.000502
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	2.26	1.58	1.72	1.70	2.19	2.20	3.24	3.14	4.42	6.47	5.73	2.59	2.59
Manganese (Mn)-Total	0.0901	0.0863	0.111	0.0913	0.0496	0.0193	0.00548	0.00529	0.000790	0.101	0.00425	0.151	0.151
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000701	0.000576	0.000507	0.000531	0.000767	0.000618	0.000805	0.000791	0.000793	0.000111	0.000089	0.00120	0.00120
Nickel (Ni)-Total	0.00054	<0.00050	0.00065	0.00058	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00064	0.00053	0.00143	0.00143

Table A3-1. 2010: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**	**2010**
Station Type	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**lake**	**lake**	**wetland**	**wetland**
QAQC							**replicate**						
Sample ID	**TD1**	**TD1**	**TD1**	**TD1**	**TD1**	**TD1**	**TD1**	**TD1**	**TD1**	**TL1 (deep)**	**Tl1 (shallow)**	**WL1**	**WL1**
Date Sampled	**8-Jun-10**	**21-Jun-10**	**22-Jul-10**	**26-Aug-10**	**21-Sep-10**	**19-Oct-10**	**15-Nov-10**	**15-Nov-10**	**14-Dec-10**	**25-Aug-10**	**25-Aug-10**	**28-Aug-10**	**28-Aug-10**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Included**	**Included**	**Included**	**Excluded**
ALS Sample ID	**L896218-4**	**L900776-4**	**L912512-5**	**L927354-5**	**L939078-4**	**L945638-4**	**L955657-10**	**L955657-4**	**L964080-4**	**L927354-4**	**L927354-3**	**L927354-12**	**L927354-12**
Total Metals *(cont'd)*													
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	1.72	1.13	1.47	1.20	0.810	0.496	0.423	0.407	0.396	0.234	0.175	0.780	0.780
Selenium (Se)-Total	0.00014	<0.00020	<0.00020	<0.00020	0.00037	0.00016	0.00023	0.00020	0.00038	<0.00020	<0.00020	0.00049	0.00049
Silicon (Si)-Total	6.84	4.49	5.99	4.56	2.74	2.12	1.47	1.47	1.67	2.72	2.29	3.24	3.24
Silver (Ag)-Total	0.000026	0.000029	0.000022	0.000015	0.000015	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000014	0.000014
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.2	2.0	<2.0	<2.0
Strontium (Sr)-Total	0.134	0.103	0.0826	0.0910	0.143	0.172	0.208	0.209	0.261	0.307	0.279	0.154	0.154
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.082	0.062	0.087	0.053	0.029	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	0.021	0.021
Uranium (U)-Total	0.000159	0.000119	0.000115	0.000136	0.000112	0.000066	0.000110	0.000107	0.000119	<0.000010	<0.000010	0.000079	0.000079
Vanadium (V)-Total	0.0069	0.0045	0.0064	0.0051	0.0025	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0033	0.0033
Zinc (Zn)-Total	0.0135	0.0110	0.0128	0.0130	0.0083	0.0064	0.0040	0.0035	0.0035	0.0016	<0.0010	0.0139	0.0139
Dissolved Metals													
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0346	0.0482	0.154	0.0542	0.0833	0.0258	0.0102	0.0117	0.0158	0.0026	0.0035	0.0091	0.0091
Antimony (Sb)-Dissolved	0.00017	0.00018	0.00018	0.00014	0.00017	0.00017	0.00018	0.00018	0.00024	<0.00010	<0.00010	0.00023	0.00023
Arsenic (As)-Dissolved	0.00035	0.00039	0.00043	0.00033	0.00045	0.00041	0.00038	0.00035	0.00052	0.00016	0.00010	0.00043	0.00043
Barium (Ba)-Dissolved	0.0605	0.0549	0.0582	0.0554	0.0738	0.100	0.0973	0.0969	0.108	0.0176	0.0157	0.0388	0.0388
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000075	0.000076	0.000092	0.000113	0.000101	0.000110	0.000084	0.000079	0.000075	<0.000010	<0.000010	0.000093	0.000093
Calcium (Ca)-Dissolved	14.8	13.1	11.1	12.1	18.2	20.1	26.6	25.4	35.3	18.8	17.5	25.5	25.5
Chromium (Cr)-Dissolved	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020	<0.00020
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00014	0.00015	0.00017	0.00013	<0.00050	<0.00050	0.00053	<0.00050	<0.00050	0.00021	0.00020	0.00032	0.00032
Iron (Fe)-Dissolved	<0.030	<0.030	0.074	<0.030	0.036	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	0.000072	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	1.46	1.22	0.994	1.14	1.89	2.16	3.12	3.05	4.33	6.06	5.46	2.34	2.34
Manganese (Mn)-Dissolved	0.0181	0.0206	0.0277	0.0227	0.00818	0.00622	0.00183	0.00187	0.000453	0.0485	0.000111	0.111	0.111
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000645	0.000554	0.000444	0.000450	0.000746	0.000618	0.000754	0.000764	0.000778	0.000093	0.000075	0.00106	0.00106
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00055	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.273	0.285	0.267	0.216	0.308	0.316	0.363	0.365	0.385	0.199	0.162	0.288	0.288
Selenium (Se)-Dissolved	<0.00010	<0.00020	<0.00020	<0.00020	0.00031	0.00015	0.00018	0.00019	0.00039	<0.00020	<0.00020	0.00045	0.00045
Silicon (Si)-Dissolved	0.832	0.681	0.735	0.524	0.828	1.28	1.25	1.25	1.73	2.57	2.22	1.00	1.00
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.2	2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.123	0.0979	0.0825	0.0871	0.136	0.175	0.198	0.200	0.277	0.284	0.261	0.150	0.150
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000065	0.000052	0.000042	0.000048	0.000078	0.000062	0.000100	0.000102	0.000100	<0.000010	<0.000010	0.000049	0.000049
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.0017	0.0011	0.0014	0.0018	<0.0030	0.0035	<0.0030	0.0038	0.0030	<0.0010	<0.0010	0.0011	0.0011

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC			replicate			replicate			replicate										
Sample ID	BIR1	BIR1	BIR1	BIR1	BIR1	BIR1	BIR1	BIR1	BIR1	BIR1	BIR2	BIR2	BIR2	BIR2	BIR2	BIR2	BR1	BR1	BR1
Date Sampled	17-May-11	15-Jul-11	15-Jul-11	26-Aug-11	17-Sep-11	17-Sep-11	18-Oct-11	13-Nov-11	13-Nov-11	13-Dec-11	17-May-11	15-Jul-11	26-Aug-11	17-Sep-11	18-Oct-11	13-Nov-11	17-Jan-11	14-Feb-11	17-Mar-11
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included
ALS Sample ID	L1007227-3	L1033117-5	L1033117-9	L1051133-5	L1060382-7	L1060382-9	L1074434-5	L1084881-5	L1084881-7	L1096258-4	L1007227-1	L1033117-6	L1051133-6	L1060382-8	L1074434-6	L1084881-6	L971395-1	L979916-1	L987767-1
Physical Tests																			
Colour, True	13.2	<5.0	<5.0	<5.0	<5.0	<5.0	5.7	<5.0	<5.0	<5.0	12.9	<5.0	<5.0	-	8.9	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	98.7	106	107	133	161	162	159	186	188	239	94.1	102	127	-	134	173	212	221	228
Hardness (as $CaCO_3$)	46.9	48.6	47.8	57.5	75.2	74.7	69.8	85.5	86.1	113	43.2	41.5	54.8	71.4	59.9	78.9	105	125	117
pH	7.27	7.94	8.03	7.96	7.98	8.02	7.87	7.18	7.20	8.12	7.70	8.00	7.99	-	7.99	7.21	8.00	7.77	7.47
Total Suspended Solids	108	189	157	104	37.2	41.2	76.5	4.3	3.0	<3.0	196	140	87.6	-	82.5	<3.0	<3.0	<3.0	3.0
Total Dissolved Solids	72	71	71	94	110	117	97	108	120	139	68	69	100	-	81	108	128	140	152
Turbidity (NTU)	66.8	129	130	83.6	51.9	52.2	51.8	2.62	2.65	0.91	91.4	109	80.8	-	52.3	1.92	5.87	4.11	1.91
Anions and Nutrients																			
Acidity (as $CaCO_3$)	3.3	3.5	3.3	2.3	<1.0	1.0	4.1	3.7	3.3	2.2	2.3	3.4	2.2	-	3.7	3.5	3.0	3.1	4.4
Alkalinity, Bicarbonate (as $CaCO_3$)	34.8	37.1	33.1	40.6	49.5	49.3	49.8	61.7	64.0	90.2	32.3	34.6	39.7	-	42.1	58.5	82.9	75.8	90.5
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	34.8	37.1	33.1	40.6	49.5	49.3	49.8	61.7	64.0	90.2	32.3	34.6	39.7	-	42.1	58.5	82.9	75.8	90.5
Ammonia, Total (as N)	<0.0050	0.0081	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0098	<0.0050	<0.0050	<0.0050	<0.0050	-
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.17
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.030	0.035	0.031	0.032	0.041	0.040	0.041	0.048	0.047	0.042	0.028	0.028	0.030	-	0.036	0.046	0.032	0.035	0.035
Nitrate (as N)	0.575	0.0178	0.0187	0.0624	0.0927	0.0915	0.101	0.124	0.125	0.161	0.542	0.0206	0.0695	-	0.116	0.150	0.0901	0.0663	0.0845
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.274	0.102	0.161	0.148	0.127	0.159	0.099	<0.050	<0.050	<0.050	0.408	0.109	0.150	0.084	0.894	<0.050	<0.050	<0.050	0.056
Total Nitrogen	0.900	0.120	0.180	0.210	0.220	0.250	0.200	0.140	0.120	0.190	0.970	0.130	0.220	0.220	1.01	0.150	0.080	0.070	0.140
Orthophosphate-Dissolved (as P)	-	0.0010	0.0013	0.0023	0.0026	0.0024	0.0013	<0.0010	<0.0010	<0.0010	-	0.0012	0.0022	-	0.0012	<0.0010	-	-	-
Phosphorus (P)-Total	0.0546	0.233	0.149	0.089	0.0555	0.0584	0.0823	0.0059	0.0058	0.0039	0.0903	0.162	0.0565	-	0.0861	0.0052	0.0048	0.0050	0.0022
Sulfate (SO_4)	12.6	17.2	17.2	21.0	26.7	26.7	25.3	30.1	30.1	34.5	11.1	16.3	19.6	-	20.8	26.4	30.0	29.3	33.2
Cyanides																			
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0011	<0.0010	-	<0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0011	<0.0010	<0.0050	<0.0010	<0.0012
Cyanide, Total	0.0055	<0.0010	<0.0010	<0.0010	0.0021	0.0018	0.0023	0.0018	-	-	0.0055	<0.0010	<0.0010	<0.0011	0.0035	0.0021	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	5.12	0.69	1.40	1.55	1.85	2.97	2.17	1.66	1.64	1.10	6.51	0.78	1.90	2.06	2.63	1.62	0.77	<0.50	0.68
Total Metals																			
Aluminum (Al)-Total	1.91	6.59	5.72	2.90	1.86	1.88	4.01	0.103	0.104	0.0364	5.70	4.97	3.28	2.27	1.35	0.223	0.166	0.222	0.240
Antimony (Sb)-Total	0.00018	0.00074	0.00064	0.00030	0.00027	0.00028	0.00051	0.00011	0.00011	0.00013	0.00027	0.00053	0.00029	0.00029	0.00013	0.00011	0.00040	0.00040	0.00035
Arsenic (As)-Total	0.00111	0.00545	0.00511	0.00193	0.00123	0.00131	0.00249	0.00020	0.00022	0.00015	0.00280	0.00394	0.00194	0.00166	0.00072	0.00023	0.00042	0.00051	0.00050
Barium (Ba)-Total	0.0539	0.132	0.110	0.0707	0.0621	0.0650	0.129	0.0380	0.0379	0.0441	0.0981	0.0951	0.0737	0.0697	0.0486	0.0352	0.0475	0.0468	0.0525
Beryllium (Be)-Total	<0.00050	0.00015	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	0.010	0.010	<0.010	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	0.010	<0.010	<0.010	0.012	0.010	0.010
Cadmium (Cd)-Total	0.000071	0.000255	0.000240	0.000082	0.000054	0.000059	0.000202	0.000011	0.000018	<0.000010	0.000117	0.000175	0.000079	0.000077	0.000047	0.000019	0.000015	0.000023	0.000351
Calcium (Ca)-Total	13.9	14.7	15.0	15.6	20.2	20.7	26.0	23.8	23.7	34.7	13.2	14.1	15.2	19.2	17.9	23.8	36.4	39.4	41.5
Chromium (Cr)-Total	0.00491	0.0135	0.0113	0.00612	0.00459	0.00476	0.0101	0.00047	0.00047	0.00030	0.0157	0.0106	0.00729	0.00605	0.00285	0.00079	0.00034	0.00040	0.00045
Cobalt (Co)-Total	0.00160	0.00369	0.00345	0.00168	0.00113	0.00119	0.00289	0.00011	0.00010	<0.00010	0.00417	0.00292	0.00185	0.00162	0.00124	0.00017	<0.00010	0.00016	0.00014
Copper (Cu)-Total	0.00504	0.0110	0.0103	0.00556	0.00393	0.00412	0.0219	0.00067	0.00078	<0.00050	0.0121	0.00888	0.00605	0.00592	0.00447	0.00090	0.00067	0.00092	0.00211
Iron (Fe)-Total	2.40	8.36	7.96	3.36	2.23	2.23	6.07	0.165	0.169	0.047	8.28	6.84	3.84	2.93	1.72	0.302	0.200	0.322	0.279
Lead (Pb)-Total	0.000845	0.00322	0.00304	0.00122	0.000758	0.000779	0.00168	<0.000050	0.000107	<0.000050	0.00197	0.00243	0.00122	0.00111	0.000529	0.000147	0.000189	0.000306	0.000320
Lithium (Li)-Total	<0.0050	0.00561	0.00693	0.00338	0.00265	0.00229	0.00454	0.00095	0.00107	0.00110	0.0064	0.00541	0.00370	0.00283	0.00185	0.00104	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Total	3.82	5.85	5.77	4.99	5.99	6.33	6.82	6.36	6.42	6.95	5.61	5.46	5.08	5.97	4.53	5.56	3.13	3.11	3.33
Manganese (Mn)-Total	0.0986	0.206	0.197	0.0897	0.0666	0.0699	0.181	0.0216	0.0222	0.0108	0.211	0.165	0.0965	0.0890	0.0833	0.0170	0.00468	0.0107	0.0102
Mercury (Hg)-Total	<0.000010	0.000024	0.000019	0.000015	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000025	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000479	0.00124	0.00112	0.000852	0.00103	0.00101	0.00238	0.000815	0.000811	0.000724	0.000689	0.00104	0.000868	0.000969	0.000586	0.000841	0.00132	0.00140	0.00134
Nickel (Ni)-Total	0.00745	0.0154	0.0145	0.00803	0.00630	0.00618	0.0528	0.00096	0.00097	0.00056	0.0228	0.0133	0.00913	0.00806	0.00425	0.00121	<0.00050	<0.00050	<0.00050

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC			replicate			replicate			replicate										
Sample ID	BIR1	BIR1	BIR1	BIR1	BIR1	BIR1	BIR1	BIR1	BIR1	BIR1	BIR2	BIR2	BIR2	BIR2	BIR2	BIR2	BR1	BR1	BR1
Date Sampled	17-May-11	15-Jul-11	15-Jul-11	26-Aug-11	17-Sep-11	17-Sep-11	18-Oct-11	13-Nov-11	13-Nov-11	13-Dec-11	17-May-11	15-Jul-11	26-Aug-11	17-Sep-11	18-Oct-11	13-Nov-11	17-Jan-11	14-Feb-11	17-Mar-11
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included
ALS Sample ID	L1007227-3	L1033117-5	L1033117-9	L1051133-5	L1060382-7	L1060382-9	L1074434-5	L1084881-5	L1084881-7	L1096258-4	L1007227-1	L1033117-6	L1051133-6	L1060382-8	L1074434-6	L1084881-6	L971395-1	L979916-1	L987767-1
Total Metals *(cont'd)*																			
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.32	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	0.663	1.87	1.48	0.902	0.795	0.814	1.03	0.358	0.358	0.381	1.26	1.31	0.960	0.852	0.581	0.342	0.546	0.573	0.762
Selenium (Se)-Total	0.00037	0.00067	0.00060	0.00057	0.00064	0.00065	0.00086	0.00064	0.00066	0.00069	0.00046	0.00056	0.00056	0.00064	0.00046	0.00059	0.00061	0.00058	0.00052
Silicon (Si)-Total	4.98	13.8	13.3	6.47	6.41	6.35	9.01	2.60	2.60	2.62	10.1	12.0	7.06	6.65	4.56	2.72	1.96	2.06	2.13
Silver (Ag)-Total	0.000024	0.000076	0.000068	0.000030	0.000024	0.000026	0.000280	<0.000010	<0.000010	<0.000010	0.000062	0.000058	0.000031	0.000031	0.000012	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2.2	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.108	0.121	0.109	0.125	0.159	0.163	0.200	0.187	0.186	0.236	0.104	0.104	0.122	0.152	0.134	0.182	0.203	0.206	0.217
Thallium (Tl)-Total	<0.00010	0.000111	0.000096	0.000041	0.000028	0.000027	0.000056	<0.000010	<0.000010	<0.000010	<0.00010	0.000077	0.000042	0.000032	0.000016	<0.000010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.038	0.236	0.227	0.081	0.069	0.061	0.116	<0.010	<0.010	<0.010	0.097	0.198	0.093	0.073	0.044	0.012	<0.010	0.017	0.018
Uranium (U)-Total	0.000050	0.000163	0.000106	0.000073	0.000047	0.000051	0.000094	0.000030	0.000031	0.000039	0.000098	0.000083	0.000104	0.000055	0.000039	0.000028	0.000119	0.000121	0.000132
Vanadium (V)-Total	0.0051	0.0181	0.0147	0.0078	0.0051	0.0051	0.0120	<0.0010	<0.0010	<0.0010	0.0158	0.0129	0.0090	0.0063	0.0041	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	0.0102	0.0362	0.0332	0.0137	0.0105	0.0146	0.0255	<0.0030	0.0031	<0.0030	0.0264	0.0263	0.0143	0.0135	0.0076	0.0035	<0.0030	<0.0030	0.0064
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.114	0.0369	0.0303	0.103	0.0604	0.0585	0.0531	0.0620	0.0607	0.0281	0.148	0.0332	0.0989	0.0304	0.0610	0.0858	0.0109	0.0052	0.0068
Antimony (Sb)-Dissolved	<0.00010	0.00015	0.00013	0.00015	0.00018	0.00018	0.00011	0.00011	0.00011	0.00013	<0.00010	0.00010	0.00013	0.00019	<0.00010	0.00011	0.00039	0.00037	0.00034
Arsenic (As)-Dissolved	0.00018	0.00023	0.00020	0.00027	0.00025	0.00028	0.00019	0.00021	0.00019	0.00016	0.00018	0.00014	0.00026	0.00021	0.00017	0.00024	0.00031	0.00037	0.00029
Barium (Ba)-Dissolved	0.0237	0.0249	0.0231	0.0296	0.0369	0.0375	0.0308	0.0392	0.0387	0.0442	0.0231	0.0182	0.0291	0.0343	0.0271	0.0359	0.0445	0.0484	0.0466
Beryllium (Be)-Dissolved	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000015	0.000037	0.000011	0.000013	0.000014	0.000028	0.000011	0.000023	0.000021	<0.000010	0.000012	<0.000010	0.000011	0.000016	0.000010	0.000024	0.000013	0.000014	0.000027
Calcium (Ca)-Dissolved	13.5	14.0	13.8	16.1	20.9	20.5	20.1	23.8	23.9	34.0	12.2	11.4	15.1	20.0	17.4	22.3	37.0	44.4	41.6
Chromium (Cr)-Dissolved	0.00051	0.00020	0.00019	0.00032	0.00030	0.00028	0.00026	0.00026	0.00028	0.00016	0.00059	0.00021	0.00033	0.00026	0.00025	0.00036	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	0.00017	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00125	0.00068	<0.00050	0.00065	0.00071	0.00080	0.00076	0.00066	0.00062	<0.00050	0.00131	<0.00050	0.00070	0.00070	0.00089	0.00093	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	0.106	<0.030	<0.030	0.065	0.055	0.046	0.059	0.138	0.135	0.037	0.132	<0.030	0.062	<0.030	0.059	0.218	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000178	0.000071	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000313	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.00050	<0.00050	0.00093	0.00085	0.00079	0.00087	0.00109	0.00112	0.00117	<0.0050	<0.00050	0.00078	0.00073	0.00077	0.00099	<0.0050	<0.0050	<0.0050
Magnesium (Mg)-Dissolved	3.21	3.31	3.27	4.20	5.58	5.72	4.76	6.30	6.44	6.80	3.08	3.18	4.13	5.22	4.00	5.63	3.07	3.42	3.23
Manganese (Mn)-Dissolved	0.0127	0.00795	0.00125	0.00412	0.00985	0.00901	0.0160	0.0216	0.0213	0.0107	0.0106	0.00228	0.00426	0.00636	0.0128	0.0181	0.000365	0.000422	0.000532
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000420	0.000964	0.000750	0.000827	0.000984	0.000974	0.000669	0.000743	0.000748	0.000678	0.000431	0.000673	0.000781	0.000930	0.000596	0.000674	0.00139	0.00142	0.00135
Nickel (Ni)-Dissolved	0.00133	0.00068	<0.00050	0.00072	0.00130	0.00146	0.00078	0.00079	0.00085	0.00052	0.00134	<0.00050	0.00062	0.00118	0.00082	0.00089	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.290	0.258	0.242	0.315	0.399	0.432	0.338	0.343	0.343	0.365	0.288	0.238	0.307	0.403	0.313	0.307	0.518	0.590	0.546
Selenium (Se)-Dissolved	0.00033	0.00040	0.00042	0.00053	0.00062	0.00065	0.00055	0.00070	0.00073	0.00082	0.00033	0.00038	0.00051	0.00061	0.00046	0.00065	0.00063	0.00059	0.00051
Silicon (Si)-Dissolved	2.14	1.22	1.20	1.77	2.17	2.16	2.27	2.50	2.51	2.63	2.15	1.09	1.80	2.06	2.18	2.50	1.58	1.58	1.62
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.2	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.102	0.0991	0.0993	0.127	0.160	0.161	0.148	0.186	0.185	0.228	0.0952	0.0847	0.119	0.154	0.131	0.165	0.203	0.204	0.210
Thallium (Tl)-Dissolved	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000014	0.000017	0.000016	0.000027	0.000029	0.000029	0.000023	0.000043	0.000032	0.000036	0.000015	0.000014	0.000023	0.000028	0.000020	0.000027	0.000120	0.000117	0.000122
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0034	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0045	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	lake	lake	lake	lake	lake	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC	replicate				replicate							replicate							
Sample ID	BR1	BR1	BR2	L1 (1M)	L1 (1M)	L1 (6M)	L2 (1M)	L2 (6M)	MC1	MC1	MC1	MC1	MC1	MC1	MC1	MC1	MC1	MC1	ST1
Date Sampled	17-Mar-11	14-Apr-11	14-Apr-11	23-Aug-11	24-Aug-11	23-Aug-11	24-Aug-11	24-Aug-11	17-May-11	26-May-11	16-Jun-11	16-Jun-11	15-Jul-11	26-Aug-11	17-Sep-11	18-Oct-11	13-Nov-11	13-Dec-11	17-Jan-11
Included/Excluded	Included	Included	Included	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included
ALS Sample ID	L987767-2	L995830-2	L995830-1	L1051244-5	L1051244-9	L1051244-6	L1051244-7	L1051244-8	L1007227-2	L1010083-1	L1019628-4	L1019628-5	L1033117-4	L1051133-7	L1060382-6	L1074434-4	L1084881-4	L1096258-3	L971395-2
Physical Tests																			
Colour, True	<5.0	<5.0	<5.0	14.5	21.3	17.0	21.4	30.8	25.1	23.2	16.5	27.6	9.4	24.8	19.9	38.8	17.0	13.6	<5.0
Conductivity (uS/cm)	229	210	220	16.6	17.5	17.1	17.6	22.6	17.5	15.8	21.1	21.2	36.4	22.6	23.8	20.3	21.7	26.1	147
Hardness (as $CaCO_3$)	111	103	110	5.96	6.70	6.11	6.78	8.25	7.08	5.61	8.43	8.44	13.7	9.07	9.97	8.48	8.32	9.86	70.6
pH	7.87	8.13	8.10	6.60	6.59	6.54	6.58	6.86	6.53	6.51	7.92	7.88	7.83	7.42	7.38	7.17	6.74	7.46	7.77
Total Suspended Solids	5.0	<3.0	<3.0	11.6	5.6	<3.0	<3.0	6.9	<3.0	<3.0	<3.0	<3.0	<3.0	6.9	<3.0	5.9	<3.0	<3.0	4.7
Total Dissolved Solids	150	122	131	16	26	21	23	31	21	24	25	24	25	27	28	31	30	25	91
Turbidity (NTU)	2.04	2.37	0.63	1.13	1.16	1.40	1.12	1.79	1.76	0.83	0.36	0.58	0.20	0.49	0.54	2.75	0.61	0.42	1.41
Anions and Nutrients																			
Acidity (as $CaCO_3$)	3.5	<1.0	<1.0	2.6	3.0	2.9	3.0	4.2	2.5	2.9	1.4	1.6	3.3	2.9	1.1	5.3	3.6	2.9	3.7
Alkalinity, Bicarbonate (as $CaCO_3$)	95.7	68.7	72.3	5.8	5.4	5.6	5.1	7.6	4.5	4.3	7.1	7.3	11.5	7.4	7.7	4.9	6.8	7.9	29.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	95.7	68.7	72.3	5.8	5.4	5.6	5.1	7.6	4.5	4.3	7.1	7.3	11.5	7.4	7.7	4.9	6.8	7.9	29.3
Ammonia, Total (as N)	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.154	<0.0050	<0.0050	<0.0050	<0.0050	0.0070	<0.0050	0.0051	<0.0050	<0.0050	0.0078	0.0106
Bromide (Br)	<0.17	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.57	<0.50	<0.50	<0.50
Fluoride (F)	0.034	0.048	0.049	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.021	<0.020	<0.020	<0.020	<0.020	<0.020	0.022
Nitrate (as N)	0.0829	0.0924	0.228	0.0206	<0.0050	0.0594	<0.0050	<0.0050	0.522	0.302	0.0729	0.0743	0.220	0.135	0.137	0.325	0.261	0.297	0.0581
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.097	0.168	0.252	0.169	0.300	0.221	0.350	0.400	0.171	0.168	0.187	0.186	0.180	0.225	0.153	0.26	0.099	0.083	<0.050
Total Nitrogen	0.180	0.260	0.480	0.190	0.300	0.280	0.350	0.400	0.710	0.470	0.260	0.260	0.400	0.360	0.290	0.590	0.360	0.380	0.060
Orthophosphate-Dissolved (as P)	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	0.0020	0.0026	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	-
Phosphorus (P)-Total	0.0054	0.0022	<0.0020	0.0089	0.0070	0.0090	0.0073	0.0186	0.0075	0.0053	0.0029	0.0032	0.0038	0.0063	0.0045	0.0151	0.0046	0.0041	0.0070
Sulfate (SO_4)	33.3	34.3	36.3	1.39	1.89	1.42	1.89	2.19	1.28	1.26	2.09	2.09	4.46	2.01	2.30	1.51	2.09	2.63	38.9
Cyanides																			
Cyanide, Weak Acid Diss	<0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.0015	<0.0010	<0.0010	<0.0010	<0.0010	<0.0012	<0.0010	<0.0011	<0.0050
Cyanide, Total	<0.0010	<0.0010	0.0013	0.0037	0.0055	0.0044	0.0057	0.0100	0.0063	0.0052	0.0040	0.0024	0.0035	0.0058	0.0051	0.0075	0.0049	0.0058	0.0015
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	0.73	<0.50	0.68	4.70	7.66	5.62	7.70	8.33	5.12	5.54	4.27	4.26	3.12	6.04	5.16	8.25	4.75	3.92	1.11
Total Metals																			
Aluminum (Al)-Total	0.0599	0.0848	0.0104	0.111	0.136	0.140	0.128	0.217	0.250	0.175	0.0861	0.0885	0.0430	0.113	0.115	0.346	0.120	0.0852	0.0357
Antimony (Sb)-Total	0.00037	0.00039	0.00016	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	0.00036	0.00039	0.00028	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	0.00017	<0.00010	<0.00010	0.00043
Barium (Ba)-Total	0.0484	0.0442	0.0411	0.00877	0.00836	0.00910	0.00797	0.0163	0.00838	0.00627	0.00733	0.00741	0.0107	0.00753	0.00827	0.0104	0.00661	0.00733	0.0246
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	0.011	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000018	0.000016	0.000012	<0.000010	<0.000010	0.000030	<0.000010	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000017
Calcium (Ca)-Total	40.1	37.8	35.5	1.69	1.88	1.73	1.81	2.31	2.36	1.98	2.64	2.64	4.10	2.84	3.06	2.74	2.50	3.07	18.5
Chromium (Cr)-Total	0.00016	0.00028	0.00017	0.00046	0.00053	0.00046	0.00049	0.00067	0.00061	<0.00050	0.00032	0.00036	0.00022	0.00027	0.00045	0.00065	0.00033	0.00028	0.00019
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00148	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00023	<0.00010	<0.00010	0.00062
Copper (Cu)-Total	0.00052	<0.00050	<0.00050	0.00065	<0.00050	0.00074	<0.00050	0.00050	0.00074	0.00067	0.00075	0.00157	0.00091	0.00088	0.00096	0.00097	0.00061	0.00062	<0.00050
Iron (Fe)-Total	0.066	0.072	<0.030	0.077	0.057	0.094	0.055	0.798	0.170	0.092	0.039	0.039	<0.030	0.059	0.064	0.277	0.080	0.041	0.682
Lead (Pb)-Total	0.000089	0.000062	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000053	<0.00015	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000067	<0.000050	<0.000050	0.000073
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	0.00063	<0.00050	0.00068	<0.00050	0.00050	<0.0050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00081	<0.00050	<0.00050	<0.0050
Magnesium (Mg)-Total	3.22	2.90	5.08	0.482	0.579	0.494	0.550	0.672	0.459	0.391	0.526	0.543	0.864	0.536	0.609	0.553	0.497	0.625	5.34
Manganese (Mn)-Total	0.00251	0.00234	0.000832	0.0126	0.00926	0.0143	0.00872	0.221	0.0193	0.00734	0.00253	0.00248	0.00102	0.00386	0.00323	0.0314	0.00491	0.00128	0.130
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.00144	0.00149	0.000745	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000314
Nickel (Ni)-Total	<0.00050	<0.00050	0.00056	0.00090	0.00105	0.00094	0.00097	0.00131	0.00113	0.00086	0.00080	0.00171	0.00075	0.00089	0.00136	0.00145	0.00081	0.00063	0.00180

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	**stream**	**stream**	**stream**	**lake**	**lake**	**lake**	**lake**	**lake**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**	**stream**
QAQC	**replicate**				**replicate**							**replicate**							
Sample ID	**BR1**	**BR1**	**BR2**	**L1 (1M)**	**L1 (1M)**	**L1 (6M)**	**L2 (1M)**	**L2 (6M)**	**MC1**	**MC1**	**MC1**	**MC1**	**MC1**	**MC1**	**MC1**	**MC1**	**MC1**	**MC1**	**ST1**
Date Sampled	**17-Mar-11**	**14-Apr-11**	**14-Apr-11**	**23-Aug-11**	**24-Aug-11**	**23-Aug-11**	**24-Aug-11**	**24-Aug-11**	**17-May-11**	**26-May-11**	**16-Jun-11**	**16-Jun-11**	**15-Jul-11**	**26-Aug-11**	**17-Sep-11**	**18-Oct-11**	**13-Nov-11**	**13-Dec-11**	**17-Jan-11**
Included/Excluded	**Included**	**Included**	**Included**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Included**
ALS Sample ID	**L987767-2**	**L995830-2**	**L995830-1**	**L1051244-5**	**L1051244-9**	**L1051244-6**	**L1051244-7**	**L1051244-8**	**L1007227-2**	**L1010083-1**	**L1019628-4**	**L1019628-5**	**L1033117-4**	**L1051133-7**	**L1060382-6**	**L1074434-4**	**L1084881-4**	**L1096258-3**	**L971395-2**
Total Metals *(cont'd)*																			
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	0.583	0.528	0.229	0.086	0.097	0.092	0.092	0.161	0.106	0.073	0.097	0.099	0.145	0.081	0.075	0.227	0.068	0.077	0.219
Selenium (Se)-Total	0.00067	0.00064	0.00039	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00079
Silicon (Si)-Total	1.72	1.63	2.31	1.29	0.616	1.40	0.591	1.49	1.80	1.58	1.39	1.40	1.56	1.58	2.21	2.17	2.22	2.32	1.94
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.223	0.210	0.320	0.0220	0.0241	0.0229	0.0228	0.0308	0.0247	0.0204	0.0307	0.0295	0.0442	0.0303	0.0326	0.0287	0.0271	0.0329	0.165
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	0.000131	0.000123	0.000057	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	0.0072	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0035	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0044	0.0057	0.0039	0.0584	0.0917	0.0822	0.0976	0.141	0.144	0.139	0.0738	0.0712	0.0375	0.0989	0.0947	0.182	0.104	0.0803	<0.0030
Antimony (Sb)-Dissolved	0.00036	0.00044	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00028	0.00033	0.00033	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00030
Barium (Ba)-Dissolved	0.0459	0.0419	0.0404	0.00803	0.00766	0.00846	0.00771	0.0128	0.00669	0.00595	0.00710	0.00690	0.0106	0.00716	0.00781	0.00810	0.00664	0.00712	0.0261
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	0.000011	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013
Calcium (Ca)-Dissolved	39.3	36.8	35.7	1.62	1.77	1.67	1.79	2.19	2.17	1.62	2.53	2.53	4.07	2.77	3.02	2.58	2.50	2.96	19.1
Chromium (Cr)-Dissolved	<0.00010	0.00014	0.00018	0.00040	0.00035	0.00033	0.00037	0.00040	0.00036	0.00030	0.00022	0.00021	0.00016	0.00023	0.00035	0.00032	0.00023	0.00017	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00055
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	0.00057	<0.00050	0.00059	<0.00050	<0.00050	0.00054	0.00055	0.00078	0.00077	0.00084	0.00088	0.00090	0.00071	0.00057	0.00056	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.177	0.048	0.043	<0.030	<0.030	<0.030	0.042	0.041	0.080	0.058	0.036	0.113
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	0.00061	<0.00050	0.00060	<0.00050	<0.00050	<0.0050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00055	<0.0050
Magnesium (Mg)-Dissolved	3.15	2.83	5.04	0.463	0.553	0.472	0.558	0.675	0.405	0.382	0.512	0.512	0.856	0.523	0.590	0.492	0.504	0.598	5.55
Manganese (Mn)-Dissolved	0.000411	0.000724	0.000454	0.000377	0.00132	0.00228	0.00291	0.0509	0.00528	0.00266	0.00101	0.00102	0.000430	0.00144	0.00149	0.00376	0.00365	0.00114	0.126
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00135	0.00143	0.000742	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000275
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	0.00083	0.00098	0.00085	0.00096	0.00125	0.00079	0.00083	0.00082	0.00080	0.00077	0.00092	0.00137	0.00103	0.00074	0.00061	0.00172
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.527	0.496	0.239	0.080	0.096	0.092	0.094	0.162	0.094	0.072	0.094	0.095	0.147	0.079	0.078	0.193	0.067	0.074	0.229
Selenium (Se)-Dissolved	0.00051	0.00063	0.00038	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00083
Silicon (Si)-Dissolved	1.57	1.43	2.24	1.21	0.522	1.31	0.541	1.48	1.58	1.58	1.34	1.34	1.51	1.56	2.19	1.88	2.21	2.25	1.84
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.208	0.202	0.316	0.0213	0.0225	0.0221	0.0225	0.0292	0.0230	0.0168	0.0287	0.0287	0.0443	0.0298	0.0323	0.0271	0.0269	0.0309	0.152
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000122	0.000115	0.000053	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC	replicate					replicate						replicate		replicate					
Sample ID	ST1	ST1	ST1	ST2	ST2	ST2	TC2	TC3	TC3	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1
Date Sampled	17-Jan-11	14-Feb-11	14-Apr-11	14-Feb-11	14-Apr-11	14-Apr-11	14-Apr-11	17-Jan-11	14-Apr-11	17-May-11	26-May-11	26-May-11	2-Jun-11	2-Jun-11	9-Jun-11	16-Jun-11	15-Jul-11	26-Aug-11	17-Sep-11
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L971395-4	L979916-2	L995830-5	L979916-3	L995830-3	L995830-4	L995830-6	L971395-3	L995830-7	L1007227-4	L1010083-2	L1010083-4	L1012816-1	L1012816-3	L1016239-2	L1019628-3	L1033117-1	L1051133-1	L1060382-3
Physical Tests																			
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	21.9	17.5	17.7	15.9	16.0	14.1	13.6	<5.0	13.1	16.0
Conductivity (uS/cm)	146	159	181	215	220	222	306	277	289	21.9	21.4	21.4	20.5	20.0	22.4	25.9	48.4	42.3	51.1
Hardness (as $CaCO_3$)	67.3	68.8	81.0	106	110	109	155	145	149	9.10	9.37	9.09	8.41	8.41	10.1	10.8	21.1	16.9	22.5
pH	7.74	7.52	7.40	8.06	8.16	8.18	8.20	7.86	8.03	7.64	6.97	6.94	6.91	6.89	8.01	7.95	7.58	7.62	7.57
Total Suspended Solids	5.7	38.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	6.3	8.4	<3.0	4.4	16.4	15.8	7.1	6.0	10.8	3.0	6.5
Total Dissolved Solids	67	99	110	133	134	135	181	143	170	28	27	27	30	28	19	21	29	38	41
Turbidity (NTU)	1.43	8.62	0.33	0.29	0.37	0.38	0.32	2.42	8.36	7.77	5.11	5.18	10.9	11.3	8.53	7.32	15.8	4.71	4.68
Anions and Nutrients																			
Acidity (as $CaCO_3$)	3.7	3.5	3.0	1.9	1.9	1.8	1.7	4.2	2.7	1.6	2.8	2.8	2.3	2.4	2.9	1.4	4.2	2.6	1.0
Alkalinity, Bicarbonate (as $CaCO_3$)	31.1	33.9	32.7	80.4	78.5	65.0	95.1	109	121	6.4	6.4	6.6	6.5	5.7	6.5	7.6	12.5	10.7	12.5
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	31.1	33.9	32.7	80.4	78.5	65.0	95.1	109	121	6.4	6.4	6.6	6.5	5.7	6.5	7.6	12.5	10.7	12.5
Ammonia, Total (as N)	0.0133	0.0100	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0095	0.0179	<0.0050	<0.0050	<0.0050	0.0071	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.022	0.026	0.026	0.041	0.049	0.049	0.049	0.042	0.050	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	0.0573	0.0586	0.0524	0.191	0.225	0.226	0.0115	0.0471	0.0874	0.364	0.208	0.207	0.0927	0.0935	0.0355	0.0129	<0.0050	0.0354	0.0634
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	0.138	<0.050	0.255	0.205	0.109	<0.050	0.173	0.178	0.132	0.103	0.167	0.167	0.244	0.127	0.110	0.175	0.087
Total Nitrogen	0.060	0.060	0.190	0.180	0.480	0.430	0.120	0.050	0.260	0.550	0.340	0.310	0.260	0.260	0.280	0.140	0.110	0.210	0.150
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.0134	0.0584	0.0036	<0.0020	<0.0020	<0.0020	0.0026	0.0036	0.0062	0.0085	0.0095	0.0108	0.0187	0.0166	0.0085	0.0064	0.0152	0.0093	0.0145
Sulfate (SO_4)	38.8	45.7	52.3	33.8	36.7	36.6	59.7	36.7	32.0	2.17	2.45	2.41	2.39	2.41	3.27	4.12	10.0	7.59	9.62
Cyanides																			
Cyanide, Weak Acid Diss	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	0.0017	<0.0010
Cyanide, Total	0.0014	0.0016	0.0013	<0.0010	0.0012	0.0011	<0.0010	0.0012	0.0019	0.0060	0.0048	0.0045	0.0043	0.0031	0.0028	0.0029	0.0014	0.0029	0.0026
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	1.01	0.98	0.76	<0.50	0.86	0.72	0.53	0.93	1.40	5.04	4.86	4.72	4.16	4.14	3.84	2.86	0.86	3.85	4.45
Total Metals																			
Aluminum (Al)-Total	0.0229	0.0816	0.0071	0.0095	0.0148	0.0155	0.0145	0.0106	0.0107	0.566	0.319	0.315	0.807	0.736	0.340	0.340	0.914	0.284	0.230
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	0.00018	0.00017	0.00017	0.00031	0.00014	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00036	<0.00010	<0.00010
Arsenic (As)-Total	0.00050	0.00031	0.00013	0.00034	0.00031	0.00030	0.00023	0.00100	0.00170	0.00020	0.00011	0.00011	0.00024	0.00024	0.00013	<0.00010	0.00023	0.00012	0.00013
Barium (Ba)-Total	0.0242	0.0233	0.0285	0.0401	0.0400	0.0423	0.0373	0.0507	0.0603	0.0129	0.00989	0.00959	0.0150	0.0149	0.0108	0.0111	0.0212	0.0125	0.0158
Beryllium (Be)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010
Cadmium (Cd)-Total	0.000021	0.000016	0.000025	<0.000010	0.000013	0.000011	0.000122	0.000070	0.000083	0.000017	<0.000020	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011
Calcium (Ca)-Total	18.1	18.5	22.7	34.2	36.3	37.5	52.2	45.4	50.2	2.58	2.64	2.52	2.31	2.36	2.80	3.13	6.01	4.73	6.52
Chromium (Cr)-Total	0.00012	0.00035	0.00012	0.00013	0.00024	0.00026	0.00046	<0.00010	0.00021	0.00146	<0.0010	<0.00090	0.00217	0.00204	0.00095	0.00097	0.00250	0.00082	0.00085
Cobalt (Co)-Total	0.00062	0.00053	0.00021	<0.00010	<0.00010	<0.00010	<0.00010	0.00023	0.00055	0.00037	0.00015	0.00016	0.00040	0.00040	0.00022	0.00018	0.00039	0.00015	0.00014
Copper (Cu)-Total	0.00060	0.00052	<0.00050	0.00209	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00162	0.00119	0.00108	0.00224	0.00284	0.00120	0.00108	0.00158	0.00131	0.00173
Iron (Fe)-Total	0.815	0.699	0.099	<0.030	<0.030	<0.030	<0.030	0.458	1.79	0.585	0.259	0.262	0.788	0.736	0.275	0.260	0.716	0.255	0.191
Lead (Pb)-Total	0.000134	0.000064	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000159	<0.00010	<0.00010	0.000172	0.000180	0.000099	0.000075	0.000213	0.000096	0.000083
Lithium (Li)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00054	0.00159	0.00064	0.00071
Magnesium (Mg)-Total	5.17	5.09	6.59	4.46	5.10	5.19	7.19	6.59	6.75	0.803	0.759	0.753	0.881	0.867	0.845	0.916	1.87	1.34	1.71
Manganese (Mn)-Total	0.134	0.114	0.0110	0.000691	0.000929	0.000945	0.00165	0.196	0.405	0.0274	0.0113	0.0105	0.0226	0.0225	0.0113	0.00896	0.0130	0.00679	0.00656
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000296	0.000285	0.000328	0.000805	0.000720	0.000771	0.00161	0.000925	0.000899	0.000059	<0.000060	<0.000050	0.000092	0.000083	0.000123	0.000134	0.000393	0.000191	0.000272
Nickel (Ni)-Total	0.00180	0.00189	0.00188	<0.00050	<0.00050	<0.00050	0.00066	0.00070	0.00086	0.00225	0.00147	0.00144	0.00277	0.00268	0.00145	0.00134	0.00216	0.00138	0.00188

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC	replicate					replicate						replicate		replicate					
Sample ID	ST1	ST1	ST1	ST2	ST2	ST2	TC2	TC3	TC3	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1
Date Sampled	17-Jan-11	14-Feb-11	14-Apr-11	14-Feb-11	14-Apr-11	14-Apr-11	14-Apr-11	17-Jan-11	14-Apr-11	17-May-11	26-May-11	26-May-11	2-Jun-11	2-Jun-11	9-Jun-11	16-Jun-11	15-Jul-11	26-Aug-11	17-Sep-11
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L971395-4	L979916-2	L995830-5	L979916-3	L995830-3	L995830-4	L995830-6	L971395-3	L995830-7	L1007227-4	L1010083-2	L1010083-4	L1012816-1	L1012816-3	L1016239-2	L1019628-3	L1033117-1	L1051133-1	L1060382-3
Total Metals *(cont'd)*																			
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	0.217	0.229	0.196	0.223	0.239	0.243	0.384	0.290	0.388	0.209	0.150	0.143	0.265	0.253	0.145	0.166	0.372	0.163	0.183
Selenium (Se)-Total	0.00084	0.00073	0.00100	0.00040	0.00046	0.00040	0.00145	0.00093	0.00066	<0.00010	<0.00010	<0.00010	0.00012	0.00012	0.00013	0.00013	0.00027	0.00021	0.00027
Silicon (Si)-Total	1.87	1.88	1.81	2.44	2.32	2.38	2.22	2.81	3.15	2.22	1.83	1.81	2.72	2.46	1.77	1.71	3.01	1.84	2.07
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000022
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2.1	2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.153	0.164	0.204	0.323	0.321	0.334	0.359	0.323	0.354	0.0292	0.0289	0.0275	0.0278	0.0280	0.0329	0.0374	0.0625	0.0538	0.0724
Thallium (Tl)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.014	<0.010	<0.010	0.032	<0.010	<0.010
Uranium (U)-Total	<0.000010	<0.000010	<0.000010	0.000055	0.000055	0.000057	0.000122	0.000053	0.000051	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000018	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	0.0019	0.0018	<0.0010	<0.0010	0.0024	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	0.0035	<0.0030	<0.0030	<0.0030	0.0068	<0.0030	0.0040	0.0037	<0.0030	<0.0030	0.0043	0.0041	0.0041	0.0033	0.0059	<0.0030	0.0053
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	<0.0030	<0.0030	<0.0030	0.0036	0.0035	0.0032	<0.0030	<0.0030	<0.0030	0.144	0.114	0.117	0.107	0.135	0.251	0.0715	0.0256	0.0637	0.0853
Antimony (Sb)-Dissolved	<0.00010	<0.00010	<0.00010	0.00017	0.00019	0.00017	0.00030	0.00014	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00026	0.00017	<0.00010	0.00033	0.00029	0.00027	0.00022	0.00083	0.00074	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)-Dissolved	0.0239	0.0236	0.0284	0.0401	0.0398	0.0398	0.0361	0.0524	0.0556	0.00801	0.00736	0.00736	0.00696	0.00752	0.00993	0.00703	0.0101	0.00991	0.0136
Beryllium (Be)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000013	0.000011	0.000022	0.000010	<0.000010	0.000012	0.000112	0.000054	0.000028	<0.000010	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013
Calcium (Ca)-Dissolved	18.3	18.5	21.7	34.9	35.6	35.2	50.5	47.0	48.7	2.57	2.61	2.54	2.32	2.31	2.72	3.00	5.86	4.68	6.35
Chromium (Cr)-Dissolved	<0.00010	<0.00010	0.00015	0.00013	0.00016	0.00014	0.00012	<0.00010	0.00011	0.00041	0.00035	0.00030	0.00037	0.00037	0.00063	0.00023	0.00023	0.00026	0.00035
Cobalt (Co)-Dissolved	0.00054	0.00045	0.00020	<0.00010	<0.00010	<0.00010	<0.00010	0.00025	0.00046	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00083	0.00082	0.00080	0.00078	0.00081	0.00078	0.00063	<0.00050	0.00086	0.00134
Iron (Fe)-Dissolved	0.099	0.034	0.051	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.090	0.043	0.048	0.046	0.067	0.218	0.043	<0.030	0.031	0.041
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	0.00069	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	5.22	5.47	6.50	4.53	5.03	5.06	7.11	6.71	6.64	0.652	0.694	0.669	0.633	0.644	0.805	0.815	1.56	1.26	1.62
Manganese (Mn)-Dissolved	0.129	0.105	0.0115	0.000178	0.000430	0.000421	0.00128	0.198	0.378	0.0104	0.00393	0.00372	0.00455	0.00501	0.00312	0.00224	0.00193	0.00156	0.00266
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000212	0.000259	0.000323	0.000790	0.000714	0.000737	0.00157	0.000975	0.000840	<0.000050	<0.000050	0.000059	0.000066	0.000064	0.000082	0.000108	0.000329	0.000185	0.000241
Nickel (Ni)-Dissolved	0.00164	0.00158	0.00177	<0.00050	<0.00050	<0.00050	0.00066	0.00069	0.00080	0.00105	0.00091	0.00092	0.00086	0.00093	0.00096	0.00066	<0.00050	0.00080	0.00158
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.222	0.220	0.195	0.223	0.236	0.235	0.379	0.301	0.383	0.124	0.112	0.106	0.099	0.123	0.143	0.091	0.122	0.109	0.151
Selenium (Se)-Dissolved	0.00036	0.00075	0.00096	0.00039	0.00043	0.00040	0.00146	0.00087	0.00059	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	0.00015	0.00014	0.00028	0.00020	0.00024
Silicon (Si)-Dissolved	1.87	1.90	1.77	2.39	2.28	2.29	2.16	2.77	2.89	1.67	1.52	1.51	1.27	1.32	1.89	1.17	0.905	1.46	1.76
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	2.4	<2.0	2.0	2.1	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.121	0.177	0.204	0.315	0.319	0.320	0.351	0.337	0.339	0.0288	0.0286	0.0279	0.0260	0.0274	0.0312	0.0360	0.0606	0.0545	0.0696
Thallium (Tl)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	<0.000010	<0.000010	<0.000010	0.000054	0.000054	0.000054	0.000118	0.000056	0.000048	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0054	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0038

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC					replicate				replicate										
Sample ID	WC1	WC1	WC1	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC4	WC4	WC4
Date Sampled	18-Oct-11	13-Nov-11	13-Dec-11	17-May-11	17-May-11	26-May-11	2-Jun-11	9-Jun-11	9-Jun-11	16-Jun-11	15-Jul-11	25-Aug-11	17-Sep-11	18-Oct-11	13-Nov-11	13-Dec-11	17-May-11	15-Jul-11	25-Aug-11
Included/Excluded	Included	Included	Included	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1074434-1	L1084881-1	L1096258-1	L1007227-5	L1007227-6	L1010083-3	L1012816-2	L1016239-3	L1016239-4	L1019628-2	L1033117-2	L1051133-2	L1060382-4	L1074434-2	L1084881-2	L1096258-2	L1007227-7	L1033117-3	L1051133-3
Physical Tests																			
Colour, True	24.4	15.5	12.1	22.2	23.5	20.6	21.1	20.4	20.3	33.1	13.2	16.8	-	29.6	25.7	21.7	26.1	33.7	52.8
Conductivity (uS/cm)	23.3	37.7	48.3	19.8	19.8	17.0	15.3	14.4	14.4	15.9	18.8	17.2	-	18.3	19.3	20.0	18.5	30.7	26.5
Hardness (as $CaCO_3$)	10.1	15.4	19.2	7.22	7.41	6.50	5.69	5.74	5.69	5.70	6.83	6.03	7.58	7.51	7.83	7.04	7.12	11.7	10.5
pH	7.02	6.67	7.71	6.52	6.53	6.41	6.64	6.47	6.46	6.83	6.62	6.67	-	6.57	6.75	7.42	6.55	7.63	7.05
Total Suspended Solids	29.2	<3.0	<3.0	<3.0	3.4	<3.0	3.8	<3.0	<3.0	<3.0	<3.0	<3.0	-	<3.0	<3.0	<3.0	5.9	7.5	<3.0
Total Dissolved Solids	24	27	29	21	24	24	25	21	22	14	17	22	-	27	25	21	23	25	37
Turbidity (NTU)	21.9	0.73	0.84	1.87	2.07	1.62	2.11	1.55	1.38	0.95	0.65	1.13	-	1.71	0.65	0.63	2.21	2.45	1.09
Anions and Nutrients																			
Acidity (as $CaCO_3$)	3.9	3.6	2.5	3.1	2.8	3.0	2.7	2.8	3.1	2.2	3.0	2.7	-	4.1	4.9	3.0	3.1	3.7	3.6
Alkalinity, Bicarbonate (as $CaCO_3$)	6.2	10.5	12.8	5.1	5.0	4.0	3.9	3.6	3.1	4.9	6.3	5.6	-	5.8	6.3	6.4	4.8	12.9	7.9
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	6.2	10.5	12.8	5.1	5.0	4.0	3.9	3.6	3.1	4.9	6.3	5.6	-	5.8	6.3	6.4	4.8	12.9	7.9
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	0.0138	0.0070	<0.0050	0.0081	<0.0050	<0.0050	0.0095	<0.0050	<0.0050	0.0061	0.0053	0.0094	0.0115	<0.0050	0.0218	0.0059
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	<0.020	<0.020	<0.020	<0.020	0.032	0.022
Nitrate (as N)	0.0571	0.129	0.143	0.660	0.663	0.594	0.441	0.312	0.315	0.211	0.101	0.0406	-	0.0971	0.147	0.166	0.432	<0.0050	0.0057
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010
Total Kjeldahl Nitrogen	0.173	0.071	0.067	0.202	0.194	0.254	0.180	0.248	0.265	0.219	0.229	0.219	0.276	0.243	0.173	0.104	0.218	0.899	0.544
Total Nitrogen	0.230	0.200	0.210	0.900	0.780	0.770	0.621	0.560	0.580	0.430	0.330	0.260	0.300	0.340	0.320	0.270	0.590	0.900	0.550
Orthophosphate-Dissolved (as P)	0.0013	<0.0010	<0.0010	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Phosphorus (P)-Total	0.0396	0.0034	0.0040	0.0073	0.0077	0.0068	0.0071	0.0059	0.0050	0.0045	0.0063	0.0092	-	0.0103	0.0065	0.0049	0.0160	0.0351	0.0399
Sulfate (SO_4)	2.88	5.99	8.18	1.29	1.28	1.15	0.97	1.15	1.14	1.35	1.66	1.45	-	1.50	1.75	1.58	1.57	1.42	2.94
Cyanides																			
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0011	<0.0010	0.0010	<0.0010	<0.0010	0.0010	0.0011	0.0013	-	<0.0010	-	<0.0010	<0.0010	<0.0011	0.0021	-	<0.0010
Cyanide, Total	0.0050	0.0016	0.0076	0.0062	0.0060	0.0055	0.0053	0.0041	0.0031	0.0044	-	0.0042	-	0.0068	0.0068	0.0047	0.0071	-	0.0103
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	5.50	4.50	3.58	5.62	5.71	5.86	5.77	5.22	5.58	5.03	3.87	5.26	8.60	8.14	6.97	5.75	6.40	8.40	12.7
Total Metals																			
Aluminum (Al)-Total	0.925	0.130	0.0919	0.254	0.266	0.221	0.268	0.221	0.241	0.176	0.0990	0.127	0.248	0.336	0.170	0.156	0.194	0.141	0.248
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	0.00027	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	0.00013	0.00013	0.00011	<0.00010	<0.00010	0.00021	0.00015
Barium (Ba)-Total	0.0204	0.0105	0.0122	0.0107	0.0109	0.00909	0.00947	0.00852	0.00867	0.00817	0.00854	0.00861	0.0107	0.0124	0.00891	0.00859	0.00910	0.0137	0.0126
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000016	<0.000010	<0.000010	0.000021	0.000011	<0.000010	<0.000010	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	0.000029	0.000024	<0.000010	0.000012	0.000014	0.000017
Calcium (Ca)-Total	3.14	4.32	5.68	2.15	2.04	1.82	1.65	1.53	1.54	1.61	1.97	1.70	2.12	2.39	2.18	2.30	2.26	3.55	3.11
Chromium (Cr)-Total	0.00225	0.00041	0.00039	0.00065	0.00075	<0.00070	0.00067	0.00058	0.00062	0.00055	0.00036	0.00036	0.00070	0.00094	0.00053	0.00107	0.00056	0.00048	0.00043
Cobalt (Co)-Total	0.00069	<0.00010	<0.00010	0.00031	0.00030	0.00012	0.00014	0.00011	0.00012	<0.00010	<0.00010	0.00011	0.00013	0.00020	<0.00010	<0.00010	0.00023	0.00049	0.00032
Copper (Cu)-Total	0.00266	0.00119	0.00120	0.00070	0.00065	0.00069	0.00097	0.00072	0.00077	0.00076	0.00185	0.00072	0.00099	0.00132	0.00081	0.00064	0.00062	0.00272	0.00092
Iron (Fe)-Total	0.863	0.073	0.055	0.253	0.259	0.130	0.140	0.093	0.106	0.073	0.078	0.098	0.149	0.287	0.137	0.386	0.177	0.414	0.311
Lead (Pb)-Total	0.000302	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000071	<0.000050	<0.000050	0.000090	0.000345	<0.000050	0.000089	0.000178	0.000072
Lithium (Li)-Total	0.00121	<0.00050	0.00081	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	0.00070	<0.00050	0.00054	<0.0050	0.00127	0.00101
Magnesium (Mg)-Total	1.04	1.13	1.44	0.575	0.595	0.509	0.486	0.471	0.477	0.466	0.560	0.481	0.572	0.596	0.555	0.568	0.472	0.697	0.577
Manganese (Mn)-Total	0.0396	0.00242	0.00187	0.0447	0.0462	0.0138	0.0122	0.00878	0.00926	0.00827	0.00885	0.0167	0.0146	0.0218	0.00892	0.00843	0.0594	0.155	0.0605
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000104	0.000095	0.000129	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000053	<0.000050	0.000079	<0.000050	0.000051	<0.000050
Nickel (Ni)-Total	0.00327	0.00108	0.00095	0.00129	0.00138	0.00111	0.00121	0.00112	0.00131	0.00105	0.00094	0.00094	0.00189	0.00177	0.00123	0.00120	0.00107	0.00141	0.00157

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Station Type	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream	stream
QAQC					replicate				replicate										
Sample ID	WC1	WC1	WC1	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC4	WC4	WC4
Date Sampled	18-Oct-11	13-Nov-11	13-Dec-11	17-May-11	17-May-11	26-May-11	2-Jun-11	9-Jun-11	9-Jun-11	16-Jun-11	15-Jul-11	25-Aug-11	17-Sep-11	18-Oct-11	13-Nov-11	13-Dec-11	17-May-11	15-Jul-11	25-Aug-11
Included/Excluded	Included	Included	Included	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1074434-1	L1084881-1	L1096258-1	L1007227-5	L1007227-6	L1010083-3	L1012816-2	L1016239-3	L1016239-4	L1019628-2	L1033117-2	L1051133-2	L1060382-4	L1074434-2	L1084881-2	L1096258-2	L1007227-7	L1033117-3	L1051133-3
Total Metals *(cont'd)*																			
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	0.346	0.102	0.122	0.138	0.143	0.107	0.117	0.083	0.087	0.086	0.109	0.083	0.094	0.133	0.085	0.072	0.117	0.138	0.079
Selenium (Se)-Total	<0.00010	0.00016	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	2.90	2.20	2.26	1.98	1.96	1.70	1.69	1.51	1.55	1.43	1.23	1.36	1.82	2.38	2.23	2.43	1.73	0.508	1.27
Silver (Ag)-Total	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000020	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.0344	0.0493	0.0648	0.0258	0.0245	0.0211	0.0212	0.0196	0.0194	0.0195	0.0241	0.0215	0.0270	0.0277	0.0274	0.0292	0.0279	0.0464	0.0409
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.018	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	0.000016	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Total	0.0021	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	0.0056	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0039	0.0068	0.0039	<0.0030	0.0038	<0.0030
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.120	0.109	0.0802	0.147	0.143	0.150	0.150	0.154	0.174	0.127	0.0816	0.0710	0.196	0.180	0.161	0.145	0.114	0.117	0.144
Antimony (Sb)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	0.00011	<0.00010	<0.00010	0.00015	0.00016
Barium (Ba)-Dissolved	0.00783	0.0105	0.0119	0.00958	0.00962	0.00819	0.00808	0.00802	0.00848	0.00751	0.00808	0.00767	0.0102	0.00916	0.00915	0.00856	0.00765	0.0141	0.0112
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	0.000024	<0.000010	<0.000010	0.000018	<0.000010
Calcium (Ca)-Dissolved	2.84	4.35	5.46	2.01	2.08	1.80	1.56	1.54	1.52	1.56	1.87	1.64	2.11	2.16	2.23	1.92	2.12	3.55	3.25
Chromium (Cr)-Dissolved	0.00039	0.00034	0.00026	0.00040	0.00048	0.00032	0.00045	0.00042	0.00042	0.00038	0.00034	0.00025	0.00053	0.00042	0.00039	0.00034	0.00035	0.00041	0.00031
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	0.00020	0.00021	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00062	<0.00010
Copper (Cu)-Dissolved	0.00105	0.00109	0.00111	<0.00050	0.00056	0.00058	0.00061	0.00058	0.00066	0.00066	0.00208	0.00067	0.00083	0.00107	0.00075	0.00074	<0.00050	0.00166	0.00087
Iron (Fe)-Dissolved	0.066	0.065	0.044	0.109	0.108	0.041	<0.030	0.061	0.061	<0.030	0.062	<0.030	0.056	0.097	0.126	0.094	0.060	0.328	0.166
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000119	<0.000050	<0.000050	<0.000050	0.000597	<0.000050	<0.000050	0.000134	0.000083
Lithium (Li)-Dissolved	<0.00050	0.00058	0.00078	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00053	<0.0050	0.00111	0.00080
Magnesium (Mg)-Dissolved	0.725	1.11	1.37	0.538	0.539	0.486	0.437	0.461	0.462	0.441	0.528	0.467	0.559	0.515	0.552	0.548	0.445	0.676	0.579
Manganese (Mn)-Dissolved	0.00469	0.00229	0.00183	0.0343	0.0349	0.00807	0.00533	0.00293	0.00645	0.00305	0.00945	0.00104	0.00465	0.0108	0.00961	0.00599	0.0153	0.235	0.00862
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000072	0.000087	0.000110	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000246	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved	0.00105	0.00104	0.00089	0.00103	0.00108	0.00101	0.00100	0.00103	0.00107	0.00092	0.00090	0.00093	0.00174	0.00128	0.00110	0.00091	0.00084	0.00154	0.00142
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.153	0.103	0.110	0.117	0.125	0.098	0.106	0.080	0.086	0.081	0.106	0.087	0.090	0.095	0.097	0.078	0.110	0.143	0.070
Selenium (Se)-Dissolved	<0.00010	0.00017	0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	1.46	2.14	2.13	1.77	1.76	1.67	1.46	1.57	1.56	1.34	1.14	1.27	1.80	2.09	2.25	2.35	1.62	0.427	1.25
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.6	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0314	0.0487	0.0628	0.0241	0.0247	0.0211	0.0203	0.0190	0.0189	0.0192	0.0232	0.0210	0.0262	0.0250	0.0279	0.0231	0.0261	0.0463	0.0428
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0044	0.0098	0.0038	<0.0030	0.0043	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	**2011**	**2011**	**2011**	**2011**
Station Type	**stream**	**stream**	**stream**	**stream**
QAQC				
Sample ID	**WC4**	**WC4**	**WC4**	**WC5**
Date Sampled	**17-Sep-11**	**18-Oct-11**	**13-Nov-11**	**26-Aug-11**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Included**
ALS Sample ID	**L1060382-5**	**L1074434-3**	**L1084881-3**	**L1051133-4**
Physical Tests				
Colour, True	-	104	28.2	11.9
Conductivity (uS/cm)	-	14.0	22.2	47.9
Hardness (as $CaCO_3$)	10.3	4.42	9.05	19.6
pH	-	5.22	6.68	7.57
Total Suspended Solids	-	5.2	31.7	<3.0
Total Dissolved Solids	-	41	33	39
Turbidity (NTU)	-	1.49	2.55	5.27
Anions and Nutrients				
Acidity (as $CaCO_3$)	-	7.7	4.5	2.9
Alkalinity, Bicarbonate (as $CaCO_3$)	-	<2.0	7.2	11.8
Alkalinity, Carbonate (as $CaCO_3$)	-	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	-	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	-	<2.0	7.2	11.8
Ammonia, Total (as N)	0.0073	<0.0050	0.0066	<0.0050
Bromide (Br)	-	<0.050	<0.050	<0.050
Chloride (Cl)	-	0.75	<0.50	<0.50
Fluoride (F)	-	<0.020	<0.020	<0.020
Nitrate (as N)	-	<0.0050	0.169	0.0258
Nitrite (as N)	-	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.367	0.330	0.201	0.204
Total Nitrogen	0.410	0.330	0.370	0.230
Orthophosphate-Dissolved (as P)	-	0.0144	<0.0010	0.0013
Phosphorus (P)-Total	-	0.0468	0.0338	0.0071
Sulfate (SO_4)	-	<0.50	2.01	9.03
Cyanides				
Cyanide, Weak Acid Diss	<0.0010	<0.0011	<0.0010	<0.0010
Cyanide, Total	0.0072	0.0150	0.0076	0.0032
CN-THIO Thiocyanate	-	-	-	-
Organic / Inorganic Carbon				
Total Organic Carbon	8.48	14.5	7.22	3.44
Total Metals				
Aluminum (Al)-Total	0.211	0.155	0.237	0.339
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	0.00011	0.00023	0.00016	0.00013
Barium (Ba)-Total	0.0129	0.00786	0.0108	0.0132
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000012	<0.000010	0.000037	<0.000010
Calcium (Ca)-Total	3.24	1.30	2.75	5.40
Chromium (Cr)-Total	0.00068	0.00045	0.00056	0.00092
Cobalt (Co)-Total	0.00025	<0.00010	0.00032	0.00016
Copper (Cu)-Total	0.00090	<0.00050	0.00097	0.00121
Iron (Fe)-Total	0.190	0.427	0.274	0.278
Lead (Pb)-Total	0.000052	<0.000050	0.000577	0.000069
Lithium (Li)-Total	0.00058	0.00093	<0.00050	0.00090
Magnesium (Mg)-Total	0.629	0.423	0.556	1.49
Manganese (Mn)-Total	0.0570	0.0148	0.0753	0.00587
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	<0.000050	<0.000050	0.000051	0.000220
Nickel (Ni)-Total	0.00191	0.00132	0.00130	0.00129

Table A3-2. 2011: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	**2011**	**2011**	**2011**	**2011**
Station Type	**stream**	**stream**	**stream**	**stream**
QAQC				
Sample ID	**WC4**	**WC4**	**WC4**	**WC5**
Date Sampled	**17-Sep-11**	**18-Oct-11**	**13-Nov-11**	**26-Aug-11**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Included**
ALS Sample ID	**L1060382-5**	**L1074434-3**	**L1084881-3**	**L1051133-4**
Total Metals *(cont'd)*				
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	0.080	0.155	0.097	0.182
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	0.00024
Silicon (Si)-Total	1.87	1.96	2.65	2.03
Silver (Ag)-Total	0.000019	<0.000010	0.000011	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.0437	0.0181	0.0365	0.0609
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	0.0035	<0.0030	0.0103	<0.0030
Dissolved Metals				
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.166	0.139	0.160	0.0754
Antimony (Sb)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	<0.00010	0.00019	0.00016	<0.00010
Barium (Ba)-Dissolved	0.0115	0.00703	0.0105	0.0103
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	0.000077	<0.000010
Calcium (Ca)-Dissolved	3.15	1.13	2.73	5.46
Chromium (Cr)-Dissolved	0.00043	0.00034	0.00033	0.00028
Cobalt (Co)-Dissolved	<0.00010	<0.00010	0.00028	<0.00010
Copper (Cu)-Dissolved	0.00074	<0.00050	0.00096	0.00081
Iron (Fe)-Dissolved	0.107	0.397	0.209	0.047
Lead (Pb)-Dissolved	<0.000050	<0.000050	0.000652	<0.000050
Lithium (Li)-Dissolved	<0.00050	0.00078	<0.00050	0.00062
Magnesium (Mg)-Dissolved	0.596	0.386	0.539	1.45
Manganese (Mn)-Dissolved	0.00562	0.00875	0.0655	0.00185
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	<0.000050	<0.000050	<0.000050	0.000205
Nickel (Ni)-Dissolved	0.00175	0.00131	0.00111	0.00071
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.070	0.107	0.080	0.113
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	0.00025
Silicon (Si)-Dissolved	1.84	1.84	2.53	1.49
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0421	0.0160	0.0366	0.0619
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	0.0032	0.0102	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-3. 2012: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake
QAQC								replicate				replicate		replicate		replicate			
Sample ID	BIR1	BIR1	BIR1	BIR1	BIR2	BIR2	BIR2	BIR2	BIR2	BIR2	L1 (1.5m)	L1 (1.5m)	L1 (1m)	L1 (1m)	L1 (1m)	L1 (1m)	L1 (6m)	L1 (7m)	L1 (8m)
Date Sampled	25-Apr-12	29-Jun-12	6-Sep-12	10-Dec-12	25-Apr-12	25-Apr-12	29-Jun-12	29-Jun-12	6-Sep-12	10-Dec-12	15-Dec-12	15-Dec-12	1-Jul-12	1-Jul-12	6-Sep-12	6-Sep-12	6-Sep-12	1-Jul-12	15-Dec-12
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1140759-1	L1171541-4	L1206762-2	L1250701-8	L1140759-2	L1140759-8	L1171541-5	L1171541-8	L1206762-1	L1250701-15	L1250701-30	L1250701-31	L1171541-15	L1171541-9	L1206762-4	L1206762-6	L1206762-5	L1171541-16	L1250701-32
Physical Tests																			
Colour, True	8.9	<5.0	<5.0	<5.0	9.4	9.5	<5.0	<5.0	<5.0	<5.0	21.4	21.5	19.3	19.4	10.9	10.9	15.5	18.9	22
Conductivity (uS/cm)	154	100	130	220	139	134	93.5	98.5	124	200	20	19.8	13.3	13.2	16.8	16.6	14.2	11.7	20.6
Hardness (as $CaCO_3$)	69.4	47.5	59.8	105	61.5	61.3	44.1	47.3	57.1	97.3	7.75	7.81	5.9	6	6.4	6.3	5.7	5.18	7.82
pH	8.08	7.92	8.06	8.25	8.06	7.82	7.93	7.8	8	8.23	7.67	7.6	6.58	6.55	6.86	6.75	6.65	6.48	7.51
Total Suspended Solids	80.2	203	27.5	<3.0	6.2	6.2	23.2	204	23.4	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.2	<3.0
Total Dissolved Solids	93	78	99	117	85	85	41	81	82	118	25	37	23	17	16	20	16	19	28
Turbidity (NTU)	17	180	30.6	0.65	5.97	6.36	196	184	26.5	0.45	0.54	0.56	1.12	1.06	0.9	1.03	1.2	1.27	0.85
Anions and Nutrients																			
Acidity (as $CaCO_3$)	1.5	1.2	2.1	1.1	1.5	2.4	1.1	1.7	2.4	1.2	3.1	3.2	2.3	2.4	2.9	2.9	3.2	2.7	3.5
Alkalinity, Bicarbonate (as $CaCO_3$)	55.1	32.4	40.2	77.8	48.7	48.7	30.1	32.9	39.6	68.6	6.9	7.2	4.8	4.9	6.2	6.2	5	4.1	7.4
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	55.1	32.4	40.2	77.8	48.7	48.7	30.1	32.9	39.6	68.6	6.9	7.2	4.8	4.9	6.2	6.2	5	4.1	7.4
Ammonia, Total (as N)	0.0156	0.0078	<0.0050	<0.0050	<0.0050	0.0051	0.0088	0.0067	<0.0050	<0.0050	0.0825	0.0856	<0.0050	<0.0050	0.0053	<0.0050	0.0053	<0.0050	0.124
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.043	0.036	0.033	0.046	0.041	0.041	0.034	0.036	0.031	0.043	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	0.511	0.071	0.0052	0.192	0.539	0.538	0.071	0.0707	0.01	0.212	0.0711	0.0737	0.169	0.172	<0.0050	<0.0050	0.0491	0.21	0.0823
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.06	0.139	0.335	<0.050	<0.050	0.057	0.189	0.259	0.101	<0.050	0.4	0.3	0.091	0.138	0.26	0.2	0.211	0.09	0.4
Total Nitrogen	0.59	0.21	0.34	0.199	0.64	0.66	0.26	0.33	0.11	0.228	0.427	0.395	0.26	0.31	0.26	0.2	0.26	0.3	0.445
Orthophosphate-Dissolved (as P)	<0.0010	0.0027	0.0015	0.0014	<0.0010	<0.0010	0.0029	0.0023	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.0757	0.209	0.0368	0.0034	0.0117	0.0134	0.328	0.24	0.0306	0.0027	0.0078	0.0083	0.006	0.0061	0.008	0.0079	0.0102	0.0061	0.0099
Sulfate (SO_4)	21	15.2	23.2	39.6	18	17.9	13.6	15.2	21.8	34.1	1.84	1.83	1.14	1.15	1.3	1.2	1.1	1.03	1.86
Cyanides																			
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	2.69	3.48	1.54	0.93	2.76	2.82	3.94	3.43	0.99	1	6.33	6.26	4.76	5.12	4.87	4.83	5.14	4.58	6.17
Total Metals																			
Aluminum (Al)-Total	0.409	1.76	1.49	0.0209	0.396	0.368	3.88	4.53	1.36	0.0178	0.126	0.126	0.18	0.181	0.08	0.085	0.144	0.203	0.145
Antimony (Sb)-Total	0.00019	0.00023	0.00032	0.00013	0.00016	0.00015	0.00028	0.00034	0.0003	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	0.00038	0.00133	0.00171	0.00018	0.00037	0.00035	0.00224	0.00236	0.00157	0.00021	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00011	<0.00010	<0.00010	<0.00010
Barium (Ba)-Total	0.0351	0.0808	0.0567	0.047	0.033	0.0324	0.11	0.102	0.0505	0.0415	0.00918	0.00899	0.00799	0.0081	0.0103	0.0099	0.0079	0.00773	0.00944
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00016	0.00014	<0.00010	<0.00010	<0.00010	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.000021	0.000102	0.000066	0.000011	0.000018	0.000021	0.000144	0.000112	0.000057	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	19.7	13.9	16	31.2	18.2	18	13.8	13.9	16	26.8	2.12	2.06	1.63	1.65	1.7	1.76	1.48	1.43	2.04
Chromium (Cr)-Total	0.00125	0.00456	0.0029	0.00025	0.00121	0.00109	0.0105	0.013	0.00261	0.00024	0.00042	0.001	0.0007	0.0006	0.00038	0.0003	0.00037	0.00051	0.00044
Cobalt (Co)-Total	0.00036	0.00292	0.00082	<0.00010	0.00029	0.00028	0.00462	0.00374	0.00079	<0.00010	0.00016	0.00013	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00017
Copper (Cu)-Total	0.00189	0.00742	0.00293	<0.00050	0.00173	0.00174	0.0123	0.0107	0.00274	0.002	0.00113	0.011	0.00079	0.00063	0.00177	0.00064	0.00065	0.00057	0.004
Iron (Fe)-Total	0.623	2.78	1.85	0.042	0.52	0.471	5.67	6.43	1.71	0.031	0.128	0.136	0.09	0.09	0.06	0.061	0.103	0.097	0.227
Lead (Pb)-Total	0.000121	0.00151	0.000964	<0.000050	0.00009	0.0001	0.00213	0.00191	0.000936	<0.000050	0.0001	0.0001	0.000052	<0.000050	0.00011	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	0.00153	0.00234	0.00188	0.00091	0.00138	0.0012	0.00443	0.00511	0.00211	0.00071	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	5.14	4.23	4.81	7.61	4.75	4.63	4.97	5.52	4.36	6.6	0.594	0.584	0.447	0.458	0.512	0.52	0.42	0.421	0.613
Manganese (Mn)-Total	0.0413	0.154	0.0569	0.0118	0.0327	0.031	0.233	0.183	0.0538	0.00842	0.0367	0.0345	0.0091	0.00925	0.0133	0.0133	0.0157	0.008	0.0506
Mercury (Hg)-Total	<0.000010	0.000035	<0.000010	<0.000010	<0.000010	<0.000010	0.000041	0.000034	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000531	0.000438	0.000827	0.000889	0.000537	0.000505	0.00064	0.000794	0.000789	0.000837	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	<0.0025	0.00991	0.00361	0.0007	<0.0025	<0.0020	0.0177	0.0187	0.00342	0.00057	0.0011	0.00113	0.00211	0.00125	0.00123	0.00087	0.00086	0.00099	0.00108

Table A3-3. 2012: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Lake
QAQC								replicate				replicate		replicate		replicate			
Sample ID	BIR1	BIR1	BIR1	BIR1	BIR2	BIR2	BIR2	BIR2	BIR2	BIR2	L1 (1.5m)	L1 (1.5m)	L1 (1m)	L1 (1m)	L1 (1m)	L1 (1m)	L1 (6m)	L1 (7m)	L1 (8m)
Date Sampled	25-Apr-12	29-Jun-12	6-Sep-12	10-Dec-12	25-Apr-12	25-Apr-12	29-Jun-12	29-Jun-12	6-Sep-12	10-Dec-12	15-Dec-12	15-Dec-12	1-Jul-12	1-Jul-12	6-Sep-12	6-Sep-12	6-Sep-12	1-Jul-12	15-Dec-12
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1140759-1	L1171541-4	L1206762-2	L1250701-8	L1140759-2	L1140759-8	L1171541-5	L1171541-8	L1206762-1	L1250701-15	L1250701-30	L1250701-31	L1171541-15	L1171541-9	L1206762-4	L1206762-6	L1206762-5	L1171541-16	L1250701-32
Total Metals *(cont'd)*																			
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	0.408	0.635	0.638	0.368	0.388	0.377	1.04	1.19	0.579	0.316	0.131	0.112	0.063	0.063	0.074	0.071	0.064	0.065	0.122
Selenium (Se)-Total	0.00052	0.00046	0.00056	0.0008	0.00047	0.00047	0.00052	0.00054	0.00054	0.00073	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	3	5.5	3.81	2.46	3.2	3.14	8.51	10.6	3.48	2.23	0.8	0.791	1.23	1.27	1.18	1.16	1.06	1.34	0.916
Silver (Ag)-Total	<0.000010	0.000021	0.00002	<0.000010	<0.000010	<0.000010	0.000041	0.000046	0.000017	<0.000010	0.000014	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	2.1	<2.0	<2.0	2.7	2.1	2	<2.0	<2.0	<2.0	2.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.154	0.11	0.133	0.239	0.145	0.145	0.11	0.113	0.129	0.217	0.026	0.0255	0.0203	0.0207	0.0232	0.0229	0.02	0.0174	0.0254
Thallium (Tl)-Total	0.000033	0.000023	0.000027	<0.000010	0.000014	<0.000010	0.000043	0.00005	0.000026	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	0.00046	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.013	0.052	0.042	<0.010	0.014	0.015	0.089	0.119	0.036	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	0.000025	0.000064	0.00006	0.000039	0.000024	0.000024	0.000099	0.000092	0.000044	0.000033	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Total	0.0013	0.005	0.0043	<0.0010	0.0013	0.0011	0.0111	0.0127	0.0037	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0060	0.0155	0.0082	<0.0030	<0.0060	<0.0060	0.0255	0.0269	0.0078	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0031	<0.0030	<0.0030	0.003	<0.0030
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0265	0.163	0.0239	0.003	0.0354	0.0257	0.123	0.0562	0.0359	0.0047	0.112	0.11	0.13	0.126	0.0418	0.0409	0.109	0.151	0.115
Antimony (Sb)-Dissolved	<0.00010	0.00014	0.00016	0.00013	<0.00010	<0.00010	0.00011	0.00013	0.00015	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00017	0.00023	0.00025	0.00014	0.00016	0.00015	0.00023	0.00018	0.00024	0.00016	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)-Dissolved	0.0312	0.0301	0.0301	0.045	0.0284	0.0275	0.0278	0.0286	0.0294	0.0427	0.00881	0.00898	0.00754	0.0073	0.0095	0.0088	0.0085	0.00702	0.00932
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000013	<0.000010	0.000016	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Dissolved	19.7	13.2	16.8	29.8	17.4	17.4	12.3	13.2	16.3	27.6	2.1	2.14	1.64	1.66	1.76	1.71	1.54	1.41	2.1
Chromium (Cr)-Dissolved	0.0002	0.00056	0.00017	0.00016	0.00019	0.0002	0.00041	0.00026	0.00014	0.00017	0.0003	0.0003	0.00047	0.00037	0.00031	0.00024	0.00035	0.00041	0.00032
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012
Copper (Cu)-Dissolved	0.00065	0.00054	<0.00050	<0.00050	0.00059	0.00063	0.0006	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00082	0.00063	0.00106	<0.00050	<0.00050	0.00059	<0.00050
Iron (Fe)-Dissolved	0.054	0.131	<0.030	<0.030	0.05	0.048	0.038	0.09	<0.030	<0.030	0.048	0.049	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.057
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.00095	0.0008	0.00109	0.00082	0.00084	0.00076	0.00069	0.00076	0.00096	0.00072	<0.00050	<0.00050	<0.00050	<0.00050	0.00066	0.00063	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	4.93	3.5	4.32	7.5	4.37	4.31	3.26	3.52	3.96	6.9	0.607	0.602	0.435	0.438	0.495	0.5	0.45	0.404	0.624
Manganese (Mn)-Dissolved	0.0254	0.0054	0.0044	0.00998	0.0196	0.0195	0.00522	0.00438	0.00364	0.00814	0.0341	0.0313	0.00461	0.00439	0.0004	0.00074	0.0019	0.00395	0.0432
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.00051	0.000726	0.000864	0.00086	0.000476	0.000479	0.000664	0.000663	0.000808	0.000857	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved	0.00092	0.00094	<0.00050	0.00055	0.00084	0.00086	0.00079	0.00073	<0.00050	0.00052	0.00107	0.00106	0.00206	0.00115	0.00117	0.0008	0.00086	0.00092	0.00104
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.32	0.348	0.262	0.356	0.291	0.284	0.334	0.318	0.253	0.338	0.13	0.117	0.069	0.059	0.071	0.061	0.074	0.065	0.126
Selenium (Se)-Dissolved	0.00044	0.00045	0.00052	0.00082	0.0004	0.00042	0.00046	0.00045	0.00049	0.00076	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	2.34	2.07	1.37	2.28	2.34	2.37	1.72	1.93	1.4	2.25	0.793	0.799	1.17	1.17	1.1	1.11	0.97	1.25	0.894
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	2	<2.0	<2.0	2.5	<2.0	<2.0	<2.0	<2.0	<2.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.154	0.103	0.135	0.226	0.139	0.138	0.0951	0.102	0.13	0.216	0.026	0.0263	0.0195	0.0199	0.0226	0.0234	0.0194	0.0166	0.0261
Thallium (Tl)-Dissolved	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00038	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000021	0.000017	0.000019	0.000036	0.000018	0.000017	0.000014	0.000014	0.000018	0.000032	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-3. 2012: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC							replicate												
Sample ID	MC1	MC1	MC1	MC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC2	WC2
Date Sampled	17-Jan-12	25-Apr-12	6-Sep-12	10-Dec-12	25-Apr-12	29-May-12	29-May-12	5-Jun-12	11-Jun-12	20-Jun-12	29-Jun-12	31-Jul-12	23-Aug-12	1-Oct-12	31-Oct-12	21-Nov-12	10-Dec-12	25-Apr-12	29-May-12
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Excluded	Excluded
ALS Sample ID	L1105752-1	L1140759-3	L1206762-3	L1250701-14	L1140759-4	L1155798-1	L1155798-10	L1158955-1	L1161793-1	L1166925-1	L1171541-1	L1188621-4	L1200103-2	L1219460-1	L1232846-1	L1241645-3	L1250701-11	L1140759-5	L1155798-2
Physical Tests																			
Colour, True	12.2	17.5	5.9	9.9	17.7	20	17.3	16.6	16.8	13.6	12.3	<5.0	<5.0	24.5	10	10.3	8.9	22.5	21
Conductivity (uS/cm)	35	25.1	48.3	32	30.5	19	19.3	20	19.3	21.8	22	49.4	59.5	27.4	57.7	52	58.2	24.1	15.6
Hardness (as $CaCO_3$)	11.7	9.8	18.2	11.8	12.3	9	8.6	8.3	8.1	9.1	10	21.3	25.6	12.1	22.9	21.4	23.9	9.06	6.7
pH	7.51	7.53	7.79	7.81	7.53	6.87	6.79	8.09	7.83	6.49	7.25	7.91	7.85	7.56	7.99	7.54	7.6	7.34	6.78
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	5	4.3	6.5	36.7	3.5	9	3.9	<3.0	10	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	33	26	36	29	30	23	25	17	36	22	22	43	42	26	37	41	45	27	25
Turbidity (NTU)	0.4	0.53	0.26	0.14	2.19	2.97	3	6.71	16.7	4.42	9	10.3	7.43	7.48	1.66	1.18	0.8	0.39	1.32
Anions and Nutrients																			
Acidity (as $CaCO_3$)	2.8	2.2	2.7	2.6	2.5	-	-	2.6	1.5	<1.0	1.4	2.9	3.1	2.8	2.2	2.2	3.2	2.7	-
Alkalinity, Bicarbonate (as $CaCO_3$)	7.6	7.3	15.2	8.4	9.5	6.6	5.8	6	5.4	6.8	7	12.7	14.7	7.8	13.9	13.5	15.8	7.3	4.2
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0
Alkalinity, Total (as $CaCO_3$)	7.6	7.3	15.2	8.4	9.5	6.6	5.8	6	5.4	6.8	7	12.7	14.7	7.8	13.9	13.5	15.8	7.3	4.2
Ammonia, Total (as N)	0.0051	0.0335	<0.0050	<0.0050	<0.0050	-	-	<0.0050	<0.0050	<0.0050	0.013	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0114	-
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	0.029	0.023	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.022	0.025	<0.020	<0.020
Nitrate (as N)	0.453	0.711	0.412	0.796	0.501	0.27	0.273	0.167	0.12	0.0643	0.029	0.007	0.011	0.11	0.3	0.3	0.312	0.632	0.584
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.094	0.065	0.13	<0.17	0.073	0.605	0.132	0.11	0.139	0.066	<0.050	<0.050	<0.050	0.172	0.1	0.1	<0.077	0.085	0.159
Total Nitrogen	0.47	0.89	0.54	0.825	0.63	0.876	0.404	0.21	0.18	0.13	<0.050	<0.050	<0.050	0.32	0.41	0.427	0.384	0.81	0.743
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	0.0014	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.0035	0.0052	0.0022	0.0041	0.0067	0.0107	0.011	0.01	0.0549	0.007	0.0109	0.0035	0.0064	0.0223	0.0038	0.0085	0.0038	0.0062	0.0055
Sulfate (SO_4)	5.7	1.8	6.33	3.14	3.02	2	1.9	1.92	2	2.7	3	10.2	12.8	3.98	10.3	9.4	10.8	1.52	1.11
Cyanides																			
Cyanide, Weak Acid Diss	<0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	0.0031	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	3.62	4.21	2.8	2.76	4.58	3.7	3.83	4.33	3.9	3.31	2.85	0.51	0.92	4.27	3.97	4.69	2.43	5.81	4.46
Total Metals																			
Aluminum (Al)-Total	0.068	0.13	0.0232	0.0498	0.207	0.297	0.31	0.578	1.27	0.296	0.49	0.679	0.44	0.684	0.096	0.0922	0.0705	0.151	0.172
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	0.0001	0.00012	0.00022	0.0005	0.00012	0.0002	0.00021	0.00016	0.00025	<0.00010	0.00013	<0.00010	<0.00010	<0.00010
Barium (Ba)-Total	0.0098	0.0091	0.014	0.008	0.0107	0.0095	0.0097	0.0122	0.0203	0.0097	0.012	0.0199	0.0187	0.0151	0.014	0.0133	0.0148	0.011	0.008
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	0.000024	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	0.000013	<0.000010
Calcium (Ca)-Total	3.7	3.11	5.38	3.41	3.53	2.3	2.33	2.44	2.43	2.58	2.7	6.2	7.29	3.19	6.69	6.13	6.68	2.64	1.82
Chromium (Cr)-Total	0.00025	0.00032	0.00013	0.00019	0.00061	0.00082	0.00087	0.00146	0.00347	0.00087	0.00134	0.00168	0.00109	0.00191	0.00037	0.0004	0.00029	0.00038	0.00045
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00017	0.00019	0.00039	0.0011	0.00018	0.00035	0.00029	0.00023	0.00043	<0.00010	<0.00010	<0.00010	<0.00010	0.0001
Copper (Cu)-Total	0.00062	0.00083	0.00082	0.001	0.00132	0.00104	0.00099	0.00161	0.00309	0.00104	0.0014	0.00144	0.00158	0.00206	0.0013	0.001	0.001	0.00086	0.00053
Iron (Fe)-Total	0.1	0.077	<0.030	<0.030	0.171	0.267	0.25	0.604	1.52	0.264	0.56	0.557	0.354	0.766	0.084	0.07	0.057	0.096	0.106
Lead (Pb)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0001	0.00006	0.000158	0.00043	0.000071	0.0001	0.000143	0.000103	0.000157	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	<0.00050	0.00051	<0.00050	<0.00050	0.00074	<0.00050	<0.00050	0.00084	0.00194	0.00069	0.001	0.00095	0.00079	0.00085	<0.00050	0.00056	<0.00050	0.00054	<0.00050
Magnesium (Mg)-Total	0.74	0.657	1.15	0.699	0.999	0.71	0.786	0.829	1.11	0.775	0.89	1.8	2.06	1.18	1.74	1.63	1.79	0.712	0.478
Manganese (Mn)-Total	0.0292	0.0104	0.00095	0.00112	0.00665	0.011	0.013	0.0205	0.069	0.0108	0.017	0.00973	0.00699	0.0241	0.00387	0.00269	0.00242	0.0118	0.0097
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	<0.000050	<0.000050	0.00006	<0.000050	<0.000050	<0.000050	<0.000050	0.000053	0.000103	0.000081	0.00012	0.000319	0.000354	0.000122	0.000145	0.000137	0.000164	<0.000050	<0.000050
Nickel (Ni)-Total	0.00078	<0.0010	0.00068	0.00068	<0.0015	0.00134	0.00153	0.00228	0.00475	0.00129	0.00198	0.00185	0.00129	0.00277	0.00106	0.00098	0.00099	<0.0015	0.0009

Table A3-3. 2012: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC							replicate												
Sample ID	MC1	MC1	MC1	MC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC1	WC2	WC2
Date Sampled	17-Jan-12	25-Apr-12	6-Sep-12	10-Dec-12	25-Apr-12	29-May-12	29-May-12	5-Jun-12	11-Jun-12	20-Jun-12	29-Jun-12	31-Jul-12	23-Aug-12	1-Oct-12	31-Oct-12	21-Nov-12	10-Dec-12	25-Apr-12	29-May-12
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Excluded	Excluded
ALS Sample ID	L1105752-1	L1140759-3	L1206762-3	L1250701-14	L1140759-4	L1155798-1	L1155798-10	L1158955-1	L1161793-1	L1166925-1	L1171541-1	L1188621-4	L1200103-2	L1219460-1	L1232846-1	L1241645-3	L1250701-11	L1140759-5	L1155798-2
Total Metals *(cont'd)*																			
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	0.088	0.093	0.122	0.098	0.139	0.13	0.132	0.177	0.306	0.126	0.17	0.295	0.241	0.272	0.15	0.144	0.141	0.113	0.078
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	0.00012	0.00012	0.00014	0.0003	0.00034	0.00015	0.00029	0.00023	0.00023	<0.00010	<0.00010
Silicon (Si)-Total	2.32	2.03	1.44	2.05	2.32	1.9	1.81	2.68	3	1.69	1.84	2.39	2.09	2.94	2.11	1.99	1.98	2.16	1.73
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000024	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.036	0.0336	0.059	0.036	0.0405	0.03	0.0271	0.0285	0.0278	0.0302	0.03	0.0726	0.0873	0.0381	0.0758	0.0721	0.0759	0.0322	0.0224
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	0.014	<0.010	<0.010	0.018	0.018	0.022	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	0.000013	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0029	<0.0010	0.0012	0.0018	0.0012	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0033	0.0037	0.0043	0.009	<0.0030	0.004	0.0031	<0.0030	0.0051	<0.0030	<0.0030	<0.0030	<0.0060	<0.0030
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0661	0.0935	0.0216	0.0487	0.131	0.107	0.123	0.133	0.111	0.0817	0.0705	0.039	0.0322	0.0993	0.0483	0.0501	0.0426	0.123	0.141
Antimony (Sb)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)-Dissolved	0.0094	0.0086	0.0143	0.00806	0.0098	0.0072	0.0075	0.00732	0.0073	0.007	0.0069	0.0111	0.0129	0.0084	0.0133	0.0129	0.0138	0.0107	0.0082
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Dissolved	3.5	2.93	5.33	3.54	3.38	2.3	2.35	2.29	2.21	2.54	2.8	5.95	7.12	3.34	6.42	6.01	6.65	2.51	1.73
Chromium (Cr)-Dissolved	0.00017	0.00023	0.00015	0.00016	0.00037	0.00031	0.00034	0.00026	0.00037	0.0003	0.00023	0.00018	<0.00010	0.00031	0.00023	0.00024	0.00021	0.00031	0.00034
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00059	<0.00050	0.00071	0.00051	0.00081	0.00063	0.00061	0.00066	0.00072	0.0006	0.00072	<0.00050	<0.00050	0.00103	0.00102	0.00095	0.00082	<0.00050	<0.00050
Iron (Fe)-Dissolved	0.089	0.039	<0.030	<0.030	0.087	0.045	0.041	0.062	0.048	0.03	0.032	<0.030	<0.030	0.063	<0.030	0.035	<0.030	0.061	0.035
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00056	<0.00050	<0.00050	0.00078	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	0.69	0.598	1.18	0.728	0.939	0.63	0.707	0.626	0.616	0.68	0.73	1.57	1.88	0.906	1.67	1.55	1.77	0.678	0.497
Manganese (Mn)-Dissolved	0.0266	0.00414	0.00054	0.000529	0.00403	0.003	0.0037	0.00368	0.0041	0.0024	0.002	0.00189	0.00113	0.00335	0.00173	0.00121	0.00114	0.00753	0.0053
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	<0.000050	<0.000050	0.000062	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000066	0.0001	0.000292	0.000363	0.000098	0.000148	0.000139	0.000149	<0.000050	<0.000050
Nickel (Ni)-Dissolved	0.00072	0.00075	0.00074	0.00064	0.00111	0.0009	0.00099	0.00091	0.00089	0.00074	0.0007	0.00096	<0.00050	0.00099	0.00094	0.00089	0.0009	0.00095	0.00088
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.082	0.086	0.124	0.102	0.121	0.08	0.1	0.087	0.093	0.076	0.08	0.121	0.127	0.142	0.138	0.121	0.134	0.106	0.09
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.00011	0.00029	0.00033	0.00014	0.00024	0.0002	0.00021	<0.00010	<0.00010
Silicon (Si)-Dissolved	2.21	1.9	1.44	2.11	2.11	1.52	1.51	1.49	1.34	1.25	1.13	1.04	0.94	1.4	1.94	1.95	1.91	2.09	1.6
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.035	0.0315	0.0552	0.0373	0.0383	0.03	0.0271	0.0265	0.0249	0.0291	0.03	0.07	0.0861	0.039	0.0722	0.0682	0.0749	0.0306	0.0213
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00025	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-3. 2012: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC			replicate		replicate										replicate				
Sample ID	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC4	WC4	WC4	WC4	WC4	WC4	WC4
Date Sampled	5-Jun-12	11-Jun-12	11-Jun-12	20-Jun-12	20-Jun-12	29-Jun-12	31-Jul-12	23-Aug-12	1-Oct-12	31-Oct-12	21-Nov-12	10-Dec-12	25-Apr-12	30-May-12	26-Jun-12	26-Jun-12	26-Jun-12	30-Jul-12	23-Aug-12
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1158955-2	L1161793-2	L1161793-6	L1166925-2	L1166925-3	L1171541-2	L1188621-5	L1200103-3	L1219460-2	L1232847-1	L1241645-1	L1250701-12	L1140759-6	L1155798-3	L1171502-2	L1171502-4	L1171502-9	L1188621-6	L1200103-4
Physical Tests																			
Colour, True	19.8	18.6	18.5	21.1	21	19.5	13.2	11.2	15.1	19.4	18	17.6	24.8	21.2	24.3	24.2	-	30.4	32.2
Conductivity (uS/cm)	17	15.3	14.7	15	15	14.1	18.6	22.8	16.7	20.2	21.6	23.6	24.6	17	20.6	20.4	-	33	36.8
Hardness (as $CaCO_3$)	6.6	5.9	5.8	6	6.2	5.74	7.26	8.69	6.65	7.3	8.37	8.79	10	7.3	8.6	8.54	8.4	12.7	13.7
pH	8.07	7.62	6.92	8.14	8.04	5.39	7.79	7.88	6.95	7.12	7.32	7.75	6.79	6.75	7.31	7.27	-	7.78	7.69
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	4	<3.0	<3.0	<3.0	<3.0	4.3	<3.0	<3.0	-	<3.0	<3.0
Total Dissolved Solids	25	24	22	20	19	23	22	23	20	21	25	30	30	23	24	23	-	30	36
Turbidity (NTU)	0.56	0.86	0.8	1.06	1	1.09	0.51	0.88	1.56	0.88	0.63	0.51	0.35	1.02	0.6	0.5	-	1.44	1.84
Anions and Nutrients																			
Acidity (as $CaCO_3$)	2.7	1.9	4.3	2.8	3.3	1.5	2.5	2.7	3.4	3.2	2.6	2.9	3.3	-	1.7	1.6	-	3.7	4
Alkalinity, Bicarbonate (as $CaCO_3$)	4.6	3.8	3.8	5	4.5	4.9	6.8	7.7	5.8	6.6	6.8	8.6	8	4.8	8	8	-	14.8	17.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	-	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	-	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	4.6	3.8	3.8	5	4.5	4.9	6.8	7.7	5.8	6.6	6.8	8.6	8	4.8	8	8	-	14.8	17.3
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	0.0108	0.0146	0.0167	-	0.0065	0.0076	-	0.0093	0.0052
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.021	0.021	<0.020	<0.020	0.023	<0.020	<0.020	0.021	0.02	-	0.038	0.043
Nitrate (as N)	0.411	0.397	0.397	0.27	0.277	0.185	0.087	0.177	0.101	0.3	0.4	0.392	0.554	0.348	0.0467	0.0478	-	0.012	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.154	0.127	0.149	0.15	0.143	0.095	0.16	0.148	0.251	0.2	0.2	0.2	0.154	0.154	0.207	0.22	-	0.4	0.439
Total Nitrogen	0.55	0.51	0.51	0.42	0.42	0.28	0.247	0.324	0.4	0.521	0.58	0.549	0.74	0.501	0.254	0.265	-	0.412	0.439
Orthophosphate-Dissolved (as P)	<0.0010	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Phosphorus (P)-Total	0.0052	0.0055	0.0057	0.0059	0.0054	0.006	0.006	0.0073	0.025	0.0075	0.0073	0.005	0.0098	0.0072	0.0078	0.008	-	0.022	0.0255
Sulfate (SO_4)	1.25	1.08	1.1	1.2	1.2	1.11	1.54	2.03	1.34	1.6	1.7	1.84	1.68	1.4	1.3	1.35	-	1.23	1.12
Cyanides																			
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	5.24	5.14	5.28	5.21	5.28	4.74	2.95	3.12	4.24	5.47	5.1	4.21	5.56	4.11	4.72	4.68	-	5.61	6.2
Total Metals																			
Aluminum (Al)-Total	0.178	0.181	0.188	0.185	0.18	0.183	0.097	0.088	0.16	0.137	0.119	0.139	0.125	0.101	0.093	0.092	-	0.163	0.123
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Arsenic (As)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00012	0.0001	0.00011	<0.00010	0.00014	<0.00010	<0.00010	0.0001	<0.00010	-	0.00021	0.00023
Barium (Ba)-Total	0.0084	0.0078	0.0082	0.0084	0.008	0.00784	0.00903	0.00973	0.00973	0.00983	0.00928	0.0123	0.011	0.0061	0.0088	0.00874	-	0.0157	0.0171
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	0.000012	<0.000010
Calcium (Ca)-Total	1.91	1.61	1.69	1.8	1.7	1.62	2.1	2.44	1.85	2.14	2.27	2.52	3.01	2.3	2.67	2.53	-	4.08	4.28
Chromium (Cr)-Total	0.00041	0.00051	0.00051	0.0005	0.00049	0.00049	0.00034	0.00032	0.00058	0.0004	0.00037	0.00046	0.00032	0.00032	0.00037	0.00034	-	0.00048	0.00032
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.00043	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	-	0.00049	0.00064
Copper (Cu)-Total	0.00061	0.00058	0.00055	0.00058	0.0007	0.00054	0.00082	0.00139	0.00084	0.00092	0.001	0.001	0.00075	<0.00050	0.00063	0.00051	-	0.00085	0.00116
Iron (Fe)-Total	0.088	0.079	0.08	0.093	0.09	0.097	0.098	0.11	0.181	0.125	0.103	0.11	0.106	0.08	0.11	0.108	-	0.476	0.604
Lead (Pb)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	0.000059	0.000054
Lithium (Li)-Total	<0.00050	0.00064	0.00065	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	0.00159	0.00201
Magnesium (Mg)-Total	0.513	0.46	0.477	0.48	0.46	0.445	0.575	0.673	0.554	0.612	0.626	0.804	0.685	0.394	0.532	0.539	-	0.781	0.812
Manganese (Mn)-Total	0.00742	0.00757	0.0076	0.0082	0.008	0.0087	0.0127	0.0146	0.04	0.0153	0.0083	0.00941	0.0164	0.0087	0.028	0.0276	-	0.228	0.309
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Molybdenum (Mo)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050
Nickel (Ni)-Total	0.00101	0.00092	0.00094	0.001	0.00095	0.00099	0.00096	0.001	0.00115	0.00113	0.00096	0.00134	<0.0010	0.00063	0.00092	0.00089	-	0.00156	0.00141

Table A3-3. 2012: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC			replicate		replicate										replicate				
Sample ID	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC2	WC4	WC4	WC4	WC4	WC4	WC4	WC4
Date Sampled	5-Jun-12	11-Jun-12	11-Jun-12	20-Jun-12	20-Jun-12	29-Jun-12	31-Jul-12	23-Aug-12	1-Oct-12	31-Oct-12	21-Nov-12	10-Dec-12	25-Apr-12	30-May-12	26-Jun-12	26-Jun-12	26-Jun-12	30-Jul-12	23-Aug-12
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
ALS Sample ID	L1158955-2	L1161793-2	L1161793-6	L1166925-2	L1166925-3	L1171541-2	L1188621-5	L1200103-3	L1219460-2	L1232847-1	L1241645-1	L1250701-12	L1140759-6	L1155798-3	L1171502-2	L1171502-4	L1171502-9	L1188621-6	L1200103-4
Total Metals *(cont'd)*																			
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	<0.30	<0.30
Potassium (K)-Total	0.074	0.07	0.074	0.07	0.06	0.064	0.093	0.113	0.122	0.134	0.133	0.166	0.113	<0.050	0.059	0.061	-	0.124	0.114
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Silicon (Si)-Total	1.63	1.48	1.52	1.33	1.26	1.3	1.23	1.24	1.41	1.78	2.07	2.02	2.16	1.59	0.93	0.91	-	0.63	0.63
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	2.2	2.8
Strontium (Sr)-Total	0.0236	0.0194	0.0203	0.02	0.021	0.0201	0.0264	0.0298	0.0238	0.0263	0.0295	0.0312	0.0383	0.03	0.037	0.0351	-	0.0609	0.0637
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010
Uranium (U)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0031	<0.0030	<0.0030	<0.0030	<0.0060	<0.0030	<0.0030	<0.0030	-	0.0031	<0.0030
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	FIELD	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.143	0.148	0.147	0.132	0.128	0.126	0.066	0.048	0.0656	0.104	0.0995	0.0926	0.103	0.0922	0.0798	0.0838	0.0612	0.07	0.06
Antimony (Sb)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	0.00018
Barium (Ba)-Dissolved	0.0083	0.0077	0.0076	0.0076	0.0075	0.00697	0.00844	0.00926	0.0084	0.00927	0.00891	0.0095	0.0107	0.0063	0.0085	0.00857	0.0078	0.0136	0.0157
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000016
Calcium (Ca)-Dissolved	1.83	1.61	1.59	1.8	1.7	1.59	2.01	2.39	1.8	1.95	2.33	2.45	2.95	2.2	2.59	2.56	2.5	3.88	4.2
Chromium (Cr)-Dissolved	0.0003	0.00041	0.00034	0.00035	0.00033	0.00035	0.00032	0.00024	0.00032	0.00033	0.00028	0.00027	0.00028	0.00024	0.00028	0.0003	0.00036	0.00024	0.00019
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00028	0.00016
Copper (Cu)-Dissolved	0.00077	0.00053	<0.00050	0.00056	0.00054	0.00066	0.00065	0.00052	0.00056	0.0006	0.00053	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00057	0.00056
Iron (Fe)-Dissolved	0.034	<0.030	<0.030	<0.030	<0.030	<0.030	0.059	0.058	0.04	0.053	0.052	0.06	0.07	0.048	0.083	0.087	0.038	0.22	0.339
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00053	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00074	0.00147	0.00183
Magnesium (Mg)-Dissolved	0.48	0.447	0.445	0.46	0.453	0.43	0.542	0.662	0.522	0.589	0.62	0.652	0.646	0.422	0.525	0.52	0.501	0.727	0.787
Manganese (Mn)-Dissolved	0.00381	0.00358	0.0036	0.0029	0.0028	0.00236	0.00483	0.0044	0.002	0.00304	0.0021	0.00186	0.00779	0.0035	0.0077	0.0244	0.003	0.17	0.146
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000064	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000053
Nickel (Ni)-Dissolved	0.001	0.00089	0.00089	0.0009	0.00091	0.00089	0.00087	0.00091	0.00092	0.00106	0.00111	0.00103	0.00082	0.00059	0.00101	0.00082	0.00085	0.00127	0.00158
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.07	0.069	0.065	0.06	0.058	0.06	0.09	0.108	0.107	0.123	0.124	0.12	0.11	0.062	0.058	0.058	0.083	0.113	0.111
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	1.52	1.48	1.42	1.23	1.21	1.17	1.16	1.14	1.26	1.69	2.04	1.92	2.1	1.47	0.864	0.868	0.806	0.47	0.51
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	2.9
Strontium (Sr)-Dissolved	0.0224	0.0192	0.0191	0.02	0.021	0.0191	0.0249	0.0289	0.0227	0.0238	0.03	0.0297	0.0373	0.028	0.0356	0.0353	0.0342	0.0567	0.0612
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	0.0052	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-3. 2012: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC						replicate								
Sample ID	WC4	WC4	WC5	WC5	WC5	WC5	WC5	WC5	WC5	WC5	WC5	WC5	WC5	WC5
Date Sampled	1-Oct-12	10-Dec-12	25-Apr-12	29-May-12	5-Jun-12	5-Jun-12	11-Jun-12	20-Jun-12	29-Jun-12	31-Jul-12	23-Aug-12	1-Oct-12	31-Oct-12	21-Nov-12
Included/Excluded	Excluded	Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1219460-3	L1250701-13	L1140759-7	L1155798-9	L1158955-3	L1158955-6	L1161793-3	L1166925-4	L1171541-3	L1188621-7	L1200103-5	L1219460-4	L1232847-2	L1241645-2
Physical Tests														
Colour, True	48.1	23	13.4	15.5	14.6	14.5	16.2	12.8	11.7	<5.0	<5.0	24.4	5.9	5.7
Conductivity (uS/cm)	25.7	33.5	33	20	20.4	20.3	19.7	21.6	22.4	50.1	58.7	27	77.6	73.4
Hardness (as $CaCO_3$)	10	12.6	13.8	9.5	8.9	8.8	8.5	9.6	10.1	21.7	25.7	12.2	32.8	30.8
pH	7.15	7.7	7.51	6.43	8.06	8.18	7.67	7.98	7.29	7.97	7.88	7.41	7.76	7.74
Total Suspended Solids	<3.0	<3.0	<3.0	3	5.2	6	52.7	5.1	8.5	4.9	<3.0	8.7	<3.0	<3.0
Total Dissolved Solids	42	35	37	26	17	21	27	19	23	42	42	30	45	48
Turbidity (NTU)	0.77	0.37	1.35	3.5	5.57	6	20.4	4.87	8.55	11.4	9.02	8.08	1.18	0.83
Anions and Nutrients														
Acidity (as $CaCO_3$)	4.1	3.2	2.6	-	2.7	1.7	1.8	4	1.3	3	3	3.2	2.7	2.1
Alkalinity, Bicarbonate (as $CaCO_3$)	9.2	11.3	10.3	6.7	6.9	6.3	5.9	7.6	6.4	12.6	14.5	7.9	18.9	18.8
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	9.2	11.3	10.3	6.7	6.9	6.3	5.9	7.6	6.4	12.6	14.5	7.9	18.9	18.8
Ammonia, Total (as N)	<0.0050	0.0217	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	0.0054	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.031	0.028	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.021	0.024
Nitrate (as N)	0.0436	0.421	0.287	0.089	0.0609	0.0607	0.0432	0.0257	0.0101	0.006	<0.0050	0.0634	0.1	0.1
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.384	0.2	0.066	0.089	0.093	0.101	0.14	<0.050	<0.050	0.054	<0.050	0.165	0.1	0.9
Total Nitrogen	0.4	0.614	0.35	0.177	0.08	0.06	0.08	0.06	<0.050	0.06	<0.050	0.2	0.192	1.06
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	0.0012
Phosphorus (P)-Total	0.0146	0.0061	0.0051	0.0082	0.0104	0.011	0.0683	0.0095	0.0118	0.007	0.007	0.0245	0.0024	0.0032
Sulfate (SO_4)	1.95	2.38	3.82	2.2	2.16	2.2	2.21	3.01	3.47	10.5	12.8	4.02	16.7	15.1
Cyanides														
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon														
Total Organic Carbon	8.07	4.61	3.63	3.26	3.56	3.64	3.79	3.15	2.72	0.54	1	4.34	2.67	2.51
Total Metals														
Aluminum (Al)-Total	0.15	0.0888	0.137	0.27	0.441	0.45	1.49	0.31	0.418	0.822	0.62	0.64	0.0582	0.0551
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	0.00012	0.00011	0.0001	0.00011	0.00015	0.0002	0.00063	0.00016	0.0002	0.00022	0.00021	0.00024	<0.00010	<0.00010
Barium (Ba)-Total	0.0124	0.012	0.0094	0.009	0.0109	0.011	0.0228	0.0101	0.0109	0.0209	0.0199	0.0143	0.0177	0.0163
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000027	<0.000010	0.000014	<0.000010	<0.000010	0.000014	<0.000010	<0.000010
Calcium (Ca)-Total	3.06	3.66	3.93	2.5	2.55	2.5	2.52	2.65	2.76	6.42	7.41	3.54	8.28	8.78
Chromium (Cr)-Total	0.00042	0.00026	0.00042	0.00071	0.00116	0.0012	0.00415	0.00091	0.00121	0.00188	0.0015	0.00182	0.0003	0.00027
Cobalt (Co)-Total	0.00019	<0.00010	<0.00010	0.00015	0.00023	0.00028	0.00132	0.00019	0.00034	0.00033	0.00027	0.0004	<0.00010	<0.00010
Copper (Cu)-Total	0.00078	<0.00050	0.00148	0.0009	0.00124	0.0012	0.00358	0.001	0.00117	0.00143	0.00171	0.00189	0.00107	0.001
Iron (Fe)-Total	0.247	0.121	0.118	0.23	0.453	0.5	1.89	0.29	0.483	0.638	0.524	0.731	0.042	0.044
Lead (Pb)-Total	<0.000050	<0.000050	<0.000050	<0.000050	0.0001	0.0001	0.000553	0.000081	0.000156	0.000163	0.000142	0.000174	<0.000050	<0.000050
Lithium (Li)-Total	0.0009	0.00068	0.00069	<0.00050	0.00069	0.00066	0.00228	0.00058	0.00056	0.00121	0.00113	0.001	0.00053	0.0008
Magnesium (Mg)-Total	0.661	0.776	1.13	0.807	0.811	0.8	1.23	0.814	0.864	1.92	2.12	1.15	2.51	2.34
Manganese (Mn)-Total	0.04	0.029	0.00322	0.0099	0.0143	0.014	0.0812	0.0117	0.016	0.0113	0.0088	0.02	0.00135	0.00115
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	<0.000050	<0.000050	0.000055	<0.000050	0.000059	0.00006	0.000128	0.000092	0.000129	0.000333	0.00041	0.000141	0.000235	0.000273
Nickel (Ni)-Total	0.00144	0.00098	<0.0015	0.00124	0.00175	0.00186	0.00563	0.00128	0.00179	0.00204	0.00156	0.00256	0.00085	0.00072

Table A3-3. 2012: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012	2012
Station Type	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
QAQC						replicate								
Sample ID	WC4	WC4	WC5	WC5	WC5	WC5	WC5	WC5	WC5	WC5	WC5	WC5	WC5	WC5
Date Sampled	1-Oct-12	10-Dec-12	25-Apr-12	29-May-12	5-Jun-12	5-Jun-12	11-Jun-12	20-Jun-12	29-Jun-12	31-Jul-12	23-Aug-12	1-Oct-12	31-Oct-12	21-Nov-12
Included/Excluded	Excluded	Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
ALS Sample ID	L1219460-3	L1250701-13	L1140759-7	L1155798-9	L1158955-3	L1158955-6	L1161793-3	L1166925-4	L1171541-3	L1188621-7	L1200103-5	L1219460-4	L1232847-2	L1241645-2
Total Metals *(cont'd)*														
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	0.335	0.142	0.129	0.13	0.161	0.16	0.385	0.13	0.157	0.326	0.286	0.26	0.155	0.154
Selenium (Se)-Total	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	0.00013	0.00013	0.00019	0.00032	0.00034	0.00013	0.00043	0.0004
Silicon (Si)-Total	1.71	2.31	2.07	1.69	2.25	2.3	3.39	1.71	1.66	2.62	2.53	2.61	2.06	1.97
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000023	<0.000010	<0.000010	<0.000010	<0.000010	0.000018	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.0425	0.05	0.0459	0.03	0.0304	0.0296	0.0291	0.0311	0.0318	0.0758	0.0908	0.0422	0.0962	0.104
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000010	0.000042	<0.000010	<0.000010	0.00001	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	0.017	0.014	0.019	<0.010	<0.010	0.022	0.026	0.015	<0.010	<0.010
Uranium (U)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000016	<0.000010	<0.000010	0.000017	0.000013	0.000012	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0034	<0.0010	<0.0010	0.0021	0.0017	0.0016	<0.0010	<0.0010
Zinc (Zn)-Total	0.0033	<0.0030	<0.0060	0.0032	0.0036	0.0036	0.0102	<0.0030	0.0037	0.0039	0.0031	0.005	<0.0030	<0.0030
Dissolved Metals														
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.144	0.077	0.0736	0.103	0.114	0.107	0.131	0.0814	0.0772	0.045	0.057	0.143	0.0288	0.0294
Antimony (Sb)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011
Barium (Ba)-Dissolved	0.0125	0.0115	0.0087	0.0075	0.0072	0.0071	0.0074	0.0068	0.00655	0.0104	0.0122	0.00872	0.0169	0.0156
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Dissolved	2.96	3.82	3.81	2.5	2.44	2.4	2.34	2.66	2.81	6.07	7.15	3.35	9.12	8.64
Chromium (Cr)-Dissolved	0.0004	0.0002	0.00027	0.00029	0.00022	0.00023	0.00036	0.00027	0.00029	0.00024	0.00019	0.00042	0.00023	0.00018
Cobalt (Co)-Dissolved	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00062	<0.00050	0.00081	0.00061	0.00062	0.00062	0.00068	0.0006	0.00052	0.00065	<0.00050	0.00096	0.0008	0.00071
Iron (Fe)-Dissolved	0.234	0.089	0.054	0.044	0.063	0.056	0.073	0.043	0.047	0.031	0.04	0.101	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.00082	0.00083	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00065	0.00072	<0.00050	0.00059	0.00098
Magnesium (Mg)-Dissolved	0.647	0.735	1.04	0.783	0.682	0.669	0.649	0.711	0.74	1.6	1.9	0.92	2.43	2.23
Manganese (Mn)-Dissolved	0.03	0.0193	0.00159	0.0019	0.00388	0.004	0.0046	0.00259	0.00273	0.0019	0.00151	0.004	0.000852	0.000622
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	0.000051	<0.000050	0.00005	0.000074	0.00011	0.000316	0.000371	0.000105	0.000243	0.000241
Nickel (Ni)-Dissolved	0.00142	0.00096	0.00084	0.00086	0.00078	0.00085	0.00084	0.00064	0.00063	<0.00050	<0.00050	0.00098	0.00077	0.00067
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.349	0.137	0.108	0.098	0.089	0.089	0.103	0.082	0.084	0.124	0.132	0.146	0.148	0.136
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00013	0.00027	0.00034	0.0001	0.00039	0.00033
Silicon (Si)-Dissolved	1.74	2.19	1.91	1.4	1.38	1.39	1.32	1.24	1.12	1.03	0.95	1.45	1.95	1.8
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0403	0.0518	0.0439	0.029	0.0286	0.0287	0.0266	0.0299	0.0315	0.0722	0.0877	0.0393	0.104	0.103
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-4. 2013: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Lake**	**Lake**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**
QAQC																			
Sample ID	**BIR 1**	**BIR 2**	**BIR1**	**BIR1**	**BIR2**	**BIR2**	**BR**	**BR**	**BR**	**KG OF**	**KG OF**	**KL 1M**	**KL 30M**	**KL IF**	**KL IF**	**KL OF**	**KL OF**	**KL0F**	**KL1F**
Date Sampled	**24-JUN-13**	**24-JUN-13**	**13-MAR-13**	**08-AUG-13**	**13-MAR-13**	**08-AUG-13**	**24-APR-13**	**24-JUN-13**	**08-AUG-13**	**22-OCT-13**	**19-NOV-13**	**12-AUG-13**	**12-AUG-13**	**24-APR-13**	**24-JUN-13**	**24-APR-13**	**24-JUN-13**	**08-AUG-13**	**08-AUG-13**
Included/Excluded	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L1322393-11**	**L1322393-12**	**L1279839-2**	**L1346151-6**	**L1279839-1**	**L1346151-7**	**L1294452-3**	**L1322393-8**	**L1346151-4**	**L1383767-4**	**L1395276-1**	**L1347703-6**	**L1347703-7**	**L1294452-5**	**L1322393-5**	**L1294452-4**	**L1322393-7**	**L1346151-3**	**L1346151-2**
Physical Tests																			
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	87.9	84.3	232	102	216	98.0	170	81.2	50.9	103	203	50.1	50.6	158	87.3	167	86.6	50.9	53.3
Hardness (as $CaCO_3$)	41.0	40.3	114	48.0	102	46.3	81.7	38.2	23.2	51.0	91.2	25.8	25.4	74.6	41.5	83.3	40.6	23.1	24.1
pH	7.81	7.83	8.13	8.06	7.58	8.08	8.08	8.16	7.70	7.91	7.83	7.48	7.97	7.97	7.98	8.14	8.06	7.74	7.73
Total Suspended Solids	9.3	7.3	<3.0	185	<3.0	175	<3.0	36.0	191	624	12.6	218	226	<3.0	89.0	<3.0	84.0	198	228
Total Dissolved Solids	69	67	147	85	134	82	95	78	52	75	127	52	57	91	80	94	81	50	52
Turbidity (NTU)	128	153	0.93	156	0.83	157	4.35	247	294	1030	14.9	308	316	5.58	273	4.55	343	330	368
Anions and Nutrients																			
Acidity (as $CaCO_3$)	1.8	1.7	3.0	3.9	2.3	3.6	1.4	<1.0	1.6	1.6	2.7	1.5	1.9	3.0	1.5	1.3	1.2	1.1	1.4
Alkalinity, Bicarbonate (as $CaCO_3$)	29.7	28.7	80.6	32.7	73.8	31.7	59.8	31.0	22.2	36.0	56.1	17.1	17.0	54.8	33.0	55.4	32.7	22.3	22.1
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<1.0	<1.0	<1.0
Alkalinity, Total (as $CaCO_3$)	29.7	28.7	80.6	32.7	73.8	31.7	59.8	31.0	22.2	36.4	56.1	17.1	17.0	54.8	33.0	55.4	32.7	22.3	22.1
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	0.0068	<0.0050	0.0059	<0.0050	<0.0050	0.0084	<0.0050	<0.0050	0.0073	0.0067	<0.0050	0.0059	<0.0050	0.0054	0.0086	0.0125
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.034	0.033	0.050	0.033	0.046	0.035	0.038	<0.020	<0.020	0.036	0.052	<0.020	<0.020	0.023	0.021	0.037	<0.020	<0.020	<0.020
Nitrate (as N)	0.0362	0.0343	0.169	0.0260	0.202	0.0298	0.0388	0.0234	0.0067	0.0187	0.0148	0.0066	0.0061	0.0555	0.0251	0.0363	0.0242	0.0073	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	0.101	0.119	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	0.138	0.153	0.168	0.066	0.199	0.067	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	0.0019	0.0021	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.0019	<0.0010	0.0015	0.0011	0.0014	0.0031	<0.0010	0.0013	<0.0010	0.0018	0.0015	<0.0010
Phosphorus (P)-Total	0.282	0.382	0.0023	0.207	0.0031	0.202	0.0032	0.394	0.237	0.689	0.0172	0.259	0.261	0.0036	0.380	0.0035	0.399	0.247	0.286
Sulfate (SO_4)	13.5	12.7	41.9	16.4	35.9	15.5	33.1	11.0	4.97	19.0	47.6	4.96	5.04	28.0	12.1	32.3	11.9	5.03	5.04
Cyanides																			
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	1.7	1.1	0.82	3.21	1.11	2.48	<0.50	1.78	1.38	<0.50	<0.50	<0.50	1.14	<0.50	1.64	<0.50	1.3	1.30	1.81
Total Metals																			
Aluminum (Al)-Total	8.98	9.42	0.0262	6.08	0.0368	6.08	0.185	11.2	9.31	17.5	0.995	11.7	11.2	0.300	10.9	0.197	10.1	9.65	11.1
Antimony (Sb)-Total	0.00074	0.00071	0.00013	0.00076	0.00012	0.00073	0.00049	0.00140	0.00109	0.00116	0.00029	0.00137	0.00131	0.00058	0.00181	0.00051	0.00148	0.00117	0.00149
Arsenic (As)-Total	0.00633	0.00660	0.00018	0.00533	0.00020	0.00529	0.00058	0.0101	0.00817	0.0127	0.00066	0.00968	0.00948	0.00081	0.0126	0.00065	0.0105	0.00847	0.0113
Barium (Ba)-Total	0.137	0.162	0.0510	0.102	0.0466	0.102	0.0365	0.248	0.184	0.518	0.0903	0.215	0.204	0.0341	0.179	0.0351	0.200	0.184	0.195
Beryllium (Be)-Total	0.00023	0.00025	<0.00010	0.00019	<0.00010	0.00017	<0.00010	0.00028	0.00019	0.00053	<0.00010	0.00020	0.00020	<0.00010	0.00021	<0.00010	0.00023	0.00019	0.00021
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	0.010	<0.010	<0.010	<0.010	0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010
Cadmium (Cd)-Total	0.000255	0.000293	<0.000010	0.000193	<0.000010	0.000182	0.000014	0.000302	0.000215	0.000314	0.000016	0.000243	0.000244	0.000016	0.000368	0.000015	0.000303	0.000224	0.000287
Calcium (Ca)-Total	12.5	12.8	33.3	14.4	29.5	14.0	30.6	16.2	9.31	32.1	33.6	10.8	11.0	25.4	17.1	27.7	16.5	9.69	10.1
Chromium (Cr)-Total	0.0225	0.0249	0.00023	0.0149	0.00028	0.0149	0.00029	0.0138	0.0100	0.0120	0.00077	0.0124	0.0118	0.00038	0.0161	0.00027	0.0139	0.0104	0.0136
Cobalt (Co)-Total	0.00570	0.00681	<0.00010	0.00430	<0.00010	0.00425	<0.00010	0.00674	0.00523	0.0118	0.00028	0.00605	0.00606	0.00013	0.00724	0.00011	0.00664	0.00553	0.00675
Copper (Cu)-Total	0.0173	0.0202	<0.00050	0.0129	<0.00050	0.0131	0.00056	0.0212	0.0197	0.0229	0.00056	0.0221	0.0218	0.00079	0.0283	0.00065	0.0228	0.0206	0.0285
Iron (Fe)-Total	12.6	14.0	0.075	9.21	0.072	9.33	0.193	15.3	12.3	28.9	0.795	14.4	14.0	0.290	17.0	0.215	15.3	12.9	15.6
Lead (Pb)-Total	0.00425	0.00459	<0.000050	0.00303	<0.000050	0.00295	0.000113	0.00811	0.00657	0.0128	0.000311	0.00798	0.00785	0.000149	0.00955	0.000121	0.00818	0.00697	0.00863
Lithium (Li)-Total	0.0101	0.0112	0.00123	0.00688	0.00109	0.00676	0.00060	0.00910	0.00611	0.0185	0.00169	0.00741	0.00692	0.00055	0.00813	0.00055	0.00831	0.00661	0.00718
Magnesium (Mg)-Total	7.23	7.41	8.49	5.96	7.44	5.91	2.80	5.97	4.42	10.1	3.06	5.29	5.13	2.86	6.79	2.67	6.13	4.64	5.54
Manganese (Mn)-Total	0.271	0.337	0.0112	0.198	0.00743	0.192	0.00582	0.453	0.285	0.878	0.0242	0.338	0.354	0.00794	0.409	0.00697	0.415	0.305	0.336
Mercury (Hg)-Total	<0.000010	0.000029	<0.000010	0.000032	<0.000010	<0.000010	<0.000010	0.000037	0.000026	<0.000050	<0.000010	0.000029	0.000026	<0.000010	0.000047	<0.000010	0.000025	0.000028	0.000029
Molybdenum (Mo)-Total	0.00116	0.00112	0.000882	0.00112	0.000851	0.00108	0.00167	0.00125	0.000788	0.00197	0.00201	0.00101	0.000968	0.00153	0.00140	0.00159	0.00133	0.000810	0.000943
Nickel (Ni)-Total	0.0297	0.0349	0.00061	0.0212	0.00056	0.0212	<0.00050	0.0127	0.00887	0.0154	0.00056	0.0104	0.0104	<0.00050	0.0122	<0.00050	0.0124	0.00945	0.0106

Table A3-4. 2013: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Lake**	**Lake**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**
QAQC																			
Sample ID	**BIR 1**	**BIR 2**	**BIR1**	**BIR1**	**BIR2**	**BIR2**	**BR**	**BR**	**BR**	**KG OF**	**KG OF**	**KL 1M**	**KL 30M**	**KL IF**	**KL IF**	**KL OF**	**KL OF**	**KL0F**	**KL1F**
Date Sampled	**24-JUN-13**	**24-JUN-13**	**13-MAR-13**	**08-AUG-13**	**13-MAR-13**	**08-AUG-13**	**24-APR-13**	**24-JUN-13**	**08-AUG-13**	**22-OCT-13**	**19-NOV-13**	**12-AUG-13**	**12-AUG-13**	**24-APR-13**	**24-JUN-13**	**24-APR-13**	**24-JUN-13**	**08-AUG-13**	**08-AUG-13**
Included/Excluded	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L1322393-11**	**L1322393-12**	**L1279839-2**	**L1346151-6**	**L1279839-1**	**L1346151-7**	**L1294452-3**	**L1322393-8**	**L1346151-4**	**L1383767-4**	**L1395276-1**	**L1347703-6**	**L1347703-7**	**L1294452-5**	**L1322393-5**	**L1294452-4**	**L1322393-7**	**L1346151-3**	**L1346151-2**
Total Metals *(cont'd)*																			
Phosphorus (P)-Total	<0.30	0.36	<0.30	<0.30	<0.30	<0.30	<0.30	0.39	<0.30	0.74	<0.30	<0.30	<0.30	<0.30	0.36	<0.30	0.37	<0.30	<0.30
Potassium (K)-Total	1.90	1.84	0.398	1.37	0.360	1.33	0.493	3.05	1.70	3.82	0.728	2.51	2.32	0.535	2.29	0.472	2.34	1.77	2.00
Selenium (Se)-Total	0.00070	0.00067	0.00091	0.00059	0.00086	0.00059	0.00056	0.00063	0.00038	0.00074	0.00041	0.00045	0.00045	0.00055	0.00069	0.00050	0.00064	0.00044	0.00052
Silicon (Si)-Total	17.8	17.3	2.47	13.9	2.40	15.5	1.29	25.4	19.0	31.9	3.67	29.1	29.4	1.49	21.4	1.25	19.2	19.3	22.9
Silver (Ag)-Total	0.000107	0.000109	<0.000010	0.000075	<0.000010	0.000076	<0.000010	0.000166	0.000117	0.000205	0.000012	0.000161	0.000160	0.000011	0.000183	0.000011	0.000160	0.000125	0.000152
Sodium (Na)-Total	<2.0	<2.0	3.5	<2.0	3.2	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.107	0.106	0.251	0.122	0.226	0.120	0.167	0.0978	0.0572	0.189	0.253	0.0686	0.0706	0.149	0.0978	0.161	0.0982	0.0630	0.0632
Thallium (Tl)-Total	0.000112	0.000104	<0.000010	0.000075	<0.000010	0.000074	<0.000010	0.000128	0.000071	0.000211	0.000019	0.000098	0.000092	<0.000010	0.000092	<0.000010	0.000099	0.000070	0.000072
Tin (Sn)-Total	0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	0.00014	<0.00010	0.00015	0.00011	<0.00010	0.00011	<0.00010	0.00011	<0.00010	0.00014
Titanium (Ti)-Total	0.243	0.227	<0.010	0.208	<0.010	0.242	<0.010	0.513	0.356	0.406	0.059	0.520	0.522	0.011	0.459	<0.010	0.421	0.376	0.448
Uranium (U)-Total	0.000145	0.000168	0.000047	0.000087	0.000041	0.000086	0.000121	0.000324	0.000161	0.000492	0.000198	0.000216	0.000213	0.000115	0.000268	0.000120	0.000250	0.000171	0.000193
Vanadium (V)-Total	0.0237	0.0261	<0.0010	0.0161	<0.0010	0.0162	<0.0010	0.0330	0.0228	0.0393	0.0025	0.0287	0.0280	0.0010	0.0356	<0.0010	0.0306	0.0243	0.0305
Zinc (Zn)-Total	0.0451	0.0509	<0.0030	0.0361	<0.0030	0.0343	<0.0030	0.0514	0.0418	0.0772	<0.0030	0.0504	0.0495	<0.0030	0.0543	<0.0030	0.0508	0.0443	0.0548
Dissolved Metals																			
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.186	0.804	<0.0030	0.110	0.0039	0.115	0.0165	0.240	0.144	0.206	0.0903	0.301	0.231	0.0182	0.195	0.0138	0.159	0.154	0.136
Antimony (Sb)-Dissolved	0.00015	0.00018	0.00013	0.00020	0.00011	0.00019	0.00045	0.00045	0.00039	0.00027	0.00023	0.00046	0.00045	0.00052	0.00068	0.00046	0.00053	0.00041	0.00059
Arsenic (As)-Dissolved	0.00032	0.00065	0.00015	0.00027	0.00016	0.00026	0.00044	0.00079	0.00053	0.00060	0.00039	0.00072	0.00070	0.00056	0.00094	0.00048	0.00076	0.00067	0.00073
Barium (Ba)-Dissolved	0.0284	0.0398	0.0494	0.0280	0.0457	0.0269	0.0335	0.0327	0.0167	0.0681	0.0742	0.0217	0.0225	0.0285	0.0223	0.0328	0.0295	0.0164	0.0133
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.000011	0.000032	<0.000010	0.000011	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000016	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Dissolved	11.4	11.0	32.2	14.1	28.9	13.4	28.4	13.4	8.32	18.3	32.0	9.27	9.11	25.6	14.4	29.1	14.2	8.27	8.61
Chromium (Cr)-Dissolved	0.00045	0.00193	0.00014	0.00024	0.00018	0.00024	<0.00010	0.00015	0.00012	<0.00010	<0.00010	0.00028	0.00019	<0.00010	0.00017	<0.00010	0.00010	0.00011	0.00012
Cobalt (Co)-Dissolved	<0.00010	0.00045	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00077	0.00150	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00101	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	<0.00050	0.00056	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Dissolved	0.135	0.782	<0.030	0.053	<0.030	0.062	<0.030	0.192	0.093	0.097	0.055	0.218	0.160	<0.030	0.183	<0.030	0.114	0.090	0.097
Lead (Pb)-Dissolved	<0.000050	0.000347	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000142	0.000060	0.000058	<0.000050	0.000134	0.000109	<0.000050	0.000094	<0.000050	0.000074	0.000064	0.000059
Lithium (Li)-Dissolved	<0.00050	0.00066	0.00117	0.00061	0.00100	0.00064	<0.00050	<0.00050	<0.00050	0.00050	0.00113	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	3.08	3.12	8.13	3.13	7.31	3.08	2.64	1.14	0.599	1.28	2.73	0.647	0.637	2.60	1.31	2.61	1.24	0.602	0.640
Manganese (Mn)-Dissolved	0.00280	0.0221	0.00523	0.00183	0.00379	0.00145	0.00149	0.00409	0.00166	0.00183	0.00207	0.00428	0.00316	0.00153	0.00291	0.00202	0.00227	0.00172	0.00159
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000720	0.000690	0.000845	0.000788	0.000810	0.000761	0.00162	0.000859	0.000541	0.00126	0.00187	0.000672	0.000630	0.00150	0.00102	0.00160	0.000950	0.000553	0.000650
Nickel (Ni)-Dissolved	0.00069	0.00238	0.00051	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	0.324	0.486	0.372	0.286	0.345	0.275	0.433	0.381	0.274	0.432	0.382	0.377	0.361	0.452	0.427	0.434	0.388	0.279	0.357
Selenium (Se)-Dissolved	0.00041	0.00041	0.00085	0.00038	0.00082	0.00036	0.00051	0.00036	0.00025	0.00030	0.00039	0.00022	0.00024	0.00054	0.00046	0.00052	0.00040	0.00027	0.00030
Silicon (Si)-Dissolved	1.59	3.57	2.32	1.12	2.25	1.15	0.931	1.17	0.578	1.02	1.42	1.08	0.781	0.908	1.03	0.922	0.936	0.575	0.579
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	3.2	<2.0	3.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0921	0.0959	0.243	0.113	0.215	0.108	0.162	0.0750	0.0421	0.127	0.239	0.0474	0.0481	0.141	0.0754	0.156	0.0768	0.0423	0.0408
Thallium (Tl)-Dissolved	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	0.038	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	0.000015	0.000029	0.000043	0.000016	0.000038	0.000014	0.000109	0.000065	0.000030	0.000100	0.000173	0.000041	0.000035	0.000109	0.000078	0.000110	0.000073	0.000033	0.000040
Vanadium (V)-Dissolved	<0.0010	0.0024	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	0.0041	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-4. 2013: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	KG Meltwater	KG Meltwater	KG Meltwater	Stream	Stream	Stream	Stream	Stream	Stream	Lake	Lake	Lake	Lake	Lake	Lake	Stream
QAQC										Potential Ref.	Potential Ref.	Potential Ref.	Potential Ref.	Potential Ref.	Potential Ref.	Potential Ref.
Sample ID	KNIPPLE GL HIGH	KNIPPLE GL LOW	KNIPPLE GL MID	KNIPPLE GL O/F	WC1	WC1	WC1	WC5	WC5	L3	L3	DIVIDE LAKE 16M	DIVIDE LAKE 16M	DIVIDE LAKE 1M	DIVIDE LAKE 1M	DIVIDE LAKE OF
Date Sampled	22-SEP-13	22-SEP-13	22-SEP-13	21-SEP-13	13-MAR-13	24-JUN-13	08-AUG-13	13-MAR-13	24-JUN-13	22-OCT-13	22-OCT-13	17-JUL-13	11-AUG-13	17-JUL-13	11-AUG-13	17-JUL-13
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Excluded	Excluded	Included	Included	Included	Included	Included
ALS Sample ID	L1367845-3	L1367845-1	L1367845-2	L1366991-4	L1279839-3	L1322393-10	L1346151-5	L1279839-4	L1322393-9	L1383767-10	L1383767-11	L1335330-5	L1347703-2	L1335330-4	L1347703-1	L1335330-6
Physical Tests																
Colour, True	<5.0	<5.0	<5.0	<5.0	9.4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	<2.0	<2.0	<2.0	65.7	61.1	38.5	48.2	93.5	39.1	64.9	66.7	13.1	13.5	13.4	13.7	13.4
Hardness (as $CaCO_3$)	<0.50	<0.50	<0.50	30.1	23.9	16.6	21.2	38.6	17.2	30.7	30.1	5.45	6.17	5.58	6.50	5.72
pH	6.04	5.80	5.68	8.07	7.86	7.30	8.16	7.81	7.57	7.15	7.64	7.60	6.74	7.72	6.87	6.48
Total Suspended Solids	<1.0	<1.0	<1.0	483	<3.0	<3.0	5.6	<3.0	4.0	<1.0	<1.0	<3.0	<1.0	<3.0	<1.0	<3.0
Total Dissolved Solids	<10	<10	<10	55	48	35	47	64	37	40	39	13	11	13	12	16
Turbidity (NTU)	0.14	0.45	0.40	625	0.54	13.9	18.7	0.51	17.2	0.96	0.85	0.64	0.57	0.65	1.36	0.65
Anions and Nutrients																
Acidity (as $CaCO_3$)	1.1	<1.0	<1.0	1.6	2.7	1.9	2.2	3.4	1.7	3.2	2.1	1.7	1.4	1.4	1.3	3.5
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	27.6	16.8	10.5	12.7	25.1	10.6	26.2	25.9	5.1	5.7	5.3	6.1	5.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	<2.0	27.6	16.8	10.5	12.7	25.1	10.6	26.2	25.9	5.1	5.7	5.3	6.1	5.3
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	0.029	<0.020	<0.020	0.040	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	<0.0050	<0.0050	<0.0050	0.0127	0.447	0.0209	0.0205	0.235	0.0112	<0.0050	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.097	<0.050	<0.050	<0.053	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	0.484	0.057	<0.050	0.266	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	0.0024	<0.0010	<0.0010	<0.0010	0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	0.0028	<0.0020	0.699	0.0037	0.0148	0.0138	0.0020	0.0468	0.0042	0.0041	0.0031	<0.0020	0.0025	0.0027	0.0023
Sulfate (SO_4)	<0.50	<0.50	<0.50	8.60	10.5	7.11	10.1	19.2	7.37	7.64	7.64	0.98	1.07	1.00	1.04	1.04
Cyanides																
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																
Total Organic Carbon	<0.50	<0.50	<0.50	0.63	2.95	1.7	0.73	1.81	1.6	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	<0.50
Total Metals																
Aluminum (Al)-Total	0.0581	0.0824	0.0150	12.7	0.0622	0.790	1.08	0.0305	1.06	0.0550	0.0567	0.0308	0.0288	0.0318	0.0654	0.0292
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	0.00134	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	<0.00010	<0.00010	<0.00010	0.0109	<0.00010	0.00031	0.00032	<0.00010	0.00043	0.00025	0.00023	0.00012	0.00016	0.00013	0.00019	0.00012
Barium (Ba)-Total	0.000318	0.000911	0.00176	0.500	0.0154	0.0177	0.0241	0.0205	0.0206	0.0131	0.0134	0.0141	0.0151	0.0131	0.0182	0.0127
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	0.00037	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	0.000302	<0.000010	<0.000010	0.000012	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	0.039	0.104	0.094	19.9	6.87	4.52	5.79	11.1	4.62	9.88	10.3	1.95	2.19	1.97	2.34	1.99
Chromium (Cr)-Total	0.00010	0.00010	0.00020	0.00707	0.00028	0.00212	0.00277	0.00020	0.00279	0.00027	0.00017	<0.00010	0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	0.00856	<0.00010	0.00047	0.00064	<0.00010	0.00070	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	<0.00050	<0.00050	<0.00050	0.0177	0.00295	0.00224	0.00244	0.00086	0.00272	0.00096	0.00068	<0.00050	0.00055	<0.00050	0.00059	<0.00050
Iron (Fe)-Total	0.065	0.106	<0.030	18.7	0.051	0.864	1.10	<0.030	1.27	0.079	0.084	<0.030	<0.030	<0.030	0.038	<0.030
Lead (Pb)-Total	<0.000050	0.000071	0.000083	0.0107	<0.000050	0.000238	0.000336	<0.000050	0.000388	0.000053	<0.000050	<0.000050	<0.000050	<0.000050	0.000077	<0.000050
Lithium (Li)-Total	<0.00050	<0.00050	<0.00050	0.0112	0.00077	0.00078	0.00152	0.00119	0.00099	<0.00050	<0.00050	0.00127	<0.00050	0.00130	<0.00050	0.00126
Magnesium (Mg)-Total	0.0279	0.0403	0.0056	6.72	1.82	1.57	1.88	2.91	1.66	1.44	1.45	0.182	0.192	0.186	0.184	0.184
Manganese (Mn)-Total	0.00120	0.00275	0.00200	0.691	0.00216	0.0165	0.0178	0.000778	0.0254	0.00258	0.00263	0.00458	0.00431	0.00475	0.00309	0.00519
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	0.000046	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	<0.000050	<0.000050	<0.000050	0.00140	0.000147	0.000307	0.000392	0.000307	0.000289	0.000340	0.000347	0.000099	0.000109	0.000139	0.000206	0.000103
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	0.00988	0.00106	0.00261	0.00330	0.00065	0.00351	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Table A3-4. 2013: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
Station Type	KG Meltwater	KG Meltwater	KG Meltwater	Stream	Stream	Stream	Stream	Stream	Stream	Lake	Lake	Lake	Lake	Lake	Lake	Stream
QAQC										Potential Ref.	Potential Ref.	Potential Ref.	Potential Ref.	Potential Ref.	Potential Ref.	Potential Ref.
Sample ID	KNIPPLE GL HIGH	KNIPPLE GL LOW	KNIPPLE GL MID	KNIPPLE GL O/F	WC1	WC1	WC1	WC5	WC5	L3	L3	DIVIDE LAKE 16M	DIVIDE LAKE 16M	DIVIDE LAKE 1M	DIVIDE LAKE 1M	DIVIDE LAKE OF
Date Sampled	22-SEP-13	22-SEP-13	22-SEP-13	21-SEP-13	13-MAR-13	24-JUN-13	08-AUG-13	13-MAR-13	24-JUN-13	22-OCT-13	22-OCT-13	17-JUL-13	11-AUG-13	17-JUL-13	11-AUG-13	17-JUL-13
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Excluded	Excluded	Included	Included	Included	Included	Included
ALS Sample ID	L1367845-3	L1367845-1	L1367845-2	L1366991-4	L1279839-3	L1322393-10	L1346151-5	L1279839-4	L1322393-9	L1383767-10	L1383767-11	L1335330-5	L1347703-2	L1335330-4	L1347703-1	L1335330-6
Total Metals *(cont'd)*																
Phosphorus (P)-Total	<0.30	<0.30	<0.30	0.51	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	<0.050	<0.050	<0.050	3.52	0.147	0.297	0.386	0.169	0.342	1.15	1.15	<0.050	0.067	<0.050	0.079	<0.050
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	0.00040	0.00022	0.00025	0.00025	0.00039	0.00026	0.00017	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	0.107	0.127	<0.050	29.1	2.12	2.29	2.46	1.99	2.77	0.711	0.739	0.452	0.473	0.468	0.597	0.442
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	0.000188	<0.000010	0.000013	0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	2.5	<2.0	<2.0	2.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.00041	0.00073	<0.00020	0.119	0.0768	0.0541	0.0748	0.129	0.0578	0.0914	0.0993	0.0186	0.0199	0.0178	0.0208	0.0182
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	0.000171	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00043	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	0.013	<0.010	0.502	<0.010	0.012	0.018	<0.010	0.017	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	<0.000010	<0.000010	<0.000010	0.000421	<0.000010	<0.000010	0.000013	<0.000010	0.000011	0.000020	0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	0.0267	<0.0010	0.0021	0.0028	<0.0010	0.0027	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	<0.0030	0.0601	<0.0030	0.0044	0.0066	<0.0030	0.0058	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0044	<0.0030	<0.0030	0.233	0.0410	0.0620	0.0360	0.0185	0.161	0.0078	0.0069	0.0070	0.0047	0.0057	0.0110	0.0051
Antimony (Sb)-Dissolved	<0.00010	<0.00010	<0.00010	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	<0.00010	<0.00010	<0.00010	0.00053	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00017	0.00019	0.00010	0.00012	0.00011	0.00016	<0.00010
Barium (Ba)-Dissolved	0.000097	0.000511	0.00161	0.0935	0.0151	0.00962	0.0113	0.0198	0.0110	0.0128	0.0127	0.0124	0.0146	0.0127	0.0170	0.0129
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Dissolved	<0.020	0.049	0.086	10.7	6.73	4.58	5.92	10.8	4.76	10.0	9.72	1.89	2.16	1.94	2.32	1.99
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	0.00016	0.00020	0.00027	0.00016	0.00017	0.00041	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	0.00088	0.00057	<0.00050	0.00073	0.00065	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00068	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	0.103	<0.030	0.047	<0.030	<0.030	0.108	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	0.000067	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	0.00072	<0.00050	<0.00050	0.00112	<0.00050	<0.00050	<0.00050	0.00121	<0.00050	<0.00050	<0.00050	0.00118
Magnesium (Mg)-Dissolved	<0.0050	<0.0050	<0.0050	0.796	1.73	1.24	1.56	2.79	1.30	1.39	1.42	0.175	0.188	0.179	0.174	0.180
Manganese (Mn)-Dissolved	0.000290	0.00116	0.00171	0.00205	0.00121	0.00275	0.00146	0.000420	0.00367	0.000134	0.000224	0.00302	0.000522	0.00323	0.00119	0.00366
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	<0.000050	<0.000050	<0.000050	0.000813	0.000142	0.000245	0.000364	0.000288	0.000285	0.000332	0.000330	0.000087	0.000097	0.000112	0.000133	0.000089
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	0.00094	0.00053	<0.00050	0.00063	0.00072	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	<0.050	<0.050	<0.050	0.293	0.137	0.129	0.133	0.160	0.170	1.13	1.17	<0.050	0.064	<0.050	0.068	<0.050
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	0.00018	0.00019	0.00024	0.00022	0.00036	0.00029	0.00016	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	<0.050	<0.050	<0.050	0.814	2.04	1.05	0.681	1.91	1.23	0.597	0.600	0.409	0.419	0.409	0.482	0.420
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	2.3	<2.0	<2.0	2.7	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	<0.00020	0.00021	<0.00020	0.0735	0.0740	0.0533	0.0739	0.126	0.0572	0.0957	0.0924	0.0173	0.0194	0.0176	0.0199	0.0180
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	<0.000010	<0.000010	<0.000010	0.000054	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	0.000016	0.000017	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0044	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Table A3-4. 2013: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	**2013**	**2013**	**2013**	**2013**
Station Type	**Stream**	**Stream**	**Stream**	**Stream**
QAQC	**Potential Ref.**	**Potential Ref.**	**Potential Ref.**	**Potential Ref.**
Sample ID	**DIVIDE O/F**	**DIVIDE O/F**	**DIVIDE OF**	**DIVIDE OF**
Date Sampled	**19-NOV-13**	**21-SEP-13**	**11-AUG-13**	**22-OCT-13**
Included/Excluded	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L1395276-2**	**L1366991-3**	**L1347703-3**	**L1383767-5**
Physical Tests				
Colour, True	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	22.4	17.1	15.0	18.3
Hardness (as $CaCO_3$)	9.47	6.62	7.08	8.24
pH	7.92	6.25	6.95	7.60
Total Suspended Solids	<1.0	<1.0	<1.0	1.0
Total Dissolved Solids	23	13	12	12
Turbidity (NTU)	0.41	0.88	0.88	0.77
Anions and Nutrients				
Acidity (as $CaCO_3$)	1.9	3.1	1.6	1.5
Alkalinity, Bicarbonate (as $CaCO_3$)	7.9	6.0	5.0	6.5
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	7.9	6.0	5.0	6.5
Ammonia, Total (as N)	0.0058	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	0.0023	<0.0020	0.0034
Sulfate (SO_4)	2.48	1.63	1.23	1.82
Cyanides				
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-
Organic / Inorganic Carbon				
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50
Total Metals				
Aluminum (Al)-Total	0.0224	0.0739	0.0572	0.0450
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	0.00011	0.00016	0.00017	0.00017
Barium (Ba)-Total	0.0163	0.0167	0.0170	0.0163
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	3.23	2.72	2.46	2.86
Chromium (Cr)-Total	0.00023	0.00011	<0.00010	0.00011
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	<0.00050	<0.00050	0.00065	<0.00050
Iron (Fe)-Total	0.032	0.038	<0.030	<0.030
Lead (Pb)-Total	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	0.274	0.218	0.197	0.228
Manganese (Mn)-Total	0.00107	0.00227	0.00263	0.00174
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	0.000188	0.000137	0.000119	0.000142
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050

Table A3-4. 2013: Bowser River, Scott/Todedada, Wildfire Creek, and Bell-Irving Watersheds

Year	**2013**	**2013**	**2013**	**2013**
Station Type	**Stream**	**Stream**	**Stream**	**Stream**
QAQC	**Potential Ref.**	**Potential Ref.**	**Potential Ref.**	**Potential Ref.**
Sample ID	**DIVIDE O/F**	**DIVIDE O/F**	**DIVIDE OF**	**DIVIDE OF**
Date Sampled	**19-NOV-13**	**21-SEP-13**	**11-AUG-13**	**22-OCT-13**
Included/Excluded	**Included**	**Included**	**Included**	**Included**
ALS Sample ID	**L1395276-2**	**L1366991-3**	**L1347703-3**	**L1383767-5**
Total Metals *(cont'd)*				
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	<0.050	0.077	0.074	0.055
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	0.682	0.626	0.562	0.635
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	0.0313	0.0256	0.0226	0.0275
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals				
Dissolved Metals Filtration Locatio	LAB	LAB	LAB	LAB
Aluminum (Al)-Dissolved	0.0040	0.0081	0.0095	0.0043
Antimony (Sb)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00011	0.00013	0.00016	0.00011
Barium (Ba)-Dissolved	0.0159	0.0145	0.0183	0.0153
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Dissolved	3.34	2.32	2.48	2.93
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	<0.00050	<0.00050	0.00058	<0.00050
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	0.277	0.199	0.219	0.222
Manganese (Mn)-Dissolved	0.000079	0.000118	0.000897	0.000121
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	0.000133	0.000119	0.000137	0.000140
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	<0.050	0.065	0.079	<0.050
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	0.633	0.519	0.485	0.544
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Dissolved	0.0319	0.0215	0.0225	0.0272
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030

Notes: All units in mg/L, unless otherwise noted

- paramater not measured

Monitoring sites have varied over the 2008-2013 baseline program to reflect updates to the proposed Project design; sites outside the current baseline study boundary have been excluded from main report.

Potential reference sites are still under evaluation.

Appendix 4

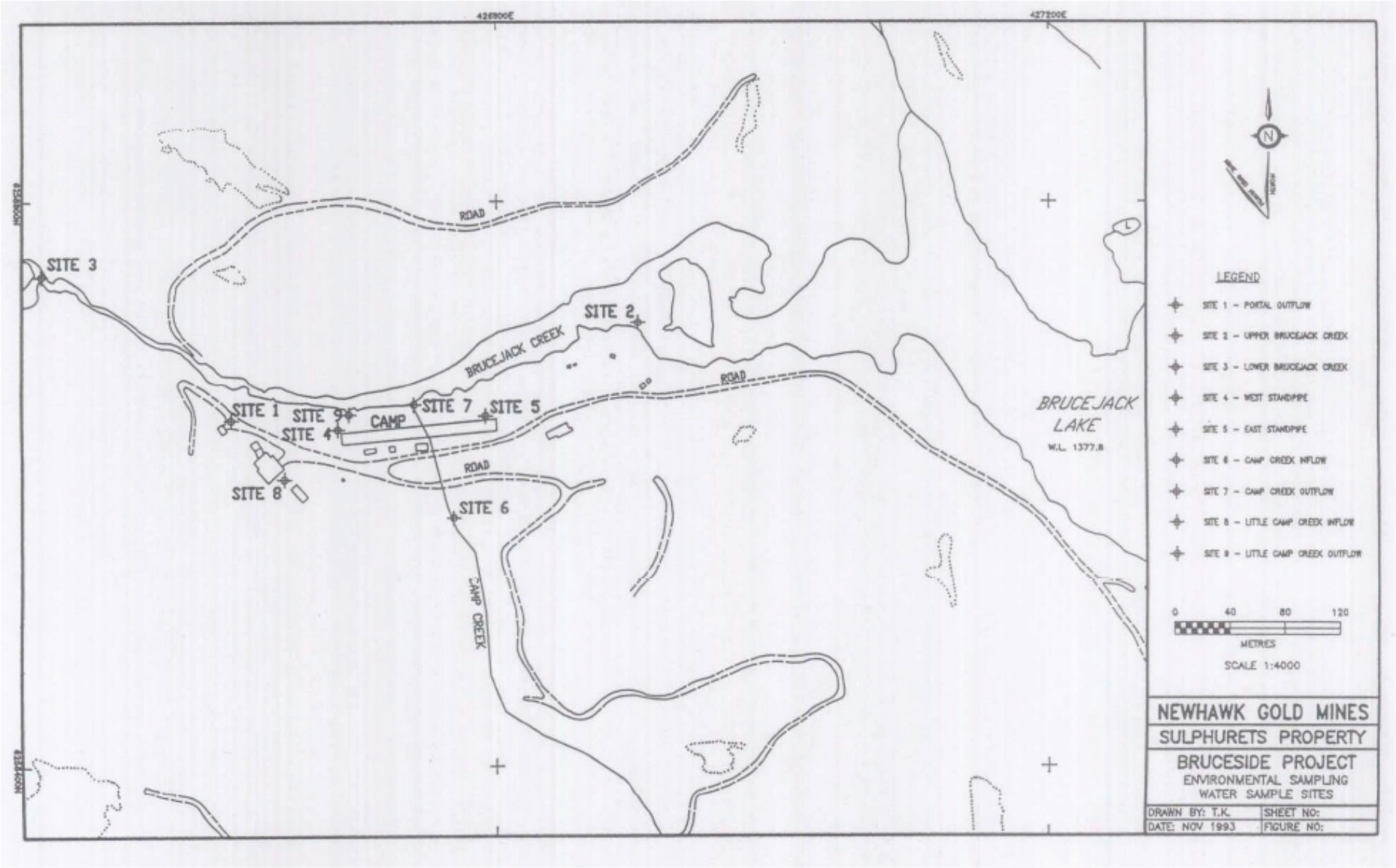
Historical Water Quality Data of Brucejack Gold Mine Project Area Lakes and Streams, 1987-2001

Figure A4-1. Historical Sampling Sites (Price 2005)

Table A4-1. 1987-2001: Brucejack Watershed

Figure A4-1

Historical Sampling Sites within the Brucejack Watershed, 1987 to 2001



Note: Historical 'Site 1' = the adit; Site 2 = BJ U/S; Site 3 = BJ 2; Site 6 = Camp Creek.
Source: Reproduced from Price 2005.

Table A4-1. 1987-2001: Brucejack Watershed

Year	1987	1987	1987	1987	1987	1987	1987	1987	1987	1987	1987	1988	1988	1988	1988	1988	1988	1988	1988	1988
Station Type	**Effluent**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Stream**	**Stream**	**Stream**
Sample ID	**Adit**	**BJ 2**	**LBJ**	**LBJ**	**LBJ**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**BJ 2**	**BJ 2**	**BJ 2**
Historical Sample ID (Newhawk 1989)	**Site 1**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 3**	**Site 3**	**Site 3**
Date Sampled	**25-Aug-87**	**25-Sep-87**	**28-Aug-87**	**23-Oct-87**	**22-Nov-87**	**28-Jul-87**	**27-Aug-87**	**25-Sep-87**	**23-Oct-87**	**22-Nov-87**	**15-Dec-87**	**31-Mar-88**	**28-Jul-88**	**30-Aug-88**	**3-Oct-88**	**28-Oct-88**	**30-Nov-88**	**9-Feb-88**	**28-Jul-88**	**3-Oct-88**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**
Physical Tests																				
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	413	63.6	42.4	54.0	67.0	32.0	42.0	42.0	43.0	42.0	42.0	462	451	381	461	381	806	62.0	45.0	44.8
Hardness (as $CaCO_3$)	140.0	26.7	20.6	29.3	30.3	-	21.0	20.0	22.0	23.0	20.0	33.0	157.0	142	149	108	209	31.0	22.0	22.1
pH	8.20	7.60	7.30	7.53	7.57	7.40	7.40	7.80	7.60	7.40	7.70	8.00	7.60	7.60	7.80	7.80	7.50	7.00	6.80	6.84
Total Suspended Solids	104.0	55.6	33.5	40.0	48.3	1.0	1.0	1.0	4.0	4.0	2.0	272.0	5230.0	1380.0	1880.0	505.0	3550.0	17.0	8.0	30.0
Total Dissolved Solids	399.00	111.00	6.70	2.00	1117.00	8.00	33.00	39.00	32.00	33.00	40.00	340.00	350.00	310.00	360.00	290.00	450.00	56.00	30.00	8.00
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																				
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	52.0	18.9	12.0	18.6	18.1	-	14.0	21.0	21.0	15.0	16.0	100.0	356.0	102.0	93.0	92.0	191.0	22.0	16.0	16.0
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	<0.5	<0.5	8.17	<0.5	<0.5	-	<0.5	6.00	<0.5	<0.5	<0.5	1.00	<0.5	<0.5	1.00	1.00	3.00	1.00	<0.5	<0.5
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	97.0	14.3	8.0	11.0	19.1	6.0	3.0	2.0	6.0	6.0	5.0	123.0	93.0	111.0	96.0	81.0	148.0	10.0	7.0	6.6
Cyanides																				
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																				
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																				
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.0200	0.0022	0.0016	0.0021	0.0027	0.0020	0.0024	0.0019	0.0008	0.0019	0.0022	0.0530	0.6000	0.6100	0.0960	0.0810	0.1500	0.0036	0.0015	0.0020
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005
Calcium (Ca)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.001	<0.005	0.001	<0.001	<0.001	<0.001	0.0200	0.4100	0.0170	1.7200	0.0400	0.9000	<0.0005	<0.0005	<0
Iron (Fe)-Total	0.10	0.62	0.14	<0.03	0.11	<0.03	0.08	0.12	<0.03	<0.03	<0.03	11.00	82.70	73.90	0.00	10.10	38.70	0.03	<0.05	0.04
Lead (Pb)-Total	-	-	0.0005	0.0005	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0220	1.4900	1.0000	<0.001	0.2300	0.5000	0.000250	0.0010	0.0005
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	-	1.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0001	0.0007	<0.00005	-	<0.00005
Molybdenum (Mo)-Total	<0.005	-	0.0025	0.0025	0.0025	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.0200	0.0930	0.0360	0.0060	0.0090	0.0320	0.0005	0.0005	0.0005
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	1987	1987	1987	1987	1987	1987	1987	1987	1987	1987	1987	1988	1988	1988	1988	1988	1988	1988	1988	1988
Station Type	**Effluent**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Stream**	**Stream**	**Stream**
Sample ID	**Adit**	**BJ 2**	**LBJ**	**LBJ**	**LBJ**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**BJ 2**	**BJ 2**	**BJ 2**
Historical Sample ID (Newhawk 1989)	**Site 1**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 3**	**Site 3**	**Site 3**
Date Sampled	**25-Aug-87**	**25-Sep-87**	**28-Aug-87**	**23-Oct-87**	**22-Nov-87**	**28-Jul-87**	**27-Aug-87**	**25-Sep-87**	**23-Oct-87**	**22-Nov-87**	**15-Dec-87**	**31-Mar-88**	**28-Jul-88**	**30-Aug-88**	**3-Oct-88**	**28-Oct-88**	**30-Nov-88**	**9-Feb-88**	**28-Jul-88**	**3-Oct-88**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**
Total Metals *(cont'd)*																				
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.005	<0.0001	<0.0001	0.3500	0.1200	0.0065	0.0430	0.0520	<0.0001	<0.0001	<0.0001
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	0.0400	<0.000018	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0940	2.31	1.39	0.0870	0.3400	0.7300	<0.005	<0.005	<0.005
Dissolved Metals																				
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	0.0100	0.0016	0.0016	0.0021	0.0019	0.0020	0.0024	0.0019	0.0080	0.0019	0.0022	0.0110	0.0140	0.0083	0.0950	0.0480	0.0033	0.0012	0.0015	0.0018
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	-
Calcium (Ca)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	<0.001	<0.005	<0	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	0.006	0.001	0.002	<0.03	<0.001	<0.001	<0.0005	<0.001	<0.0005
Iron (Fe)-Dissolved	0.0500	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.0400	<0.03	<0.03	<0.03	0.0300	<0.03	<0.03	<0.001	<0.03	<0.03	<0.03	<0.05	<0.03
Lead (Pb)-Dissolved	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0050	<0.0005	0.0960	<0.001	0.0020	0.0010	<0.0005	<0.0005	<0.001
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	-	-	-	-	-	-	<0.005	-	-	-	-	-	<0.00005	-	<0.00005	<0.00005	<0.00005	-	<0.00005
Molybdenum (Mo)-Dissolved	<0.005	<0.001	<0.001	<0.005	<0.005	-	<0.005	-	<0.005	<0.005	<0.001	<0.001	0.0080	0.0130	0.0030	0.0090	0.0060	<0.001	<0.0005	<0.0005
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0005	<0.0005	<0.0005	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	0.0002	<0.001	<0.001	<0.0001	<0.0001	0.00000025	<0.0001
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	0.0200	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0050	0.0200	<0.005	0.0120	<0.005	<0.005	-	<0.005

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A4-1. 1987-2001: Brucejack Watershed

Year	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988
Station Type	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Lake**	**Lake**	**Lake**	**Lake**	**Lake**
Sample ID	**BJ 2**	**BJ 2**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**
Historical Sample ID (Newhawk 1989)	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**
Date Sampled	**28-Oct-88**	**88-08-30**	**30-Mar-88**	**5-May-88**	**30-Jun-88**	**28-Jul-88**	**3-Aug-88**	**30-Aug-88**	**3-Oct-88**	**28-Oct-88**	**88-01-27**	**88-02-29**	**30-Jun-88**	**28-Jul-88**	**3-Aug-88**	**30-Aug-88**	**28-Oct-88**
Included/Excluded	**Excluded**	**Excluded**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
Physical Tests																	
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	50.0	44.0	44.0	47.3	50.0	44.0	-	44.8	44.4	44.8	51.8	44.0	50.0	44.0	-	45.0	45.0
Hardness (as $CaCO_3$)	30.0	24.0	24.1	24.2	25.6	22.5	-	21.7	23.5	23.3	22.6	24.6	26.0	23.0	-	22.0	23.0
pH	6.80	7.20	7.35	7.40	7.65	7.31	-	6.88	6.78	6.80	7.28	7.37	7.70	7.30	-	6.90	6.80
Total Suspended Solids	21.0	34.0	2.7	0.5	0.5	0.5	-	8.0	8.0	6.0	6.0	4.0	<1	<1	2.0	8.0	6.0
Total Dissolved Solids	40.00	49.00	40.00	<80	<80	<60	-	30.00	40.00	35.00	40.00	40.00	40.00	30.00	-	30.00	35.00
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																	
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	17.0	14.0	15.5	13.6	11.9	14.0	-	18.0	21.0	17.5	15.7	15.5	12.0	14.0	-	18.0	18.0
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	<0.5	<0.5	<0.5	<0.5	1.20	<0.5	-	<0.5	<0.5	0.50	<0.5	<0.5	1.00	<0.5	-	<0.5	1.00
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	9.0	7.0	5.4	7.5	6.1	4.8	-	6.0	6.9	5.4	5.4	5.7	6.0	5.0	-	6.0	5.0
Cyanides																	
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																	
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																	
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.0019	0.0036	0.0005	0.0021	0.0023	0.0018	-	0.0024	0.0015	0.0016	0.0023	0.0022	0.0023	0.0018	-	0.0024	0.0016
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	-	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	<0.001	<0.000005	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.0005	0.0700	<0.001	<0.001	0.000400	<0.0005	<0.0005	<0.0010	<0.0005	<0.0010
Iron (Fe)-Total	0.04	-	<0.03	<0.03	0.03	0.05	0.05	0.09	<0.001	0.10	<0.03	<0.03	0.30	0.05	0.05	0.09	0.10
Lead (Pb)-Total	0.00050	0.00025	<0.0005	<0.001	<0.0005	<0.0005	0.0010	<0.0005	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.001
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	-	-	-	-	-	-	-	0.000080	-	<0.00005	-	-	-	-	-	0.001200	<0.000050
Molybdenum (Mo)-Total	0.0005	0.0005	0.0010	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	0.0020	<0.001	<0.001	-	0.0060	<0.001
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988
Station Type	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Lake**	**Lake**	**Lake**	**Lake**	**Lake**
Sample ID	**BJ 2**	**BJ 2**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**
Historical Sample ID (Newhawk 1989)	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**	**Brucejack Lake**
Date Sampled	**28-Oct-88**	**88-08-30**	**30-Mar-88**	**5-May-88**	**30-Jun-88**	**28-Jul-88**	**3-Aug-88**	**30-Aug-88**	**3-Oct-88**	**28-Oct-88**	**88-01-27**	**88-02-29**	**30-Jun-88**	**28-Jul-88**	**3-Aug-88**	**30-Aug-88**	**28-Oct-88**
Included/Excluded	**Excluded**	**Excluded**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
Total Metals *(cont'd)*																	
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	0.00500	<0.0001
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	<0.005	<0.005	0.0210	<0.005	0.0040	0.0060	<0.0005	<0.005	<0.005	<0.005	0.0070	<0.005	0.0040	0.0060	<0.00050	0.1700	<0.0050
Dissolved Metals																	
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	0.0014	0.0012	0.0004	0.0015	0.0023	0.0018	-	0.0015	0.0011	0.0016	0.0016	0.0019	0.0023	0.0018	-	0.0007	0.0016
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	-	<0.005	<0.03	<0.001	<0.0001	0.0004	<0.0005	<0.0005	-	<0.0005	<0.001
Iron (Fe)-Dissolved	<0.03	-	<0.03	<0.03	0.0100	<0.03	-	<0.03	<0.001	<0.03	<0.03	<0.03	0.01	<0.03	-	<0.03	<0.03
Lead (Pb)-Dissolved	<0.001	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	-	<0.005	<0.001	<0.001	<0.001	<0.0005	<0.00050	<0.00050	-	0.0040	<0.0010
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	0.000025	-	-	-	-	-	<0.00005		<0.00005	-	-	-	-	-	0.001	<0.000050
Molybdenum (Mo)-Dissolved	<0.001	<0.005	0.0010	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	0.0010	0.0010	-	-	<0.0010	<0.0010
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0001	0.000000	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.0010	-	<0.0010	<0.0010
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	<0.005	-	0.01100	<0.005	0.00400	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.0040	<0.00010	-	0.0060	0.0050

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A4-1. 1987-2001: Brucejack Watershed

Year	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989
Station Type	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Lake**
Sample ID	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Brucejack Lake**
Historical Sample ID (Newhawk 1989)	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 3**	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Brucejack Lake**
Date Sampled	**28-Feb-89**	**11-Apr-89**	**4-May-89**	**29-May-89**	**3-Jul-89**	**2-Aug-89**	**23-Aug-89**	**2-Oct-89**	**8-Nov-89**	**13-Dec-89**	**29-May-89**	**23-Aug-89**	**13-Dec-89**	**28-Feb-89**	**29-May-89**	**23-Aug-89**	**2-Oct-89**	**8-Nov-89**	**13-Dec-89**	**28-Feb-89**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Included**
Physical Tests																				
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	307	661	646	583	518	519	633	596	667	671	86.0	44.0	86.0	48.0	51.0	47.0	49.0	50.0	52.0	48.0
Hardness (as $CaCO_3$)	149	150	180	156	157	134	123	172	107	87	31.0	17.0	23.0	23.0	23.0	22.0	24.0	22.0	19.0	23.0
pH	7.80	7.90	7.90	7.80	8.00	7.80	7.80	7.80	7.80	7.90	7.20	6.90	7.80	6.90	7.30	7.00	6.80	7.00	7.70	6.90
Total Suspended Solids	1850	790	1500	66	806	402	196	2240	5320	417	13.0	24.0	15.0	<1	3.0	<1	4.0	<1	3.0	<1
Total Dissolved Solids	303	480	300	270	480	480	570	540	560	590	30.00	30.00	70.00	34.00	20.00	40.00	40.00	40.00	40.00	34.00
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																				
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	125	127	102	90.0	110	116	116	125	107	130	20.0	10.0	24.0	20.0	19.0	15.0	14.0	11.0	18.0	20.0
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	3.00	5.00	11.00	2.00	1.00	1.00	3.00	2.00	16.00	4.00	1.00	<0.5	<0.5	<0.5	1.00	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	138	337	339	265	155	150	147	137	132	163	18.0	9.0	15.0	4.0	5.0	4.0	6.0	5.0	12.0	4.0
Cyanides																				
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																				
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																				
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.2400	0.0640	0.1600	0.0360	0.1800	0.0730	0.0590	0.1700	0.0380	0.0900	0.0022	0.0030	0.0039	0.0018	0.0010	0.0014	0.0010	0.0012	0.0021	0.0018
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	0.450	0.023	0.130	0.006	0.031	0.015	0.056	0.082	0.003	0.140	<0.006	<0.006	<0.001	<0.001	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)-Total	28.20	3.80	27.60	0.70	17.40	3.60	1.40	31.10	<0.03	9.30	0.20	0.57	0.08	0.03	<0.03	0.06	<0.03	<0.03	<0.03	0.03
Lead (Pb)-Total	1.4900	0.2700	0.2600	0.0190	0.2800	0.0400	0.2500	0.4000	0.0200	0.4200	0.013000	0.002000	0.004000	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	<0.001
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	<0.00005		<0.00005	<0.00005	0.0000	0.0000	**<0.000050**
Molybdenum (Mo)-Total	0.0150	0.0010	0.0860	0.0120	0.0170	0.0200	0.0010	0.0200	0.0050	0.0160	0.0005	0.0005	0.0030	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989
Station Type	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Lake**
Sample ID	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Brucejack Lake**
Historical Sample ID (Newhawk 1989)	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 3**	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Brucejack Lake**
Date Sampled	**28-Feb-89**	**11-Apr-89**	**4-May-89**	**29-May-89**	**3-Jul-89**	**2-Aug-89**	**23-Aug-89**	**2-Oct-89**	**8-Nov-89**	**13-Dec-89**	**29-May-89**	**23-Aug-89**	**13-Dec-89**	**28-Feb-89**	**29-May-89**	**23-Aug-89**	**2-Oct-89**	**8-Nov-89**	**13-Dec-89**	**28-Feb-89**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Included**
Total Metals *(cont'd)*																				
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	0.0300	0.0100	0.0750	0.0035	0.0290	0.0036	0.0280	0.8800	0.0010	0.1000	<0.0004	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0023	<0.0001
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	1.6800	0.1300	0.4100	0.0900	0.2400	0.5100	0.2200	<0.005	0.0140	0.5600	<0.032	<0.018	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0050
Dissolved Metals																				
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	0.0330	0.0420	0.0130	0.0280	0.0530	0.0030	0.0430	0.0094	0.0250	0.0240	0.0007	0.0004	0.0028	0.0010	0.0010	0.0014	0.0010	0.0011	0.0013	0.0010
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)-Dissolved	-	-	-	-	54.1	46.0	42.1	58.8	36.1	29.5	-	6.4	8.6	-	-	8.3	9.0	8.2	7.3	-
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	0.003	0.003	0.002	<0.001	<0.001	0.006	0.017	0.003	<0.001	0.005	-	0.0020	<0.001	<0.001	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)-Dissolved	<0.03	<0.015	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03
Lead (Pb)-Dissolved	0.0070	0.0020	0.0010	0.0020	<0.001	<0.001	0.0050	0.0040	0.0010	0.0120	0.0020	<0.001	0.0030	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	-	-	-	-	5.20	4.51	4.17	6.07	3.97	3.16	-	0.28	0.42	-	-	0.25	0.30	0.28	0.25	-
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	<0.00005	-	-	-	-	<0.00005	<0.00005	-	-	-	-	<0.00005	-	<0.00005	-	<0.00005	<0.00005	0.000005	<0.000005	<0.00005
Molybdenum (Mo)-Dissolved	0.0120	0.0060	0.0150	0.0100	0.0170	0.0200	0.0050	0.0070	0.0040	0.0030	<0.001	<0.001	0.0020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.2700	<0.0001	0.0009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0010
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	<0.005	0.0060	0.0690	0.0640	<0.005	0.0110	<0.005	<0.005	<0.005	0.0160	0.0140	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0050

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A4-1. 1987-2001: Brucejack Watershed

Year	1989	1989	1989	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1991	1991	1991	1991	1991	1991
Station Type	Lake	Lake	Stream	Effluent	Effluent	Effluent	Effluent	Effluent	Stream	Stream	Stream	Stream	Lake	Effluent	Effluent	Effluent	Stream	Stream	Stream
Sample ID	Brucejack Lake	Brucejack Lake	Camp Creek	Adit	Adit	Adit	Adit	Adit	BJ U/S	BJ U/S	BJ U/S	BJ U/S	Brucejack Lake	Adit	Adit	Adit	BJ 2	BJ 2	BJ U/S
Historical Sample ID (Newhawk 1989)	Brucejack Lake	Brucejack Lake	Site 6	Site 1	Site 1	Site 1	Site 1	Site 1	Site 2	Site 2	Site 2	Site 2	Brucejack Lake	Site 1	Site 1	Site 1	Site 3	Site 3	Site 2
Date Sampled	29-May-89	23-Aug-89	23-Aug-89	3-Mar-90	6-Apr-90	6-Jun-90	21-Nov-90	)-Jun-26 MC	3-Mar-90	6-Apr-90	6-Jun-90	26-Jun-90	21-Nov-90	26-Jun-91	24-Jul-91	15-Sep-91	24-Jul-91	15-Sep-91	24-Jul-91
Included/Excluded	Included	Included	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Excluded	Excluded	Excluded	Included	Included	Included
Physical Tests																			
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	51.0	47.0	44.0	643.0	636.0	659.0	544.0	468.0	63.0	51.0	84.0	56.0	56.0	510	468	424	48.0	107	48.0
Hardness (as $CaCO_3$)	23.0	22.0	19.0	77.0	76.0	150.0	227.0	187.0	22.0	24.0	26.0	24.0	24.0	212.0	221.0	174.0	22.0	46.0	22.0
pH	7.30	7.00	6.50	8.30	8.30	7.90	7.10	7.80	6.80	7.80	7.40	7.60	7.00	7.50	6.90	7.60	6.50	7.60	7.40
Total Suspended Solids	3.0	<1	45.0	173.0	31.0	256.0	3.0	149.0	<1	5.0	7.0	3.0	3.0	-	<1	1.0	3.0	21.0	3.0
Total Dissolved Solids	20.00	40.00	30.00	570.00	520.00	580.00	343.00	440.00	40.00	40.00	60.00	50.00	40.00	-	374.00	339.00	39.00	86.00	38.00
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																			
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	19.0	15.0	2.0	130.0	130.0	116.0	59.0	89.0	17.0	19.0	17.0	17.0	17.0	79.0	82.0	79.0	15.0	31.0	17.0
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	1.00	<0.5	<0.5	3.00	31.00	2.00	<0.5	<0.5	<0.5	15.00	<0.5	<0.5	<0.5	-	<0.5	1.00	<0.5	<0.5	<0.5
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	5.0	4.0	13.0	190.0	171.0	207.0	167.0	152.0	5.0	9.0	10.0	8.0	10.0	172	161	126	6.0	38.0	5.0
Cyanides																			
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon			-																
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals			-																
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.0010	0.0014	0.0021	0.0300	0.0260	0.0200	0.0006	0.0100	0.0014	0.0016	0.0011	0.0016	0.0020	0.0070	0.0011	0.0031	0.0007	0.0009	0.0012
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
Calcium (Ca)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	74.4	-	-	-	-	-
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	0.001	<0.001	0.0030	<0.001	0.0010	0.0010	<0.001	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	0.0030	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)-Total	<0.03	0.06	1.39	<0.03	0.10	0.02	0.10	<0.03	<0.03	0.03	0.08	0.08	0.12	0.50	<0.03	0.10	0.20	0.18	0.17
Lead (Pb)-Total	<0.001	<0.001	0.0030	<0.001	<0.001	0.0020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0120	<0.001	0.0020	<0.001	0.0010	<0.001
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	6.53	-	-	-	-	-
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	-	<0.000050	0.0001	-	-	-	-	-	0.0000	0.0000	0.0000	<0.000005	<0.0005	-	-	-	-	-	-
Molybdenum (Mo)-Total	<0.001	<0.001	<0.001	0.0060	0.0020	<0.001	0.0020	0.0040	<0.001	<0.001	0.0030	<0.001	<0.00001	<0.0005	0.0020	0.0020	<0.001	<0.001	<0.001
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	1989	1989	1989	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1991	1991	1991	1991	1991	1991
Station Type	Lake	Lake	Stream	Effluent	Effluent	Effluent	Effluent	Effluent	Stream	Stream	Stream	Stream	Lake	Effluent	Effluent	Effluent	Stream	Stream	Stream
Sample ID	Brucejack Lake	Brucejack Lake	Camp Creek	Adit	Adit	Adit	Adit	Adit	BJ U/S	BJ U/S	BJ U/S	BJ U/S	Brucejack Lake	Adit	Adit	Adit	BJ 2	BJ 2	BJ U/S
Historical Sample ID (Newhawk 1989)	Brucejack Lake	Brucejack Lake	Site 6	Site 1	Site 1	Site 1	Site 1	Site 1	Site 2	Site 2	Site 2	Site 2	Brucejack Lake	Site 1	Site 1	Site 1	Site 3	Site 3	Site 2
Date Sampled	29-May-89	23-Aug-89	23-Aug-89	3-Mar-90	6-Apr-90	6-Jun-90	21-Nov-90	)-Jun-26 MC	3-Mar-90	6-Apr-90	6-Jun-90	26-Jun-90	21-Nov-90	26-Jun-91	24-Jul-91	15-Sep-91	24-Jul-91	15-Sep-91	24-Jul-91
Included/Excluded	Included	Included	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Excluded	Excluded	Excluded	Included	Included	Included
Total Metals *(cont'd)*			-																
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	0.00020	<0.0001	<0.0001	0.0008	0.0002	<0.0001	0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	<0.0050	<0.0050	0.0200	<0.005	0.0060	0.0130	0.2550	0.0630	<0.005	<0.005	0.0060	<0.005	0.01100		0.0720	0.0780	0.0070	0.0170	<0.005
Dissolved Metals																			
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	0.0010	0.0014	0.0002	0.0270	0.0260	0.0180	0.0005	0.0086	0.0012	0.0011	0.0008	0.0009	0.00040	0.0010	0.0010	0.0019	0.0007	0.0007	0.0011
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	-	-	-
Calcium (Ca)-Dissolved	-	-	6.9	25.5	24.8	49.0	79.1	64.6	8.4	9.1	9.3	8.9	-	74.3	76.0	59.8	8.4	16.6	8.3
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)-Dissolved	<0.03	<0.03	<0.03	<0.03	<0.03	<0.015	<0.03	<0.015	<0.03	<0.03	<0.015	0.08	<0.03	0.02	<0.03	<0.03	<0.03	<0.03	<0.03
Lead (Pb)-Dissolved	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	-	-	0.320	3.21	3.39	4.85	6.99	6.12	0.260	0.290	0.330	0.300	-	6.53	7.39	5.72	0.30	1.10	0.29
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	<0.00005	<0.00005	-	-	-	-	-	0.000025	0.000005	0.000013	-	<0.0005	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	<0.0010	<0.0010	<0.001	0.0030	0.0020	<0.001	<0.00005	0.0030	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	0.0020	0.0020	<0.001	<0.001	<0.001
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0010	<0.0010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0010	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	<0.00050	<0.00050	0.0110	<0.005	0.0050	<0.005	0.2420	0.0630	<0.005	<0.005	<0.005	<0.005	0.0070	0.1800	0.0630	0.0580	<0.005	0.0100	<0.005

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A4-1. 1987-2001: Brucejack Watershed

Year	1991	1991	1991	1991	1992	1992	1992	1992	1992	1992	1992	1992	1992	1992	1992	1992	1992	1992
Station Type	Stream	Lake	Lake	Stream	Effluent	Effluent	Effluent	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
Sample ID	BJ U/S	Brucejack Lake	Brucejack Lake	Camp Creek	Adit	Adit	Adit	BJ 2	BJ 2	BJ 2	BJ U/S	BJ U/S	BJ U/S	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Camp Creek
Historical Sample ID (Newhawk 1989)	Site 2	Brucejack Lake	Brucejack Lake	Site 6	Site 1	Site 1	Site 1	Site 3	Site 3	Site 3	Site 2	Site 2	Site 2	Site 6	Site 6	Site 6	Site 6	Site 6
Date Sampled	15-Sep-91	24-Jul-91	15-Sep-91	26-Jun-91 MOE	23-Jul-92	19-Aug-92	21-Sep-92	23-Jul-92	19-Aug-92	21-Sep-92	23-Jul-92	19-Aug-92	21-Sep-92	23-Jul-92	5-Aug-92	19-Aug-92	8-Sep-92	21-Sep-92
Included/Excluded	Included	Included	Included	Excluded	Excluded	Excluded	Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Physical Tests																		
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	52.0	48.0	52.0	-	389.0	410.0	360.0	49.0	51.0	46.0	52.0	41.0	42.0	67.0	54.0	70.0	77.0	230.0
Hardness (as $CaCO_3$)	24.0	22.0	24.0	25.0	169.0	148.0	209.0	23.0	21.0	21.0	25.0	22.0	14.0	29.0	23.0	28.0	48.0	60.0
pH	7.70	7.40	7.70	6.50	7.00	7.00	7.20	7.20	7.30	6.60	7.30	7.30	6.70	6.60	6.10	7.00	7.90	5.60
Total Suspended Solids	7.0	3.0	7.0	<1	<1	2.0	<1	12.0	6.0	5.0	14.0	13.0	7.0	12.0	9.0	6.0	9.0	2.0
Total Dissolved Solids	42.00	38.00	42.00	-	296.00	271.00	294.00	59.00	44.00	30.00	66.00	36.00	28.00	67.00	53.00	30.00	55.00	162.00
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																		
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	15.0	17.0	15.0	-	75.0	73.0	103.0	20.0	17.0	17.0	18.0	15.0	21.0	10.0	8.0	5.0	14.0	8.0
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	<0.5	<0.5	<0.5	-	<0.3	<0.5	<0.3	<0.3	1.00	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	1.00	<0.5	<0.3
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	9.0	5.0	9.0	-	120.0	137.0	106.0	10.0	7.0	11.0	11.0	6.0	9.0	29.0	19.0	26.0	35.0	104.0
Cyanides																		
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																		
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																		
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.0011	0.0012	0.0011	0.0010	0.0050	0.0110	0.0220	<0.003	<0.003	<0.003	0.0150	<0.003	0.0050	0.0070	<0.003	<0.003	<0.003	0.0060
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	-	-	-	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium (Ca)-Total	-	-	-	9.1	58.6	50.8	84.0	8.4	8.6	7.0	8.7	13.5	4.8	10.6	8.7	10.4	17.9	21.8
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	<0.001	<0.001	<0.001	0.002	0.002	0.003	0.023	0.002	<0.001	0.002	0.002	<0.001	0.002	0.007	<0.001	0.039	0.002	0.002
Iron (Fe)-Total	0.390	0.170	0.390	0.400	0.200	0.100	0.015	0.490	0.190	0.180	0.720	0.350	0.150	0.430	0.200	0.150	0.380	0.200
Lead (Pb)-Total	0.0010	<0.001	0.001	-	<0.005	0.0080	0.0030	<0.005	<0.005	0.0020	<0.005	<0.005	<0.001	<0.005	<0.005	0.0070	<0.005	<0.001
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	-	-	-	0.470	5.47	5.08	6.60	0.500	<0.001	0.820	0.720	0.920	0.530	0.560	0.400	0.440	0.730	1.26
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	<0.00005	0.000006	<0.000050	-	<0.00005	<0.01	<0.005	<0.00005	<0.01	<0.005	<0.00005	<0.01	<0.005	<0.00005	<0.00005	<0.01	<0.005	<0.005
Molybdenum (Mo)-Total	<0.001	<0.001	<0.001	-	0.0010	0.0010	0.0130	<0.001	<0.001	0.0240	<0.001	<0.001	0.0130	<0.001	<0.001	<0.001	0.0010	0.0170
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	1991	1991	1991	1991	1992	1992	1992	1992	1992	1992	1992	1992	1992	1992	1992	1992	1992	1992
Station Type	**Stream**	**Lake**	**Lake**	**Stream**	**Effluent**	**Effluent**	**Effluent**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**
Sample ID	**BJ U/S**	**Brucejack Lake**	**Brucejack Lake**	**Camp Creek**	**Adit**	**Adit**	**Adit**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Camp Creek**	**Camp Creek**	**Camp Creek**	**Camp Creek**	**Camp Creek**
Historical Sample ID (Newhawk 1989)	**Site 2**	**Brucejack Lake**	**Brucejack Lake**	**Site 6**	**Site 1**	**Site 1**	**Site 1**	**Site 3**	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 6**	**Site 6**	**Site 6**	**Site 6**	**Site 6**
Date Sampled	**15-Sep-91**	**24-Jul-91**	**15-Sep-91**	**26-Jun-91 MOE**	**23-Jul-92**	**19-Aug-92**	**21-Sep-92**	**23-Jul-92**	**19-Aug-92**	**21-Sep-92**	**23-Jul-92**	**19-Aug-92**	**21-Sep-92**	**23-Jul-92**	**5-Aug-92**	**19-Aug-92**	**8-Sep-92**	**21-Sep-92**
Included/Excluded	**Included**	**Included**	**Included**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
Total Metals *(cont'd)*																		
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	<0.0001	<0.0001	<0.0001	<0.0005	0.0005	<0.0001	0.0011	0.0003	0.0004	0.0007	0.0005	0.0011	<0.0001	0.0005	0.0001	0.0001	<0.0001	0.0010
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	<0.005	<0.0050	<0.0050	0.0400	0.0540	0.0460	0.1130	0.0200	<0.05	0.0150	0.0190	<0.005	0.0030	0.0280	0.0110	0.1860	0.0500	0.0170
Dissolved Metals																		
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	0.0012	0.0011	0.0012	-	0.0040	0.0080	0.0150	<0.003	<0.003	<0.003	0.0040	<0.003	0.0050	<0.003	<0.003	<0.003	<0.003	0.004000
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium (Ca)-Dissolved	8.9	8.3	8.9	-	58.6	50.9	92.3	8.1	8.6	5.8	8.0	8.8	4.3	10.2	8.7	10.6	14.6	22.3
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	<0.001	<0.001	<0.001	-	0.002	0.003	0.018	0.002	<0.001	0.004	<0.001	<0.001	0.003	0.002	<0.001	0.022	<0.001	0.002
Iron (Fe)-Dissolved	<0.03	<0.03	<0.03	-	0.05	0.05	0.01	0.06	<0.03	0.01	0.07	<0.03	0.03	0.04	<0.03	0.07	0.23	<0.002
Lead (Pb)-Dissolved	<0.001	<0.0010	<0.0010	-	<0.005	0.0080	0.0030	<0.005	<0.005	0.0040	<0.005	<0.005	0.0030	<0.005	<0.005	0.0070	<0.005	<0.001
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	0.31	-	0.31	-	5.47	5.02	6.58	0.32	<0.001	0.90	0.30	<0.001	0.52	0.50	0.40	0.57	0.54	1.25
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	-	-	-	<0.00005	<0.01	<0.005	<0.00005	<0.01	<0.005	<0.00005	<0.01	<0.005	<0.00005	<0.00005	<0.01	<0.005	<0.005
Molybdenum (Mo)-Dissolved	<0.001	<0.0010	<0.0010	-	0.0010	<0.001	0.0220	<0.001	<0.001	0.0180	<0.001	<0.001	0.0120	0.0060	<0.001	0.0020	0.0010	0.0130
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0001	<0.0010	<0.0010	-	0.0004	<0.0001	0.0015	0.0003	0.0004	0.0009	0.0004	0.0008	0.0005	0.0005	0.0001	0.0001	<0.0001	<0.0001
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	<0.005	<0.0050	<0.0050	-	0.0460	0.0460	0.1050	0.0100	<0.005	0.0150	0.0130	<0.005	0.0030	0.0170	0.0110	0.0470	0.0400	0.0180

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A4-1. 1987-2001: Brucejack Watershed

Year	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993
Station Type	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**
Sample ID	**Adit**	**Adit**	**Adit**	**Adit**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Camp Creek**	**Camp Creek**	**Camp Creek**
Historical Sample ID (Newhawk 1989)	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 6**	**Site 6**	**Site 6**
Date Sampled	**28-May-93**	**6-Jul-93**	**16-Aug-93**	**1-Sep-93**	**28-May-93**	**13-Jun-93**	**6-Jul-93**	**20-Jul-93**	**16-Aug-93**	**22-Sep-93**	**28-May-93**	**13-Jun-93**	**6-Jul-93**	**20-Jul-93**	**16-Aug-93**	**22-Sep-93**	**28-May-93**	**13-Jun-93**	**6-Jul-93**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Excluded QA/QC**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
Physical Tests																			
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	413	404	402	396	62.0	-	48.0	47.0	48.0	62.0	51.0	-	45.0	46.0	45.0	46.0	119.0	-	61.0
Hardness (as $CaCO_3$)	146	136	161	164	26.0	26.0	17.0	20.0	22.0	27.0	21.0	21.0	17.0	18.0	21.0	22.0	41.0	39.0	19.0
pH	6.90	7.20	7.40	7.30	6.60	6.80	7.40	7.40	7.30	7.30	7.90	7.40	7.30	7.50	7.40	7.40	6.20	5.50	5.80
Total Suspended Solids	<1	<1	<1	3.0	<1	9.0	4.0	3.0	4.0	5.0	2.0	1.0	2.0	3.0	<1	5.0	2.0	2.0	4.0
Total Dissolved Solids	330	320	300	295	50.00	-	35.00	38.00	29.00	39.00	41.00	-	34.00	36.00	27.00	29.00	95.00	-	39.00
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																			
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	76.0	75.0	80.0	83.0	12.0	-	15.0	17.0	16.0	16.0	14.0	-	17.0	15.0	17.0	16.0	<1	-	<1
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	1.00	<0.5	<0.5	1.00	1.00	-	<0.5	<0.5	<0.5	1.00	1.00	-	<0.5	<0.5	<0.5	1.00	1.00	-	<0.5
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	134.0	126.0	120.0	122.0	15.0	14.0	8.0	6.0	7.0	11.0	6.0	6.0	6.0	6.0	4.0	6.0	48.0	41.0	23.0
Cyanides																			
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																			
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.0051	0.0073	0.0074	0.0095	0.0017	0.0020	0.0016	0.0020	0.0021	0.0018	0.0013	0.0016	0.0018	0.0009	0.0023	0.0022	0.0002	<0.0001	0.0002
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	0.0005	0.0005	0.0006	0.0002	<0.0002	0.0110	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.01	<0.0002	<0.0002	<0.0002	<0.0002	0.0004	<0.01	<0.0002
Calcium (Ca)-Total	61.2	46.0	56.4	57.0	47.7	9.6	6.5	7.4	8.2	10.3	8.0	7.9	6.4	6.6	8.5	8.6	15.3	14.5	7.0
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	0.002	0.002	0.008	0.002	0.007	0.003	0.002	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	0.007	0.002	0.009	0.006	0.002
Iron (Fe)-Total	0.30	0.20	0.10	0.20	0.44	0.28	0.16	0.13	0.13	<0.03	0.09	0.10	0.19	0.26	0.11	0.03	0.22	0.30	0.24
Lead (Pb)-Total	0.0060	0.0090	0.0040	0.0020	0.0030	0.0050	0.0010	<0.001	<0.001	0.0020	<0.001	0.0010	<0.001	0.0030	<0.001	<0.001	0.0010	0.0010	<0.001
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	6.03	5.42	5.55	5.40	0.42	0.38	0.30	0.28	0.30	0.40	0.31	0.27	0.29	0.33	0.29	0.29	0.81	0.71	0.43
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	0.000010	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001
Molybdenum (Mo)-Total	0.0020	<0.001	0.0060	0.0030	<0.001	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.03	<0.001
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993	1993
Station Type	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**
Sample ID	**Adit**	**Adit**	**Adit**	**Adit**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Camp Creek**	**Camp Creek**	**Camp Creek**
Historical Sample ID (Newhawk 1989)	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 6**	**Site 6**	**Site 6**
Date Sampled	**28-May-93**	**6-Jul-93**	**16-Aug-93**	**1-Sep-93**	**28-May-93**	**13-Jun-93**	**6-Jul-93**	**20-Jul-93**	**16-Aug-93**	**22-Sep-93**	**28-May-93**	**13-Jun-93**	**6-Jul-93**	**20-Jul-93**	**16-Aug-93**	**22-Sep-93**	**28-May-93**	**13-Jun-93**	**6-Jul-93**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Excluded QA/QC**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
Total Metals *(cont'd)*																			
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.015	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.015	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.015	<0.0001
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	0.0520	0.0560	0.0360	0.0310	0.0250	0.0160	0.0060	<0.005	<0.005	0.0080	<0.005	<0.005	<0.005	0.0110	<0.005	0.0050	0.0700	0.0490	0.0190
Dissolved Metals																			
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	0.0015	0.0023	0.0034	0.0030	<0.0001	0.0004	0.0006	0.0010	0.0011	0.0008	0.0010	0.0014	0.0013	<0.0001	0.0016	0.0011	0.0002	<0.0001	<0.0001
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	0.0005	0.0004	0.0002	<0.002	0.0004	<0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.01	<0.0002	<0.0002	<0.0002	<0.0002	0.0004	<0.01	<0.0002
Calcium (Ca)-Dissolved	48.9	45.7	55.4	56.9	9.5	9.6	6.5	7.4	8.2	10.1	7.8	7.8	6.4	6.6	7.9	8.5	15.2	14.4	7.8
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	0.0020	<0.001	0.001	<0.001	0.003	0.003	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.009	0.006	0.002
Iron (Fe)-Dissolved	<0.03	<0.03	<0.03	<0.03	0.05	0.11	0.05	<0.03	<0.03	<0.03	<0.03	0.05	0.05	0.03	<0.03	0.03	0.21	0.06	<0.03
Lead (Pb)-Dissolved	<0.001	<0.001	<0.001	<0.001	<0.001	0.0020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	5.76	5.38	5.44	5.39	0.41	0.37	0.30	0.27	0.30	0.40	0.27	0.26	0.29	0.33	0.27	0.29	0.78	0.70	0.42
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	0.0010	<0.001	0.0020	0.0020	<0.001	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.03	<0.001
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.015	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.015	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.015	<0.0001
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	0.0480	0.0500	0.0300	0.0280	0.0250	0.0160	0.0060	<0.005	<0.005	0.0080	<0.005	<0.005	<0.005	0.0110	<0.005	0.0050	0.0700	0.0490	0.0190

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A4-1. 1987-2001: Brucejack Watershed

Year	1993	1993	1993	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994
Station Type	**Stream**	**Stream**	**Stream**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Effluent**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**
Sample ID	**Camp Creek**	**Camp Creek**	**Camp Creek**	**Adit**	**Adit**	**Adit**	**Adit**	**Adit**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Camp Creek**
Historical Sample ID (Newhawk 1989)	**Site 6**	**Site 6**	**Site 6**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 1**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 6**
Date Sampled	**20-Jul-93**	**16-Aug-93**	**22-Sep-93**	**29-Jun-94**	**27-Jul-94**	**15-Aug-94**	**31-Aug-94**	**27-Sep-94**	**29-Jun-94**	**27-Jul-94**	**15-Aug-94**	**31-Aug-94**	**27-Sep-94**	**29-Jun-94**	**27-Jul-94**	**15-Aug-94**	**31-Aug-94**	**27-Sep-94**	**14-Jul-94**
Included/Excluded	**Included**	**Included**	**Included**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
Physical Tests																			
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	50.0	55.0	109	411	410	412	413	402	65.0	50.0	50.0	46.0	53.0	52.0	49.0	48.0	-	47.0	65.0
Hardness (as $CaCO_3$)	20.0	22.0	48.0	176	134	161	161	155	26.0	23.0	22.0	21.0	22.0	25.0	23.0	22.0	21.0	20.0	25.0
pH	6.10	6.90	7.00	7.20	7.30	7.60	6.80	8.00	7.00	7.10	7.50	7.60	7.80	7.20	7.20	7.60	7.90	8.00	5.20
Total Suspended Solids	10.0	13.0	<1	4.0	1.0	<1	<1	9.0	6.0	4.0	6.0	12.0	34.0	3.0	6.0	7.0	-	10.0	14.0
Total Dissolved Solids	39.0	35.0	77.0	284	271	276	281	256	37.0	29.0	29.0	28.0	30.0	32.0	28.0	30.0	-	25.0	40.0
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																			
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	2.0	3.0	5.0	76.0	80.0	81.0	82.0	81.0	16.0	16.0	16.0	15.0	15.0	17.0	16.0	18.0	-	15.0	<1
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	<0.5	<0.5	<0.5	<0.5	<0.5	1.00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	1.00
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	18.0	19.0	43.0	125	127	120	123	116	8.0	7.0	5.0	5.0	9.0	7.0	5.0	5.0	-	5.0	25.0
Cyanides																			
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																			
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.0019	0.0006	<0.0001	0.0076	0.0073	0.0085	0.0088	0.0096	0.0018	0.0015	0.0023	0.0024	0.0035	0.0019	0.0015	0.0024	0.0025	0.0027	0.0003
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	<0.0002	0.000200	<0.0002	0.000400	0.000500	0.000400	0.000300	0.000400	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Calcium (Ca)-Total	7.4	8.2	17.9	61.7	45.1	55.9	55.8	54.6	9.8	9.1	8.8	8.2	8.3	9.4	8.8	8.5	7.9	8.2	9.5
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	<0.03	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.003	0.001	0.002	<0.001	<0.001	0.001	0.001	0.001	0.001	0.003
Iron (Fe)-Total	0.150	0.130	<0.03	0.300	0.200	0.200	0.200	0.400	0.120	0.160	0.240	0.260	<0.03	0.060	0.110	0.230	0.230	0.320	0.360
Lead (Pb)-Total	<0.001	<0.001	0.0020	0.0050	0.0060	0.0080	0.0060	0.0070	0.0010	<0.001	0.0210	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	0.290	0.400	0.780	5.770	5.070	5.460	5.210	5.210	0.350	0.320	0.330	0.300	0.320	0.320	0.300	0.310	0.280	0.320	0.440
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum (Mo)-Total	<0.001	<0.001	<0.001	0.0010	0.0010	0.0020	0.0020	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0020	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	1993	1993	1993	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994
Station Type	Stream	Stream	Stream	Effluent	Effluent	Effluent	Effluent	Effluent	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream	Stream
Sample ID	Camp Creek	Camp Creek	Camp Creek	Adit	Adit	Adit	Adit	Adit	BJ 2	BJ 2	BJ 2	BJ 2	BJ 2	BJ U/S	BJ U/S	BJ U/S	BJ U/S	BJ U/S	Camp Creek
Historical Sample ID (Newhawk 1989)	Site 6	Site 6	Site 6	Site 1	Site 1	Site 1	Site 1	Site 1	Site 3	Site 3	Site 3	Site 3	Site 3	Site 2	Site 2	Site 2	Site 2	Site 2	Site 6
Date Sampled	20-Jul-93	16-Aug-93	22-Sep-93	29-Jun-94	27-Jul-94	15-Aug-94	31-Aug-94	27-Sep-94	29-Jun-94	27-Jul-94	15-Aug-94	31-Aug-94	27-Sep-94	29-Jun-94	27-Jul-94	15-Aug-94	31-Aug-94	27-Sep-94	14-Jul-94
Included/Excluded	Included	Included	Included	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Total Metals *(cont'd)*																			
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	0.0060	0.0110	0.0130	0.0490	0.0430	0.0410	0.0330	0.0490	0.0060	0.0060	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0200
Dissolved Metals																			
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	0.0012	<0.0001	<0.0001	0.0025	0.0023	0.0026	0.0026	0.0016	0.0016	0.0009	0.0011	0.0008	0.0012	0.0019	0.0012	0.0014	0.0010	0.0012	<0.0001
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Calcium (Ca)-Dissolved	7.4	8.0	17.8	61.0	45.1	55.6	55.8	53.5	9.3	8.9	8.2	8.0	7.5	9.4	8.8	8.5	7.8	7.5	9.5
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
Iron (Fe)-Dissolved	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.06	0.04	0.04	<0.03	<0.03	0.06	0.04	0.04	0.08	<0.03	<0.03
Lead (Pb)-Dissolved	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	0.27	0.38	0.76	5.68	5.07	5.44	5.20	5.17	0.35	0.28	0.28	0.24	0.27	0.32	0.28	0.26	0.24	0.27	0.43
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	<0.001	<0.001	<0.001	0.0010	<0.001	0.0020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	<0.005	0.0060	0.0130	0.0420	0.0430	0.0350	0.0250	0.0400	0.0060	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0200

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A4-1. 1987-2001: Brucejack Watershed

Year	1994	1994	1995	1995	1995	1996	1996	1996	1997	1997	1997	1998	1998	1998	1998	1998	1999	1999	1999	1999
Station Type	**Stream**	**Stream**	**Effluent**	**Stream**	**Stream**	**Effluent**	**Stream**	**Stream**	**Effluent**	**Stream**	**Stream**	**Effluent**	**Stream**	**Stream**	**Stream**	**Stream**	**Effluent**	**Effluent**	**Effluent**	**Effluent**
Sample ID	**Camp Creek**	**Camp Creek**	**Adit**	**BJ 2**	**BJ U/S**	**Adit**	**BJ 2**	**BJ U/S**	**Adit**	**BJ 2**	**BJ U/S**	**Adit**	**BJ 2**	**BJ 2**	**BJ U/S**	**Camp Creek**	**Adit**	**Adit**	**Adit**	**Adit**
Historical Sample ID (Newhawk 1989)	**Site 6**	**Site 6**	**Site 1**	**Site 3**	**Site 2**	**Site 1**	**Site 3**	**Site 2**	**Site 1**	**Site 3**	**Site 2**	**Site 1**	**Site 3**	**Site 3**	**Site 2**	**Site 6**	**Site 1**	**Site 1**	**Site 1**	**Site 1**
Date Sampled	**13-Sep-94**	**27-Sep-94**	**25-Aug-95**	**25-Aug-95**	**25-Aug-95**	**6-Sep-96**	**6-Sep-96**	**6-Sep-96**	**8-Jul-97**	**7-Aug-97**	**7-Aug-97**	**9-Jul-98**	**19-Jun-98**	**9-Jul-98**	**19-Jun-98**	**19-Jun-98**	**12-Jul-99**	**4-Aug-99**	**2-Sep-99**	**14-Sep-99**
Included/Excluded	**Included**	**Included**	**Excluded**	**Included**	**Included**	**Excluded**	**Included**	**Included**	**Excluded**	**Included**	**Included**	**Excluded**	**Included**	**Included**	**Included**	**Included**	**Excluded**	**Excluded**	**Excluded**	**Excluded**
Physical Tests																				
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	123	163	405	56.0	48.0	405	53.0	52.0	375	69.0	54.0	394	62.0	62.0	51.0	96.0	394	353	380	385
Hardness (as $CaCO_3$)	44.0	65.0	154.0	21.0	21.0	142.0	24.0	23.0	126.0	21.0	19.0	158.0	28.0	28.0	24.0	38.0	152	147	143	141
pH	4.40	6.20	7.60	7.40	7.30	7.80	7.50	7.50	7.40	6.50	7.10	7.50	7.20	7.20	7.20	5.60	7.10	7.70	6.90	6.90
Total Suspended Solids	67.0	12.0	<1	12.0	1.0	<1	1.0	<1	2.0	12.0	4.0	<1	2.0	2.0	1.0	3.0	<3	<3	7.0	<3
Total Dissolved Solids	76.0	101	265	29.0	20.0	222	31.0	30.0	227	37.0	29.0	276	43.0	43.0	36.0	67.0	276.00	247.00	239.0	239.0
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																				
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	<1	2.0	82.0	15.0	16.0	80.0	16.0	17.0	75.0	13.0	17.0	63.0	13.0	13.0	12.0	1.0	69.0	70.0	73.0	73.0
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	<0.5	<0.5	<0.5	<0.5	<0.5	1.00	<0.5	1.00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.00	<0.5	1.00	1.00	1.00
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	47.0	62.0	123.0	11.0	5.0	113.0	9.0	8.0	96.0	15.0	6.0	124	13.0	13.0	11.0	38.0	120	117	116	117
Cyanides																				
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																				
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																				
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.0033	0.0003	0.0071	0.0003	0.0014	0.0044	0.0014	0.0018	0.0126	0.0016	0.0015	0.0059	0.0021	0.0021	0.0018	0.0002	0.0114	0.0086	0.0091	0.0076
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	0.0007	0.0004	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	0.0003	0.0003	0.0003	0.0003	0.0003
Calcium (Ca)-Total	16.0	24.2	52.9	9.1	8.2	50.5	8.8	8.5	43.2	7.9	7.2	52.8	10.5	10.5	8.9	13.7	53.2	51.3	52.5	49.4
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	0.008	0.003	0.001	0.012	0.001	0.001	0.001	0.002	0.004	0.002	<0.001	0.003	0.004	0.004	<0.001	0.005	0.002	0.002	0.002	0.002
Iron (Fe)-Total	1.96	0.10	0.10	0.25	0.14	0.20	0.11	0.15	1.00	0.21	0.05	0.30	0.43	0.43	0.18	0.29	0.30	0.20	0.30	0.20
Lead (Pb)-Total	0.0020	<0.001	0.0020	<0.001	<0.001	0.0060	<0.001	<0.001	0.0100	<0.001	<0.001	0.0040	0.0010	0.0010	<0.001	<0.001	0.0040	0.0050	0.0080	0.0070
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	1.05	1.18	5.22	0.28	0.28	4.90	0.31	0.29	4.15	0.31	0.26	5.08	0.42	0.42	0.33	0.73	5.17	5.05	4.95	4.61
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	0.0000100	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum (Mo)-Total	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	<0.001	0.0030	0.0010	<0.001	<0.001	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	0.0010	0.0010
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	1994	1994	1995	1995	1995	1996	1996	1996	1997	1997	1997	1998	1998	1998	1998	1998	1999	1999	1999	1999
Station Type	**Stream**	**Stream**	**Effluent**	**Stream**	**Stream**	**Effluent**	**Stream**	**Stream**	**Effluent**	**Stream**	**Stream**	**Effluent**	**Stream**	**Stream**	**Stream**	**Stream**	**Effluent**	**Effluent**	**Effluent**	**Effluent**
Sample ID	**Camp Creek**	**Camp Creek**	**Adit**	**BJ 2**	**BJ U/S**	**Adit**	**BJ 2**	**BJ U/S**	**Adit**	**BJ 2**	**BJ U/S**	**Adit**	**BJ 2**	**BJ 2**	**BJ U/S**	**Camp Creek**	**Adit**	**Adit**	**Adit**	**Adit**
Historical Sample ID (Newhawk 1989)	**Site 6**	**Site 6**	**Site 1**	**Site 3**	**Site 2**	**Site 1**	**Site 3**	**Site 2**	**Site 1**	**Site 3**	**Site 2**	**Site 1**	**Site 3**	**Site 3**	**Site 2**	**Site 6**	**Site 1**	**Site 1**	**Site 1**	**Site 1**
Date Sampled	**13-Sep-94**	**27-Sep-94**	**25-Aug-95**	**25-Aug-95**	**25-Aug-95**	**6-Sep-96**	**6-Sep-96**	**6-Sep-96**	**8-Jul-97**	**7-Aug-97**	**7-Aug-97**	**9-Jul-98**	**19-Jun-98**	**9-Jul-98**	**19-Jun-98**	**19-Jun-98**	**12-Jul-99**	**4-Aug-99**	**2-Sep-99**	**14-Sep-99**
Included/Excluded	**Included**	**Included**	**Excluded**	**Included**	**Included**	**Excluded**	**Included**	**Included**	**Excluded**	**Included**	**Included**	**Excluded**	**Included**	**Included**	**Included**	**Included**	**Excluded**	**Excluded**	**Excluded**	**Excluded**
Total Metals *(cont'd)*																				
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	0.0500	0.0350	0.0280	0.0060	0.0060	0.0350	<0.005	0.0060	0.0500	0.0070	<0.005	0.0160	0.0180	0.0180	<0.005	0.0290	0.0460	0.0410	0.0460	0.0450
Dissolved Metals																				
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	<0.0001	0.000100	0.0071	0.0003	0.0011	0.0025	0.0008	0.0011	0.0027	0.0005	0.0012	0.0016	0.0003	0.0003	0.0009	<0.0001	0.0037	0.0026	0.0022	0.0024
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	0.0007	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002
Calcium (Ca)-Dissolved	16.0	24.2	52.9	9.2	8.0	49.1	9.0	8.7	43.6	10.5	7.1	54.7	10.5	10.5	9.0	13.9	52.4	50.5	49.6	48.8
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	0.008	0.002	0.001	<0.001	0.001	0.001	0.001	0.001	0.012	0.003	0.001	0.001	0.003	0.003	<0.001	0.006	<0.001	<0.001	<0.001	<0.001
Iron (Fe)-Dissolved	0.17	<0.03	0.12	<0.03	<0.03	0.03	0.05	<0.03	<0.03	0.09	<0.03	<0.03	0.09	0.09	<0.03	0.07	0.04	<0.03	<0.03	0.06
Lead (Pb)-Dissolved	<0.001	<0.001	0.0020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.007
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	0.89	1.18	5.22	0.36	0.29	4.80	0.32	0.30	4.12	0.39	0.23	5.23	0.39	0.39	0.29	0.71	5.11	4.97	4.68	4.54
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001	0.001
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	0.0500	0.0350	0.0280	0.0060	<0.005	0.0310	0.0060	<0.005	0.0400	0.0160	<0.005	0.0450	0.0160	0.0160	<0.005	0.0300	<0.0001	0.0390	0.0420	0.0380

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A4-1. 1987-2001: Brucejack Watershed

Year	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999
Station Type	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Lake**
Sample ID	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Brucejack Lake**
Historical Sample ID (Newhawk 1989)	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Brucejack Lake**
Date Sampled	**12-Jul-99**	**4-Aug-99**	**19-Aug-99**	**2-Sep-99**	**14-Sep-99**	**11-Aug-99 Eskay**	**25-Aug-99 Eskay**	**29-Jul-99 Eskay**	**12-Jul-99**	**4-Aug-99**	**19-Aug-99**	**2-Sep-99**	**14-Sep-99**	**11-Aug-99 Eskay**	**25-Aug-99 Eskay**	**29-Jul-99 Eskay**	**12-Jul-99**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**
Physical Tests																	
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	80.0	86.0	77.0	74.0	74.0	77.0	54.0	66.0	59.0	44.0	52.0	60.0	61.0	50.0	54.0	56.0	57.0
Hardness (as $CaCO_3$)	32.0	39.0	28.0	30.0	32.0	-	-	-	23.0	22.0	21.0	25.0	27.0	-	-	-	18.0
pH	7.50	7.40	7.80	8.00	7.30	7.50	7.80	6.70	7.80	6.50	7.60	8.10	6.90	7.60	8.00	7.00	9.20
Total Suspended Solids	8.0	7.0	11.0	<3	<3	13.0	2.0	14.0	<3	<3	<3	7.0	4.0	2.0	3.0	5.0	4.0
Total Dissolved Solids	56.0	60.0	39.0	39.0	40.0	-	-	-	42.0	31.0	30.0	30.0	<30	-	-	-	40.0
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																	
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	13.0	11.0	11.0	15.0	16.0	14.0	26.0	12.0	16.0	14.0	15.0	16.0	18.0	14.0	21.0	14.0	9.0
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	<0.5	<0.5	<0.5	1.00	1.00	-	-	-	<0.5	1.00	<0.5	1.00	1.00	-	-	-	<0.5
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	20.0	30.0	22.0	18.0	17.0	29.0	14.0	23.0	8.0	7.0	9.0	10.0	10.0	10.0	13.0	10.0	8.0
Cyanides																	
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																	
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																	
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.0020	0.0030	0.0023	0.0012	0.0012	-	-	-	0.0008	0.0014	0.0012	0.0014	0.0009	-	-	-	0.0008
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	0.0002	0.0005	0.0003	<0.0002	0.0002	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	<0.0002
Calcium (Ca)-Total	11.9	14.6	10.6	11.9	0.0	-	-	-	6.8	8.4	8.1	9.8	10.3	-	-	-	6.8
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	0.005	0.010	0.007	0.003	0.004	<0.01	0.010	0.020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	0.010	0.010	<0.001
Iron (Fe)-Total	0.74	1.00	0.42	0.22	0.24	0.03	0.14	0.85	0.10	0.08	0.06	0.21	0.08	0.03	0.08	0.08	0.10
Lead (Pb)-Total	0.0030	0.0040	-	0.0020	0.0020	-	-	-	<0.001	0.0020	0.0020	0.0030	0.0020	-	-	-	<0.001
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	0.44	0.55	0.46	0.47	0.48	-	-	-	0.28	0.26	0.27	0.33	0.34	-	-	-	0.28
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	<0.0001
Molybdenum (Mo)-Total	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	<0.001	<0.001	<0.001	0.0020	<0.001	-	-	-	<0.001
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999
Station Type	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Stream**	**Lake**
Sample ID	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ 2**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**BJ U/S**	**Brucejack Lake**
Historical Sample ID (Newhawk 1989)	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 3**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Site 2**	**Brucejack Lake**
Date Sampled	**12-Jul-99**	**4-Aug-99**	**19-Aug-99**	**2-Sep-99**	**14-Sep-99**	**11-Aug-99 Eskay**	**25-Aug-99 Eskay**	**29-Jul-99 Eskay**	**12-Jul-99**	**4-Aug-99**	**19-Aug-99**	**2-Sep-99**	**14-Sep-99**	**11-Aug-99 Eskay**	**25-Aug-99 Eskay**	**29-Jul-99 Eskay**	**12-Jul-99**
Included/Excluded	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**	**Excluded**
Total Metals *(cont'd)*																	
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	<0.0001	0.0005	0.0005	0.0005	0.0004	-	-	-	<0.0001	0.0002	0.0003	0.0004	0.0004	-	-	-	<0.0001
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	0.0290	0.0490	0.0360	0.0250	0.0250	0.0700	0.0100	0.0400	<0.0050	<0.0050	<0.0050	<0.0050	0.0090	<0.0100	0.0100	0.0100	<0.0050
Dissolved Metals																	
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	0.0003	0.0005	0.0004	0.0004	0.0007	-	-	-	0.0003	0.0008	0.0007	0.0005	0.0040	-	-	-	0.0003
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	0.0002	0.0005	0.0001	<0.0002	0.0005	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	<0.00020
Calcium (Ca)-Dissolved	11.9	14.7	10.4	11.4	12.0	-	-	-	6.6	8.3	8.1	9.7	10.3	-	-	-	6.6
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	0.0030	0.0050	0.0030	0.0010	0.0020	<0.01	<0.01	0.0100	<0.001	<0.001	<0.001	<0.001	0.0010	<0.01	<0.01	0.0100	<0.0010
Iron (Fe)-Dissolved	0.15	0.32	0.09	0.06	0.15	0.01	0.05	0.17	<0.03	<0.03	<0.03	<0.03	<0.03	0.01	0.03	0.03	<0.03
Lead (Pb)-Dissolved	<0.001	<0.001	<0.001	<0.001	0.0010	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	<0.0010
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	0.41	0.53	0.45	0.44	0.46	-	-	-	0.25	0.26	0.28	0.29	0.31	-	-	-	0.25
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	<0.001	<0.001	<0.001	<0.001	0.002	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	<0.0010
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	<0.0010
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	0.0300	0.0480	0.0320	0.0220	0.0250	0.0700	0.0500	0.0400	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	0.0100	<0.0050

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A4-1. 1987-2001: Brucejack Watershed

Year	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	2000	2000	2000	2000	2000
Station Type	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Stream	Stream	Stream	Stream	Effluent	Effluent	Effluent	Stream	Stream
Sample ID	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Adit	Adit	Adit	BJ 2	BJ 2
Historical Sample ID (Newhawk 1989)	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Site 6	Site 6	Site 6	Site 6	Site 1	Site 1	Site 1	Site 3	Site 3
Date Sampled	4-Aug-99	19-Aug-99	2-Sep-99	14-Sep-99	29-Jul-99 Eskay	11-Aug-99	25-Aug-99	12-Jul-99	4-Aug-99	2-Sep-99	14-Sep-99	12-Aug-00	20-Sep-00	12-Aug-00 Dup	12-Aug-00	20-Sep-00
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included
Physical Tests																
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	50.0	51.0	68.0	69.0	47.0	52.0	53.0	80.0	54.0	159	177	369	375	370	78.0	82.0
Hardness (as $CaCO_3$)	26.0	22.0	28.0	29.0	-	-	-	29.0	19.0	64.0	69.0	115	136	104	29.0	33.0
pH	6.80	7.00	7.90	7.70	7.10	7.60	7.40	6.60	5.80	5.30	5.60	6.80	7.40	6.80	7.00	7.60
Total Suspended Solids	<3	<3	<3	4.0	8.0	2.0	2.0	5.0	13.0	3.0	<3	<3	<3	<3	8.0	4.0
Total Dissolved Solids	35.0	29.0	34.0	38.0	-	-	-	56.0	38.0	99.0	106	214	231	185	38.0	64.0
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	17.0	16.0	16.0	18.0	15.0	14.0	23.0	1.0	<1	2.0	2.0	70.0	71.0	67.0	15.0	19.0
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	<0.5	<0.5	1.00	2.00	-	-	-	<0.5	<0.5	1.00	2.00	<0.5	1.00	<0.5	<0.5	1.00
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	9.0	8.0	11.0	12.0	10.0	12.0	9.0	31.0	19.0	66.0	73.0	111	113	109	19.0	18.0
Cyanides																
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.0014	0.0014	0.0010	0.0009	-	-	-	0.0002	0.0007	0.0001	<0.0001	0.0090	0.0121	0.0094	0.0017	0.0019
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	0.0002	0.0002	0.0006	0.0006	0.0002	0.0003	0.0003	<0.0002	<0.0002
Calcium (Ca)-Total	8.4	8.5	10.8	11.3	-	-	-	10.7	7.2	22.9	25.9	37.1	48.7	40.0	10.6	12.0
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	<0.001	<0.001	<0.001	<0.001	<0.010	<0.010	0.020	0.090	0.003	0.007	0.005	0.002	0.002	0.002	0.002	0.002
Iron (Fe)-Total	0.07	0.08	0.10	0.11	0.08	0.04	0.07	0.19	0.33	0.19	0.11	0.20	0.40	0.20	0.22	0.24
Lead (Pb)-Total	0.002	0.002	0.002	0.002	-	-	-	0.007000	<0.001	<0.001	<0.001	0.0060	0.0080	0.0070	<0.001	<0.001
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	0.27	0.29	0.35	0.35	-	-	-	2.55	0.37	1.26	1.36	3.71	4.64	3.94	0.45	0.57
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum (Mo)-Total	<0.001	<0.001	<0.001	<0.001	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	<0.001	<0.001	<0.001
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	2000	2000	2000	2000	2000
Station Type	Lake	Lake	Lake	Lake	Lake	Lake	Lake	Stream	Stream	Stream	Stream	Effluent	Effluent	Effluent	Stream	Stream
Sample ID	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Camp Creek	Camp Creek	Camp Creek	Camp Creek	Adit	Adit	Adit	BJ 2	BJ 2
Historical Sample ID (Newhawk 1989)	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Brucejack Lake	Site 6	Site 6	Site 6	Site 6	Site 1	Site 1	Site 1	Site 3	Site 3
Date Sampled	4-Aug-99	19-Aug-99	2-Sep-99	14-Sep-99	29-Jul-99 Eskay	11-Aug-99	25-Aug-99	12-Jul-99	4-Aug-99	2-Sep-99	14-Sep-99	12-Aug-00	20-Sep-00	12-Aug-00 Dup	12-Aug-00	20-Sep-00
Included/Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included
Total Metals *(cont'd)*																
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	0.00030	0.00020	0.00040	0.00040	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	0.0050	<0.0050	0.0060	0.0090	<0.0100	<0.0100	0.0100	0.4810	0.0150	0.0520	0.0470	0.0400	0.0500	0.0420	0.0160	0.0160
Dissolved Metals																
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	0.0009	0.0007	0.0004	0.0004	-	-	-	<0.0001	0.0005	0.0001	<0.0001	0.0024	0.0027	0.0026	0.0010	0.0014
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	<0.00020	<0.00020	<0.00020	0.0	-	-	-	0.0052	0.0002	0.0007	0.0007	<0.0002	0.0003	0.0003	0.0002	0.0002
Calcium (Ca)-Dissolved	9.8	8.4	10.6	11.2	-	-	-	56.0	73.6	23.4	25.4	39.5	47.2	35.9	10.8	12.1
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.010	<0.010	<0.010	0.090	0.003	0.007	0.005	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)-Dissolved	<0.03	<0.03	<0.03	<0.03	0.04	0.02	0.02	0.03	0.23	0.13	0.06	<0.03	<0.03	<0.03	<0.03	0.05
Lead (Pb)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	0.004	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	0.260	0.280	0.340	0.340	-	-	-	2.74	0.360	1.28	1.33	3.89	4.54	3.59	0.420	0.570
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	<0.0050	<0.0050	<0.0050	0.00600	<0.010	<0.010	<0.010	0.517000	0.017000	0.060000	0.048000	0.0400	0.0710	0.0550	0.0190	0.0290

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Table A4-1. 1987-2001: Brucejack Watershed

Year	2000	2000	2000	2000	2000	2000	2000	2001	2001	2001	2001	2001	2001
Station Type	Stream	Stream	Lake	Lake	Lake	Stream	Stream	Effluent	Effluent	Stream	Stream	Lake	Stream
Sample ID	BJ U/S	BJ U/S	Brucejack Lake	Brucejack Lake	Brucejack Lake	Camp Creek	Camp Creek	Adit	Adit	BJ 2	BJ U/S	Brucejack Lake	Camp Creek
Historical Sample ID (Newhawk 1989)	Site 2	Site 2	Brucejack Lake	Brucejack Lake	Brucejack Lake	Site 6	Site 6	Site 1	Site 1	Site 3	Site 2	Brucejack Lake	Site 6
Date Sampled	12-Aug-00	20-Sep-00	12-Aug-00	20-Sep-00	00-Sep-20	12-Aug-00	20-Sep-00	8-Sep-01	08-Sep-01 Dup	8-Sep-01	8-Sep-01	8-Sep-01	8-Sep-01
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Excluded	Excluded	Included	Included	Included	Included
Physical Tests													
Colour, True	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (uS/cm)	60.0	63.0	65.0	120	149	81.0	144	352	354	86	60.0	65.0	146
Hardness (as $CaCO_3$)	24.0	24.0	26.0	84.0	88.0	18.0	55.0	136.0	134.0	35.0	25.0	29.0	57.0
pH	6.40	7.30	7.60	7.80	8.00	6.20	6.00	7.90	8.00	7.70	7.80	7.50	6.20
Total Suspended Solids	<3	<3	4.0	15.0	12.0	3.0	<3	<3	<3	<3	<3	<3	<3
Total Dissolved Solids	34.0	54.0	40.0	94.0	123.0	48.0	105	212	220	46.0	30.0	34.0	88.0
Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients													
Acidity (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	16.0	17.0	18.0	27.0	34.0	2.0	1.0	64.0	66.0	16.0	17.0	18.0	1.0
Ammonia, Total (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	<0.5	1.00	<0.5	1.00	1.00	<0.5	1.00	1.00	1.00	1.00	<0.5	<0.5	1.00
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO_4)	10.0	10.0	12.0	23.0	33.0	30.0	60.0	109.0	108	22.0	11.0	12.0	59.0
Cyanides													
Cyanide, Weak Acid Diss	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon													
Total Organic Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals													
Aluminum (Al)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	0.0016	0.0017	0.0017	0.0010	0.0010	0.0001	<0.0001	0.0070	0.0070	<0.001	<0.001	<0.001	<0.0001
Barium (Ba)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	0.0004	0.0003	0.0003	0.0002	<0.0002	<0.0002	0.0005
Calcium (Ca)-Total	8.6	9.2	9.6	34.1	35.3	3.7	20.3	45.4	45.7	12.9	9.7	10.9	21.0
Chromium (Cr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.004	0.002	0.003	0.003	<0.001	<0.001	0.008
Iron (Fe)-Total	0.170	0.200	0.180	0.190	0.180	0.060	0.070	0.200	0.200	0.150	0.060	0.050	0.270
Lead (Pb)-Total	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0090	0.0090	<0.001	<0.001	<0.001	<0.001
Lithium (Li)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	0.280	0.350	0.300	0.770	0.780	0.190	1.03	4.10	4.20	0.600	0.300	0.300	1.100
Manganese (Mn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	<0.00001	<0.00001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum (Mo)-Total	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0010	0.0010	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A4-1. 1987-2001: Brucejack Watershed

Year	2000	2000	2000	2000	2000	2000	2000	2001	2001	2001	2001	2001	2001
Station Type	Stream	Stream	Lake	Lake	Lake	Stream	Stream	Effluent	Effluent	Stream	Stream	Lake	Stream
Sample ID	BJ U/S	BJ U/S	Brucejack Lake	Brucejack Lake	Brucejack Lake	Camp Creek	Camp Creek	Adit	Adit	BJ 2	BJ U/S	Brucejack Lake	Camp Creek
Historical Sample ID (Newhawk 1989)	Site 2	Site 2	Brucejack Lake	Brucejack Lake	Brucejack Lake	Site 6	Site 6	Site 1	Site 1	Site 3	Site 2	Brucejack Lake	Site 6
Date Sampled	12-Aug-00	20-Sep-00	12-Aug-00	20-Sep-00	00-Sep-20	12-Aug-00	20-Sep-00	8-Sep-01	08-Sep-01 Dup	8-Sep-01	8-Sep-01	8-Sep-01	8-Sep-01
Included/Excluded	Included	Included	Included	Included	Included	Included	Included	Excluded	Excluded	Included	Included	Included	Included
Total Metals *(cont'd)*													
Potassium (K)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0150	0.0390	<0.05	<0.05	<0.05	<0.05	<0.050	0.0500
Dissolved Metals													
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	0.0011	0.0013	0.0011	0.0008	0.0010	0.0005	0.0004	0.0020	0.0020	<0.001	<0.001	<0.001	<0.01
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0004	0.0006	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	0.0005
Calcium (Ca)-Dissolved	9.2	9.2	9.8	32.6	34.0	6.5	20.4	47.5	46.7	13.0	9.6	10.9	20.9
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.001	<0.001	0.003	<0.001	<0.001	0.007
Iron (Fe)-Dissolved	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	0.04	<0.03	<0.03	0.09
Lead (Pb)-Dissolved	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.001
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	0.27	0.31	0.27	0.71	0.72	0.30	1.05	4.40	4.30	0.60	0.30	0.30	1.10
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum (Mo)-Dissolved	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.0001	<0.0001	<0.0010	<0.0010	<0.0010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0010	<0.001
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-		-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	0.006	0.021	0.00700	<0.0050	0.01700	0.028	0.060	<0.05	<0.05	<0.05	<0.05	<0.05	0.06

Notes:

All units in mg/L, unless otherwise noted

- paramater not measured

Historical and recent mining and mineral exploration activities have affected lake and stream water quality within the Brucejack Watershed. Although data from the entire period of water equality monitoring (1987-2013) are included in this report, only those data determined to best characterize background conditions have been used for the calculation of means and related statistics and as a basis for describing baseline or background conditions.

Appendix 5

Annual Water Quality CCME and BC Exceedances of Brucejack Gold Mine Project Area Lakes and Streams, 2008-2013

Table A5-1. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2008

Table A5-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2009

Table A5-3. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2010

Table A5-4. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2011

Table A5-5. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2012

Table A5-6. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2013

Table A5-7. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary Project Infrastructure, Brucejack Project, 2010

Table A5-8. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary Project Infrastructure, Brucejack Project, 2011

Table A5-9. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary Project Infrastructure, Brucejack Project, 2012

Table A5-10. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary Project Infrastructure, Brucejack Project, 2013

Table A5-1. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2008

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate								Nitrite				Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME				BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
SUL	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Eutrophic
SC1	12	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
SC2	13	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.1	46%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Oligotrophic - Hyper-eutrophic
SC3	4	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.0	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Mesotrophic - Hyper-eutrophic
UR1A	3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic
UR1	9	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Mesotrophic - Hyper-eutrophic
UR2	3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Oligotrophic - Eutrophic

Parameter	Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline	CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
	0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
SUL	–	0%	–	–	–	–	1.0	100%	–	0%	23.0	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.5	100%	4.5	100%	–	0%	–	0%
SC1	–	–	–	0%	–	0%	1.3	45%	–	0%	35.5	83%	–	0%	2.0	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	5.4	83%	5.4	83%	1.1	8%	–	0%
SC2	–	–	–	0%	–	0%	2.3	23%	2.1	8%	46.1	100%	–	0%	5.2	46%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	62.8	100%	62.8	100%	2.0	46%	–	0%
SC3	–	–	–	0%	–	0%	4.3	25%	2.2	25%	46.8	100%	–	0%	6.8	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	99.1	100%	99.1	100%	2.4	50%	–	0%
UR1A	–	–	–	0%	–	0%	–	0%	–	0%	11.5	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.4	100%	2.4	100%	–	0%	–	0%
UR1	–	–	–	0%	–	0%	1.3	33%	–	0%	27.9	100%	–	0%	3.0	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	34.9	100%	34.9	100%	1.6	22%	–	0%
UR2	–	–	–	0%	–	0%	1.2	67%	–	0%	15.1	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	12.5	100%	12.5	100%	–	0%	–	0%

Parameter	Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline	CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
	Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
SUL	–	0%	1.7	100%	4.5	100%	1.4	100%	4.5	100%	–	0%	2.4	100%	8.0	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC1	–	0%	3.0	67%	7.1	83%	3.0	58%	8.0	100%	–	0%	4.0	83%	13.4	83%	3.2	17%	2.4	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC2	1.1	15%	4.3	85%	46.6	100%	15.9	100%	73.3	100%	6.1	8%	10.4	100%	34.6	100%	1.6	23%	1.4	15%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC3	1.1	25%	5.1	75%	72.9	100%	24.0	100%	105.6	100%	5.3	25%	15.4	75%	39.1	100%	1.5	25%	1.2	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1A	–	0%	1.9	67%	1.5	67%	–	0%	1.7	67%	–	0%	1.5	67%	5.0	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1	1.3	11%	5.3	67%	29.7	100%	9.6	100%	38.9	100%	–	0%	5.6	100%	18.6	100%	1.6	22%	1.5	11%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR2	–	0%	2.0	67%	12.0	100%	3.6	100%	12.8	100%	–	0%	2.2	67%	7.3	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Parameter	Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline	BC				CCME		BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
	30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
SUL	–	0%	–	0%	2.6	100%	–	0%	–	0%	2.6	100%	1.3	100%	1.3	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.5	100%	–	0%	–	0%
SC1	1.8	25%	–	0%	4.4	67%	–	0%	–	0%	2.9	33%	1.6	25%	1.6	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.9	50%	1.2	17%	1.3	17%
SC2	2.2	31%	–	0%	3.4	85%	1.4	31%	1.8	92%	3.9	38%	2.2	31%	2.0	46%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	11.1	100%	3.0	100%	5.0	100%
SC3	2.4	50%	–	0%	4.8	75%	1.6	50%	2.6	75%	3.8	75%	2.4	50%	2.4	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	21.4	100%	6.4	75%	5.8	100%
UR1A	–	0%	–	0%	1.1	67%	–	0%	–	0%	1.6	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1	2.2	11%	–	0%	3.8	56%	–	0%	1.5	33%	2.5	33%	1.6	22%	1.4	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.0	100%	1.9	78%	2.2	100%
UR2	–	0%	–	0%	1.7	67%	–	0%	–	0%	1.8	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.4	100%	–	0%	–	0%

Notes: All units in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2009

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate								Nitrite						Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME				BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
BJ	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–
BJ U/S	2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–
Camp Creek	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–
BJ OF	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–
SUL	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic
SC1	9	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
SC2	16	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.3	44%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Meso-eutrophic - Hyper-eutrophic
SC3	6	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.0	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
UR1A	6	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
UR1	4	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Mesotrophic - Hyper-eutrophic
UR2	14	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic

Parameter		Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline		CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
		0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site		Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ		–	–	–	–	–	–	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	0%	–	0%
BJ U/S		–	–	–	–	–	–	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	0%	–	0%
Camp Creek		–	–	–	–	–	–	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ OF		–	–	–	–	–	–	–	0%	–	0%	–	0%	–	0%	1.3	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	5.1	100%	5.1	100%	–	0%	–	0%
SUL		–	0%	–	–	–	–	2.0	100%	1.0	100%	14.6	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.5	100%	4.5	100%	–	0%	–	0%
SC1		–	–	–	0%	–	0%	2.9	56%	2.6	22%	22.8	89%	–	0%	1.4	44%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	5.8	100%	5.8	100%	–	0%	–	0%
SC2		–	–	–	0%	–	0%	1.2	25%	–	0%	37.5	100%	–	0%	3.3	56%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	65.4	100%	65.4	100%	1.6	50%	–	0%
SC3		–	–	–	0%	–	0%	1.1	33%	–	0%	18.1	83%	–	0%	1.1	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	33.5	100%	33.5	100%	–	0%	–	0%
UR1A		–	–	–	0%	–	0%	1.6	17%	–	0%	15.9	83%	–	0%	1.7	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.1	83%	3.1	83%	–	0%	–	0%
UR1		–	–	–	0%	–	0%	1.0	25%	–	0%	15.3	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	24.8	100%	24.8	100%	–	0%	–	0%
UR2		–	–	–	0%	–	0%	3.4	71%	4.2	21%	36.9	86%	–	0%	1.2	21%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	16.5	100%	16.5	100%	1.1	7%	–	0%

Notes: All units in mg/L unless otherwise noted.

(contined)

(contined)

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-2. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2009 (completed)

Parameter	Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline	CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
	Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
Camp Creek	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ OF	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.3	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SUL	–	0%	–	0%	5.3	100%	2.0	100%	5.3	100%	–	0%	1.6	100%	5.2	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC1	–	0%	2.8	44%	5.7	100%	2.9	67%	6.7	100%	–	0%	3.9	56%	13.2	56%	1.1	11%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC2	–	0%	4.7	63%	49.6	100%	17.0	100%	76.2	100%	–	0%	7.9	100%	26.2	100%	1.1	6%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC3	–	0%	2.5	33%	27.1	100%	9.5	100%	43.6	100%	–	0%	3.7	83%	12.2	83%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1A	1.3	17%	3.7	67%	6.2	17%	1.9	17%	3.9	33%	–	0%	4.7	33%	7.3	83%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1	–	0%	3.0	50%	21.7	100%	7.1	100%	28.7	100%	–	0%	3.4	75%	9.0	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR2	1.0	14%	5.2	86%	15.8	100%	5.8	86%	16.5	100%	10.0	7%	5.0	86%	16.7	86%	1.6	7%	1.2	7%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Parameter	Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline	BC				CCME		BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
	30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
Camp Creek	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ OF	–	0%	–	0%	3.3	100%	–	0%	–	0%	2.10	100%	1.05	100%	1.05	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.37	100%	–	0%	–	0%
SUL	–	0%	–	0%	2.2	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.11	100%	–	0%	–	0%
SC1	1.3	33%	–	0%	4.9	44%	–	0%	–	0%	1.79	38%	1.03	11%	1.03	11%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.92	44%	–	0%	–	0%
SC2	1.5	50%	–	0%	4.3	63%	1.3	50%	2.1	88%	2.79	53%	1.48	44%	1.43	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	12.56	94%	3.56	88%	5.00	100%
SC3	1.1	17%	–	0%	3.2	33%	1.3	33%	2.2	67%	1.98	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	5.73	83%	2.51	50%	3.55	83%
UR1A	–	0%	–	0%	4.4	17%	–	0%	–	0%	1.50	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.17	17%	–	0%	–	0%
UR1	–	0%	–	0%	2.6	50%	–	0%	1.5	50%	1.38	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.93	75%	1.38	75%	1.77	100%
UR2	1.1	14%	–	0%	3.0	86%	–	0%	–	0%	1.50	43%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.24	86%	1.42	29%	1.40	43%

Notes: All units in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-3. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2010

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate								Nitrite						Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME				BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
BJ	5	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic
Camp Creek	1	1.0	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Mesotrophic
BJ OF	5	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic
SC1	12	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
SC2	15	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.3	47%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Meso-eutrophic - Hyper-eutrophic
SC3	12	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.3	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Mesotrophic - Hyper-eutrophic
UR1A	12	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
UR1	12	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Oligotrophic - Hyper-eutrophic
UR2	4	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Meso-eutrophic - Eutrophic

Parameter	Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline	CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
	0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	0%	–	0%
Camp Creek	–	0%	–	0%	–	0%	–	0%	–	0%	176.2	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	20.0	100%	20.0	100%	–	0%	–	0%
BJ OF	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.4	100%	2.4	100%	–	0%	–	0%
SC1	–	–	–	0%	–	0%	1.7	33%	1.1	8%	18.9	50%	–	0%	1.2	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.2	92%	3.2	92%	–	0%	–	0%
SC2	–	–	–	0%	–	0%	1.4	33%	1.1	7%	23.4	100%	–	0%	3.8	40%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	42.3	100%	42.3	100%	1.4	33%	–	0%
SC3	–	–	–	0%	–	0%	1.6	42%	–	0%	22.2	100%	–	0%	2.9	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	41.0	100%	41.0	100%	1.2	25%	–	0%
UR1A	–	–	–	0%	–	0%	2.2	8%	1.1	8%	20.9	67%	–	0%	1.6	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.8	83%	3.8	83%	1.5	8%	–	0%
UR1	–	–	–	0%	–	0%	2.2	42%	2.6	8%	17.3	100%	–	0%	1.7	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	22.5	100%	22.5	100%	1.7	8%	–	0%
UR2	–	–	–	0%	–	0%	1.1	50%	–	0%	6.4	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	10.7	100%	10.7	100%	–	0%	–	0%

Parameter	Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline	CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
	Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
Camp Creek	–	0%	–	0%	2.0	100%	–	0%	2.0	100%	–	0%	1.1	100%	3.7	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ OF	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC1	–	0%	2.0	33%	3.6	83%	2.0	42%	4.4	92%	–	0%	2.8	33%	6.9	50%	1.3	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC2	–	0%	2.9	60%	30.9	93%	12.7	80%	48.9	93%	–	0%	6.0	100%	19.9	100%	1.5	13%	1.1	13%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC3	–	0%	3.4	50%	29.3	100%	10.3	100%	46.7	100%	–	0%	5.6	100%	18.8	100%	1.2	17%	1.0	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1A	1.8	8%	6.0	42%	4.8	42%	2.8	17%	4.3	50%	–	0%	4.2	50%	12.1	58%	1.9	17%	2.0	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1	1.8	8%	6.0	33%	17.5	100%	5.8	100%	24.7	100%	6.1	8%	4.1	83%	11.7	100%	1.7	17%	1.7	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR2	–	0%	1.4	25%	9.2	100%	2.9	100%	11.3	100%	–	0%	1.3	75%	4.1	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Parameter	Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline	BC				CCME		BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
	30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
Camp Creek	–	0%	–	0%	–	0%	–	0%	–	0%	2.6	100%	1.3	100%	1.3	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.4	100%	–	0%	–	0%
BJ OF	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC1	1.3	8%	–	0%	3.2	33%	–	0%	–	0%	1.3	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.6	33%	–	0%	–	0%
SC2	1.9	20%	–	0%	3.6	53%	1.3	47%	2.2	67%	2.8	27%	2.1	13%	2.1	13%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	5.9	93%	2.6	67%	4.6	80%
SC3	1.9	17%	–	0%	3.9	42%	1.4	17%	2.0	75%	2.9	33%	3.5	8%	3.5	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.1	92%	2.2	83%	3.7	100%
UR1A	1.5	8%	–	0%	4.4	25%	–	0%	–	0%	2.3	17%	1.5	8%	1.5	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.1	25%	1.2	8%	1.3	8%
UR1	1.4	17%	–	0%	3.6	42%	–	0%	1.2	50%	2.2	33%	2.0	8%	2.0	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.7	92%	1.4	75%	1.7	83%
UR2	–	0%	–	0%	1.3	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.3	100%	–	0%	–	0%

Notes: All units in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-4. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2011

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate								Nitrite						Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME				BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
BJ	4	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic
BJ U/S	9	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Oligotrophic
BJ2	6	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Meso-eutrophic
SC1	12	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic
SC2	10	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.3	60%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Eutrophic - Hyper-eutrophic
SC3	11	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.2	45%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Meso-eutrophic - Hyper-eutrophic
UR1A	12	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
UR1	11	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Oligotrophic - Hyper-eutrophic
UR2	3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Mesotrophic - Hyper-eutrophic

Parameter	Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline	CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
	0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	0%	–	0%
BJ U/S	–	–	–	–	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	0%	–	0%
BJ2	–	0%	–	0%	–	0%	1.2	17%	–	0%	2.7	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.5	100%	6.5	100%	–	0%	–	0%
SC1	–	–	–	0%	–	0%	1.6	25%	–	0%	21.9	42%	–	0%	1.3	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.8	75%	3.8	75%	–	0%	–	0%
SC2	–	0%	–	0%	–	0%	1.1	30%	–	0%	27.2	100%	–	0%	2.3	60%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	47.5	100%	47.5	100%	1.4	30%	–	0%
SC3	–	–	–	0%	–	0%	1.4	45%	–	0%	33.0	100%	–	0%	2.5	45%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	39.2	100%	39.2	100%	2.5	18%	–	0%
UR1A	–	–	–	0%	–	0%	1.6	25%	1.1	8%	38.1	50%	–	0%	4.0	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.0	50%	6.0	50%	2.8	8%	–	0%
UR1	–	0%	–	0%	–	0%	1.7	50%	1.6	8%	29.7	83%	–	0%	3.5	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	23.2	100%	23.2	100%	3.4	17%	–	0%
UR2	–	–	–	0%	–	0%	1.7	67%	–	0%	120.2	67%	–	0%	3.5	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	20.5	100%	20.5	100%	3.9	33%	–	0%

Parameter	Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline	CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
	Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S	–	0%	–	–	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.6	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC1	–	0%	1.8	33%	4.3	58%	1.8	42%	4.2	83%	–	0%	2.3	42%	7.8	42%	1.2	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC2	1.2	10%	3.9	50%	38.6	100%	13.3	100%	61.5	100%	–	0%	6.6	100%	21.9	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC3	2.7	9%	6.7	45%	31.4	100%	10.7	100%	48.1	100%	–	0%	7.2	100%	23.9	100%	–	0%	–	0%	–	0%	1.1	9%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1A	3.3	8%	7.9	42%	7.2	33%	4.0	17%	7.4	33%	–	0%	7.5	33%	17.3	50%	3.4	8%	2.6	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.1	8%	1.1	8%
UR1	3.2	17%	11.4	50%	19.4	100%	6.3	100%	25.3	100%	1.6	8%	10.3	67%	23.7	100%	3.9	17%	3.0	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.1	17%	1.1	17%
UR2	3.9	33%	18.3	67%	21.7	100%	6.7	100%	22.5	100%	–	0%	17.5	67%	39.2	100%	4.8	50%	3.7	50%	–	0%	1.0	33%	–	0%	–	0%	–	0%	–	0%	1.2	33%	1.2	33%

Parameter	Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline	BC				CCME		BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
	30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	1.7	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S	–	0%	–	0%	–	0%	–	0%	–	–	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ2	–	0%	–	0%	1.6	17%	–	0%	–	0%	1.9	50%	1.3	17%	1.3	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.2	17%	–	0%	–	0%
SC1	–	0%	–	0%	2.4	33%	–	0%	–	0%	1.2	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.6	42%	–	0%	–	0%
SC2	1.4	10%	–	0%	2.7	40%	1.1	60%	2.0	90%	2.5	30%	2.2	10%	2.2	10%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	8.2	90%	2.7	80%	4.4	100%
SC3	2.9	9%	–	0%	3.7	36%	1.1	36%	1.9	82%	6.3	18%	5.5	9%	5.5	9%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.1	91%	2.7	64%	3.6	100%
UR1A	2.2	8%	–	0%	4.4	25%	–	0%	–	0%	5.1	8%	2.5	8%	2.5	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.0	17%	2.4	8%	2.6	8%
UR1	2.7	17%	–	0%	6.6	42%	–	0%	1.3	75%	5.8	25%	4.1	17%	4.1	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.4	67%	1.8	67%	1.9	92%
UR2	4.2	33%	–	0%	10.2	67%	–	0%	1.1	33%	6.4	33%	3.2	33%	3.2	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.3	100%	3.4	33%	3.7	33%

Notes: All units in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-5. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2012

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate								Nitrite						Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME				BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
BJ	5	1	20%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic
BJ U/S	8	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Mesotrophic
BJ U/S of CC	11	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Meso-eutrophic
Camp Creek	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.7	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic
BJ OF	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Eutrophic
BJ 200m D/S	4	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Meso-eutrophic
BJ2	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic
SC0	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Oligotrophic
SUL	6	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Mesotrophic - Hyper-eutrophic
SC1	11	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic
SC2	11	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.5	73%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Eutrophic - Hyper-eutrophic
SC3	10	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.3	80%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Oligotrophic - Hyper-eutrophic
UR1A	10	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
UR1	11	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Oligotrophic - Hyper-eutrophic
UR2	4	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic

Parameter	Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline	CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
	0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	0%	–	0%
BJ U/S	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S of CC	–	0%	–	0%	–	0%	–	0%	–	0%	5.0	18%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.2	75%	4.2	75%	–	0%	–	0%
Camp Creek	–	0%	–	0%	–	0%	–	0%	–	0%	1.5	100%	–	0%	2.1	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ OF	–	0%	–	0%	–	0%	–	0%	–	0%	2.5	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.4	100%	4.4	100%	–	0%	–	0%
BJ 200m D/S	–	0%	–	0%	–	0%	–	0%	–	0%	2.2	75%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.0	100%	4.0	100%	–	0%	–	0%
BJ2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.7	100%	4.7	100%	–	0%	–	0%
SC0	–	0%	–	0%	–	0%	1.4	100%	–	0%	6.4	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.3	100%	2.3	100%	–	0%	–	0%
SUL	–	0%	–	–	–	–	2.1	100%	2.8	17%	23.4	100%	–	0%	1.3	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	5.9	100%	5.9	100%	–	0%	–	0%
SC1	–	–	–	0%	–	0%	2.5	27%	2.6	9%	15.6	55%	–	0%	1.0	9%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.7	73%	2.7	73%	–	0%	–	0%
SC2	–	–	–	0%	–	0%	1.4	27%	–	0%	20.2	100%	–	0%	3.7	73%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	56.1	100%	56.1	100%	1.5	27%	–	0%
SC3	–	–	–	0%	–	0%	1.2	60%	–	0%	19.8	100%	–	0%	4.1	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	47.8	100%	47.8	100%	1.5	20%	–	0%
UR1A	–	–	–	0%	–	0%	2.9	30%	1.4	30%	14.9	60%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.7	60%	3.7	60%	–	0%	–	0%
UR1	–	–	–	0%	–	0%	1.2	27%	–	0%	17.7	91%	–	0%	1.8	45%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	25.8	100%	25.8	100%	1.1	9%	–	0%
UR2	–	–	–	0%	–	0%	1.4	50%	–	0%	17.9	75%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	10.3	100%	10.3	100%	–	0%	–	0%

Notes: All units in mg/L unless otherwise noted.

(continued)

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-5. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2012 (completed)

Parameter	Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline	CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
	Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S	–	0%	–	0%	2.1	13%	–	0%	2.1	13%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S of CC	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.9	9%	6.3	9%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
Camp Creek	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.6	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ OF	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.6	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ 200m D/S	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.4	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC0	–	0%	–	0%	–	0%	–	0%	1.1	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SUL	–	0%	1.9	67%	6.7	100%	2.3	100%	7.7	100%	–	0%	2.9	83%	8.4	100%	1.3	50%	1.0	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC1	–	0%	1.6	27%	3.3	64%	1.6	27%	3.2	100%	–	0%	2.4	27%	5.2	55%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC2	–	0%	2.4	55%	38.9	100%	13.5	100%	62.9	100%	–	0%	6.6	100%	22.0	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC3	–	0%	3.0	50%	34.3	100%	11.9	100%	54.9	100%	–	0%	5.9	100%	19.5	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1A	–	0%	4.0	40%	2.7	40%	1.0	10%	2.7	40%	–	0%	3.1	40%	7.4	60%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1	–	0%	4.2	45%	21.7	100%	7.7	91%	29.1	100%	–	0%	5.1	64%	11.6	100%	1.3	9%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR2	–	0%	3.8	50%	10.7	100%	4.3	75%	11.8	100%	–	0%	4.3	50%	9.9	75%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Parameter	Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline	BC				CCME		BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
	30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S of CC	–	0%	–	0%	1.3	9%	–	0%	–	0%	4.0	9%	2.0	9%	2.0	9%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.5	10%	–	0%	–	0%
Camp Creek	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.7	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ OF	–	0%	–	0%	2.2	100%	–	0%	–	0%	5.6	100%	2.8	100%	2.8	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	–	–	0%	–	0%
BJ 200m D/S	–	0%	–	0%	1.1	50%	–	0%	–	0%	2.0	50%	1.1	25%	1.1	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.4	25%	–	0%	–	0%
BJ2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC0	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SUL	1.4	17%	–	0%	3.5	67%	–	0%	–	0%	1.9	50%	1.3	17%	1.3	17%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.9	100%	–	0%	–	0%
SC1	–	0%	–	0%	2.3	27%	–	0%	–	0%	1.5	9%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.5	27%	–	0%	–	0%
SC2	1.1	18%	–	0%	2.7	45%	1.4	55%	2.6	73%	2.0	18%	1.1	9%	1.1	9%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.4	100%	2.7	100%	5.6	100%
SC3	1.2	20%	–	0%	2.9	40%	1.2	50%	2.2	80%	2.4	20%	1.5	10%	1.5	10%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.9	100%	2.8	80%	4.5	100%
UR1A	–	0%	–	0%	1.5	40%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.7	40%	–	0%	–	0%
UR1	–	0%	–	0%	2.6	36%	–	0%	1.3	55%	1.7	27%	1.2	9%	1.2	9%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.3	73%	2.3	45%	1.9	91%
UR2	–	0%	–	0%	2.6	50%	–	0%	–	0%	1.1	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.3	75%	1.2	25%	1.3	25%

Notes: All units in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-6. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2013

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate								Nitrite						Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME				BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
BJ U/S	13	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Mesotrophic
BJ U/S of CC	4	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Oligotrophic
Camp Creek	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Meso-eutrophic
BJ OF	7	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.2	29%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic
BJ 200m D/S	12	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.1	13%	–	0%	–	0%	–	0%	–	0%	2.6	53%	1.5	13%	1.5	13%	Oligotrophic - Eutrophic
BJ2	10	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.0	8%	–	0%	–	0%	–	0%	–	0%	2.4	62%	1.2	15%	1.2	15%	Ultra-oligotrophic - Hyper-eutrophic
BJ3	8	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.1	13%	–	0%	–	0%	–	0%	–	0%	1.9	13%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
SC0	13	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
SUL	7	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic
SC1	7	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
SC2	8	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.4	63%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Eutrophic - Hyper-eutrophic
SC3	7	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.3	71%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Meso-eutrophic - Hyper-eutrophic
UR1A	4	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic
UR1	5	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Oligotrophic - Hyper-eutrophic
UR2	7	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic

Parameter	Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline	CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
	0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ U/S	–	0%	–	0%	–	0%	–	0%	–	0%	3.4	54%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.4	50%	1.4	50%	–	0%	–	0%
BJ U/S of CC	–	0%	–	0%	–	0%	–	0%	–	0%	3.2	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.3	100%	1.3	100%	–	0%	–	0%
Camp Creek	–	0%	–	0%	–	0%	–	0%	–	0%	9.0	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	10.9	100%	10.9	100%	–	0%	–	0%
BJ OF	–	0%	–	0%	–	0%	–	0%	–	0%	6.5	71%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.3	67%	4.3	67%	–	0%	–	0%
BJ 200m D/S	–	0%	–	0%	–	0%	1.5	7%	–	0%	6.7	40%	–	0%	1.1	7%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.0	64%	3.0	64%	–	0%	–	0%
BJ2	–	0%	–	0%	–	0%	7.6	8%	3.8	8%	5.8	31%	–	0%	2.4	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	9.3	38%	9.3	38%	–	0%	–	0%
BJ3	–	0%	–	0%	–	0%	–	0%	–	0%	7.3	50%	–	0%	2.0	13%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.4	63%	7.4	63%	–	0%	–	0%
SC0	–	0%	–	0%	–	0%	2.6	69%	1.6	46%	41.3	100%	–	0%	3.5	69%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	15.1	85%	15.1	85%	1.3	31%	–	0%
SUL	–	0%	–	0%	–	0%	2.1	43%	1.3	29%	22.0	86%	–	0%	1.3	43%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.8	100%	6.8	100%	–	0%	–	0%
SC1	–	–	–	0%	–	0%	1.5	29%	–	0%	37.1	43%	–	0%	1.9	29%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.3	57%	7.3	57%	–	0%	–	0%
SC2	–	0%	–	0%	–	0%	1.3	63%	–	0%	38.0	100%	–	0%	3.1	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	49.3	100%	49.3	100%	1.5	50%	–	0%
SC3	–	–	–	0%	–	0%	1.6	43%	–	0%	22.4	100%	–	0%	6.2	29%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	50.5	100%	50.5	100%	1.4	29%	–	0%
UR1A	–	–	–	0%	–	0%	–	0%	–	0%	9.3	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.2	25%	4.2	25%	–	0%	–	0%
UR1	–	0%	–	0%	–	0%	1.3	60%	–	0%	9.8	100%	–	0%	2.1	20%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	22.2	100%	22.2	100%	–	0%	–	0%
UR2	–	–	–	0%	–	0%	3.9	29%	3.1	14%	23.2	29%	–	0%	1.2	14%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.9	100%	7.9	100%	–	0%	–	0%

Notes: All units in mg/L unless otherwise noted.

(continued)

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-6. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 2013 (completed)

Parameter	Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline	CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
	Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ U/S	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.9	23%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S of CC	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.1	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
Camp Creek	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.1	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ OF	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.3	57%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ 200m D/S	–	0%	–	0%	1.2	13%	–	0%	1.2	13%	–	0%	1.2	20%	3.6	27%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ2	–	0%	–	0%	1.6	15%	–	0%	1.6	15%	–	0%	2.9	8%	6.5	15%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ3	–	0%	–	0%	1.7	13%	–	0%	1.7	13%	–	0%	2.1	13%	3.9	38%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC0	–	0%	4.5	69%	14.1	69%	5.2	69%	14.1	77%	–	0%	8.5	77%	28.3	77%	2.6	38%	2.7	23%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SUL	–	0%	2.2	57%	8.7	100%	3.4	100%	10.4	100%	–	0%	2.7	71%	8.9	71%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC1	–	0%	2.4	43%	6.0	57%	2.8	43%	4.7	100%	–	0%	4.6	43%	15.2	43%	1.4	29%	1.3	14%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC2	–	0%	6.1	50%	34.0	100%	11.8	100%	46.9	100%	–	0%	7.9	100%	26.5	100%	1.1	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC3	–	0%	2.7	57%	35.7	100%	12.2	100%	54.2	100%	–	0%	6.1	100%	20.3	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1A	–	0%	1.8	25%	1.4	25%	–	0%	1.4	25%	–	0%	1.5	25%	4.8	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR1	–	0%	2.5	40%	14.1	100%	4.6	100%	17.8	100%	–	0%	4.6	40%	7.7	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
UR2	–	0%	2.8	29%	4.9	100%	4.2	29%	5.7	100%	–	0%	3.5	29%	11.7	29%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Parameter	Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline	BC				CCME		BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
	30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ U/S	–	0%	–	0%	–	0%	–	0%	–	0%	1.1	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BJ U/S of CC	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
Camp Creek	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.1	100%	–	0%	–	0%
BJ OF	–	0%	–	0%	1.6	43%	–	0%	–	0%	2.8	57%	1.6	43%	1.6	43%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.2	29%	–	0%	–	0%
BJ 200m D/S	–	0%	–	0%	2.8	20%	–	0%	–	0%	4.3	27%	2.6	20%	2.6	20%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.5	13%	–	0%	–	0%
BJ2	2.4	8%	–	0%	5.7	15%	–	0%	–	0%	7.7	23%	5.5	15%	5.5	15%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.5	15%	–	0%	–	0%
BJ3	1.9	13%	–	0%	3.5	38%	–	0%	–	0%	5.8	38%	4.0	25%	4.0	25%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.1	25%	–	0%	–	0%
SC0	2.2	69%	–	0%	8.4	69%	–	0%	–	0%	5.1	69%	2.6	69%	2.6	69%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	5.4	69%	1.6	38%	1.6	46%
SUL	–	0%	–	0%	3.1	71%	–	0%	–	0%	1.5	57%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.3	71%	–	0%	1.0	14%
SC1	1.4	29%	–	0%	4.2	43%	–	0%	–	0%	2.1	43%	1.3	29%	1.3	29%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.7	43%	–	0%	–	0%
SC2	2.1	38%	–	0%	7.2	50%	1.2	63%	2.4	63%	3.2	50%	1.9	38%	1.9	38%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	8.2	100%	2.5	88%	4.4	100%
SC3	–	0%	–	0%	2.9	57%	1.1	43%	2.1	71%	1.4	57%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	10.2	100%	3.4	71%	4.1	100%
UR1A	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.4	25%	–	0%	–	0%
UR1	–	0%	–	0%	2.3	40%	–	0%	1.4	60%	1.0	20%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	5.2	60%	2.3	20%	1.7	100%
UR2	–	0%	–	0%	1.7	29%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.7	29%	1.2	14%	1.3	14%

Notes: All units in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-7. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary Project Infrastructure, Brucejack Project, 2010

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate								Nitrite						Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME				BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
BR1	10	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Mesotrophic - Hyper-eutrophic
BR2	12	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
ST1	6	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Mesotrophic
ST2	7	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
TL1	2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Mesotrophic
TC1	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Hyper-eutrophic
TC2	11	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
TC3	9	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Oligotrophic - Hyper-eutrophic

Parameter	Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline	CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
	0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BR1	–	0%	–	0%	–	0%	5.3	50%	10.5	10%	49.9	100%	–	0%	1.4	20%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.1	100%	7.1	100%	1.3	20%	–	0%
BR2	–	0%	–	0%	–	0%	1.5	42%	–	0%	21.3	92%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	5.5	92%	5.5	92%	–	0%	–	0%
ST1	–	0%	–	0%	–	0%	–	0%	–	0%	2.0	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.0	33%	4.0	33%	–	0%	–	0%
ST2	–	0%	–	0%	–	0%	2.6	29%	1.3	29%	31.2	71%	–	0%	1.5	14%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	10.9	71%	10.9	71%	1.2	14%	–	0%
TL1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TC1	–	–	–	0%	–	0%	–	0%	–	0%	32.0	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.9	100%	6.9	100%	–	0%	–	0%
TC2	–	0%	–	0%	–	0%	9.0	27%	6.4	18%	34.3	91%	–	0%	1.4	36%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	23.6	100%	23.6	100%	–	0%	–	0%
TC3	–	0%	–	0%	–	0%	1.3	22%	–	0%	14.9	89%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	10.9	100%	10.9	100%	–	0%	–	0%

Parameter	Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline	CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
	Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BR1	1.5	30%	7.8	90%	5.1	80%	2.3	50%	5.2	90%	2.4	10%	6.3	100%	20.9	100%	1.2	20%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BR2	–	0%	2.4	67%	1.4	58%	–	0%	1.6	58%	–	0%	3.2	67%	9.8	75%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
ST1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.5	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
ST2	–	0%	3.8	43%	2.9	43%	1.6	14%	2.9	43%	–	0%	6.8	43%	17.4	57%	2.2	14%	1.7	14%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TL1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TC1	–	0%	1.2	100%	1.3	100%	–	0%	1.4	100%	–	0%	4.4	100%	14.5	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TC2	–	0%	4.5	55%	3.0	55%	1.3	18%	3.7	55%	2.5	9%	6.5	64%	19.1	73%	2.4	36%	1.8	36%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TC3	–	0%	2.8	33%	2.0	33%	–	0%	2.3	33%	–	0%	3.5	44%	6.0	100%	1.7	22%	1.3	22%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Parameter	Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline	BC				CCME		BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
	30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BR1	1.2	30%	–	0%	4.3	60%	–	0%	–	0%	1.8	60%	1.2	20%	1.2	20%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.1	80%	1.2	20%	1.3	20%
BR2	–	0%	–	0%	1.5	42%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.8	58%	–	0%	–	0%
ST1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
ST2	1.0	14%	–	0%	2.8	43%	–	0%	–	0%	2.6	14%	1.3	14%	1.3	14%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.6	43%	1.6	14%	1.8	14%
TL1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TC1	–	0%	–	0%	2.2	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.6	100%	–	0%	–	0%
TC2	–	0%	–	0%	2.5	55%	1.0	9%	1.5	73%	2.4	45%	1.3	36%	1.3	36%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.7	64%	2.3	45%	2.5	45%
TC3	–	0%	–	0%	1.9	22%	–	0%	–	0%	1.5	22%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.1	44%	1.1	33%	1.2	33%

Notes: All units in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-8. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary Project Infrastructure, Brucejack Project, 2011

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate								Nitrite						Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME				BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
BR1	5	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Oligotrophic
BR2	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic
ST1	4	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic
ST2	3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic
TC2	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic
TC3	2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Oligotrophic
WC5	1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Oligotrophic
WC1	11	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic

Parameter	Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline	CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
	0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BR1	–	0%	–	0%	–	0%	–	0%	–	0%	2.1	60%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	9.3	20%	9.3	20%	–	0%	–	0%
BR2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
ST1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
ST2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TC2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.5	100%	2.5	100%	–	0%	–	0%
TC3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.7	100%	1.7	100%	–	0%	–	0%
WC5	–	0%	–	0%	–	0%	1.5	100%	–	0%	3.4	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	0%	–	0%
WC1	–	0%	1.4	18%	–	0%	2.3	91%	1.4	55%	4.8	91%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.5	100%	2.5	100%	–	0%	–	0%

Parameter	Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline	CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
	Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BR1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.1	20%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BR2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
ST1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.4	75%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
ST2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TC2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TC3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.8	50%	3.7	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
WC5	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
WC1	–	0%	2.1	36%	1.3	18%	–	0%	1.3	18%	–	0%	–	0%	2.4	36%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Parameter	Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline	BC				CCME		BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
	30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BR1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BR2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
ST1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
ST2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TC2	–	0%	–	0%	–	0%	–	0%	1.5	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
TC3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
WC5	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
WC1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Notes: All units in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-9. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary Project Infrastructure, Brucejack Project, 2012

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate								Nitrite						Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME				BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
WC5	12	1.0	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic
WC1	12	1.0	8%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic

Parameter	Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline	CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
	0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
WC5	–	0%	–	0%	–	0%	2.0	75%	1.3	42%	10.7	83%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	4.1	50%	4.1	50%	–	0%	–	0%
WC1	–	0%	–	0%	–	0%	2.0	67%	1.2	33%	11.7	75%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	3.8	75%	3.8	75%	–	0%	–	0%

Parameter	Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline	CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
	Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
WC5	–	0%	1.8	58%	1.8	8%	1.3	8%	1.8	8%	–	0%	1.9	8%	2.5	58%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
WC1	–	0%	1.8	50%	1.3	17%	1.1	8%	1.3	17%	–	0%	1.5	8%	2.4	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Parameter	Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline	BC				CCME		BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
	30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
WC5	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.4	8%	–	0%	–	0%
WC1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.2	8%	–	0%	–	0%

Notes: All units in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Table A5-10. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Ancillary Project Infrastructure, Brucejack Project, 2013

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate								Nitrite						Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME				BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
KL IF	3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
KG OF	2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Mesotrophic - Hyper-eutrophic
KL	2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Hyper-eutrophic
KL OF	3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
BR	3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Hyper-eutrophic
WC5	2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Eutrophic
WC1	3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	Ultra-oligotrophic - Mesotrophic

Parameter	Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline	CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
	0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
KL IF	–	0%	–	0%	–	0%	3.3	67%	1.7	67%	74.3	100%	–	0%	2.4	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	26.6	67%	26.6	67%	1.7	67%	–	0%
KG OF	–	0%	–	0%	–	0%	3.0	100%	2.1	50%	92.5	100%	–	0%	2.5	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	16.9	50%	16.9	50%	3.0	50%	–	0%
KL	–	0%	–	0%	–	0%	5.3	100%	2.7	100%	114.5	100%	–	0%	1.9	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	23.7	100%	23.7	100%	1.5	100%	–	0%
KL OF	–	0%	–	0%	–	0%	3.1	67%	1.6	67%	66.5	100%	–	0%	1.9	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	21.9	67%	21.9	67%	1.5	67%	–	0%
BR	–	0%	–	0%	–	0%	3.8	67%	1.9	67%	69.0	100%	–	0%	1.8	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	21.8	67%	21.8	67%	1.5	67%	–	0%
WC5	–	0%	–	0%	–	0%	3.2	50%	1.6	50%	10.6	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.8	50%	1.8	50%	–	0%	–	0%
WC1	–	0%	–	0%	–	0%	1.2	33%	–	0%	9.4	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	1.4	100%	1.4	100%	–	0%	–	0%

Parameter	Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline	CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
	Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
KL IF	1.7	67%	14.9	67%	14.2	67%	5.7	67%	14.2	67%	–	0%	16.3	67%	54.3	67%	1.9	67%	1.5	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
KG OF	1.3	50%	12.0	50%	11.2	50%	3.4	50%	11.5	50%	–	0%	28.9	50%	49.5	100%	–	0%	–	0%	–	0%	1.1	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
KL	1.4	100%	12.1	100%	11.0	100%	5.0	100%	11.0	100%	–	0%	14.2	100%	47.3	100%	1.4	100%	1.1	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
KL OF	1.4	67%	12.2	67%	10.9	67%	4.4	67%	10.9	67%	–	0%	14.1	67%	47.0	67%	1.3	67%	1.1	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
BR	1.3	67%	11.9	67%	10.2	67%	4.3	67%	10.2	67%	–	0%	13.8	67%	46.0	67%	1.6	67%	1.4	33%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
WC5	–	0%	2.8	50%	1.4	50%	–	0%	1.4	50%	–	0%	1.3	50%	4.2	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
WC1	–	0%	2.4	67%	1.3	100%	–	0%	1.3	100%	–	0%	1.1	33%	3.3	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Parameter	Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline	BC				CCME		BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
	30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
KL IF	2.2	67%	–	0%	9.1	67%	–	0%	–	0%	3.4	67%	1.7	67%	1.7	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.3	67%	1.7	67%	1.8	67%
KG OF	2.7	50%	–	0%	12.8	50%	–	0%	–	0%	4.1	50%	2.1	50%	2.1	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	10.3	50%	2.3	50%	2.6	50%
KL	2.0	100%	–	0%	7.9	100%	–	0%	–	0%	3.2	100%	1.6	100%	1.6	100%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.7	100%	1.5	100%	1.7	100%
KL OF	1.9	67%	–	0%	7.6	67%	–	0%	–	0%	2.9	67%	1.4	67%	1.4	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.3	67%	1.4	67%	1.6	67%
BR	1.8	67%	–	0%	7.3	67%	–	0%	–	0%	2.8	67%	1.4	67%	1.4	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	6.2	67%	1.4	67%	1.6	67%
WC5	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
WC1	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Notes: All units in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Appendix 6

Historical Water Quality CCME and BC Exceedances of Brucejack Gold Mine Project Area Lakes and Streams, 1987-2001

Table A6-1. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 1987 to 2001

Table A6-1. Percentage of BC and CCME Guideline Exceedances and Average Factor of Exceedances in Water Quality Samples, Mine Site Area and Downstream Receiving Environment, Brucejack Project, 1988 to 2007

Parameter		pH		Chloride								Fluoride				Ammonia, Total		Nitrate						Nitrite						Total Phosphorus
Guideline		CCME = BC		BC				CCME				BC		CCME		CCME		BC				CCME		BC				CCME		CCME
		6.5 to 9.0		30-day 150		Maximum 600		Long-term 120		Short-term 640		Hardness Dependent		Hardness Dependent*		pH and Temperature Dependent		30-day 3		Maximum 32.8		Long-term 3		Short-term 124		30-day Chloride Dependent		Maximum Chloride Dependent		0.06		
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Trigger Ranges
BJ	14	–	0%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BJ U/S	22	1.0	5%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Camp Creek	18	1.1	72%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BJ2	24	1.0	8%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SC1	2	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–
SC3	3	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–

Parameter		Cyanide, Total		Cyanide, Weak Acid Diss.				Aluminum, Dissolved				Aluminum, Total		Antimony		Arsenic		Boron						Barium				Beryllium		Cadmium				Cobalt			
Guideline		CCME		BC				BC				CCME		BC		CCME = BC		BC		CCME				BC				BC		BC		CCME		BC			
		0.005		30-day 0.005		Maximum 0.01		30-day pH Dependent		Maximum pH Dependent		0.005 if pH < 6.5; 0.1 if pH ≥ 6.5		0.02*		0.005		1.2		Long-term 1.5		Short-term 29		30-day 1*		Maximum 5*		0.0053*		Hardness Dependent*		Hardness Dependent*		30-day 0.004		Maximum 0.11	
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	14	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BJ U/S	22	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.0	5%	–	–	–	–	–	–	–	–	–	–	–	–	163.8	100%	163.8	100%	–	–	–	–
Camp Creek	18	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.3	11%	–	–	–	–	–	–	–	–	–	–	–	–	60.0	100%	60.0	100%	–	–	–	–
BJ2	24	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%	–	–	–	–	–	–	–	–	–	–	–	–	536.5	100%	536.5	100%	–	–	–	–
SC1	2	–	–	–	–	–	–	1.5	50%	–	0%	18.7	100%	–	0%	1.0	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	7.8	100%	7.8	100%	–	0%	–	0%
SC3	3	–	–	–	–	–	–	–	0%	–	0%	63.5	100%	–	0%	2.8	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	58.8	100%	58.8	100%	1.8	67%	–	0%

Parameter		Chromium				Copper						Iron, Dissolved		Iron, Total				Mercury				Lithium		Manganese				Molybdenum						Nickel			
Guideline		CCME				BC				CCME		BC		BC		CCME		BC		CCME		BC		BC				BC				CCME		BC		CCME	
		Cr(III) 0.0089*		Cr(IV) 0.001*		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.35		1		0.3		0.00002 when Methylmercury = 0.5% of Total Mercury		0.000026		0.87*		30-day Hardness Dependent		Maximum Hardness Dependent		30-day 1		Maximum 2		0.073*		Hardness Dependent*		Hardness Dependent	
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	14	–	–	–	–	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	–	–	–	–	–	–	0%	–	0%	–	0%	–	–	–	–
BJ U/S	22	–	–	–	–	3.5	5%	1.8	5%	3.5	5%	–	0%	–	0%	1.5	18%	–	0%	–	0%	–	–	–	–	–	–	–	0%	–	0%	–	0%	–	–	–	–
Camp Creek	18	–	–	–	–	4.8	61%	2.7	39%	4.9	61%	–	0%	2.0	6%	2.6	22%	–	0%	–	0%	–	–	–	–	–	–	–	0%	–	0%	–	0%	–	–	–	–
BJ2	24	–	–	–	–	2.4	33%	2.3	8%	2.4	33%	–	0%	–	0%	1.5	17%	–	0%	–	0%	–	–	–	–	–	–	–	0%	–	0%	–	0%	–	–	–	–
SC1	2	–	0%	1.9	50%	6.2	100%	2.1	100%	6.2	100%	–	0%	3.2	50%	6.2	100%	1.9	50%	1.4	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%
SC3	3	–	0%	5.4	100%	53.7	100%	17.4	100%	71.9	100%	–	0%	11.3	100%	37.5	100%	2.0	67%	1.6	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%

Parameter		Lead						Selenium				Silver						Sulphate		Thallium				Uranium						Zn					
Guideline		BC						BC		CCME		BC				CCME		BC		BC		CCME		BC		CCME				BC				CCME	
		30-day Hardness Dependent		Maximum Hardness Dependent		Hardness Dependent		0.002		0.001		30-day Hardness Dependent		Maximum Hardness Dependent		0.0001		30-day Hardness Dependent		0.0003*		0.0008		0.3*		Long-term 0.015		Short-term 0.033		30-day Hardness Dependent		Maximum Hardness Dependent		0.03	
Site	Samples	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent	Factor	Percent
BJ	14	–	0%	–	0%	–	0%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%	–	0%	–	0%
BJ U/S	22	–	0%	–	0%	3.0	33%	–	–	–	–	11.0	100%	7.0	75%	7.0	75%	–	0%	–	–	–	–	–	–	–	–	–	–	2.0	10%	–	0%	–	0%
Camp Creek	18	1.8	7%	–	0%	3.7	43%	–	–	–	–	31.3	100%	23.0	67%	23.0	67%	–	0%	–	–	–	–	–	–	–	–	–	–	5.4	94%	2.0	44%	2.2	44%
BJ2	24	3.4	9%	1.8	4%	6.6	50%	–	–	–	–	36.0	100%	22.3	80%	22.3	80%	–	0%	–	–	–	–	–	–	–	–	–	–	2.4	48%	–	0%	–	0%
SC1	2	–	0%	–	0%	3.8	50%	–	0%	–	–	1.0	50%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	2.3	50%	–	0%	–	0%
SC3	3	1.6	67%	–	0%	4.5	67%	–	0%	1.4	100%	3.6	100%	2.5	67%	2.5	67%	–	0%	–	0%	–	0%	–	0%	–	0%	–	0%	13.6	100%	3.2	100%	3.6	100%

Notes:

All units are in mg/L unless otherwise noted.

** Interim/working guideline.*

Half the detection limit was substituted for values below the detection limit.

Samples below the detection limit but above the guideline concentration were excluded from all calculations.

Factor represents the average factor by which sample concentrations were greater than guideline concentrations.

Percent represents the percentage of samples collected at each site that were greater than guidelines.

Appendix 7

Annual Water Quality Blanks, Brucejack Gold Mine Project, 2009-2013

Table A7-1. 2009: Water Quality Blanks

Table A7-2. 2010: Water Quality Blanks

Table A7-3. 2011: Water Quality Blanks

Table A7-4. 2012: Water Quality Blanks

Table A7-5. 2012: Water Quality Blanks

Table A7-1. Water Quality Blanks, 2009

QA/QC	TRAVEL BLANK
Sample ID (new)	**TB**
Sample ID (old)	**TRAVEL BLANK**
Project	**BJ**
Company	**Rescan**
Date Sampled	**12-Oct-09**
SampleType	**11**
ALS Sample ID	**L829659-7**
Physical Tests	
Colour, True (CU)	-
Conductivity (µS/cm)	-
Hardness (as $CaCO_3$)	<0.50
pH	5.56
Total Suspended Solids	<3.0
Total Dissolved Solids	<10
Turbidity (NTU)	-
Acidity (as $CaCO_3$)	-
Alkalinity, Bicarbonate (as $CaCO_3$)	-
Alkalinity, Carbonate (as $CaCO_3$)	-
Alkalinity, Hydroxide (as $CaCO_3$)	-
Alkalinity, Total (as $CaCO_3$)	-
Anions	
Bromide (Br)	<0.050
Chloride (Cl)	<0.50
Fluoride (F)	<0.020
Sulfate (SO_4)	<0.50
Nutrients	
Ammonia, Total (as N)	<0.0050
Nitrate (as N)	<0.0050
Nitrite (as N)	<0.0010
Total Kjeldahl Nitrogen	-
Total Nitrogen	-
Orthophosphate-Dissolved (as P)	-
Phosphorus (P)-Total	-
Cyanides	
Cyanide, Weak Acid Diss	-
Cyanide, Total	-
CN-THIO Thiocyanate	-
Organic / Inorganic Carbon	
Total Organic Carbon	-
Total Metals	
Aluminum (Al)	<0.0010
Antimony (Sb)	<0.00010
Arsenic (As)	<0.00010
Barium (Ba)	<0.000050
Beryllium (Be)	<0.00050
Bismuth (Bi)	<0.00050
Boron (B)	<0.010
Cadmium (Cd)	<0.000010
Calcium (Ca)	<0.020
Chromium (Cr)	<0.00050
Cobalt (Co)	<0.00010
Copper (Cu)	<0.00010
Iron (Fe)	<0.030
Lead (Pb)	<0.000050
Lithium (Li)	<0.0050
Magnesium (Mg)	<0.0050
Manganese (Mn)	<0.000050
Mercury (Hg)	<0.000010
Molybdenum (Mo)	<0.000050
Nickel (Ni)	<0.00050

QA/QC	TRAVEL BLANK
Sample ID (new)	**TB**
Sample ID (old)	**TRAVEL BLANK**
Project	**BJ**
Company	**Rescan**
Date Sampled	**12-Oct-09**
SampleType	**11**
ALS Sample ID	**L829659-7**
Total Metals *(cont'd)*	
Phosphorus (P)	<0.30
Potassium (K)	<0.050
Selenium (Se)	<0.00010
Silicon (Si)	<0.050
Silver (Ag)	<0.000010
Sodium (Na)	<2.0
Strontium (Sr)	<0.00010
Sulphur (S)	-
Thallium (Tl)	<0.00010
Tin (Sn)	<0.00010
Titanium (Ti)	<0.010
Uranium (U)	<0.000010
Vanadium (V)	<0.0010
Zinc (Zn)	<0.0010
Dissolved Metals	
Aluminum (Al)	-
Antimony (Sb)	-
Arsenic (As)	-
Barium (Ba)	-
Beryllium (Be)	-
Bismuth (Bi)	-
Boron (B)	-
Cadmium (Cd)	-
Calcium (Ca)	-
Chromium (Cr)	-
Cobalt (Co)	-
Copper (Cu)	-
Iron (Fe)	-
Lead (Pb)	-
Lithium (Li)	-
Magnesium (Mg)	-
Manganese (Mn)	-
Mercury (Hg)	-
Molybdenum (Mo)	-
Nickel (Ni)	-
Phosphorus (P)	-
Potassium (K)	-
Selenium (Se)	-
Silicon (Si)	-
Silver (Ag)	-
Sodium (Na)	-
Strontium (Sr)	-
Sulphur (S)	-
Thallium (Tl)	-
Tin (Sn)	-
Titanium (Ti)	-
Uranium (U)	-
Vanadium (V)	-
Zinc (Zn)	-
Aggregate Organics	
COD	-

Note: All units are in mg/L unless otherwise noted.

Table A7-2. Water Quality Blanks, 2010

QA/QC	EQUIPMENT BLANK	FIELD BLANK										TRAVEL BLANK									
Sample ID (new)	**EB (GO FLO)**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**
Sample ID (old)	**EQUIPMENT BLANK (GO FLO)**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD**	**FIELD**	**FIELD BLNK**	**FIELD**	**FIELD**	**FIELD**	**FIELD**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL**	**TRAVEL**	**TRAVEL BLNK**	**TRAVEL**	**TRAVEL**	**TRAVEL**	**TRAVEL**
Project	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**
Date Sampled	**9-Jul-10**	**20-May-10**	**1-Jun-10**	**8-Jun-10**	**21-Jun-10**	**22-Jul-10**	**30-Aug-10**	**21-Sep-10**	**19-Oct-10**	**15-Nov-10**	**14-Dec-10**	**20-May-10**	**1-Jun-10**	**8-Jun-10**	**21-Jun-10**	**22-Jul-10**	**30-Aug-10**	**21-Sep-10**	**19-Oct-10**	**15-Nov-10**	**14-Dec-10**
SampleType	**11**	**11**	**12**	**12**	**11**	**11**	**1**	**11**	**11**	**11**	**11**	**11**	**12**	**12**	**11**	**11**	**1**	**11**	**11**	**11**	**11**
ALS Sample ID	**L908014-1**	**L889248-9**	**L893465-5**	**L896218-5**	**L900776-9**	**L912512-9**	**L927354-22**	**L939078-11**	**L945638-11**	**L955657-11**	**L964080-8**	**L889248-10**	**L893465-6**	**L896218-6**	**L900776-11**	**L912512-10**	**L927354-23**	**L939078-12**	**L945638-12**	**L955657-12**	**L964080-9**
Physical Tests																					
Colour, True (CU)	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	-	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	-	5.87	5.49	5.83	5.49	5.81	5.86	5.72	5.67	5.76	5.69	5.83	5.32	5.31	5.50	5.83	5.62	5.70	5.86	5.80	5.68
Total Suspended Solids	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acidity (as $CaCO_3$)	-	2.1	2.6	2.4	2.6	1.3	3.0	3.2	3.2	2.3	2.6	2.1	2.5	2.3	2.5	1.6	2.9	3.2	2.7	2.1	2.6
Alkalinity, Bicarbonate (as $CaCO_3$)	-	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	-	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	-	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	-	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0
Anions																					
Bromide (Br)	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sulfate (SO_4)	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nutrients																					
Ammonia, Total (as N)	-	<0.0050	<0.0050	0.0055	<0.0050	<0.0050	<0.0050	0.0084	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0090	<0.0050	<0.0050	<0.0050
Nitrate (as N)	-	<0.0050	<0.0050	<0.0050	<0.0050	0.0130	<0.0050	0.0135	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0130	<0.0050	0.0126	<0.0050	<0.0050	<0.0050
Nitrite (as N)	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanides																					
Cyanide, Weak Acid Diss	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0015	<0.0010	<0.0010
Cyanide, Total	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0025	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0023	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																					
Total Organic Carbon	-	<0.50	<0.50	<0.50	<0.50	<0.50	2.33	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals																					
Aluminum (Al)	0.0096	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0030	<0.0030	<0.0030	<0.0030	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	0.000125	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Beryllium (Be)	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.000050	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)	<0.020	<0.020	<0.020	<0.020	-	-	<0.020	0.029	<0.020	<0.020	<0.020	<0.020	0.055	<0.020	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chromium (Cr)	<0.00050	<0.00020	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)	-	<0.030	<0.030	<0.030	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0050	<0.0050	<0.0050	<0.0050	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)	<0.0050	<0.0050	<0.0050	<0.0050	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	0.000121	<0.000050	0.000054	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Mercury (Hg)	-	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	-	<0.30	<0.30	<0.30	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-2. Water Quality Blanks, 2010

QA/QC	EQUIPMENT BLANK	FIELD BLANK										TRAVEL BLANK									
Sample ID (new)	**EB (GO FLO)**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**
Sample ID (old)	**EQUIPMENT BLANK (GO FLO)**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD**	**FIELD**	**FIELD BLNK**	**FIELD**	**FIELD**	**FIELD**	**FIELD**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL**	**TRAVEL**	**TRAVEL BLNK**	**TRAVEL**	**TRAVEL**	**TRAVEL**	**TRAVEL**
Project	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**
Date Sampled	**9-Jul-10**	**20-May-10**	**1-Jun-10**	**8-Jun-10**	**21-Jun-10**	**22-Jul-10**	**30-Aug-10**	**21-Sep-10**	**19-Oct-10**	**15-Nov-10**	**14-Dec-10**	**20-May-10**	**1-Jun-10**	**8-Jun-10**	**21-Jun-10**	**22-Jul-10**	**30-Aug-10**	**21-Sep-10**	**19-Oct-10**	**15-Nov-10**	**14-Dec-10**
SampleType	**11**	**11**	**12**	**12**	**11**	**11**	**1**	**11**	**11**	**11**	**11**	**11**	**12**	**12**	**11**	**11**	**1**	**11**	**11**	**11**	**11**
ALS Sample ID	**L908014-1**	**L889248-9**	**L893465-5**	**L896218-5**	**L900776-9**	**L912512-9**	**L927354-22**	**L939078-11**	**L945638-11**	**L955657-11**	**L964080-8**	**L889248-10**	**L893465-6**	**L896218-6**	**L900776-11**	**L912512-10**	**L927354-23**	**L939078-12**	**L945638-12**	**L955657-12**	**L964080-9**
Potassium (K)	<0.050	<0.050	<0.050	<0.050	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)	<0.0010	<0.00020	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	-	<0.050	<0.050	<0.050	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<0.050	<2.0	<2.0	<2.0	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	-	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0030	<0.0030	<0.0030	<0.0030	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																					
Aluminum (Al)	-	-	-	<0.0010	-	<0.0010	-	-	-	-	<0.0030	-	-	<0.0010	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	<0.00010	-	<0.00010	-	-	-	-	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	<0.00010	-	<0.00010	-	-	-	-	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	<0.000050	-	<0.000050	-	-	-	-	<0.000050	-	-	<0.000050	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	<0.00050	-	<0.00050	-	-	-	-	<0.00050	-	-	<0.00050	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	<0.00050	-	<0.00050	-	-	-	-	<0.00050	-	-	<0.00050	-	-	-	-	-	-	-
Boron (B)	-	-	-	<0.010	-	<0.010	-	-	-	-	<0.010	-	-	<0.010	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	<0.000010	-	<0.000010	-	-	-	-	<0.000010	-	-	<0.000010	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	<0.020	-	<0.020	-	-	-	-	<0.020	-	-	<0.020	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	<0.00010	-	<0.00010	-	-	-	-	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	<0.00010	-	<0.00010	-	-	-	-	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	<0.00010	-	<0.00010	-	-	-	-	<0.00050	-	-	<0.00010	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	<0.030	-	<0.030	-	-	-	-	<0.030	-	-	<0.030	-	-	-	-	-	-	-
Lead (Pb)	-	-	-	<0.000050	-	<0.000050	-	-	-	-	<0.000050	-	-	<0.000050	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	<0.0050	-	<0.0050	-	-	-	-	<0.0050	-	-	<0.0050	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	<0.0050	-	<0.0050	-	-	-	-	<0.0050	-	-	<0.0050	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	<0.000050	-	<0.000050	-	-	-	-	<0.000050	-	-	<0.000050	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	<0.000010	-	<0.000010	-	-	-	-	<0.000010	-	-	<0.000010	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	<0.000050	-	<0.000050	-	-	-	-	<0.000050	-	-	<0.000050	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	<0.00050	-	<0.00050	-	-	-	-	<0.00050	-	-	<0.00050	-	-	-	-	-	-	-
Phosphorus (P)	-	-	-	<0.30	-	<0.30	-	-	-	-	<0.30	-	-	<0.30	-	-	-	-	-	-	-
Potassium (K)	-	-	-	<0.050	-	<0.050	-	-	-	-	<0.050	-	-	<0.050	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	<0.00010	-	<0.00010	-	-	-	-	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	<0.050	-	<0.050	-	-	-	-	<0.050	-	-	<0.050	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	<0.000010	-	<0.000010	-	-	-	-	<0.000010	-	-	<0.000010	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	<2.0	-	<2.0	-	-	-	-	<2.0	-	-	<2.0	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	<0.00010	-	<0.00010	-	-	-	-	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	<0.00010	-	<0.00010	-	-	-	-	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	<0.00010	-	<0.00010	-	-	-	-	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	<0.010	-	<0.010	-	-	-	-	<0.010	-	-	<0.010	-	-	-	-	-	-	-
Uranium (U)	-	-	-	<0.000010	-	<0.000010	-	-	-	-	<0.000010	-	-	<0.000010	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	<0.0010	-	<0.0010	-	-	-	-	<0.0010	-	-	<0.0010	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	<0.0010	-	<0.0010	-	-	-	-	<0.0030	-	-	<0.0010	-	-	-	-	-	-	-
Aggregate Organics																					
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-3. Water Quality Blanks, 2011

QA/QC	FIELD BLANK													
Sample ID (new)	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Sample ID (old)	**FIELD**	**FIELD**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANKS**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**
Project	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**
Date Sampled	**17-Jan-11**	**14-Feb-11**	**17-Mar-11**	**14-Apr-11**	**17-May-11**	**26-May-11**	**2-Jun-11**	**9-Jun-11**	**16-Jun-11**	**15-Jul-11**	**24-Aug-11**	**17-Sep-11**	**18-Oct-11**	**13-Nov-11**
SampleType	**11**	**11**	**11**	**11**	**12**	**12**	**12**	**12**	**12**	**11**	**1**	**11**	**11**	**11**
ALS Sample ID	**L971395-5**	**L979916-4**	**L987767-4**	**L995830-8**	**L1007227-9**	**L1010083-6**	**L1012816-4**	**L1016239-5**	**L1019628-6**	**L1033117-10**	**L1051244-10**	**L1060382-10**	**L1074434-10**	**L1084881-8**
Physical Tests														
Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	5.82	5.59	5.93	5.91	5.72	5.34	5.68	5.64	5.92	5.58	5.63	5.58	5.59	6.00
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acidity (as $CaCO_3$)	<1.0	1.9	2.0	2.6	1.2	2.7	2.5	3.1	2.1	3.4	2.7	2.8	3.5	1.2
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Anions														
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sulfate (SO_4)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nutrients														
Ammonia, Total (as N)	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	0.0062	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanides														
Cyanide, Weak Acid Diss	<0.0050	<0.0010	<0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0012	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0011	<0.0011	<0.0011
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon														
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals														
Aluminum (Al)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000636	<0.000050	<0.000050
Beryllium (Be)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000185	<0.000050	<0.000050
Mercury (Hg)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-3. Water Quality Blanks, 2011

QA/QC	FIELD BLANK													
Sample ID (new)	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Sample ID (old)	**FIELD**	**FIELD**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANKS**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**
Project	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**
Date Sampled	**17-Jan-11**	**14-Feb-11**	**17-Mar-11**	**14-Apr-11**	**17-May-11**	**26-May-11**	**2-Jun-11**	**9-Jun-11**	**16-Jun-11**	**15-Jul-11**	**24-Aug-11**	**17-Sep-11**	**18-Oct-11**	**13-Nov-11**
SampleType	**11**	**11**	**11**	**11**	**12**	**12**	**12**	**12**	**12**	**11**	**1**	**11**	**11**	**11**
ALS Sample ID	**L971395-5**	**L979916-4**	**L987767-4**	**L995830-8**	**L1007227-9**	**L1010083-6**	**L1012816-4**	**L1016239-5**	**L1019628-6**	**L1033117-10**	**L1051244-10**	**L1060382-10**	**L1074434-10**	**L1084881-8**
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals														
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aggregate Organics														
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-3. Water Quality Blanks, 2011

QA/QC	TRAVEL BLANK													
Sample ID (new)	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**
Sample ID (old)	**TRAVEL**	**TRAVEL**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANKS**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**
Project	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**
Date Sampled	**17-Jan-11**	**14-Feb-11**	**17-Mar-11**	**14-Apr-11**	**17-May-11**	**26-May-11**	**2-Jun-11**	**9-Jun-11**	**16-Jun-11**	**15-Jul-11**	**23-Aug-11**	**17-Sep-11**	**18-Oct-11**	**13-Nov-11**
SampleType	**11**	**11**	**11**	**11**	**12**	**12**	**12**	**12**	**12**	**11**	**1**	**11**	**11**	**11**
ALS Sample ID	**L971395-6**	**L979916-5**	**L987767-3**	**L995830-9**	**L1007227-8**	**L1010083-5**	**L1012816-5**	**L1016239-6**	**L1019628-7**	**L1033117-11**	**L1051244-11**	**L1060382-11**	**L1074434-11**	**L1084881-9**
Physical Tests														
Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	5.81	5.74	5.36	5.91	5.73	5.40	-	5.63	5.72	5.73	5.68	5.61	5.63	5.96
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	<10	<10	<10	<10	<10	<10	-	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acidity (as $CaCO_3$)	1.0	1.7	2.6	2.6	1.2	2.7	-	3.1	3.2	2.8	2.6	1.3	3.3	2.6
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Anions														
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sulfate (SO_4)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nutrients														
Ammonia, Total (as N)	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0089	0.0380
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanides														
Cyanide, Weak Acid Diss	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0011	<0.0010	<0.0010	<0.0012	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0011	<0.0010	<0.0011	<0.0011	<0.0011
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon														
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals														
Aluminum (Al)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000116	<0.000050	<0.000050
Beryllium (Be)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Mercury (Hg)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-3. Water Quality Blanks, 2011

QA/QC	TRAVEL BLANK													
Sample ID (new)	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**
Sample ID (old)	**TRAVEL**	**TRAVEL**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANKS**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**
Project	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**
Date Sampled	**17-Jan-11**	**14-Feb-11**	**17-Mar-11**	**14-Apr-11**	**17-May-11**	**26-May-11**	**2-Jun-11**	**9-Jun-11**	**16-Jun-11**	**15-Jul-11**	**23-Aug-11**	**17-Sep-11**	**18-Oct-11**	**13-Nov-11**
SampleType	**11**	**11**	**11**	**11**	**12**	**12**	**12**	**12**	**12**	**11**	**1**	**11**	**11**	**11**
ALS Sample ID	**L971395-6**	**L979916-5**	**L987767-3**	**L995830-9**	**L1007227-8**	**L1010083-5**	**L1012816-5**	**L1016239-6**	**L1019628-7**	**L1033117-11**	**L1051244-11**	**L1060382-11**	**L1074434-11**	**L1084881-9**
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals														
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aggregate Organics														
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-4. Water Quality Blanks, 2012

QA/QC	EQUIPMENT BLANK							FIELD BLANK								
Sample ID (new)	**EB**	**EB (Niskin)**	**EB (Go-Flo)**	**EB**	**EB (Go-Flo)**	**EB**	**EB (Niskin)**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Sample ID (old)	**EB**	**EQUIP BLANK (Niskin)**	**EQUIP BLANK GO FLOW**	**EB**	**EQUIPMENT BLANK (Go-Flo)**	**EB**	**EQUIP BLANK**	**FB**	**FIELD BLANKS**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB-2**	**FIELD BLANK**
Project	**KSM**	**BJ**	**BJ**	**KSM**	**BJ**	**KSM**	**BJ**	**KSM**	**BJ**	**KSM**	**KSM**	**KSM**	**KSM**	**KSM**	**BJ**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**BGC**	**Rescan**
Date Sampled	**28-Jun-12**	**30-Jun-12**	**1-Jul-12**	**1-Aug-12**	**6-Sep-12**	**5-Oct-12**	**12-Dec-12**	**9-Jan-12**	**17-Jan-12**	**30-Jan-12**	**27-Feb-12**	**27-Mar-12**	**1-May-12**	**28-May-12**	**29-May-12**	**5-Jun-12**
SampleType	**Quarterly**			**Monthly**		**Monthly**		**Monthly**		**Monthly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**		
ALS Sample ID	**L1171583-12**	**L1171541-19**	**L1171541-20**	**L1190018-29**	**L1206762-8**	**L1221662-2**	**L1250701-18**	**L1103291-11**	**L1105752-3**	**L1111122-8**	**L1119935-9**	**L1131394-17**	**L1143005-8**	**L1155050-8**	**L1155798-8**	**L1158955-8**
Physical Tests																
Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	5.54	5.72	5.62	5.88	5.96	5.98	7.68	5.51	5.74	5.7	5.55	5.82	6.09	5.98	5.75	8.24
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	<0.10	<0.10	<0.10	0.17	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acidity (as $CaCO_3$)	1.8	2	1.9	2.5	<1.0	2.9	1.6	3	2.5	3.4	2	2.7	2.7	<1.0	-	<1.0
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sulfate (SO_4)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nutrients																
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	-	<0.050	<0.050	<0.0025	<0.050	<0.050	<0.0025	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanides																
Cyanide, Weak Acid Diss	-	<0.0010	<0.0010	-	<0.0010	-	<0.0010	-	<0.0010	-	-	-	-	-	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0011	<0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals																
Aluminum (Al)	0.0488	<0.0030	<0.0030	0.0221	0.007	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)	0.000588	0.0007	0.0002	0.000422	0.0005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)	<0.020	<0.020	<0.020	0.029	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)	0.000128	<0.000050	<0.000050	0.000461	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000211	<0.000050	<0.000050	<0.000050	<0.000050
Mercury (Hg)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-4. Water Quality Blanks, 2012

QA/QC	EQUIPMENT BLANK							FIELD BLANK								
Sample ID (new)	**EB**	**EB (Niskin)**	**EB (Go-Flo)**	**EB**	**EB (Go-Flo)**	**EB**	**EB (Niskin)**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Sample ID (old)	**EB**	**EQUIP BLANK (Niskin)**	**EQUIP BLANK GO FLOW**	**EB**	**EQUIPMENT BLANK (Go-Flo)**	**EB**	**EQUIP BLANK**	**FB**	**FIELD BLANKS**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB-2**	**FIELD BLANK**
Project	**KSM**	**BJ**	**BJ**	**KSM**	**BJ**	**KSM**	**BJ**	**KSM**	**BJ**	**KSM**	**KSM**	**KSM**	**KSM**	**KSM**	**BJ**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**BGC**	**Rescan**
Date Sampled	**28-Jun-12**	**30-Jun-12**	**1-Jul-12**	**1-Aug-12**	**6-Sep-12**	**5-Oct-12**	**12-Dec-12**	**9-Jan-12**	**17-Jan-12**	**30-Jan-12**	**27-Feb-12**	**27-Mar-12**	**1-May-12**	**28-May-12**	**29-May-12**	**5-Jun-12**
SampleType	**Quarterly**			**Monthly**		**Monthly**		**Monthly**		**Monthly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**		
ALS Sample ID	**L1171583-12**	**L1171541-19**	**L1171541-20**	**L1190018-29**	**L1206762-8**	**L1221662-2**	**L1250701-18**	**L1103291-11**	**L1105752-3**	**L1111122-8**	**L1119935-9**	**L1131394-17**	**L1143005-8**	**L1155050-8**	**L1155798-8**	**L1158955-8**
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	0	<0.00010	0.00052	<0.00010	0.00024	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	0.0284	<0.0030	<0.0030	<0.0030	0.003	<0.0030	<0.0030	-	-	-	-	-	-	-	<0.0030	-
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	<0.00010	-
Arsenic (As)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	<0.00010	-
Barium (Ba)	0.00072	0.0003	0.00006	<0.000050	0.00023	<0.000050	<0.000050	-	-	-	-	-	-	-	<0.000050	-
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	<0.00010	-
Bismuth (Bi)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	<0.00050	-
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-	-	-	<0.010	-
Cadmium (Cd)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	<0.000010	-
Calcium (Ca)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	-	-	-	-	-	<0.020	-
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	<0.00010	-
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	<0.00010	-
Copper (Cu)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	<0.00050	-
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-	-	-	-	-	-	-	<0.030	-
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-	-	-	-	<0.000050	-
Lithium (Li)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	<0.00050	-
Magnesium (Mg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	-	-	-	-	<0.0050	-
Manganese (Mn)	0.000088	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-	-	-	-	<0.000050	-
Mercury (Hg)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	<0.000010	-
Molybdenum (Mo)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-	-	-	-	<0.000050	-
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	<0.00050	-
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	-	-	-	-	-	-	<0.30	-
Potassium (K)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	-	-	-	-	-	-	<0.050	-
Selenium (Se)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	<0.00010	-
Silicon (Si)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	-	-	-	-	-	-	<0.050	-
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	<0.000010	-
Sodium (Na)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-	-	-	-	-	<2.0	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	-	-	-	-	-	-	-	<0.00020	-
Thallium (Tl)	-	<0.000010	<0.000010	-	<0.000010	-	<0.000010	-	-	-	-	-	-	-	<0.000010	-
Tin (Sn)	<0.000010	<0.00010	0.00018	<0.000010	0.00016	<0.000010	<0.00010	-	-	-	-	-	-	-	<0.00010	-
Titanium (Ti)	0.00011	<0.010	<0.010	<0.00010	<0.010	<0.00010	<0.010	-	-	-	-	-	-	-	<0.010	-
Uranium (U)	<0.010	<0.000010	<0.000010	<0.010	<0.000010	<0.010	<0.000010	-	-	-	-	-	-	-	<0.000010	-
Vanadium (V)	<0.000010	<0.0010	<0.0010	<0.000010	<0.0010	<0.000010	<0.0010	-	-	-	-	-	-	-	<0.0010	-
Zinc (Zn)	<0.0010	<0.0030	<0.0030	<0.0010	<0.0030	<0.0010	<0.0030	-	-	-	-	-	-	-	<0.0030	-
Aggregate Organics																
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-4. Water Quality Blanks, 2012

QA/QC	FIELD BLANK																	
Sample ID (new)	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Sample ID (old)	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FB**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FB**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FB**	**FB**	**FIELD BLANK**
Project	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**KSM**	**BJ**	**BJ**	**BJ**	**BJ**	**KSM**	**BJ**	**BJ**	**BJ**	**BJ**	**KSM**	**KSM**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**BGC**	**BGC**	**Rescan**	**BGC**	**Rescan**	**BGC**	**BGC**	**Rescan**	**BGC**	**BGC**	**Rescan**	**BGC**	**Rescan**	**Rescan**	**BGC**
Date Sampled	**11-Jun-12**	**14-Jun-12**	**20-Jun-12**	**26-Jun-12**	**26-Jun-12**	**28-Jun-12**	**29-Jun-12**	**30-Jun-12**	**4-Jul-12**	**31-Jul-12**	**1-Aug-12**	**21-Aug-12**	**24-Aug-12**	**6-Sep-12**	**2-Oct-12**	**4-Oct-12**	**5-Oct-12**	**31-Oct-12**
SampleType						**Quarterly**					**Monthly**					**Monthly**	**Monthly**	
ALS Sample ID	**L1161793-8**	**L1163187-6**	**L1166925-8**	**L1171502-1**	**L1171502-1**	**L1171583-8**	**L1171618-7**	**L1171541-18**	**L1174986-8**	**L1188621-1**	**L1190018-8**	**L1199717-9**	**L1200103-9**	**L1206762-7**	**L1219460-7**	**L1221669-26**	**L1221662-5**	**L1232846-4**
Physical Tests																		
Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	6.47	5.89	5.5	5.8	5.8	5.67	6.02	5.98	5.73	5.78	6	5.97	6.08	6.18	5.78	5.52	5.81	5.9
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.47	<0.10	<0.10	<0.10	<0.10	<0.10
Acidity (as $CaCO_3$)	2.2	2	1.3	1.4	1.4	1.6	2.5	2.5	1.7	2.1	2.3	2.6	3	2.2	1.9	2.1	2.7	3.5
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Anions																		
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sulfate (SO_4)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nutrients																		
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.431
Total Nitrogen	<0.050	<0.050	<0.050	<0.0025	<0.0025	<0.050	<0.0025	<0.050	<0.0025	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.431
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanides																		
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																		
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals																		
Aluminum (Al)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Mercury (Hg)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-4. Water Quality Blanks, 2012

QA/QC	FIELD BLANK																	
Sample ID (new)	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Sample ID (old)	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FB**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FB**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FB**	**FB**	**FIELD BLANK**
Project	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**KSM**	**BJ**	**BJ**	**BJ**	**BJ**	**KSM**	**BJ**	**BJ**	**BJ**	**BJ**	**KSM**	**KSM**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**BGC**	**BGC**	**Rescan**	**BGC**	**Rescan**	**BGC**	**BGC**	**Rescan**	**BGC**	**BGC**	**Rescan**	**BGC**	**Rescan**	**Rescan**	**BGC**
Date Sampled	**11-Jun-12**	**14-Jun-12**	**20-Jun-12**	**26-Jun-12**	**26-Jun-12**	**28-Jun-12**	**29-Jun-12**	**30-Jun-12**	**4-Jul-12**	**31-Jul-12**	**1-Aug-12**	**21-Aug-12**	**24-Aug-12**	**6-Sep-12**	**2-Oct-12**	**4-Oct-12**	**5-Oct-12**	**31-Oct-12**
SampleType						**Quarterly**					**Monthly**					**Monthly**	**Monthly**	
ALS Sample ID	**L1161793-8**	**L1163187-6**	**L1166925-8**	**L1171502-1**	**L1171502-1**	**L1171583-8**	**L1171618-7**	**L1171541-18**	**L1174986-8**	**L1188621-1**	**L1190018-8**	**L1199717-9**	**L1200103-9**	**L1206762-7**	**L1219460-7**	**L1221669-26**	**L1221662-5**	**L1232846-4**
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																		
Aluminum (Al)	-	-	-	<0.0030	<0.0030	-	<0.0030	-	<0.0030	<0.0030	-	<0.0030	<0.0030	-	<0.0030	-	-	<0.0030
Antimony (Sb)	-	-	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	-	<0.00010
Arsenic (As)	-	-	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	-	<0.00010
Barium (Ba)	-	-	-	<0.000050	<0.000050	-	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	-	-	<0.000050
Beryllium (Be)	-	-	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	-	<0.00010
Bismuth (Bi)	-	-	-	<0.00050	<0.00050	-	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	-	-	<0.00050
Boron (B)	-	-	-	<0.010	<0.010	-	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	-	-	<0.010
Cadmium (Cd)	-	-	-	<0.000010	<0.000010	-	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	-	-	<0.000010
Calcium (Ca)	-	-	-	<0.020	<0.020	-	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	-	-	<0.020
Chromium (Cr)	-	-	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	-	<0.00010
Cobalt (Co)	-	-	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	-	<0.00010
Copper (Cu)	-	-	-	<0.00050	<0.00050	-	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	-	-	<0.00050
Iron (Fe)	-	-	-	<0.030	<0.030	-	<0.030	-	<0.030	<0.030	-	<0.030	<0.030	-	<0.030	-	-	<0.030
Lead (Pb)	-	-	-	<0.000050	<0.000050	-	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	-	-	<0.000050
Lithium (Li)	-	-	-	<0.00050	<0.00050	-	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	-	-	<0.00050
Magnesium (Mg)	-	-	-	<0.0050	<0.0050	-	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	-	-	<0.0050
Manganese (Mn)	-	-	-	<0.000050	<0.000050	-	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	-	-	<0.000050
Mercury (Hg)	-	-	-	<0.000010	<0.000010	-	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	-	-	<0.000010
Molybdenum (Mo)	-	-	-	<0.000050	<0.000050	-	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	-	-	<0.000050
Nickel (Ni)	-	-	-	<0.00050	<0.00050	-	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	-	-	<0.00050
Phosphorus (P)	-	-	-	<0.30	<0.30	-	<0.30	-	<0.30	<0.30	-	<0.30	<0.30	-	<0.30	-	-	<0.30
Potassium (K)	-	-	-	<0.050	<0.050	-	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050
Selenium (Se)	-	-	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	-	<0.00010
Silicon (Si)	-	-	-	<0.050	<0.050	-	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050
Silver (Ag)	-	-	-	<0.000010	<0.000010	-	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	-	-	<0.000010
Sodium (Na)	-	-	-	<2.0	<2.0	-	<2.0	-	<2.0	<2.0	-	<2.0	<2.0	-	<2.0	-	-	<2.0
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	<0.00020	<0.00020	-	<0.00020	-	<0.00020	<0.00020	-	<0.00020	<0.00020	-	<0.00020	-	-	<0.00020
Thallium (Tl)	-	-	-	<0.000010	<0.000010	-	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	-	-	<0.000010
Tin (Sn)	-	-	-	<0.00010	<0.00010	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	-	-	<0.00010
Titanium (Ti)	-	-	-	<0.010	<0.010	-	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	-	-	<0.010
Uranium (U)	-	-	-	<0.000010	<0.000010	-	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010	-	-	<0.000010
Vanadium (V)	-	-	-	<0.0010	<0.0010	-	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	-	-	<0.0010
Zinc (Zn)	-	-	-	<0.0030	<0.0030	-	<0.0030	-	<0.0030	<0.0030	-	<0.0030	<0.0030	-	<0.0030	-	-	<0.0030
Aggregate Organics																		
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-4. Water Quality Blanks, 2012

QA/QC	FIELD BLANK		TRAVEL BLANK													
Sample ID (new)	**FB**	**FB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**
Sample ID (old)	**FIELD BLANK**	**FIELD BLANK**	**TB**	**TRAVEL BLANKS**	**TB**	**TB**	**TB**	**TB**	**TB**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**
Project	**BJ**	**BJ**	**KSM**	**BJ**	**KSM**	**KSM**	**KSM**	**KSM**	**KSM**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**BGC**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**BGC**	**BGC**
Date Sampled	**21-Nov-12**	**10-Dec-12**	**9-Jan-12**	**17-Jan-12**	**30-Jan-12**	**27-Feb-12**	**27-Mar-12**	**1-May-12**	**28-May-12**	**29-May-12**	**5-Jun-12**	**11-Jun-12**	**14-Jun-12**	**20-Jun-12**	**26-Jun-12**	**26-Jun-12**
SampleType			**Monthly**		**Monthly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**							
ALS Sample ID	**L1241645-4**	**L1250701-9**	**L1103291-12**	**L1105752-4**	**L1111122-7**	**L1119935-10**	**L1131394-18**	**L1143005-9**	**L1155050-9**	**L1155798-11**	**L1158955-7**	**L1161793-7**	**L1163187-7**	**L1166925-7**	**L1171502-8**	**L1171502-8**
Physical Tests																
Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	<2.0	<2.0	<2.0	14	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	<0.50	<0.50	1	<0.50	<0.50	<0.50	<0.50	19.9	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50
pH	5.52	5.96	5.61	4.76	5.76	5.64	6.05	5.94	5.94	5.81	8.39	6.65	6.06	5.51	6.06	6.06
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acidity (as $CaCO_3$)	1.9	1.6	3	4.2	3.4	1.5	1.9	2.5	1.4	-	<1.0	2	1.8	<1.0	2.7	2.7
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sulfate (SO_4)	<0.50	<0.50	<0.50	2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nutrients																
Ammonia, Total (as N)	<0.0050	<0.0050	0.0448	-	0.0545	<0.0050	0.0115	<0.0050	0.0258	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	<0.0050	<0.0050	<0.0050	0.0975	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	-	-	<0.050	<0.050	<0.0025	<0.050	<0.050	<0.0025	<0.050	<0.050	<0.050	<0.050	<0.0025	<0.0025
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanides																
Cyanide, Weak Acid Diss	<0.0010	<0.0010	-	<0.0010	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0011	<0.0013	-	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																
Total Organic Carbon	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals																
Aluminum (Al)	<0.0030	<0.0030	<0.0030	0.007	<0.0030	<0.0030	<0.0030	<0.0030	0.0084	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)	<0.000050	<0.000050	<0.000050	0.0002	<0.000050	<0.000050	<0.000050	<0.000050	0.000557	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)	<0.020	<0.020	<0.020	0.3	<0.020	<0.020	<0.020	<0.020	7.87	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	<0.00050	<0.00050	<0.00050	0.00063	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	0.0002	<0.000050	<0.000050	<0.000050	<0.000050	0.000065	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)	<0.0050	<0.0050	<0.0050	0.01	<0.0050	<0.0050	<0.0050	<0.0050	0.0725	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)	<0.000050	<0.000050	<0.000050	0.001	<0.000050	<0.000050	<0.000050	<0.000050	0.00081	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Mercury (Hg)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000161	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-4. Water Quality Blanks, 2012

QA/QC	FIELD BLANK		TRAVEL BLANK													
Sample ID (new)	**FB**	**FB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**
Sample ID (old)	**FIELD BLANK**	**FIELD BLANK**	**TB**	**TRAVEL BLANKS**	**TB**	**TB**	**TB**	**TB**	**TB**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**
Project	**BJ**	**BJ**	**KSM**	**BJ**	**KSM**	**KSM**	**KSM**	**KSM**	**KSM**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**	**BJ**
Company	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**BGC**	**Rescan**	**Rescan**	**Rescan**	**Rescan**	**BGC**	**BGC**
Date Sampled	**21-Nov-12**	**10-Dec-12**	**9-Jan-12**	**17-Jan-12**	**30-Jan-12**	**27-Feb-12**	**27-Mar-12**	**1-May-12**	**28-May-12**	**29-May-12**	**5-Jun-12**	**11-Jun-12**	**14-Jun-12**	**20-Jun-12**	**26-Jun-12**	**26-Jun-12**
SampleType			**Monthly**		**Monthly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**							
ALS Sample ID	**L1241645-4**	**L1250701-9**	**L1103291-12**	**L1105752-4**	**L1111122-7**	**L1119935-10**	**L1131394-18**	**L1143005-9**	**L1155050-9**	**L1155798-11**	**L1158955-7**	**L1161793-7**	**L1163187-7**	**L1166925-7**	**L1171502-8**	**L1171502-8**
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.075	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	6.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	<0.00020	<0.00020	<0.00010	0	<0.00010	<0.00010	<0.00010	<0.00010	0.00445	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aggregate Organics																
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-4. Water Quality Blanks, 2012

QA/QC	TRAVEL BLANK															
Sample ID (new)	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**
Sample ID (old)	**TB**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TB**	**TRAVEL BLANK**	**TB**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TB**	**TB**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**
Project	**KSM**	**BJ**	**BJ**	**BJ**	**BJ**	**KSM**	**BJ**	**KSM**	**BJ**	**BJ**	**KSM**	**KSM**	**BJ**	**BJ**	**BJ**	**BJ**
Company	**Rescan**	**BGC**	**Rescan**	**BGC**	**BGC**	**Rescan**	**BGC**	**Rescan**	**Rescan**	**BGC**	**Rescan**	**Rescan**	**BGC**	**BGC**	**Rescan**	**Rescan**
Date Sampled	**28-Jun-12**	**29-Jun-12**	**30-Jun-12**	**4-Jul-12**	**30-Jul-12**	**1-Aug-12**	**21-Aug-12**	**5-Sep-12**	**8-Sep-12**	**1-Oct-12**	**4-Oct-12**	**5-Oct-12**	**29-Oct-12**	**31-Oct-12**	**21-Nov-12**	**10-Dec-12**
SampleType	**Quarterly**					**Monthly**		**Monthly**			**Monthly**	**Monthly**				
ALS Sample ID	**L1171583-9**	**L1171618-6**	**L1171541-17**	**L1174986-9**	**L1188621-10**	**L1190018-9**	**L1199717-8**	**L1206302-14**	**L1207289-9**	**L1219460-9**	**L1221669-25**	**L1221662-4**	**L1232163-4**	**L1232847-4**	**L1241645-5**	**L1250701-10**
Physical Tests																
Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	-	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	5.64	5.6	6.04	5.61	5.96	5.73	5.96	5.87	5.98	5.93	6.05	5.64	5.8	5.75	5.55	6.09
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acidity (as $CaCO_3$)	1.7	1.8	2.6	1.5	1.9	2.6	2.6	2.2	1.9	2	1.6	2.7	1.8	2.1	1.9	1.7
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Anions																
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sulfate (SO_4)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nutrients																
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	0.0077	0.0104	<0.0050	<0.0050	0.0065	<0.0050	0.0064	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.0025	<0.050	<0.0025	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanides																
Cyanide, Weak Acid Diss	-	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010
CN-THIO Thiocyanate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																
Total Organic Carbon	1.16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals																
Aluminum (Al)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Beryllium (Be)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chromium (Cr)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Mercury (Hg)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000053	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-4. Water Quality Blanks, 2012

QA/QC	TRAVEL BLANK															
Sample ID (new)	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**	**TB**
Sample ID (old)	**TB**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TB**	**TRAVEL BLANK**	**TB**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TB**	**TB**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**
Project	**KSM**	**BJ**	**BJ**	**BJ**	**BJ**	**KSM**	**BJ**	**KSM**	**BJ**	**BJ**	**KSM**	**KSM**	**BJ**	**BJ**	**BJ**	**BJ**
Company	**Rescan**	**BGC**	**Rescan**	**BGC**	**BGC**	**Rescan**	**BGC**	**Rescan**	**Rescan**	**BGC**	**Rescan**	**Rescan**	**BGC**	**BGC**	**Rescan**	**Rescan**
Date Sampled	**28-Jun-12**	**29-Jun-12**	**30-Jun-12**	**4-Jul-12**	**30-Jul-12**	**1-Aug-12**	**21-Aug-12**	**5-Sep-12**	**8-Sep-12**	**1-Oct-12**	**4-Oct-12**	**5-Oct-12**	**29-Oct-12**	**31-Oct-12**	**21-Nov-12**	**10-Dec-12**
SampleType	**Quarterly**					**Monthly**		**Monthly**			**Monthly**	**Monthly**				
ALS Sample ID	**L1171583-9**	**L1171618-6**	**L1171541-17**	**L1174986-9**	**L1188621-10**	**L1190018-9**	**L1199717-8**	**L1206302-14**	**L1207289-9**	**L1219460-9**	**L1221669-25**	**L1221662-4**	**L1232163-4**	**L1232847-4**	**L1241645-5**	**L1250701-10**
Phosphorus (P)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																
Aluminum (Al)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aggregate Organics																
COD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-5. Water Quality Blanks, 2013

QA/QC	EQUIPMENT BLANK				FIELD BLANK							
Sample ID	**EQUIP BLANK**	**EQUIP BLANK**	**EQUIP BLANK**	**EQUIPMENT BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**
Date Sampled	**15-JUL-13**	**09-AUG-13**	**22-OCT-13**	**14-MAR-13**	**11-AUG-13**	**30-JAN-13**	**20-FEB-13**		**14-MAR-13**		**19-MAY-13**	**28-MAY-13**
Time Sampled	**10:40**	**08:30**	**10:40**	**08:00**	**15:00**	**00:00**	**08:39**		**10:30**		**00:00**	**00:00**
ALS Sample ID	**L1334719-13**	**L1346151-9**	**L1383767-9**	**L1279839-7**	**L1347703-4**	**L1264309-1**	**L1271673-1**	**L1279839-24**	**L1279839-8**	**L1294452-2**	**L1304309-2**	**L1309095-10**
Matrix	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Physical Tests												
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	5.49	5.57	5.49	5.59	5.75	5.75	5.63	5.65	5.59	5.64	5.56	5.57
Total Suspended Solids	<3.0	<1.0	<1.0	<3.0	<1.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	<0.10	<0.10	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anions and Nutrients												
Acidity (as $CaCO_3$)	1.7	1.1	1.3	1.7	<1.0	2.5	1.9	1.8	1.9	<1.0	1.5	10.3
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Sulfate (SO_4)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cyanides												
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon												
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals												
Aluminum (Al)-Total	0.0056	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)-Total	0.000090	<0.000050	0.000340	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chromium (Cr)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)-Total	0.000057	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-5. Water Quality Blanks, 2013

QA/QC	EQUIPMENT BLANK				FIELD BLANK							
Sample ID	**EQUIP BLANK**	**EQUIP BLANK**	**EQUIP BLANK**	**EQUIPMENT BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**
Date Sampled	**15-JUL-13**	**09-AUG-13**	**22-OCT-13**	**14-MAR-13**	**11-AUG-13**	**30-JAN-13**	**20-FEB-13**		**14-MAR-13**		**19-MAY-13**	**28-MAY-13**
Time Sampled	**10:40**	**08:30**	**10:40**	**08:00**	**15:00**	**00:00**	**08:39**		**10:30**		**00:00**	**00:00**
ALS Sample ID	**L1334719-13**	**L1346151-9**	**L1383767-9**	**L1279839-7**	**L1347703-4**	**L1264309-1**	**L1271673-1**	**L1279839-24**	**L1279839-8**	**L1294452-2**	**L1304309-2**	**L1309095-10**
Matrix	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals												
Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	-	-	-	-	-	-	-	-
Aluminum (Al)-Dissolved	0.0067	<0.0030	<0.0030	<0.0030	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-
Barium (Ba)-Dissolved	<0.000050	<0.000050	0.000134	<0.000050	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	-
Calcium (Ca)-Dissolved	<0.020	<0.020	<0.020	<0.020	-	-	-	-	-	-	-	-
Chromium (Cr)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-
Iron (Fe)-Dissolved	<0.030	<0.030	<0.030	<0.030	-	-	-	-	-	-	-	-
Lead (Pb)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-	-	-	-	-
Lithium (Li)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	-	-	-	-	-
Manganese (Mn)-Dissolved	0.000065	<0.000050	<0.000050	<0.000050	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-	-	-	-	-
Nickel (Ni)-Dissolved	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	<0.30	<0.30	<0.30	<0.30	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	<0.050	<0.050	<0.050	<0.050	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	<0.050	<0.050	<0.050	<0.050	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	-
Sodium (Na)-Dissolved	<2.0	<2.0	<2.0	<2.0	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	<0.00020	<0.00020	<0.00020	<0.00020	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	<0.0030	<0.0030	<0.0030	<0.0030	-	-	-	-	-	-	-	-
Aggregate Organics												
BOD		-		-				-	-	-		

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-5. Water Quality Blanks, 2013

QA/QC	FIELD BLANK							TRAVEL BLANK				
Sample ID	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**
Date Sampled	**06-JUN-13**	**13-JUN-13**	**22-JUN-13**	**18-JUL-13**	**21-SEP-13**	**23-OCT-13**	**20-NOV-13**				**19-MAY-13**	**28-MAY-13**
Time Sampled	**00:00**	**00:00**	**00:00**	**06:30**	**00:00**	**00:00**	**00:00**				**00:00**	**00:00**
ALS Sample ID	**L1313730-2**	**L1317318-2**	**L1321448-11**	**L1335330-8**	**L1366991-1**	**L1384222-2**	**L1395276-17**	**L1264309-2**	**L1271673-2**	**L1294452-1**	**L1304309-1**	**L1309095-9**
Matrix	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Physical Tests												
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	<0.50
pH	5.61	5.86	5.72	5.61	5.55	5.72	5.78	5.74	5.65	5.68	5.57	5.57
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anions and Nutrients												
Acidity (as $CaCO_3$)	3.8	1.6	1.5	1.3	<1.0	<1.0	1.3	2.3	1.9	<1.0	1.5	3.4
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Ammonia, Total (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0065	<0.0050	0.0119	0.0089
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Sulfate (SO_4)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cyanides												
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon												
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals												
Aluminum (Al)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chromium (Cr)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-5. Water Quality Blanks, 2013

QA/QC	FIELD BLANK							TRAVEL BLANK				
Sample ID	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**FIELD BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**
Date Sampled	**06-JUN-13**	**13-JUN-13**	**22-JUN-13**	**18-JUL-13**	**21-SEP-13**	**23-OCT-13**	**20-NOV-13**				**19-MAY-13**	**28-MAY-13**
Time Sampled	**00:00**	**00:00**	**00:00**	**06:30**	**00:00**	**00:00**	**00:00**				**00:00**	**00:00**
ALS Sample ID	**L1313730-2**	**L1317318-2**	**L1321448-11**	**L1335330-8**	**L1366991-1**	**L1384222-2**	**L1395276-17**	**L1264309-2**	**L1271673-2**	**L1294452-1**	**L1304309-1**	**L1309095-9**
Matrix	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals												
Dissolved Metals Filtration Location	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	-	-	-	-	-	-	-	-	-	-	-	-
Aggregate Organics												
BOD			-							-		

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-5. Water Quality Blanks, 2013

QA/QC	TRAVEL BLANK								
Sample ID	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRIP BLANK**	**TRIP BLANK**
Date Sampled	**06-JUN-13**	**13-JUN-13**	**22-JUN-13**	**17-JUL-13**	**21-SEP-13**	**23-OCT-13**	**20-NOV-13**	**14-MAR-13**	**11-AUG-13**
Time Sampled	**00:00**	**00:00**	**00:00**	**06:30**	**00:00**	**00:00**	**00:00**	**00:00**	**15:00**
ALS Sample ID	**L1313730-1**	**L1317318-1**	**L1321448-10**	**L1334719-20**	**L1366991-2**	**L1384222-1**	**L1395276-16**	**L1279839-9**	**L1347703-5**
Matrix	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Physical Tests									
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (µS/cm)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as $CaCO_3$)	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	<0.50	-
pH	5.68	6.02	5.72	5.50	5.57	5.78	5.45	5.57	5.68
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	<1.0	<1.0	<1.0	<3.0	<1.0
Total Dissolved Solids	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity (NTU)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anions and Nutrients									
Acidity (as $CaCO_3$)	2.9	1.5	1.5	1.2	1.3	<1.0	1.8	1.8	1.3
Alkalinity, Bicarbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Ammonia, Total (as N)	0.0076	0.0201	<0.0050	0.0128	<0.0050	<0.0050	<0.0050	0.0250	<0.0050
Bromide (Br)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Sulfate (SO_4)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cyanides									
Cyanide, Weak Acid Diss	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Total Organic Carbon	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals									
Aluminum (Al)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium (Ba)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Beryllium (Be)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chromium (Cr)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Manganese (Mn)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Mercury (Hg)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Table A7-5. Water Quality Blanks, 2013

QA/QC	TRAVEL BLANK								
Sample ID	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRAVEL BLANK**	**TRIP BLANK**	**TRIP BLANK**
Date Sampled	**06-JUN-13**	**13-JUN-13**	**22-JUN-13**	**17-JUL-13**	**21-SEP-13**	**23-OCT-13**	**20-NOV-13**	**14-MAR-13**	**11-AUG-13**
Time Sampled	**00:00**	**00:00**	**00:00**	**06:30**	**00:00**	**00:00**	**00:00**	**00:00**	**15:00**
ALS Sample ID	**L1313730-1**	**L1317318-1**	**L1321448-10**	**L1334719-20**	**L1366991-2**	**L1384222-1**	**L1395276-16**	**L1279839-9**	**L1347703-5**
Matrix	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Phosphorus (P)-Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Selenium (Se)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals									
Dissolved Metals Filtration Location	-	-	-	-	-	-	-	-	-
Aluminum (Al)-Dissolved	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	-	-	-	-	-	-	-	-	-
Barium (Ba)-Dissolved	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	-	-	-	-	-	-	-	-	-
Calcium (Ca)-Dissolved	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Dissolved	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	-	-	-	-	-	-	-	-	-
Iron (Fe)-Dissolved	-	-	-	-	-	-	-	-	-
Lead (Pb)-Dissolved	-	-	-	-	-	-	-	-	-
Lithium (Li)-Dissolved	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	-	-	-	-	-	-	-	-	-
Manganese (Mn)-Dissolved	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	-	-	-	-	-	-	-	-	-
Nickel (Ni)-Dissolved	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	-	-	-	-	-	-	-	-	-
Sodium (Na)-Dissolved	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	-	-	-	-	-	-	-	-	-
Aggregate Organics									
BOD			-					-	

Notes: All units are in mg/L unless otherwise noted.

Sample above detection limits.

Appendix 8

Annual Water Quality Relative Percent Difference Results, Brucejack Gold Mine Project Area, 2008-2013

Table A8-1. 2008: Water Quality Relative Percent Difference Results

Table A8-2. 2009: Water Quality Relative Percent Difference Results

Table A8-3. 2010: Water Quality Relative Percent Difference Results

Table A8-4. 2011: Water Quality Relative Percent Difference Results

Table A8-5. 2012: Water Quality Relative Percent Difference Results

Table A8-6. 2013: Water Quality Relative Percent Difference Results

Table A8-1. Water Quality Relative Percent Difference Results, 2008

Sample ID	SC1			SC2			SC2			SC1			UR1		
Date Sampled	28-May-08			3-Jul-08			25-Sep-08			2-Oct-08			6-Dec-08		
ALS Sample ID	L635965-8	L635965-9	RPD (%)[a]	L652071-9	L652071-10	RPD (%)	L688714-7	L688714-8	RPD (%)	L691752-10	L691752-9	RPD (%)	L717413-13	L717413-14	RPD (%)
Physical Tests															
Colour, True (CU)	93.9	94.2	0.3	<5.0	<5.0	n/a	<5.0	<5.0	n/a	6.6	<5.0	n/a	<5.0	<5.0	n/a
Conductivity (µS/cm)	<5.0	<5.0	n/a[b]	186	186	0.0	193	193	0.0	114	114	0.0	244	244	0.0
Hardness (as $CaCO_3$)	211	211	0.0	68.2	67.0	1.8	79.1	79.6	0.6	50.3	50.6	0.6	108	108	0.0
pH	7.76	7.91	1.9	6.92	6.65	4.0	7.71	7.74	0.4	7.74	7.87	1.7	8.08	8.09	0.1
Total Suspended Solids	141	140	0.7	545	150	**113.7**	51.4	52.4	1.9	291	293	0.7	13	9	n/a
Total Dissolved Solids	20.8	30.3	n/a	115	106	8.1	123	119	3.3	75	94	*22.5*	151	146	3.4
Turbidity (NTU)	45.1	46.1	2.2	339	344	1.5	38.5	40.9	6.0	350	352	0.6	13.8	14	1.4
Acidity (as $CaCO_3$)	5.6	3.9	n/a	9.9	12.1	*20.0*	1.5	1.4	n/a	1.2	<1.0	n/a	<1.0	<1.0	n/a
Alkalinity, Bicarbonate (as $CaCO_3$)	39.1	38.6	1.3	<2.0	2.8	n/a	33.8	33.9	0.3	34.1	34.2	0.3	71.9	70.2	2.4
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<1.0	<1.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<1.0	<1.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	39.1	38.6	1.3	<2.0	2.8	n/a	33.8	33.9	0.3	34.1	34.2	0.3	71.9	70.2	2.4
Anions															
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.052	0.052	n/a	0.125	0.122	2.4	0.093	0.094	n/a	<0.020	<0.020	n/a	0.066	0.066	n/a
Sulfate (SO_4)	58.4	58.6	0.3	76.6	77.0	0.5	54.4	54.2	0.4	22.4	22.4	0.0	57.1	56.9	0.4
Nutrients															
Ammonia, Total (as N)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.034	0.0335	1.5	0.0219	0.0206	n/a	0.0218	0.0222	n/a	0.0157	0.0137	n/a	0.107	0.108	0.9
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	0.073	n/a
Total Nitrogen	<0.05	<0.05	n/a	<0.05	<0.05	n/a	<0.05	<0.05	n/a	<0.05	<0.05	n/a	0.15	0.18	n/a
Orthophosphate-Dissolved (as P)	-	-	n/a	-	-	n/a	<0.0010	<0.0010	n/a	0.0011	<0.0010	n/a	<0.0010	<0.0010	n/a
Phosphorus (P)-Total	0.0253	0.0364	n/a	1.02	1.42	*32.8*	0.0456	0.0609	n/a	0.163	0.163	n/a	0.0177	0.0136	n/a
Cyanides															
Cyanide, Weak Acid Diss	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Cyanide, Total	0.0013	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Organic / Inorganic Carbon															
Total Organic Carbon	<0.50	<0.50	n/a	1.43	1.46	n/a	<0.50	<0.50	n/a	0.59	0.79	n/a	0.51	0.55	n/a
Total Metals															
Aluminum (Al)	1.87	1.97	5.2	10.2	11.2	9.3	1.74	1.90	8.8	9.02	10.6	16.1	0.322	0.328	1.8
Antimony (Sb)	0.00145	0.00145	0.0	0.00202	0.00205	1.5	0.00076	0.00078	2.6	0.00364	0.00405	10.7	0.00199	0.00202	1.5
Arsenic (As)	0.00416	0.00436	4.7	0.0568	0.0590	3.8	0.00225	0.00231	2.6	0.0111	0.0124	11.1	0.00146	0.00146	0.0

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-1. Water Quality Relative Percent Difference Results, 2008

Sample ID	SC1			SC2			SC2			SC1			UR1		
Date Sampled	28-May-08			3-Jul-08			25-Sep-08			2-Oct-08			6-Dec-08		
ALS Sample ID	L635965-8	L635965-9	RPD (%)[a]	L652071-9	L652071-10	RPD (%)	L688714-7	L688714-8	RPD (%)	L691752-10	L691752-9	RPD (%)	L717413-13	L717413-14	RPD (%)
Barium (Ba)	0.0612	0.0643	4.9	0.287	0.288	0.3	0.0506	0.0516	2.0	0.223	0.251	11.8	0.0326	0.0326	0.0
Beryllium (Be)	<0.00050	<0.00050	n/a	0.00083	0.00084	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.000116	0.000135	15.1	0.00541	0.00559	3.3	0.00120	0.00120	0.0	0.000195	0.000205	5.0	0.000728	0.000731	0.4
Calcium (Ca)	34.8	35.3	1.4	28.4	29.6	4.1	29.7	29.7	0.0	17.5	18.6	6.1	36.8	36.7	0.3
Chromium (Cr)	0.00134	0.00145	n/a	0.00868	0.00941	8.1	0.00133	0.00146	n/a	0.00648	0.00755	15.3	<0.00050	<0.00050	n/a
Cobalt (Co)	0.00138	0.00139	0.7	0.0135	0.0139	2.9	0.00225	0.00226	0.4	0.00375	0.00428	13.2	0.0007	0.0007	0.0
Copper (Cu)	0.016	0.0167	4.3	0.417	0.432	3.5	0.107	0.107	0.0	0.0327	0.0360	9.6	0.071	0.0712	0.3
Iron (Fe)	2.02	2.11	4.4	31.6	32.2	1.9	3.53	3.84	8.4	11.0	11.9	7.9	1.53	1.53	0.0
Lead (Pb)	0.00199	0.00212	6.3	0.0175	0.0193	9.8	0.00299	0.00305	2.0	0.00979	0.0101	3.1	0.00122	0.00122	0.0
Lithium (Li)	<0.0050	<0.0050	n/a	0.0070	0.0073	n/a	<0.0050	<0.0050	n/a	0.0066	0.0076	n/a	<0.0050	<0.0050	n/a
Magnesium (Mg)	3.03	3.02	0.3	5.96	6.35	6.3	3.05	3.09	1.3	4.70	5.39	13.7	3.94	3.96	0.5
Manganese (Mn)	0.154	0.158	2.6	0.581	0.612	5.2	0.183	0.182	0.5	0.287	0.322	11.5	0.0842	0.0838	0.5
Mercury (Hg)	<0.000010	0.00001	n/a	0.000014	0.000030	n/a	0.000013	<0.000010	n/a	0.000075	0.000052	*36.2*	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.00137	0.0014	2.2	0.00581	0.00636	9.0	0.00173	0.00176	1.7	0.00148	0.00163	9.6	0.00153	0.00158	3.2
Nickel (Ni)	0.00133	0.00145	n/a	0.0116	0.00957	19.2	0.00234	0.00229	n/a	0.00427	0.00485	12.7	0.00079	0.00085	n/a
Phosphorus (P)	<0.30	<0.30	n/a	1.40	1.41	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	1.11	1.16	4.4	3.57	3.91	9.1	1.46	1.48	1.4	3.71	4.22	12.9	0.879	0.878	0.1
Selenium (Se)	0.00041	0.00039	n/a	0.00339	0.00367	7.9	0.00118	0.00108	8.8	0.00038	0.00042	n/a	0.0014	0.00123	12.9
Silicon (Si)	4.5	4.55	1.1	18.5	19.0	2.7	4.29	4.39	2.3	19.5	22.0	12.0	2.49	2.49	0.0
Silver (Ag)	0.000043	0.000045	n/a	0.000283	0.000296	4.5	0.000035	0.000038	n/a	0.000162	0.000195	18.5	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	2	<2.0	n/a
Strontium (Sr)	0.167	0.17	1.8	0.145	0.153	5.4	0.149	0.148	0.7	0.0990	0.106	6.8	0.223	0.223	0.0
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.00010	<0.00010	n/a	0.00020	0.00021	n/a	<0.00010	<0.00010	n/a	0.00016	0.00017	n/a	<0.00010	<0.00010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	0.00016	0.00019	n/a	<0.00010	0.00020	n/a	0.00015	0.00018	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	0.053	0.053	0.0	0.636	0.643	1.1	0.064	0.068	6.1	0.229	0.261	13.1	<0.010	<0.010	n/a
Uranium (U)	0.000083	0.000089	7.0	0.000816	0.000832	1.9	0.000300	0.000294	2.0	0.000263	0.000227	14.7	0.000223	0.00023	3.1
Vanadium (V)	0.0061	0.0065	6.3	0.0408	0.0426	4.3	0.0051	0.0054	5.7	0.0282	0.0330	15.7	<0.0010	<0.0010	n/a
Zinc (Zn)	0.0128	0.0149	n/a	0.385	0.395	2.6	0.0810	0.0817	0.9	0.0374	0.0423	n/a	0.0538	0.0539	0.2
Dissolved Metals															
Aluminum (Al)	0.0493	0.0389	*23.6*	0.208	0.215	3.3	0.0398	0.0390	2.0	0.0749	0.0762	1.7	0.0347	0.0497	n/a
Antimony (Sb)	0.00094	0.00093	1.1	<0.00010	<0.00010	n/a	0.00047	0.00047	n/a	0.00138	0.00137	0.7	0.00189	0.0019	0.5
Arsenic (As)	0.00047	0.00043	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00086	0.00080	7.2	<0.00010	0.00015	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-1. Water Quality Relative Percent Difference Results, 2008

Sample ID	SC1			SC2			SC2			SC1			UR1		
Date Sampled	28-May-08			3-Jul-08			25-Sep-08			2-Oct-08			6-Dec-08		
ALS Sample ID	L635965-8	L635965-9	RPD (%)[a]	L652071-9	L652071-10	RPD (%)	L688714-7	L688714-8	RPD (%)	L691752-10	L691752-9	RPD (%)	L717413-13	L717413-14	RPD (%)
Barium (Ba)	0.0276	0.0276	0.0	0.0450	0.0456	1.3	0.0298	0.0297	0.3	0.0302	0.0304	0.7	0.0302	0.0302	0.0
Beryllium (Be)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.000080	<0.000070	n/a	0.00485	0.00483	0.4	0.000698	0.000707	1.3	<0.000017	<0.000017	n/a	0.000388	0.000403	n/a
Calcium (Ca)	33.8	33.9	0.3	24.6	24.1	2.1	27.9	28.1	0.7	18.1	18.2	0.6	37	37	0.0
Chromium (Cr)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Cobalt (Co)	0.0003	0.00029	n/a	0.00760	0.00761	0.1	0.00120	0.00116	3.4	<0.00010	<0.00010	n/a	0.00053	0.00053	0.0
Copper (Cu)	0.001	0.00094	n/a	0.256	0.257	0.4	0.00201	0.00197	n/a	0.00018	0.00022	n/a	0.00355	0.00651	n/a
Iron (Fe)	<0.030	<0.030	n/a	2.13	1.84	14.6	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	0.065	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	0.000100	0.000143	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	0.000054	n/a
Lithium (Li)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Magnesium (Mg)	2.34	2.35	0.4	1.68	1.67	0.6	2.28	2.31	1.3	1.24	1.24	0.0	3.83	3.85	0.5
Manganese (Mn)	0.0899	0.0878	2.4	0.312	0.308	1.3	0.129	0.126	2.4	0.000355	0.000348	2.0	0.0752	0.0752	0.0
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000013	<0.000010	n/a
Molybdenum (Mo)	0.00126	0.0013	3.1	<0.000050	<0.000050	n/a	0.00147	0.00147	0.0	0.00134	0.00130	3.0	0.00152	0.00159	4.5
Nickel (Ni)	<0.00050	<0.00050	n/a	0.00325	0.00242	n/a	0.00113	0.00109	n/a	<0.00050	<0.00050	n/a	0.00078	0.0008	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.39	0.394	1.0	0.879	0.845	3.9	0.888	0.863	2.9	0.399	0.404	1.2	0.863	0.863	0.0
Selenium (Se)	0.00036	0.00038	n/a	0.00087	0.00071	*20.3*	0.00095	0.00094	1.1	0.00036	0.00040	n/a	0.00124	0.00111	11.1
Silicon (Si)	1.29	1.24	4.0	1.11	1.11	0.0	1.14	1.15	0.9	0.647	0.653	0.9	2.1	2.07	1.4
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	2	<2.0	n/a
Strontium (Sr)	0.162	0.162	0.0	0.110	0.110	0.0	0.141	0.140	0.7	0.0925	0.0923	0.2	0.222	0.223	0.4
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000052	0.000054	3.8	0.000063	0.000066	4.7	0.000080	0.000084	4.9	0.000036	0.000039	n/a	0.00016	0.00016	0.0
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0010	0.0015	n/a	0.325	0.322	0.9	0.0242	0.0241	0.4	<0.0010	<0.0010	n/a	0.0162	0.0178	9.4

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-2. Water Quality Relative Percent Difference Results, 2009

Sample ID	SC2			SC3			SC1			UR2			SC2		
Date Sampled	4-Mar-09			29-Mar-09			27-May-09			13-Jun-09			19-Jun-09		
ALS Sample ID	L740333-5	L740333-6	RPD (%)[a]	L749298-6	L749298-7	RPD (%)	L771080-2	L771080-1	RPD (%)	L778602-2	L778602-3	RPD (%)	L781603-4	L781603-3	RPD (%)
Physical Tests															
Colour, True (CU)	<5.0	<5.0	n/a[b]	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	5.1	n/a	<5.0	<5.0	n/a
Conductivity (µS/cm)	419	418	0.2	417	417	0.0	331	330	0.3	105	105	0.0	187	184	1.6
Hardness (as $CaCO_3$)	193	197	2.1	194	188	3.1	166	170	2.4	48.2	44.1	8.9	79.2	76.3	3.7
pH	7.98	7.97	0.1	8.1	8.12	0.2	7.86	7.76	1.3	7.84	7.85	0.1	7.32	7.01	4.3
Total Suspended Solids	5.5	6	n/a	7.5	5	n/a	8.5	11	n/a	146	137	6.4	172	173	0.6
Total Dissolved Solids	293	291	0.7	276	277	0.4	225	227	0.9	66	67	1.5	113	116	2.6
Turbidity (NTU)	12.6	11.7	7.4	7.58	8.63	13.0	10	10.5	4.9	94.7	93	1.8	132	138	4.4
Acidity (as $CaCO_3$)	3.9	3.6	n/a	3	2.9	n/a	3.5	3.8	n/a	1.2	1.2	n/a	2.8	3.2	n/a
Alkalinity, Bicarbonate (as $CaCO_3$)	95	94.4	0.6	97.4	100	2.6	73.8	63.2	15.5	28.8	29.1	1.0	21.8	21.8	0.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	95	94.4	0.6	97.4	100	2.6	73.8	63.2	15.5	28.8	29.1	1.0	21.8	21.8	0.0
Anions															
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.164	0.162	1.2	0.123	0.121	1.6	0.077	0.077	n/a	0.052	0.051	n/a	0.103	0.116	11.9
Sulfate (SO_4)	134	134	0.0	122	121	0.8	110	110	0.0	18	18	0.0	61.3	61.6	0.5
Nutrients															
Ammonia, Total (as N)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0857	0.0836	2.5	0.0988	0.0981	0.7	0.0473	0.0574	19.3	0.0999	0.101	1.1	0.0507	0.0509	0.4
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	0.0014	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Total Nitrogen	0.07	0.09	n/a	0.1	0.08	n/a	0.07	0.05	n/a	0.144	0.134	n/a	0.072	0.073	n/a
Orthophosphate-Dissolved (as P)	0.0013	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0022	0.0019	n/a	<0.0010	<0.0010	n/a
Phosphorus (P)-Total	0.0341	0.035	n/a	0.0171	0.0205	n/a	0.0136	0.0148	n/a	0.207	0.0583	n/a	0.269	0.273	1.5
Cyanides															
Cyanide, Weak Acid Diss	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Cyanide, Total	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Organic / Inorganic Carbon			n/a			n/a			n/a			n/a			n/a
Total Organic Carbon	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	1.01	0.98	n/a	<0.50	<0.50	n/a
Total Metals															
Aluminum (Al)	0.365	0.371	1.6	0.322	0.324	0.6	0.13	0.139	6.7	5.35	4.67	13.6	5	4.1	19.8
Antimony (Sb)	0.00062	0.00063	1.6	0.00055	0.00055	0.0	0.00105	0.00112	6.5	0.00104	0.00088	16.7	0.00096	0.00086	11.0
Arsenic (As)	0.00243	0.00246	1.2	0.00254	0.00257	1.2	0.00078	0.001	*24.7*	0.00513	0.00399	*25.0*	0.00801	0.00736	8.5

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-2. Water Quality Relative Percent Difference Results, 2009

Sample ID	SC2			SC3			SC1			UR2			SC2		
Date Sampled	4-Mar-09			29-Mar-09			27-May-09			13-Jun-09			19-Jun-09		
ALS Sample ID	L740333-5	L740333-6	RPD (%)[a]	L749298-6	L749298-7	RPD (%)	L771080-2	L771080-1	RPD (%)	L778602-2	L778602-3	RPD (%)	L781603-4	L781603-3	RPD (%)
Barium (Ba)	0.0377	0.0382	1.3	0.0386	0.038	1.6	0.0347	0.0356	2.6	0.0882	0.0848	3.9	0.111	0.0941	16.5
Beryllium (Be)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.0019	0.00195	2.6	0.00147	0.00148	0.7	0.000136	0.000143	5.0	0.000472	0.000402	16.0	0.0025	0.00242	3.3
Calcium (Ca)	68.6	67.2	2.1	68.6	68.9	0.4	55.9	54.5	2.5	18.5	17.1	7.9	30.7	30.1	2.0
Chromium (Cr)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00895	0.00701	*24.3*	0.00391	0.00333	16.0
Cobalt (Co)	0.00184	0.00186	1.1	0.00125	0.00127	1.6	0.00118	0.00125	5.8	0.00387	0.00319	19.3	0.00602	0.00571	5.3
Copper (Cu)	0.0849	0.0864	1.8	0.0554	0.0552	0.4	0.018	0.0196	8.5	0.066	0.0525	*22.8*	0.329	0.328	0.3
Iron (Fe)	1.97	2	1.5	1.34	1.33	0.7	0.189	0.248	*27.0*	7.84	6.74	15.1	9.64	8.39	13.9
Lead (Pb)	0.00144	0.00145	0.7	0.000974	0.000971	0.3	0.000288	0.000386	*29.1*	0.00396	0.00323	*20.3*	0.00682	0.00656	3.9
Lithium (Li)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Magnesium (Mg)	5.55	5.71	2.8	6.18	6.31	2.1	4.15	4.34	4.5	3.91	3.37	14.8	3.9	3.53	10.0
Manganese (Mn)	0.272	0.281	3.3	0.205	0.206	0.5	0.176	0.188	6.6	0.165	0.158	4.3	0.378	0.353	6.8
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.00247	0.0026	5.1	0.00228	0.00229	0.4	0.00134	0.00139	3.7	0.00176	0.00153	14.0	0.0022	0.00202	8.5
Nickel (Ni)	0.00147	0.00159	n/a	0.00177	0.00171	n/a	0.00131	0.00127	n/a	0.00784	0.00583	n/a	0.00509	0.00446	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	1.78	1.78	0.0	1.68	1.68	0.0	0.539	0.568	n/a	2.05	1.69	19.3	2.03	1.84	9.8
Selenium (Se)	0.00269	0.00258	4.2	0.00259	0.00255	1.6	0.00057	0.00055	n/a	0.00069	0.00066	n/a	0.00157	0.00146	7.3
Silicon (Si)	2.88	2.89	0.3	2.67	2.68	0.4	1.81	1.91	5.4	11.7	10.7	8.9	8.8	7.21	19.9
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000096	0.000069	n/a	0.000101	0.000077	n/a
Sodium (Na)	3.5	3.5	n/a	3.5	3.4	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.368	0.385	4.5	0.366	0.368	0.5	0.254	0.265	4.2	0.0975	0.103	5.5	0.168	0.162	3.6
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.356	0.304	15.8	0.211	0.144	*37.7*
Uranium (U)	0.000531	0.000528	0.6	0.00048	0.000475	1.0	0.000085	0.000084	1.2	0.000377	0.000322	15.7	0.000698	0.00057	*20.2*
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0218	0.0169	*25.3*	0.0157	0.0129	19.6
Zinc (Zn)	0.124	0.126	1.6	0.101	0.0995	1.5	0.0124	0.013	4.7	0.0501	0.0392	*24.4*	0.165	0.159	3.7

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-2. Water Quality Relative Percent Difference Results, 2009

Sample ID	SC2			SC3			SC1			UR2			SC2		
Date Sampled	4-Mar-09			29-Mar-09			27-May-09			13-Jun-09			19-Jun-09		
ALS Sample ID	L740333-5	L740333-6	RPD (%)[a]	L749298-6	L749298-7	RPD (%)	L771080-2	L771080-1	RPD (%)	L778602-2	L778602-3	RPD (%)	L781603-4	L781603-3	RPD (%)
Dissolved Metals															
Aluminum (Al)	0.0389	0.0384	1.3	0.0505	0.0491	2.8	0.0297	0.027	9.5	0.827	0.0755	**166.5**	0.0177	0.0168	5.2
Antimony (Sb)	0.00054	0.00055	1.8	0.00047	0.00046	n/a	0.00105	0.00106	0.9	0.00057	0.00054	5.4	0.00036	0.00035	n/a
Arsenic (As)	<0.00010	<0.00010	n/a	0.00019	0.00018	n/a	0.00025	0.00021	n/a	0.00241	0.00013	n/a	<0.00010	<0.00010	n/a
Barium (Ba)	0.0362	0.0374	3.3	0.0354	0.0357	0.8	0.0345	0.0336	2.6	0.0382	0.0193	**65.7**	0.0312	0.0316	1.3
Beryllium (Be)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.00122	0.00129	5.6	0.000739	0.000752	1.7	0.000143	0.000133	7.2	0.000378	0.00009	**123.1**	0.00185	0.00172	7.3
Calcium (Ca)	68.1	69.7	2.3	67.9	65.9	3.0	58.4	60.3	3.2	16.5	15.5	6.3	28.2	27.1	4.0
Chromium (Cr)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00094	<0.00050	n/a	<0.00050	<0.00050	n/a
Cobalt (Co)	0.00171	0.00174	1.7	0.00109	0.0011	0.9	0.00114	0.00109	4.5	0.0017	0.00021	n/a	0.00348	0.00323	7.5
Copper (Cu)	0.00385	0.00397	n/a	0.00242	0.00234	n/a	0.00682	0.00649	5.0	0.047	0.00206	n/a	0.0102	0.00803	*23.8*
Iron (Fe)	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	3.5	0.051	n/a	<0.030	<0.030	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.00236	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Magnesium (Mg)	5.57	5.69	2.1	5.86	5.61	4.4	4.93	4.63	6.3	1.73	1.32	*26.9*	2.17	2.1	3.3
Manganese (Mn)	0.272	0.274	0.7	0.194	0.189	2.6	0.187	0.182	2.7	0.0999	0.0333	**100.0**	0.246	0.243	1.2
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.0024	0.00244	1.7	0.00219	0.00217	0.9	0.00152	0.00149	2.0	0.000956	0.00123	*25.1*	0.00103	0.00103	0.0
Nickel (Ni)	0.00169	0.00168	n/a	0.00172	0.00215	n/a	0.00153	0.00129	n/a	0.00199	<0.00050	n/a	0.00193	0.00178	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	1.78	1.82	2.2	1.63	1.59	2.5	0.625	0.59	5.8	0.732	0.611	18.0	0.873	0.865	0.9
Selenium (Se)	0.00223	0.00232	4.0	0.00224	0.00209	6.9	0.00057	0.00061	n/a	0.00045	0.00037	n/a	0.00098	0.00097	n/a
Silicon (Si)	2.52	2.53	0.4	2.43	2.41	0.8	1.65	1.68	1.8	3.07	1.49	**69.3**	1.37	1.36	0.7
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	3.5	3.6	n/a	3.4	3.5	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.375	0.386	2.9	0.362	0.363	0.3	0.278	0.271	2.6	0.0876	0.0807	8.2	0.145	0.142	2.1
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.065	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000418	0.000427	2.1	0.000398	0.000425	6.6	0.000084	0.000084	0.0	0.000245	0.000113	**73.7**	0.000016	0.000017	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0035	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	0.0478	0.0513	7.1	0.0234	0.0232	0.9	0.0097	0.0095	n/a	0.0292	0.0019	n/a	0.097	0.0757	*24.7*

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-2. Water Quality Relative Percent Difference Results, 2009

Sample ID	UR1A			SC1			UR2			BJ U/S		
Date Sampled	2-Jul-09			4-Aug-09			27-Sep-09			12-Oct-09		
ALS Sample ID	L787346-30	L787346-6	RPD (%)	L801967-8	L801967-9	RPD (%)	L824535-12	L824535-2	RPD (%)	L829659-4	L829659-5	RPD (%)
Physical Tests												
Colour, True (CU)	<5.0	6.6	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	-	-	n/a
Conductivity (µS/cm)	91	90.7	0.3	68.3	66.5	2.7	120	119	0.8	-	-	n/a
Hardness (as $CaCO_3$)	45.1	43.7	3.2	31	29.8	3.9	50.9	52.1	2.3	22.6	22.5	0.4
pH	7.89	7.9	0.1	8.08	7.93	1.9	7.83	7.76	0.9	7.65	7.54	1.4
Total Suspended Solids	7.5	8.5	n/a	110	115	4.4	41	44	7.1	<3.0	<3.0	n/a
Total Dissolved Solids	57	50	n/a	42	40	n/a	86	70	*20.5*	23	22	n/a
Turbidity (NTU)	12.8	12.6	1.6	137	132	3.7	51.7	49.2	5.0	-	-	n/a
Acidity (as $CaCO_3$)	2.7	2.6	n/a	<1.0	1.1	n/a	2.2	2.5	n/a	-	-	n/a
Alkalinity, Bicarbonate (as $CaCO_3$)	32.7	35.3	7.6	26	25.3	2.7	36.5	37	1.4	-	-	n/a
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<1.0	<1.0	n/a	<2.0	<2.0	n/a	-	-	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<1.0	<1.0	n/a	<2.0	<2.0	n/a	-	-	n/a
Alkalinity, Total (as $CaCO_3$)	32.7	35.3	7.6	26	25.3	2.7	36.5	37	1.4	-	-	n/a
Anions												
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	<0.020	<0.020	n/a	<0.020	<0.020	n/a	0.04	0.037	n/a	<0.020	<0.020	n/a
Sulfate (SO_4)	11.7	11.6	0.9	10.1	10.1	0.0	19.5	19.4	0.5	8.72	8.75	0.3
Nutrients												
Ammonia, Total (as N)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0279	0.0292	4.6	0.011	0.012	n/a	0.099	0.101	2.0	<0.0050	<0.0050	n/a
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	<0.050	<0.050	n/a	0.075	0.056	n/a	<0.050	<0.050	n/a	-	-	n/a
Total Nitrogen	<0.050	<0.050	n/a	0.086	0.068	n/a	0.12	0.1	n/a	-	-	n/a
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	n/a	<0.0010	0.0011	n/a	0.0016	0.0014	n/a	-	-	n/a
Phosphorus (P)-Total	0.0156	0.0105	n/a	0.105	0.112	6.5	0.064	0.067	n/a	-	-	n/a
Cyanides												
Cyanide, Weak Acid Diss	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Cyanide, Total	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0013	<0.0010	n/a	-	-	n/a
Organic / Inorganic Carbon			n/a			n/a			n/a			n/a
Total Organic Carbon	0.52	0.6	n/a	<0.50	<0.50	n/a	0.86	0.67	n/a	-	-	n/a
Total Metals												
Aluminum (Al)	0.429	0.53	*21.1*	4.78	4.83	1.0	2.06	2.02	2.0	0.0189	0.0222	16.1
Antimony (Sb)	0.00123	0.00123	0.0	0.002	0.00204	2.0	0.00123	0.00134	8.6	0.00025	0.00024	n/a
Arsenic (As)	0.00056	0.00072	*25.0*	0.00773	0.00778	0.6	0.0019	0.00204	7.1	0.00079	0.00078	1.3

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-2. Water Quality Relative Percent Difference Results, 2009

Sample ID	UR1A			SC1			UR2			BJ U/S		
Date Sampled	2-Jul-09			4-Aug-09			27-Sep-09			12-Oct-09		
ALS Sample ID	L787346-30	L787346-6	RPD (%)	L801967-8	L801967-9	RPD (%)	L824535-12	L824535-2	RPD (%)	L829659-4	L829659-5	RPD (%)
Barium (Ba)	0.0214	0.0245	13.5	0.128	0.132	3.1	0.0547	0.0531	3.0	0.0360	0.0349	3.1
Beryllium (Be)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.00003	0.000037	n/a	0.000138	0.000133	3.7	0.000151	0.000181	18.1	<0.000010	<0.000010	n/a
Calcium (Ca)	14.8	15.3	3.3	11.6	11.9	2.6	18.8	20.2	7.2	9.18	8.68	5.6
Chromium (Cr)	0.00082	0.00112	n/a	0.00315	0.00317	0.6	0.00296	0.00316	6.5	<0.00050	<0.00050	n/a
Cobalt (Co)	0.00021	0.00032	n/a	0.00227	0.00229	0.9	0.00133	0.00144	7.9	<0.00010	<0.00010	n/a
Copper (Cu)	0.00104	0.00151	n/a	0.0196	0.0201	2.5	0.0191	0.0204	6.6	0.00037	0.00011	n/a
Iron (Fe)	0.447	0.632	*34.3*	5.2	5.12	1.6	2.93	3.11	6.0	<0.030	<0.030	n/a
Lead (Pb)	0.00032	0.00054	**51.2**	0.00554	0.00558	0.7	0.00171	0.00213	*21.9*	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Magnesium (Mg)	3.01	3.07	2.0	2.49	2.46	1.2	2.34	2.51	7.0	0.304	0.295	3.0
Manganese (Mn)	0.0143	0.0204	*35.2*	0.183	0.186	1.6	0.0776	0.08	3.0	0.00515	0.00400	*25.1*
Mercury (Hg)	<0.000010	<0.000010	n/a	0.000017	0.000016	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000657	0.000683	3.9	0.000703	0.000698	0.7	0.00168	0.00179	6.3	0.000383	0.000368	4.0
Nickel (Ni)	0.00089	0.00114	n/a	0.00222	0.00233	n/a	<0.0030	<0.0040	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.423	0.455	n/a	1.84	1.89	2.7	1.2	1.28	n/a	0.104	0.095	n/a
Selenium (Se)	0.00041	0.00066	n/a	0.00013	0.00022	n/a	0.00057	0.0007	n/a	0.00011	<0.00010	n/a
Silicon (Si)	1.88	2.04	8.2	7.31	7.35	0.5	6.06	6.24	2.9	0.555	0.559	0.7
Silver (Ag)	<0.000010	<0.000010	n/a	0.000103	0.000089	n/a	<0.000040	0.000035	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.157	0.162	3.1	0.0614	0.0628	2.3	0.105	0.112	6.5	0.0582	0.0561	3.7
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	0.013	0.018	n/a	0.114	0.111	2.7	0.142	0.151	6.1	<0.010	<0.010	n/a
Uranium (U)	0.00002	0.000026	n/a	0.000122	0.000099	*20.8*	0.000239	0.00026	8.4	0.000037	0.000036	n/a
Vanadium (V)	0.0017	0.0023	n/a	0.0149	0.0147	1.4	0.007	0.0074	5.6	<0.0010	<0.0010	n/a
Zinc (Zn)	0.0032	0.0046	n/a	0.0242	0.025	3.3	0.0162	0.017	4.8	0.0011	0.0014	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-2. Water Quality Relative Percent Difference Results, 2009

Sample ID	UR1A			SC1			UR2			BJ U/S		
Date Sampled	2-Jul-09			4-Aug-09			27-Sep-09			12-Oct-09		
ALS Sample ID	L787346-30	L787346-6	RPD (%)	L801967-8	L801967-9	RPD (%)	L824535-12	L824535-2	RPD (%)	L829659-4	L829659-5	RPD (%)
Dissolved Metals												
Aluminum (Al)	0.0807	0.0358	**77.1**	0.417	0.0724	**140.8**	0.0411	0.0519	*23.2*	0.0041	0.0038	n/a
Antimony (Sb)	0.0011	0.00114	3.6	0.00066	0.00058	12.9	0.00102	0.00111	8.5	0.00024	0.00025	n/a
Arsenic (As)	0.00046	0.00027	n/a	0.00096	0.00058	n/a	0.00016	0.00019	n/a	0.00069	0.00068	n/a
Barium (Ba)	0.0175	0.0157	10.8	0.0329	0.0237	*32.5*	0.021	0.0225	6.9	0.0343	0.0338	1.5
Beryllium (Be)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.00003	0.000022	n/a	0.000016	0.00001	n/a	0.000063	0.000065	n/a	<0.000010	<0.000010	n/a
Calcium (Ca)	13.7	13.3	3.0	11.2	10.8	3.6	18	18.4	2.2	8.56	8.52	0.5
Chromium (Cr)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Cobalt (Co)	0.00018	<0.00010	n/a	0.00014	<0.00010	n/a	0.00014	0.00015	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.00088	0.00039	n/a	0.00159	0.00108	n/a	0.0022	0.00238	n/a	<0.00010	<0.00010	n/a
Iron (Fe)	0.188	0.048	n/a	0.291	<0.030	n/a	<0.030	0.039	n/a	<0.030	<0.030	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	0.000379	0.000079	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Magnesium (Mg)	2.67	2.56	4.2	0.769	0.663	14.8	1.43	1.49	4.1	0.286	0.285	0.4
Manganese (Mn)	0.0131	0.00538	**83.5**	0.011	0.00141	**154.6**	0.022	0.0225	2.2	0.000228	0.000245	n/a
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000521	0.000622	17.7	0.000492	0.000483	1.8	0.00145	0.00157	7.9	0.000426	0.000350	19.6
Nickel (Ni)	0.00058	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.299	0.294	1.7	0.286	0.16	n/a	0.726	0.728	0.3	0.095	0.082	n/a
Selenium (Se)	0.00033	0.00033	n/a	<0.00010	<0.00010	n/a	0.00039	0.00055	n/a	<0.00010	<0.00010	n/a
Silicon (Si)	1.27	1.25	1.6	0.998	0.383	**89.1**	1.74	1.75	0.6	0.533	0.527	1.1
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.137	0.133	3.0	0.0572	0.0556	2.8	0.0927	0.0991	6.7	0.0541	0.0528	2.4
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000019	0.000018	n/a	0.000022	0.000016	n/a	0.000154	0.000167	8.1	0.000033	0.000030	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	0.0012	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	0.003	0.0011	n/a	<0.0030	<0.0020	n/a	0.0012	0.0015	n/a	<0.0010	<0.0010	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-3. Water Quality Relative Percent Difference Results, 2010

Sample ID	TC2			TD1			BR2			TC2			TC2			BJ O/F			TC3			BR2			TD1		
Date Sampled	20-May-10			1-Jun-10			8-Jun-10			21-Jun-10			22-Jul-10			28-Aug-10			21-Sep-10			19-Oct-10			15-Nov-10		
ALS Sample ID	L889248-6	L889248-8	RPD (%)[a]	L893465-4	L893465-7	RPD (%)	L896218-2	L896218-7	RPD (%)	L900776-7	L900776-10	RPD (%)	L912512-6	L912512-8	RPD (%)	L927354-14	L927354-16	RPD (%)	L939078-7	L939078-10	RPD (%)	L945638-2	L945638-10	RPD (%)	L955657-4	L955657-10	RPD (%)
Physical Tests																											
Colour, True (CU)	<5.0	<5.0	n/a[b]	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	10.5	8.4	n/a	<5.0	<5.0	n/a
Conductivity (µS/cm)	177	177	0.0	93.3	93.8	0.5	114	113	0.9	113	113	0.0	88.4	88.4	0.0	56.5	57.0	0.9	186	186	0.0	142	142	0.0	164	165	0.6
Hardness (as $CaCO_3$)	85.8	85.2	0.7	42.0	41.3	1.7	52.4	55.7	6.1	54.5	54.0	0.9	44.8	44.0	1.8	25.0	24.7	1.2	90.0	91.2	1.3	65.8	66.9	1.7	76.0	79.3	4.2
pH	8.04	8.09	0.6	7.92	7.91	0.1	7.65	7.18	6.3	8.00	7.90	1.3	7.87	7.93	0.8	7.38	7.35	0.4	8.10	8.10	0.0	8.24	8.18	0.7	8.07	8.00	0.9
Total Suspended Solids	160	154	3.8	51.3	38.8	*27.7*	30.1	34.1	12.5	157	205	*26.5*	153	108	*34.5*	<3.0	<3.0	n/a	11.0	10.0	n/a	3.3	3.3	n/a	<3.0	<3.0	n/a
Total Dissolved Solids	116	117	0.9	76	88	14.6	84	77	8.7	109	90	19.1	73	67	8.6	37	29	n/a	112	115	2.6	95	96	1.0	89	88	1.1
Turbidity (NTU)	120	138	14.0	73.3	77.6	5.7	50.7	53.2	4.8	181	183	1.1	136	119	13.3	1.42	1.55	8.8	4.57	5.08	10.6	3.32	3.41	2.7	2.27	2.71	17.7
Acidity (as $CaCO_3$)	2.7	2.1	n/a	2.8	2.7	n/a	2.9	2.6	n/a	2.4	2.7	n/a	1.7	1.6	n/a	3.4	3.7	n/a	2.2	2.2	n/a	2.4	3.7	n/a	1.8	2.1	n/a
Alkalinity, Bicarbonate (as $CaCO_3$)	60.1	60.2	0.2	40.0	43.7	8.8	41.6	46.9	12.0	45.0	44.6	0.9	35.7	36.2	1.4	14.6	14.2	2.8	71.6	64.7	10.1	48.3	48.8	1.0	58.3	59.6	2.2
Alkalinity, Carbonate (as $CaCO_3$)	<1.0	<1.0	n/a	<1.0	<1.0	n/a	<2.0	<1.0	n/a	<1.0	<1.0	n/a	<1.0	<1.0	n/a	<1.0	<1.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<1.0	<1.0	n/a	<1.0	<1.0	n/a	<2.0	<1.0	n/a	<1.0	<1.0	n/a	<1.0	<1.0	n/a	<1.0	<1.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	60.1	60.2	0.2	40.0	43.7	8.8	41.6	46.9	12.0	45.0	44.6	0.9	35.7	36.2	1.4	14.6	14.2	2.8	71.6	64.7	10.1	48.3	48.8	1.0	58.3	59.6	2.2
Anions																											
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.032	0.031	n/a	<0.020	<0.020	n/a	0.026	0.027	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	0.025	n/a	0.020	0.021	n/a	0.025	0.025	n/a
Sulfate (SO_4)	30.5	30.3	0.7	8.84	8.81	0.3	14.0	14.0	0.0	14.2	14.1	0.7	10.8	9.69	10.8	11.7	11.8	0.9	18.7	25.0	*28.8*	17.9	17.8	0.6	25.0	24.9	0.4
Nutrients																											
Ammonia, Total (as N)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	0.0061	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0565	0.0574	1.6	0.0782	0.0794	1.5	0.125	0.126	0.8	<0.0050	<0.0050	n/a	0.0051	0.0317	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	0.379	0.375	1.1	0.149	0.148	0.7
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	0.084	0.073	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	0.060	0.070	n/a	<0.050	<0.050	n/a	<0.050	0.050	n/a	<0.050	<0.050	n/a	0.051	0.075	n/a	0.061	<0.050	n/a
Total Nitrogen	0.140	0.130	n/a	0.110	0.120	n/a	0.170	0.150	n/a	0.060	0.070	n/a	<0.050	<0.050	n/a	<0.050	0.050	n/a	<0.050	<0.050	n/a	0.430	0.450	4.5	0.210	0.190	n/a
Orthophosphate-Dissolved (as P)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Phosphorus (P)-Total	0.138	0.139	0.7	0.0773	0.0790	n/a	0.0565	0.0674	n/a	0.254	0.261	2.7	0.186	0.159	15.7	<0.0020	0.0021	n/a	0.0108	0.0114	n/a	0.0079	0.0083	n/a	0.0022	0.0024	n/a
Cyanides																											
Cyanide, Weak Acid Diss	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Cyanide, Total	0.0011	<0.0010	n/a	0.0016	0.0014	n/a	0.0016	0.0015	n/a	<0.0010	<0.0010	n/a	0.0010	0.0014	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0029	0.0029	n/a	<0.0010	<0.0010	n/a
Organic / Inorganic Carbon																											
Total Organic Carbon	1.94	1.95	n/a	0.76	0.74	n/a	1.14	0.92	n/a	0.76	<0.50	n/a	1.19	0.73	n/a	2.14	1.45	n/a	0.68	0.65	n/a	2.33	2.52	n/a	0.76	0.73	n/a
Total Metals																											
Aluminum (Al)	6.55	5.77	12.7	3.52	3.45	2.0	2.62	2.86	8.8	5.58	4.96	11.8	5.00	4.60	8.3	0.0621	0.0589	5.3	0.303	0.303	0.0	0.191	0.159	18.3	0.107	0.126	16.3
Antimony (Sb)	0.00146	0.00141	3.5	0.00034	0.00033	n/a	0.00045	0.00046	n/a	0.00151	0.00153	1.3	0.00096	0.00060	*46.2*	0.00024	0.00024	n/a	0.00028	0.00029	n/a	0.00013	0.00013	n/a	0.00020	0.00018	n/a
Arsenic (As)	0.00627	0.00611	2.6	0.00191	0.00200	4.6	0.00227	0.00230	1.3	0.00753	0.00741	1.6	0.00497	0.00342	*36.9*	0.00095	0.00093	2.1	0.00074	0.00097	*26.9*	0.00032	0.00033	n/a	0.00041	0.00046	n/a
Barium (Ba)	0.141	0.131	7.4	0.147	0.147	0.0	0.0735	0.0770	4.7	0.126	0.115	9.1	0.101	0.109	7.6	0.0333	0.0333	0.0	0.0416	0.0417	0.2	0.0316	0.0309	2.2	0.103	0.104	1.0
Beryllium (Be)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.020	<0.020	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.011	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.00109	0.00105	3.7	0.000144	0.000147	2.1	0.000170	0.000176	3.5	0.00123	0.00119	3.3	0.000548	0.000142	**117.7**	0.000035	0.000033	n/a	0.000110	0.000120	8.7	0.000037	0.000040	n/a	0.000079	0.000088	n/a
Calcium (Ca)	28.9	28.9	0.0	15.6	16.0	2.5	18.7	19.6	4.7	20.3	19.1	6.1	16.5	15.4	6.9	10.2	10.1	1.0	31.9	31.5	1.3	21.1	20.1	4.9	26.6	27.5	3.3
Chromium (Cr)	0.00558	0.00511	8.8	0.00069	0.00070	n/a	0.00237	0.00248	n/a	0.00533	0.00492	8.0	0.00309	0.00293	5.3	<0.00020	<0.00020	n/a	0.00024	0.00027	n/a	0.00041	0.00037	n/a	0.00011	0.00017	n/a
Cobalt (Co)	0.00305	0.00294	3.7	0.00117	0.00120	2.5	0.00124	0.00129	4.0	0.00339	0.00324	4.5	0.00215	0.00210	2.4	0.00015	0.00015	n/a	0.00015	0.00023	n/a	0.00010	0.00011	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.00854	0.00823	3.7	0.00222	0.00226	n/a	0.00301	0.00306	1.6	0.00943	0.00944	0.1	0.00526	0.00393	*28.9*	0.00041	0.00057	n/a	<0.00050	0.00078	n/a	0.00087	0.00134	n/a	<0.00050	<0.00050	n/a
Iron (Fe)	7.23	6.90	4.7	3.06	3.01	1.6	3.01	2.91	3.4	8.79	9.19	4.4	6.10	5.94	2.7	0.047	0.045	n/a	0.394	0.559	*34.6*	0.199	0.193	3.1	0.074	0.078	n/a
Lead (Pb)	0.00292	0.00280	4.2	0.00202	0.00193	4.6	0.00110	0.00111	0.9	0.00377	0.00382	1.3	0.00259	0.00236	9.3	0.000154	0.000140	n/a	0.000127	0.000224	n/a	0.000076	0.000084	n/a	0.000103	0.000092	n/a
Lithium (Li)	0.0060	0.0056	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	0.0059	0.0054	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Magnesium (Mg)	6.32	6.06	4.2	2.30	2.28	0.9	3.21	3.29	2.5	3.34	2.97	11.7	2.59	2.66	2.7	0.414	0.399	3.7	4.27	4.37	2.3	3.70	3.61	2.5	3.14	3.24	3.1
Manganese (Mn)	0.368	0.362	1.6	0.117	0.119	1.7	0.0885	0.0942	6.2	0.319	0.287	10.6	0.190	0.163	15.3	0.0310	0.0298	3.9	0.0504	0.0669	*28.1*	0.00965	0.00933	3.4	0.00529	0.00548	3.5
Mercury (Hg)	0.00004	0.00002	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.00005	0.00006	17.9	0.00004	0.00001	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.00195	0.00196	0.5	0.000635	0.000619	2.6	0.000744	0.000729	2.0	0.00210	0.00224	6.5	0.00132	0.000791	**50.1**	0.000371	0.000330	11.7	0.00153	0.00145	5.4	0.000462	0.000445	3.7	0.000791	0.000805	1.8
Nickel (Ni)	0.0105	0.0102	2.9	0.00070	0.00071	n/a	0.00233	0.00243	n/a	0.00968	0.00922	4.9	0.00462	0.00279	*49.4*	<0.00050	<0.00050	n/a	0.00058	0.00084	n/a	0.00088	0.00094	n/a	<0.00050	<0.00050	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-3. Water Quality Relative Percent Difference Results, 2010

Sample ID	TC2			TD1			BR2			TC2			TC2			BJ O/F			TC3			BR2			TD1		
Date Sampled	20-May-10			1-Jun-10			8-Jun-10			21-Jun-10			22-Jul-10			28-Aug-10			21-Sep-10			19-Oct-10			15-Nov-10		
ALS Sample ID	L889248-6	L889248-8	RPD (%)[a]	L893465-4	L893465-7	RPD (%)	L896218-2	L896218-7	RPD (%)	L900776-7	L900776-10	RPD (%)	L912512-6	L912512-8	RPD (%)	L927354-14	L927354-16	RPD (%)	L939078-7	L939078-10	RPD (%)	L945638-2	L945638-10	RPD (%)	L955657-4	L955657-10	RPD (%)
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	2.11	1.91	10.0	1.88	1.89	0.5	1.09	1.22	11.3	2.19	2.00	9.1	2.37	1.84	*25.2*	0.127	0.123	n/a	0.409	0.418	2.2	0.243	0.220	n/a	0.407	0.423	3.9
Selenium (Se)	0.00208	0.00198	4.9	<0.00020	<0.00020	n/a	0.00028	0.00043	n/a	0.00145	0.00132	9.4	0.00055	<0.00020	n/a	<0.00020	<0.00020	n/a	0.00088	0.00076	n/a	0.00038	0.00038	n/a	0.00020	0.00023	n/a
Silicon (Si)	16.2	13.5	18.2	7.55	7.47	1.1	6.91	7.17	3.7	11.4	10.7	6.3	11.8	9.94	17.1	0.739	0.720	2.6	2.09	2.00	4.4	2.70	2.53	6.5	1.47	1.47	0.0
Silver (Ag)	0.000103	0.000102	1.0	0.000031	0.000025	n/a	0.000027	0.000035	n/a	0.000156	0.000156	0.0	0.000078	0.000048	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	33.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.242	0.243	0.4	0.115	0.117	1.7	0.160	0.163	1.9	0.129	0.115	11.5	0.0913	0.110	18.6	0.0775	0.0744	4.1	0.226	0.219	3.1	0.200	0.199	0.5	0.209	0.208	0.5
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	0.00024	0.00023	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00027	0.00027	n/a	0.00019	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	0.166	0.127	*26.6*	0.107	0.102	4.8	0.068	0.069	1.5	0.114	0.111	2.7	0.128	0.118	8.1	<0.010	<0.010	n/a	0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000201	0.000203	1.0	0.000166	0.000184	10.3	0.000083	0.000131	*44.9*	0.000240	0.000241	0.4	0.000185	0.000115	*46.7*	0.000034	0.000033	n/a	0.000074	0.000077	4.0	0.000026	0.000026	n/a	0.000107	0.000110	2.8
Vanadium (V)	0.0142	0.0126	11.9	0.0078	0.0076	2.6	0.0065	0.0071	8.8	0.0154	0.0141	8.8	0.0123	0.0100	*20.6*	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	0.0868	0.0817	6.1	0.0122	0.0123	n/a	0.0171	0.0176	2.9	0.0829	0.0838	1.1	0.0404	0.0163	**85.0**	0.0033	0.0031	n/a	0.0032	0.0050	n/a	<0.0030	<0.0030	n/a	0.0035	0.0040	n/a
Dissolved Metals																											
Aluminum (Al)	0.0317	0.0493	n/a	0.0495	0.101	**68.4**	0.0708	0.0941	*28.3*	0.0360	0.0672	**60.5**	1.17	0.106	**166.8**	0.0112	0.0113	n/a	0.0605	0.0060	n/a	0.0266	0.0258	n/a	0.0117	0.0102	n/a
Antimony (Sb)	0.00022	0.00023	n/a	0.00015	0.00017	n/a	0.00013	0.00014	n/a	0.00027	0.00028	n/a	0.00040	0.00018	n/a	0.00021	0.00021	n/a	0.00026	0.00023	n/a	0.00012	0.00012	n/a	0.00018	0.00018	n/a
Arsenic (As)	0.00023	0.00023	n/a	0.00037	0.00040	n/a	0.00035	0.00036	n/a	0.00035	0.00037	n/a	0.00120	0.00037	n/a	0.00056	0.00053	5.5	0.00083	0.00032	n/a	0.00021	0.00021	n/a	0.00035	0.00038	n/a
Barium (Ba)	0.0200	0.0202	1.0	0.0601	0.0612	1.8	0.0249	0.0255	2.4	0.0172	0.0177	2.9	0.0395	0.0274	*36.2*	0.0309	0.0303	2.0	0.0369	0.0344	7.0	0.0283	0.0286	1.1	0.0969	0.0973	0.4
Beryllium (Be)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.000060	0.000063	n/a	0.000051	0.000053	n/a	0.000046	0.000049	n/a	0.000034	0.000034	n/a	0.000123	0.000013	n/a	0.000030	0.000028	n/a	0.000129	0.000068	n/a	0.000034	0.000028	n/a	0.000079	0.000084	n/a
Calcium (Ca)	27.1	26.8	1.1	14.6	14.4	1.4	17.2	18.3	6.2	18.6	18.4	1.1	15.3	15.3	0.0	9.41	9.28	1.4	29.5	29.7	0.7	20.4	20.8	1.9	25.4	26.6	4.6
Chromium (Cr)	<0.00020	<0.00020	n/a	<0.00020	<0.00020	n/a	<0.00020	<0.00020	n/a	<0.00020	<0.00050	n/a	0.00074	<0.00020	n/a	<0.00020	<0.00020	n/a	<0.00010	<0.00010	n/a	0.00020	0.00014	n/a	<0.00010	<0.00010	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00035	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00018	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.00045	0.00043	n/a	0.00032	0.00034	n/a	0.00032	0.00042	n/a	0.00016	0.00016	n/a	0.00085	0.00018	n/a	0.00020	0.00017	n/a	0.00084	<0.00050	n/a	0.00061	0.00086	n/a	<0.00050	0.00053	n/a
Iron (Fe)	<0.030	0.040	n/a	0.035	0.087	n/a	0.054	0.069	n/a	<0.030	0.030	n/a	0.869	0.073	n/a	<0.030	<0.030	n/a	0.333	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	0.000071	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.000456	<0.000050	n/a	<0.000050	<0.000050	n/a	0.000195	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Magnesium (Mg)	4.38	4.41	0.7	1.35	1.32	2.2	2.32	2.44	5.0	1.98	1.93	2.6	1.61	1.42	12.5	0.374	0.368	1.6	3.96	4.15	4.7	3.57	3.62	1.4	3.05	3.12	2.3
Manganese (Mn)	0.000726	0.00105	*36.5*	0.0251	0.0257	2.4	0.00965	0.0103	6.5	0.000601	0.000840	*33.2*	0.0314	0.00168	**179.7**	0.0220	0.0209	5.1	0.0613	0.0265	**79.3**	0.00314	0.00315	0.3	0.00187	0.00183	2.2
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000999	0.00101	1.1	0.000524	0.000522	0.4	0.000530	0.000512	3.5	0.00105	0.00109	3.7	0.000842	0.000611	*31.8*	0.000344	0.000325	5.7	0.00131	0.00143	8.8	0.000424	0.000428	0.9	0.000764	0.000754	1.3
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00077	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00055	<0.00050	n/a	0.00071	0.00069	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.272	0.280	2.9	0.283	0.307	8.1	0.175	0.198	n/a	0.236	0.244	n/a	0.670	0.189	n/a	0.106	0.106	n/a	0.284	0.276	2.9	0.193	0.190	n/a	0.365	0.363	0.5
Selenium (Se)	0.00158	0.00141	11.4	<0.00020	<0.00020	n/a	0.00021	0.00034	n/a	0.00084	0.00093	n/a	0.00053	<0.00020	n/a	<0.00020	<0.00020	n/a	0.00092	0.00087	n/a	0.00039	0.00040	n/a	0.00019	0.00018	n/a
Silicon (Si)	1.52	1.59	4.5	0.909	1.07	16.3	1.76	1.72	2.3	1.03	1.04	1.0	3.93	0.982	**120.0**	0.643	0.651	1.2	1.54	1.49	3.3	2.39	2.39	0.0	1.25	1.25	0.0
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000016	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000014	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.218	0.222	1.8	0.109	0.106	2.8	0.148	0.153	3.3	0.109	0.109	0.0	0.0894	0.110	*20.7*	0.0711	0.0670	5.9	0.210	0.210	0.0	0.194	0.199	2.5	0.200	0.198	1.0
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.046	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000067	0.000073	8.6	0.000062	0.000067	7.8	0.000031	0.000033	n/a	0.000060	0.000065	8.0	0.000098	0.000036	n/a	0.000027	0.000026	n/a	0.000068	0.000063	7.6	0.000024	0.000024	n/a	0.000102	0.000100	2.0
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0032	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	0.0016	0.0019	n/a	<0.0010	0.0012	n/a	0.0011	0.0015	n/a	<0.0010	<0.0010	n/a	0.0078	<0.0010	n/a	0.0022	0.0024	n/a	0.0040	0.0038	n/a	<0.0030	<0.0030	n/a	0.0038	<0.0030	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-4. Water Quality Relative Percent Difference Results, 2011

Sample ID	ST1			SC1			BR1			ST2			WC2			WC1			WC1			WC2		
Date Sampled	17-Jan-11			1-Feb-11			17-Mar-11			14-Apr-11			17-May-11			26-May-11			2-Jun-11			9-Jun-11		
ALS Sample ID	L971395-2	L971395-4	RPD (%)	L975149-7	L975149-10	RPD (%)	L987767-1	L987767-2	RPD (%)	L995830-3	L995830-4	RPD (%)	L1007227-5	L1007227-6	RPD (%)	L1010083-2	L1010083-4	RPD (%)	L1012816-1	L1012816-3	RPD (%)	L1016239-3	L1016239-4	RPD (%)
Physical Tests																								
Colour, True (CU)	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	22.2	23.5	n/a	17.5	17.7	n/a	15.9	16	n/a	20.4	20.3	n/a
Conductivity (µS/cm)	147	146	0.7	390	391.0	0.3	228	229	0.4	220	222	0.9	19.8	19.8	0.0	21.4	21.4	0.0	20.5	20	2.5	14.4	14.4	0.0
Hardness (as $CaCO_3$)	70.6	67.3	4.8	166	168.0	1.2	117	111	5.3	110	109	0.9	7.22	7.41	2.6	9.37	9.09	3.0	8.41	8.41	0.0	5.74	5.69	0.9
pH	7.77	7.74	0.4	7.97	7.8	1.9	7.47	7.87	5.2	8.16	8.18	0.2	6.52	6.53	0.2	6.97	6.94	0.4	6.91	6.89	0.3	6.47	6.46	0.2
Total Suspended Solids	4.7	5.7	n/a	<3.0	<3.0	n/a	3	5	n/a	<3.0	<3.0	n/a	<3.0	3.4	n/a	<3.0	4.4	n/a	16.4	15.8	n/a	<3.0	<3.0	n/a
Total Dissolved Solids	91	67	*30.4*	260	261.0	0.4	152	150	1.3	134	135	0.7	21	24	n/a	27	27	n/a	30	28	n/a	21	22	n/a
Turbidity (NTU)	1.41	1.43	1.4	0.36	0.2	n/a	1.91	2.04	6.6	0.4	0.38	n/a	1.87	2.07	10.2	5.11	5.18	1.4	10.9	11.3	3.6	1.55	1.38	11.6
Acidity (as $CaCO_3$)	3.7	3.7	n/a	3	3.0	n/a	4.4	3.5	n/a	1.9	1.8	n/a	3.1	2.8	n/a	2.8	2.8	n/a	2.3	2.4	n/a	2.8	3.1	n/a
Alkalinity, Bicarbonate (as $CaCO_3$)	29.3	31.1	6.0	81.9	80.3	2.0	90.5	95.7	5.6	78.5	65	18.8	5.1	5	n/a	6.4	6.6	n/a	6.5	5.7	n/a	3.6	3.1	n/a
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	29.3	31.1	6.0	81.9	80.3	2.0	90.5	95.7	5.6	78.5	65	18.8	5.1	5	n/a	6.4	6.6	n/a	6.5	5.7	n/a	3.6	3.1	n/a
Anions																								
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.17	<0.17	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.022	0.022	n/a	0.062	0.1	n/a	0.035	0.034	n/a	0.049	0.049	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a
Sulphate (SO_4)	38.9	38.8	0.3	119	117.0	1.7	33.2	33.3	0.3	36.7	36.6	0.3	1.29	1.28	n/a	2.45	2.41	n/a	2.39	2.41	n/a	1.15	1.14	n/a
Nutrients																								
Ammonia, Total (as N)	0.0106	0.0133	n/a	<0.0050	<0.0050	n/a	-	-	n/a	<0.0050	<0.0050	n/a	0.0138	0.0070	n/a	<0.0050	<0.0050	n/a	0.0071	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0581	0.0573	1.4	0.0888	0.1	2.6	0.0845	0.0829	1.9	0.225	0.226	0.4	0.66	0.663	0.5	0.208	0.207	0.5	0.0927	0.0935	0.9	0.312	0.315	1.0
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	<0.050	<0.050	n/a	<0.050	<0.050	n/a	0.056	0.097	n/a	0.255	0.205	n/a	0.202	0.194	n/a	0.132	0.103	n/a	0.167	0.167	n/a	0.248	0.265	n/a
Total Nitrogen	0.06	0.060	n/a	0.060	0.1	n/a	0.140	0.180	n/a	0.480	0.43	11.0	0.9	0.78	14.3	0.340	0.31	9.2	0.26	0.26	0.0	0.56	0.58	3.5
Orthophosphate-Dissolved (as P)	-	-	n/a	<0.0010	<0.0010	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Phosphorus (P)-Total	0.007	0.0134	n/a	<0.0020	<0.0020	n/a	0.0022	0.0054	n/a	<0.0020	<0.0020	n/a	0.0073	0.0077	n/a	0.0095	0.0108	n/a	0.0187	0.0166	n/a	0.0059	0.005	n/a
Cyanides																								
Cyanide, Weak Acid Diss	<0.0050	<0.0050	n/a	-	-	n/a	<0.0012	<0.0012	n/a	<0.0010	<0.0010	n/a	<0.0010	0.001	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.001	0.0011	n/a
Cyanide, Total	0.0015	0.0014	n/a	-	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0012	0.0011	n/a	0.0062	0.006	3.3	0.0048	0.0045	n/a	0.0043	0.0031	n/a	0.0041	0.0031	n/a
Organic / Inorganic Carbon																								
Total Organic Carbon	1.11	1.01	n/a	0.55	<0.50	n/a	0.68	0.73	n/a	0.86	0.72	n/a	5.62	5.71	1.6	4.86	4.72	2.9	4.16	4.14	0.5	5.22	5.58	6.7
Total Metals																								
Aluminum (Al)	0.0357	0.0229	n/a	0.0148	0.0	n/a	0.24	0.0599	n/a	0.0148	0.0155	n/a	0.254	0.266	4.6	0.319	0.315	1.3	0.807	0.736	9.2	0.221	0.241	8.7
Antimony (Sb)	<0.00010	<0.00010	n/a	0.00136	0.0	4.3	0.00035	0.00037	n/a	0.00017	0.00017	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Arsenic (As)	0.00043	0.0005	n/a	0.00033	0.0	n/a	0.0005	0.00036	n/a	0.00031	0.0003	n/a	<0.00010	<0.00010	n/a	0.00011	0.00011	n/a	0.00024	0.00024	n/a	<0.00010	<0.00010	n/a
Barium (Ba)	0.0246	0.0242	1.6	0.0435	0.0	2.1	0.0525	0.0484	8.1	0.0400	0.0423	5.6	0.0107	0.0109	1.9	0.00989	0.00959	3.1	0.015	0.0149	0.7	0.00852	0.00867	1.7
Beryllium (Be)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.010	0.011	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.000017	0.000021	n/a	0.000037	0.0	n/a	0.000351	0.000018	n/a	0.000013	0.000011	n/a	0.000021	0.000011	n/a	<0.000020	<0.000010	n/a	0.000011	<0.000010	n/a	<0.000010	0.000014	n/a
Calcium (Ca)	18.5	18.1	2.2	63	62.6	0.6	41.5	40.1	3.4	36.3	37.5	3.3	2.15	2.04	5.3	2.64	2.52	4.7	2.31	2.36	2.1	1.53	1.54	0.7
Chromium (Cr)	0.00019	0.00012	n/a	<0.00010	<0.00010	n/a	0.00045	0.00016	n/a	0.00024	0.00026	n/a	0.00065	0.00075	n/a	<0.0010	<0.00090	n/a	0.00217	0.00204	n/a	0.00058	0.00062	n/a
Cobalt (Co)	0.00062	0.00062	0.0	0.00016	0.0	n/a	0.00014	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00031	0.0003	n/a	0.00015	0.00016	n/a	0.0004	0.0004	n/a	0.00011	0.00012	n/a
Copper (Cu)	<0.00050	0.0006	n/a	0.00362	0.0	0.3	0.00211	0.00052	n/a	<0.00050	<0.00050	n/a	0.0007	0.00065	n/a	0.00119	0.00108	n/a	0.00224	0.00284	n/a	0.00072	0.00077	n/a
Iron (Fe)	0.682	0.815	17.8	<0.030	<0.030	n/a	0.28	0.066	n/a	<0.030	<0.030	n/a	0.253	0.259	2.3	0.259	0.262	1.2	0.788	0.736	6.8	0.093	0.106	n/a
Lead (Pb)	0.000073	0.000134	n/a	<0.000050	<0.000050	n/a	0.00032	0.000089	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.00010	<0.00010	n/a	0.000172	0.00018	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Magnesium (Mg)	5.34	5.17	3.2	5.12	5.1	1.4	3.33	3.22	3.4	5.1	5.19	1.7	0.575	0.595	3.4	0.759	0.753	0.8	0.881	0.867	1.6	0.471	0.477	1.3
Manganese (Mn)	0.13	0.134	3.0	0.0273	0.0	1.8	0.0102	0.00251	**121.0**	0.000929	0.000945	1.7	0.0447	0.0462	3.3	0.0113	0.0105	7.3	0.0226	0.0225	0.4	0.00878	0.00926	5.3
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000314	0.000296	n/a	0.00163	0.0	3.6	0.00134	0.00144	7.2	0.00072	0.000771	6.8	<0.000050	<0.000050	n/a	<0.000060	<0.000050	n/a	0.000092	0.000083	n/a	<0.000050	<0.000050	n/a
Nickel (Ni)	0.0018	0.0018	n/a	0.0006	0.0	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00129	0.00138	n/a	0.00147	0.00144	n/a	0.00277	0.00268	3.3	0.00112	0.00131	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-4. Water Quality Relative Percent Difference Results, 2011

Sample ID	ST1			SC1			BR1			ST2			WC2			WC1			WC1			WC2		
Date Sampled	17-Jan-11			1-Feb-11			17-Mar-11			14-Apr-11			17-May-11			26-May-11			2-Jun-11			9-Jun-11		
ALS Sample ID	L971395-2	L971395-4	RPD (%)	L975149-7	L975149-10	RPD (%)	L987767-1	L987767-2	RPD (%)	L995830-3	L995830-4	RPD (%)	L1007227-5	L1007227-6	RPD (%)	L1010083-2	L1010083-4	RPD (%)	L1012816-1	L1012816-3	RPD (%)	L1016239-3	L1016239-4	RPD (%)
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.219	0.217	n/a	0.518	0.5	2.1	0.762	0.583	*26.6*	0.239	0.243	n/a	0.138	0.143	n/a	0.15	0.143	n/a	0.265	0.253	4.6	0.083	0.087	n/a
Selenium (Se)	0.00079	0.00084	6.1	0.00089	0.0	0.0	0.00052	0.00067	*25.2*	0.00046	0.0004	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00012	0.00012	n/a	<0.00010	<0.00010	n/a
Silicon (Si)	1.94	1.87	3.7	2.04	2.0	0.0	2.13	1.72	*21.3*	2.32	2.38	2.6	1.98	1.96	1.0	1.83	1.81	1.1	2.72	2.46	10.0	1.51	1.55	2.6
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.165	0.153	7.5	0.4	0.4	4.4	0.217	0.223	2.7	0.321	0.334	4.0	0.0258	0.0245	5.2	0.0289	0.0275	5.0	0.0278	0.028	0.7	0.0196	0.0194	1.0
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.018	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.017	0.014	n/a	<0.010	<0.010	n/a
Uranium (U)	<0.000010	<0.000010	n/a	0.000123	0.0	4.0	0.000132	0.000131	0.8	0.000055	0.000057	3.6	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0019	0.0018	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	0.0053	0.0	n/a	0.0064	0.0072	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	0.0043	0.0041	n/a	<0.0030	<0.0030	n/a
Dissolved Metals																								
Aluminum (Al)	<0.0030	<0.0030	n/a	0.008	0.0	n/a	0.0068	0.0044	n/a	0.0035	0.0032	n/a	0.147	0.143	2.8	0.114	0.117	2.6	0.107	0.135	*23.1*	0.154	0.174	12.2
Antimony (Sb)	<0.00010	<0.00010	n/a	0.00131	0.0	0.8	0.00034	0.00036	n/a	0.00019	0.00017	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Arsenic (As)	0.0003	0.00026	n/a	0.00032	0.0	n/a	0.00029	0.00028	n/a	0.00029	0.00027	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Barium (Ba)	0.0261	0.0239	8.8	0.0417	0.0	1.9	0.0466	0.0459	1.5	0.0398	0.0398	0.0	0.00958	0.00962	0.4	0.00736	0.00736	0.0	0.00696	0.00752	7.7	0.00802	0.00848	5.6
Beryllium (Be)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.000013	0.000013	n/a	0.000033	0.0	n/a	0.000027	<0.000010	n/a	<0.000010	0.000012	n/a	<0.000010	<0.000010	n/a	<0.000010	0.000014	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Calcium (Ca)	19.1	18.3	4.3	58.7	59.5	1.4	41.6	39.3	5.7	35.6	35.2	1.1	2.01	2.08	3.4	2.61	2.54	2.7	2.32	2.31	0.4	1.54	1.52	1.3
Chromium (Cr)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00016	0.00014	n/a	0.00040	0.00048	n/a	0.00035	0.00030	n/a	0.00037	0.00037	n/a	0.00042	0.00042	n/a
Cobalt (Co)	0.00055	0.00054	1.8	0.00014	0.0	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.0002	0.00021	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	<0.00050	<0.00050	n/a	0.00294	0.0	1.4	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	0.00056	n/a	0.00082	0.0008	n/a	0.00078	0.00081	n/a	0.00058	0.00066	n/a
Iron (Fe)	0.113	0.099	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	0.109	0.108	n/a	0.043	0.048	n/a	0.046	0.067	n/a	0.061	0.061	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Magnesium (Mg)	5.55	5.22	6.1	4.64	4.7	1.7	3.23	3.15	2.5	5.03	5.06	0.6	0.538	0.539	0.2	0.694	0.669	3.7	0.633	0.644	1.7	0.461	0.462	0.2
Manganese (Mn)	0.126	0.129	2.4	0.0247	0.0	0.8	0.000532	0.000411	*25.7*	0.00043	0.000421	2.1	0.0343	0.0349	1.7	0.00393	0.00372	5.5	0.00455	0.00501	9.6	0.00293	0.00645	**75.1**
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000275	0.000212	n/a	0.00153	0.0	2.0	0.00135	0.00135	0.0	0.000714	0.000737	3.2	<0.000050	<0.000050	n/a	<0.000050	0.000059	n/a	0.000066	0.000064	n/a	<0.000050	<0.000050	n/a
Nickel (Ni)	0.00172	0.00164	n/a	0.00057	0.0	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00103	0.00108	n/a	0.00091	0.00092	n/a	0.00086	0.00093	n/a	0.00103	0.00107	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.229	0.222	n/a	0.488	0.5	0.2	0.546	0.527	3.5	0.236	0.235	n/a	0.117	0.125	n/a	0.112	0.106	n/a	0.099	0.123	n/a	0.08	0.086	n/a
Selenium (Se)	0.00083	0.00036	n/a	0.00088	0.0	1.1	0.00051	0.00051	0.0	0.00043	0.0004	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.0001	<0.00010	n/a	<0.00010	<0.00010	n/a
Silicon (Si)	1.84	1.87	1.6	2	2.0	0.5	1.62	1.57	3.1	2.28	2.29	0.4	1.77	1.76	0.6	1.52	1.51	0.7	1.27	1.32	3.9	1.57	1.56	0.6
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	2.4	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.152	0.121	*22.7*	0.3790	0.4	4.0	0.210	0.208	1.0	0.319	0.32	0.3	0.0241	0.0247	2.5	0.0286	0.0279	2.5	0.026	0.0274	5.2	0.019	0.0189	0.5
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	<0.000010	<0.000010	n/a	0.000118	0.0	0.8	0.000122	0.000122	0.0	0.000054	0.000054	0.0	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	0.004	0.0	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-4. Water Quality Relative Percent Difference Results, 2011

Sample ID	MC1			BIR1			L2 (1 m)			Adit			BIR1			Adit			BIR1			UR1A		
Date Sampled	16-Jun-11			15-Jul-11			24-Aug-11			25-Aug-11			17-Sep-11			18-Oct-11			13-Nov-11			27-Nov-11		
ALS Sample ID	L1019628-4	L1019628-5	RPD (%)	L1033117-5	L1033117-9	RPD (%)	L1051244-7	L1051244-9	RPD (%)[a]	L1051133-8	L1051133-10	RPD (%)	L1060382-7	L1060382-9	RPD (%)	L1074434-7	L1074434-9	RPD (%)	L1084881-5	L1084881-7	RPD (%)	L1091310-3	L1091310-12	RPD (%)
Physical Tests																								
Colour, True (CU)	16.5	27.6	n/a	<5.0	<5.0	n/a	21.4	21.3	n/a[b]	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a
Conductivity (µS/cm)	21.1	21.2	0.5	106	107	0.9	17.6	17.5	0.6	404	406	0.5	161	162	0.6	406	406	0.0	186	188	1.1	201	202	0.5
Hardness (as $CaCO_3$)	8.43	8.44	0.1	48.6	47.8	1.7	6.78	6.70	1.2	147	151	2.7	75.2	74.7	0.7	151	151	0.0	85.5	86.1	0.7	90.3	91.5	1.3
pH	7.92	7.88	0.5	7.94	8.03	1.1	6.58	6.59	0.2	7.99	8.05	0.7	7.98	8.02	0.5	8.02	8.07	0.6	7.18	7.2	0.3	8.16	8.17	0.1
Total Suspended Solids	<3.0	<3.0	n/a	189.0	157	18.5	<3.0	5.6	n/a	27.6	12.2	n/a	37.2	41.2	n/a	19.9	16.5	n/a	4.3	3	n/a	<3.0	<3.0	n/a
Total Dissolved Solids	25	24	n/a	71	71	0.0	23	26	n/a	255	261	2.3	110	117	6.2	251	231	8.3	108	120	10.5	116	111	4.4
Turbidity (NTU)	0.36	0.58	n/a	129	130	0.8	1.12	1.16	3.5	17.9	18.8	4.9	51.9	52.2	0.6	13.5	13.6	0.7	2.62	2.65	1.1	0.86	0.76	12.3
Acidity (as $CaCO_3$)	1.4	1.6	n/a	3.5	3.3	n/a	3.0	3.0	n/a	2.7	2.5	n/a	<1.0	1	n/a	3.9	3.5	n/a	3.7	3.3	n/a	1.8	1.7	n/a
Alkalinity, Bicarbonate (as $CaCO_3$)	7.1	7.3	n/a	37.1	33.1	11.4	5.1	5.4	n/a	85.4	86.6	1.4	49.5	49.3	0.4	87.4	82.3	6.0	61.7	64	3.7	71.9	69.5	3.4
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<1.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<1.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	7.1	7.3	n/a	37.1	33.1	11.4	5.1	5.4	n/a	85.4	86.6	1.4	49.5	49.3	0.4	87.4	82.3	6.0	61.7	64	3.7	71.9	69.5	3.4
Anions																								
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	<0.020	<0.020	n/a	0.035	0.031	n/a	<0.020	<0.020	n/a	0.203	0.202	0.5	0.041	0.04	n/a	0.216	0.215	0.5	0.048	0.047	n/a	0.041	0.041	n/a
Sulphate (SO_4)	2.09	2.09	n/a	17.2	17.2	0.0	1.89	1.89	n/a	116	115	0.9	26.7	26.7	0.0	116	115	0.9	30.1	30.1	0.0	30.8	30.8	0.0
Nutrients																								
Ammonia, Total (as N)	<0.0050	<0.0050	n/a	0.0081	<0.0050	n/a	<0.0050	<0.0050	n/a	0.0103	0.0096	n/a	<0.0050	<0.0050	n/a	0.0165	0.0148	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0729	0.0743	1.9	0.0178	0.0187	n/a	<0.0050	<0.0050	n/a	0.0333	0.0337	1.2	0.0927	0.0915	1.3	0.0174	0.0174	n/a	0.124	0.125	0.8	0.0644	0.0648	0.6
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	0.187	0.186	n/a	0.102	0.161	n/a	0.350	0.300	n/a	0.097	0.086	n/a	0.127	0.159	n/a	0.083	0.133	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Total Nitrogen	0.26	0.26	0.0	0.12	0.18	n/a	0.350	0.300	15.4	0.13	0.12	n/a	0.22	0.25	n/a	0.1	0.15	n/a	0.14	0.12	n/a	0.05	<0.050	n/a
Orthophosphate-Dissolved (as P)	<0.0010	0.0020	n/a	0.0010	0.0013	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0026	0.0024	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Phosphorus (P)-Total	0.0029	0.0032	n/a	0.233	0.149	n/a	0.0073	0.0070	n/a	0.0257	0.0136	n/a	0.0555	0.0584	n/a	0.0370	0.0334	n/a	0.0059	0.0058	n/a	0.0023	0.0021	n/a
Cyanides																								
Cyanide, Weak Acid Diss	0.0015	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0011	<0.0012	n/a	<0.0010	-	n/a	-	-	n/a
Cyanide, Total	0.004	0.0024	n/a	<0.0010	<0.0010	n/a	0.0057	0.0055	n/a	<0.0010	<0.0010	n/a	0.0021	0.0018	n/a	<0.0011	<0.0011	n/a	0.0018	-	n/a	0.0011	0.0011	n/a
Organic / Inorganic Carbon																								
Total Organic Carbon	4.27	4.26	0.2	0.69	1.4	n/a	7.70	7.66	0.5	<0.50	<0.50	n/a	1.85	2.97	n/a	0.60	1.41	n/a	1.66	1.64	n/a	0.77	0.7	n/a
Total Metals																								
Aluminum (Al)	0.0861	0.0885	n/a	6.59	5.72	14.1	0.128	0.136	n/a	0.167	0.307	***59.1***	1.86	1.88	1.1	0.222	0.253	13.1	0.103	0.104	n/a	0.047	0.0508	n/a
Antimony (Sb)	<0.00010	<0.00010	n/a	0.00074	0.00064	14.5	<0.00010	<0.00010	n/a	0.00129	0.00134	3.8	0.00027	0.00028	n/a	0.00163	0.0017	4.2	0.00011	0.00011	n/a	0.00202	0.00213	5.3
Arsenic (As)	<0.00010	<0.00010	n/a	0.00545	0.00511	6.4	<0.00010	<0.00010	n/a	0.00387	0.00393	1.5	0.00123	0.00131	6.3	0.00914	0.00935	2.3	0.0002	0.00022	n/a	0.00033	0.00034	n/a
Barium (Ba)	0.00733	0.00741	1.1	0.132	0.11	18.2	0.00797	0.00836	4.8	0.0238	0.0262	9.6	0.0621	0.065	4.6	0.0228	0.023	0.9	0.038	0.0379	0.3	0.0333	0.0327	1.8
Beryllium (Be)	<0.00010	<0.00010	n/a	0.00015	0.00015	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	0.010	0.010	n/a	<0.010	<0.010	n/a	0.034	0.034	n/a	<0.010	<0.010	n/a	0.041	0.043	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.000010	<0.000010	n/a	0.000255	0.00024	6.1	<0.000010	<0.000010	n/a	0.000229	0.000221	3.6	0.000054	0.000059	n/a	0.000351	0.000383	8.7	0.000011	0.000018	n/a	0.000027	0.000025	n/a
Calcium (Ca)	2.64	2.64	0.0	14.7	15	2.0	1.81	1.88	3.8	53.6	53.9	0.6	20.2	20.7	2.4	54.3	55.7	2.5	23.8	23.7	0.4	29.4	31.1	5.6
Chromium (Cr)	0.00032	0.00036	n/a	0.0135	0.0113	17.7	0.00049	0.00053	n/a	0.0005	0.00049	n/a	0.00459	0.00476	n/a	0.00013	0.00015	n/a	0.00047	0.00047	n/a	0.00018	0.00020	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	0.00369	0.00345	6.7	<0.00010	<0.00010	n/a	0.00051	0.00052	1.9	0.00113	0.00119	5.2	0.00079	0.00077	2.6	0.00011	0.0001	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.00075	0.00157	n/a	0.011	0.0103	6.6	<0.00050	<0.00050	n/a	0.00379	0.00365	3.8	0.00393	0.00412	4.7	0.00378	0.00381	0.8	0.00067	0.00078	n/a	<0.00050	<0.00050	n/a
Iron (Fe)	0.039	0.039	n/a	8.36	7.96	4.9	0.055	0.057	n/a	0.646	0.654	1.2	2.23	2.23	0.0	1.160	1.22	5.0	0.165	0.169	2.4	0.083	0.082	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	0.00322	0.00304	5.8	<0.000050	<0.000050	n/a	0.00169	0.00164	3.0	0.000758	0.000779	2.7	0.007830	0.00867	10.2	<0.000050	0.000107	n/a	0.000058	<0.000050	n/a
Lithium (Li)	<0.00050	<0.00050	n/a	0.0056	0.0069	n/a	<0.00050	<0.00050	n/a	0.0488	0.0488	0.0	0.0027	0.0023	n/a	0.0540	0.0547	1.3	0.0010	0.0011	n/a	0.0012	0.0013	n/a
Magnesium (Mg)	0.526	0.543	3.2	5.85	5.77	1.4	0.550	0.579	5.1	4.5	4.5	0.0	5.99	6.33	5.5	4.56	4.67	2.4	6.36	6.42	0.9	4.5	4.59	2.0
Manganese (Mn)	0.00253	0.00248	2.0	0.206	0.197	4.5	0.0087	0.00926	6.0	0.165	0.162	1.8	0.0666	0.0699	4.8	0.229	0.217	5.4	0.0216	0.0222	2.7	0.0104	0.0102	1.9
Mercury (Hg)	<0.000010	<0.000010	n/a	0.000024	0.000019	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	<0.000050	<0.000050	n/a	0.00124	0.00112	10.2	<0.000050	<0.000050	n/a	0.00174	0.00182	4.5	0.00103	0.00101	2.0	0.00168	0.00173	2.9	0.000815	0.000811	0.5	0.00118	0.00126	6.6
Nickel (Ni)	0.0008	0.00171	n/a	0.0154	0.0145	6.0	0.00097	0.00105	n/a	<0.00050	<0.00050	n/a	0.0063	0.00618	1.9	<0.00050	0.0005	n/a	0.00096	0.00097	n/a	0.00057	0.00057	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-4. Water Quality Relative Percent Difference Results, 2011

Sample ID	MC1			BIR1			L2 (1 m)			Adit			BIR1			Adit			BIR1			UR1A		
Date Sampled	16-Jun-11			15-Jul-11			24-Aug-11			25-Aug-11			17-Sep-11			18-Oct-11			13-Nov-11			27-Nov-11		
ALS Sample ID	L1019628-4	L1019628-5	RPD (%)	L1033117-5	L1033117-9	RPD (%)	L1051244-7	L1051244-9	RPD (%)[a]	L1051133-8	L1051133-10	RPD (%)	L1060382-7	L1060382-9	RPD (%)	L1074434-7	L1074434-9	RPD (%)	L1084881-5	L1084881-7	RPD (%)	L1091310-3	L1091310-12	RPD (%)
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.097	0.099	n/a	1.87	1.48	*23.3*	0.092	0.097	n/a	1.86	1.92	3.2	0.795	0.814	2.4	1.88	1.93	2.6	0.358	0.358	0.0	0.569	0.576	1.2
Selenium (Se)	<0.00010	<0.00010	n/a	0.00067	0.0006	11.0	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00064	0.00065	1.6	<0.00010	<0.00010	n/a	0.00064	0.00066	3.1	0.00065	0.00063	3.1
Silicon (Si)	1.39	1.4	0.7	13.8	13.3	3.7	0.59	0.616	4.1	3.13	3.41	8.6	6.41	6.35	0.9	3.38	3.63	7.1	2.6	2.6	0.0	2.08	2.08	0.0
Silver (Ag)	<0.000010	<0.000010	n/a	0.000076	0.000068	n/a	<0.000010	<0.000010	n/a	0.000092	0.000280	n/a	0.000024	0.000026	n/a	0.000348	0.000519	*39.4*	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	17.3	17.2	0.6	<2.0	<2.0	n/a	18.4	19.1	3.7	2.2	2.2	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.0307	0.0295	4.0	0.121	0.109	10.4	0.0228	0.0241	5.5	1.01	1.03	2.0	0.159	0.163	2.5	1.07	1.09	1.9	0.187	0.186	0.5	0.245	0.261	6.3
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	0.00011	0.00010	n/a	<0.000010	<0.000010	n/a	0.00002	0.00002	n/a	0.00003	0.00003	n/a	0.00002	0.00002	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	0.236	0.227	3.9	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.069	0.061	12.3	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	<0.000010	<0.000010	n/a	0.000163	0.000106	*42.4*	<0.000010	<0.000010	n/a	0.000225	0.00023	2.2	0.000047	0.000051	n/a	0.00023	0.000237	3.0	0.00003	0.000031	n/a	0.000037	0.000038	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	0.0181	0.0147	*20.7*	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0051	0.0051	0.0	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	0.0362	0.0332	8.6	<0.0030	<0.0030	n/a	0.0328	0.0318	3.1	0.0105	0.0146	n/a	0.0457	0.0478	4.5	<0.0030	0.0031	n/a	0.0041	0.004	n/a
Dissolved Metals																								
Aluminum (Al)	0.0738	0.0712	3.6	0.0369	0.0303	19.6	0.0976	0.0917	6.2	0.0146	0.0158	n/a	0.0604	0.0585	3.2	0.0923	0.092	0.3	0.062	0.0607	2.1	0.007	0.0317	n/a
Antimony (Sb)	<0.00010	<0.00010	n/a	0.00015	0.00013	n/a	<0.00010	<0.00010	n/a	0.0012	0.00122	1.7	0.00018	0.00018	n/a	0.00143	0.00138	3.6	0.00011	0.00011	n/a	0.00199	0.00198	0.5
Arsenic (As)	<0.00010	<0.00010	n/a	0.00023	0.00020	n/a	<0.00010	<0.00010	n/a	0.00018	0.00031	n/a	0.00025	0.00028	n/a	0.00769	0.00731	5.1	0.00021	0.00019	n/a	0.00027	0.00035	n/a
Barium (Ba)	0.0071	0.0069	2.9	0.0249	0.0231	7.5	0.00771	0.00766	0.7	0.0195	0.0197	1.0	0.0369	0.0375	1.6	0.0177	0.017	4.0	0.0392	0.0387	1.3	0.032	0.0312	2.5
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.033	0.034	n/a	<0.010	<0.010	n/a	0.040	0.040	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.000010	<0.000010	n/a	0.000037	0.000011	n/a	<0.000010	<0.000010	n/a	0.000214	0.000142	*40.4*	0.000014	0.000028	n/a	0.000368	0.000356	3.3	0.000023	0.000021	n/a	0.000021	0.000021	n/a
Calcium (Ca)	2.53	2.53	0.0	14	13.8	1.4	1.79	1.77	1.1	51.6	53	2.7	20.9	20.5	1.9	53.3	53	0.6	23.8	23.9	0.4	28.9	29.4	1.7
Chromium (Cr)	0.00022	0.00021	n/a	0.00020	0.00019	n/a	0.00037	0.00035	n/a	<0.00010	<0.00010	n/a	0.00030	0.00028	n/a	<0.00010	<0.00010	n/a	0.00026	0.00028	n/a	<0.00010	0.00010	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00051	0.00039	n/a	<0.00010	<0.00010	n/a	0.0007	0.00068	2.9	<0.00010	0.0001	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	0.00078	0.00077	n/a	0.00068	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00071	0.00080	n/a	0.00335	0.00331	1.2	0.00066	0.00062	n/a	<0.00050	<0.00050	n/a
Iron (Fe)	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	0.055	0.046	n/a	0.840	0.783	7.0	0.138	0.135	n/a	<0.030	0.072	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.005990	0.005530	8.0	0.000178	0.000071	n/a	<0.000050	0.000070	n/a
Lithium (Li)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.0456	0.0468	2.6	0.0009	0.0008	n/a	0.0525	0.0499	5.1	0.0011	0.0011	n/a	0.0012	0.0012	n/a
Magnesium (Mg)	0.512	0.512	0.0	3.31	3.27	1.2	0.558	0.553	0.9	4.41	4.45	0.9	5.58	5.72	2.5	4.36	4.45	2.0	6.3	6.44	2.2	4.43	4.41	0.5
Manganese (Mn)	0.00101	0.00102	1.0	0.00795	0.00125	**145.7**	0.002910	0.00132	**75.2**	0.16	0.155	3.2	0.00985	0.00901	8.9	0.199	0.194	2.5	0.0216	0.0213	1.4	0.00792	0.0107	*29.9*
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	<0.000050	<0.000050	n/a	0.000964	0.00075	*25.0*	<0.000050	<0.000050	n/a	0.00168	0.00172	2.4	0.000984	0.000974	1.0	0.00151	0.00154	2.0	0.000743	0.000748	0.7	0.00113	0.00114	0.9
Nickel (Ni)	0.00082	0.00080	n/a	0.00068	<0.00050	n/a	0.00096	0.00098	n/a	<0.00050	<0.00050	n/a	0.0013	0.00146	n/a	<0.00050	0.00051	n/a	0.00079	0.00085	n/a	<0.00050	0.0005	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.094	0.095	n/a	0.258	0.242	n/a	0.094	0.096	n/a	1.78	1.8	1.1	0.399	0.432	7.9	1.75	1.75	0.0	0.343	0.343	0.0	0.548	0.544	0.7
Selenium (Se)	<0.00010	<0.00010	n/a	0.0004	0.00042	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00062	0.00065	4.7	<0.00010	<0.00010	n/a	0.0007	0.00073	4.2	0.00063	0.00062	1.6
Silicon (Si)	1.34	1.34	0.0	1.22	1.2	1.7	0.54	0.522	3.6	2.84	2.89	1.7	2.17	2.16	0.5	3.06	3.03	1.0	2.5	2.51	0.4	1.94	1.96	1.0
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000012	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	16.6	17.0	2.4	<2.0	<2.0	n/a	18.3	18.2	0.5	2.2	2.2	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.0287	0.0287	0.0	0.0991	0.0993	0.2	0.0225	0.0225	0.0	1.01	1.03	2.0	0.16	0.161	0.6	1.05	1.05	0.0	0.186	0.185	0.5	0.24	0.248	3.3
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.00001	0.00001	n/a	<0.000010	<0.000010	n/a	0.00002	0.00002	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	<0.000010	<0.000010	n/a	0.000017	0.000016	n/a	<0.000010	<0.000010	n/a	0.000199	0.000202	1.5	0.000029	0.000029	n/a	0.000223	0.000225	0.9	0.000043	0.000032	n/a	0.000038	0.000034	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	0.003	<0.0030	n/a	<0.0030	<0.0030	n/a	0.0248	0.0177	*33.4*	<0.0030	<0.0030	n/a	0.0456	0.046	0.9	<0.0030	0.0034	n/a	<0.0030	0.0031	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-5. Water Quality Relative Percent Difference Results, 2012

Sample ID	UR1A			BIR2			WC1			WC5			WC2			WC2			WC4			UR1		
Date Sampled	27-Feb-12			25-Apr-12			29-May-12			5-Jun-12			11-Jun-12			20-Jun-12			26-Jun-12			27-Jun-12		
ALS Sample ID	L1119935-3	L1119935-4	RPD (%)	L1140759-2	L1140759-8	RPD (%)	L1155798-1	L1155798-10	RPD (%)	L1158955-3	L1158955-6	RPD (%)	L1161793-2	L1161793-6	RPD (%)	L1166925-2	L1166925-3	RPD (%)	L1171502-4	L1171502-2	RPD (%)	L1171873-1	L1171873-9	RPD (%)
Physical Tests																								
Colour, True (CU)	<5.0	<5.0	n/a	9.4	9.5	n/a	20	17.3	n/a	14.6	14.5	n/a	18.6	18.5	n/a	21.1	21	n/a	24.2	24.3	n/a	<5.0	<5.0	n/a
Conductivity (µS/cm)	230	229	0.4	139	134	3.7	19	19.3	1.6	20.4	20.3	0.5	15.3	14.7	4.0	15	15	0.0	20.4	20.6	1.0	138	137	0.7
Hardness (as $CaCO_3$)	109	109	0.0	61.5	61.3	0.3	9	8.6	4.5	8.9	8.8	1.1	5.9	5.8	1.7	6	6.2	3.3	8.54	8.6	0.7	63.8	62.6	1.9
pH	8.13	8.13	0.0	8.06	7.82	3.0	6.87	6.79	1.2	8.06	8.18	1.5	7.62	6.92	9.6	8.14	8.04	1.2	7.27	7.31	0.5	7.57	7.81	3.1
Total Suspended Solids	<3.0	<3.0	n/a	6.2	6.2	n/a	5	4.3	n/a	5.2	6	n/a	<3.0	<3.0	n/a	<3.0	<3.0	n/a	<3.0	<3.0	n/a	132	149	n/a
Total Dissolved Solids	126	137	8.4	85	85	0.0	23	25	n/a	17	21	n/a	24	22	n/a	20	19	n/a	23	24	n/a	97	95	2.1
Turbidity (NTU)	0.6	0.57	5.1	5.97	6.36	6.3	2.97	3	1.0	5.57	6	7.4	0.86	0.8	7.2	1.06	1	5.8	0.5	0.6	n/a	92.4	96.1	3.9
Acidity (as $CaCO_3$)	2	1.9	n/a	1.5	2.4	n/a	-	-	n/a	2.7	1.7	n/a	1.9	4.3	n/a	2.8	3.3	n/a	1.6	1.7	n/a	3.2	1.9	n/a
Alkalinity, Bicarbonate (as $CaCO_3$)	82.1	81.7	0.5	48.7	48.7	0.0	6.6	5.8	n/a	6.9	6.3	n/a	3.8	3.8	n/a	5	4.5	n/a	8	8	n/a	31.6	31.5	0.3
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<1.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<1.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	82.1	81.7	0.5	48.7	48.7	0.0	6.6	5.8	n/a	6.9	6.3	n/a	3.8	3.8	n/a	5	4.5	n/a	8	8	n/a	31.6	31.5	0.3
Anions																								
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.042	0.042	n/a	0.041	0.041	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a	0.02	0.021	n/a	0.079	0.082	n/a
Sulphate (SO_4)	37.6	37.6	0.0	18	17.9	0.6	2	1.9	n/a	2.16	2.2	n/a	1.08	1.1	n/a	1.2	1.2	n/a	1.35	1.3	n/a	35.5	35.4	0.3
Nutrients																								
Ammonia, Total (as N)	<0.0050	<0.0050	n/a	<0.0050	0.0051	n/a	-	-	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	0.0076	0.0065	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.068	0.068	0.0	0.539	0.538	0.2	0.27	0.273	1.1	0.0609	0.0607	0.3	0.397	0.397	0.0	0.27	0.277	2.6	0.0478	0.0467	2.3	0.0516	0.0507	1.8
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	<0.050	<0.050	n/a	<0.050	0.057	n/a	0.605	0.132	n/a	0.093	0.101	n/a	0.127	0.149	n/a	0.15	0.143	n/a	0.22	0.207	n/a	<0.050	<0.050	n/a
Total Nitrogen	0.06	0.06	n/a	0.64	0.66	n/a	0.876	0.404	n/a	0.08	0.06	n/a	0.51	0.51	n/a	0.42	0.42	n/a	0.265	0.254	n/a	<0.050	0.05	n/a
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0018	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	0.0012	n/a
Phosphorus (P)-Total	<0.0020	<0.0020	n/a	0.0117	0.0134	n/a	0.0107	0.011	n/a	0.0104	0.011	n/a	0.0055	0.0057	n/a	0.0059	0.0054	n/a	0.008	0.0078	n/a	0.234	0.342	n/a
Cyanides																								
Cyanide, Weak Acid Diss	-	-	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	-	-	n/a
Cyanide, Total	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Organic / Inorganic Carbon																								
Total Organic Carbon	0.63	0.73	n/a	2.76	2.82	2.2	3.7	3.83	3.5	3.56	3.64	2.2	5.14	5.28	2.7	5.21	5.28	1.3	4.68	4.72	0.9	0.71	0.87	n/a
Total Metals																								
Aluminum (Al)	0.021	0.021	n/a	0.396	0.368	7.3	0.297	0.31	4.3	0.441	0.45	2.0	0.181	0.188	3.8	0.185	0.18	2.7	0.092	0.093	1.1	3.99	3.91	2.0
Antimony (Sb)	0.00187	0.00189	1.1	0.00016	0.00015	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00122	0.00111	9.4
Arsenic (As)	0.0003	0.0003	n/a	0.00037	0.00035	n/a	0.0001	0.00012	n/a	0.00015	0.0002	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	0.0001	n/a	0.00993	0.01	0.7
Barium (Ba)	0.0382	0.0378	1.1	0.033	0.0324	1.8	0.0095	0.0097	2.1	0.0109	0.011	0.9	0.0078	0.0082	5.0	0.0084	0.008	4.9	0.00874	0.0088	0.7	0.0905	0.0891	1.6
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.0002	0.00019	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.000015	0.000015	n/a	0.000018	0.000021	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.0012	0.00118	n/a
Calcium (Ca)	34.7	34.5	0.6	18.2	18	1.1	2.3	2.33	1.3	2.55	2.5	2.0	1.61	1.69	4.8	1.8	1.7	5.7	2.53	2.67	5.4	24.1	22.8	5.5
Chromium (Cr)	0.00015	0.00014	n/a	0.00121	0.00109	10.4	0.00082	0.00087	n/a	0.00116	0.0012	3.4	0.00051	0.00051	n/a	0.0005	0.00049	n/a	0.00034	0.00037	n/a	0.00524	0.00541	3.2
Cobalt (Co)	<0.00010	<0.00010	n/a	0.00029	0.00028	n/a	0.00017	0.00019	n/a	0.00023	0.00028	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	0.00011	n/a	0.00395	0.00431	8.7
Copper (Cu)	<0.00050	<0.00050	n/a	0.00173	0.00174	n/a	0.00104	0.00099	n/a	0.00124	0.0012	n/a	0.00058	0.00055	n/a	0.00058	0.0007	n/a	0.00051	0.00063	n/a	0.157	0.158	0.6
Iron (Fe)	0.05	0.05	n/a	0.52	0.471	9.9	0.267	0.25	6.6	0.453	0.5	9.9	0.079	0.08	n/a	0.093	0.09	n/a	0.108	0.11	n/a	7.92	7.85	0.9
Lead (Pb)	<0.000050	<0.000050	n/a	0.00009	0.0001	n/a	0.0001	0.00006	n/a	0.0001	0.0001	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.00447	0.00448	0.2
Lithium (Li)	0.00149	0.00151	n/a	0.00138	0.0012	n/a	<0.00050	<0.00050	n/a	0.00069	0.00066	n/a	0.00064	0.00065	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00367	0.00338	n/a
Magnesium (Mg)	5.51	5.42	1.6	4.75	4.63	2.6	0.71	0.786	10.2	0.811	0.8	1.4	0.46	0.477	3.6	0.48	0.46	4.3	0.539	0.532	1.3	4	4	0.0
Manganese (Mn)	0.0071	0.0069	2.9	0.0327	0.031	5.3	0.011	0.013	16.7	0.0143	0.014	2.1	0.00757	0.0076	0.4	0.0082	0.008	2.5	0.0276	0.028	1.4	0.26	0.282	8.1
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000025	0.000017	n/a
Molybdenum (Mo)	0.00119	0.00118	n/a	0.000537	0.000505	n/a	<0.000050	<0.000050	n/a	0.000059	0.00006	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.00168	0.0016	n/a
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.0025	<0.0020	n/a	0.00134	0.00153	n/a	0.00175	0.00186	n/a	0.00092	0.00094	n/a	0.001	0.00095	n/a	0.00089	0.00092	n/a	0.00601	0.00659	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-5. Water Quality Relative Percent Difference Results, 2012

Sample ID	UR1A			BIR2			WC1			WC5			WC2			WC2			WC4			UR1		
Date Sampled	27-Feb-12			25-Apr-12			29-May-12			5-Jun-12			11-Jun-12			20-Jun-12			26-Jun-12			27-Jun-12		
ALS Sample ID	L1119935-3	L1119935-4	RPD (%)	L1140759-2	L1140759-8	RPD (%)	L1155798-1	L1155798-10	RPD (%)	L1158955-3	L1158955-6	RPD (%)	L1161793-2	L1161793-6	RPD (%)	L1166925-2	L1166925-3	RPD (%)	L1171502-4	L1171502-2	RPD (%)	L1171873-1	L1171873-9	RPD (%)
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	0.32	0.36	n/a
Potassium (K)	0.654	0.643	1.7	0.388	0.377	n/a	0.13	0.132	n/a	0.161	0.16	n/a	0.07	0.074	n/a	0.07	0.06	n/a	0.061	0.059	n/a	1.44	1.41	2.1
Selenium (Se)	0.00077	0.00072	n/a	0.00047	0.00047	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00096	0.00091	n/a
Silicon (Si)	2.05	2.02	1.5	3.2	3.14	1.9	1.9	1.81	4.9	2.25	2.3	2.2	1.48	1.52	2.7	1.33	1.26	5.4	0.91	0.93	2.2	9.29	8.43	9.7
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000116	0.000076	n/a
Sodium (Na)	2.7	2.7	n/a	2.1	2	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.278	0.277	0.4	0.145	0.145	0.0	0.03	0.0271	10.2	0.0304	0.0296	2.7	0.0194	0.0203	4.5	0.02	0.021	4.9	0.0351	0.037	5.3	0.161	0.153	5.1
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	0.000014	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000052	0.00005	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	0.014	0.015	n/a	<0.010	<0.010	n/a	0.017	0.014	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.159	0.152	4.5
Uranium (U)	0.000043	0.000039	n/a	0.000024	0.000024	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000287	0.000278	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	0.0013	0.0011	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0135	0.0138	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0060	<0.0060	n/a	0.0033	0.0037	n/a	0.0036	0.0036	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	0.0859	0.0886	3.1
Dissolved Metals																								
Aluminum (Al)	0.0041	0.0043	n/a	0.0354	0.0257	n/a	0.107	0.123	13.9	0.114	0.107	6.3	0.148	0.147	0.7	0.132	0.128	3.1	0.0838	0.0798	4.9	0.0449	0.0499	10.5
Antimony (Sb)	0.00193	0.00194	0.5	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00059	0.00057	n/a
Arsenic (As)	0.00026	0.00025	n/a	0.00016	0.00015	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	0.00011	n/a
Barium (Ba)	0.0374	0.0376	0.5	0.0284	0.0275	3.2	0.0072	0.0075	4.1	0.0072	0.0071	1.4	0.0077	0.0076	1.3	0.0076	0.0075	1.3	0.00857	0.0085	0.8	0.024	0.0255	6.1
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.000013	0.000014	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000329	0.000297	10.2
Calcium (Ca)	35	35	0.0	17.4	17.4	0.0	2.3	2.35	2.2	2.44	2.4	1.7	1.61	1.59	1.3	1.8	1.7	5.7	2.56	2.59	1.2	21.8	21.3	2.3
Chromium (Cr)	<0.00010	<0.00010	n/a	0.00019	0.0002	n/a	0.00031	0.00034	n/a	0.00022	0.00023	n/a	0.00041	0.00034	n/a	0.00035	0.00033	n/a	0.0003	0.00028	n/a	<0.00010	<0.00010	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00085	0.00071	n/a
Copper (Cu)	<0.00050	<0.00050	n/a	0.00059	0.00063	n/a	0.00063	0.00061	n/a	0.00062	0.00062	n/a	0.00053	<0.00050	n/a	0.00056	0.00054	n/a	<0.00050	<0.00050	n/a	0.00161	0.00182	n/a
Iron (Fe)	<0.030	<0.030	n/a	0.05	0.048	n/a	0.045	0.041	n/a	0.063	0.056	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	0.087	0.083	n/a	<0.030	<0.030	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	0.00149	0.00149	n/a	0.00084	0.00076	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00065	0.00103	n/a
Magnesium (Mg)	5.36	5.32	0.7	4.37	4.31	1.4	0.63	0.707	11.5	0.682	0.669	1.9	0.447	0.445	0.4	0.46	0.453	1.5	0.52	0.525	1.0	2.28	2.27	0.4
Manganese (Mn)	0.0062	0.0061	1.6	0.0196	0.0195	0.5	0.003	0.0037	*20.9*	0.00388	0.004	3.0	0.00358	0.0036	0.6	0.0029	0.0028	3.5	0.0244	0.0077	**104.0**	0.099	0.094	5.2
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.00119	0.00119	0.0	0.000476	0.000479	n/a	<0.000050	<0.000050	n/a	0.000051	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.00117	0.00117	0.0
Nickel (Ni)	<0.00050	<0.00050	n/a	0.00084	0.00086	n/a	0.0009	0.00099	n/a	0.00078	0.00085	n/a	0.00089	0.00089	n/a	0.0009	0.00091	n/a	0.00082	0.00101	n/a	0.00063	0.00053	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.638	0.637	0.2	0.291	0.284	n/a	0.08	0.1	n/a	0.089	0.089	n/a	0.069	0.065	n/a	0.06	0.058	n/a	0.058	0.058	n/a	0.622	0.615	1.1
Selenium (Se)	0.00075	0.00071	n/a	0.0004	0.00042	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00065	0.00066	n/a
Silicon (Si)	2.01	2	0.5	2.34	2.37	1.3	1.52	1.51	0.7	1.38	1.39	0.7	1.48	1.42	4.1	1.23	1.21	1.6	0.868	0.864	0.5	1.23	1.24	0.8
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	2.6	2.6	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.279	0.28	0.4	0.139	0.138	0.7	0.03	0.0271	10.2	0.0286	0.0287	0.3	0.0192	0.0191	0.5	0.02	0.021	4.9	0.0353	0.0356	0.8	0.141	0.137	2.9
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	0.00025	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000039	0.00004	n/a	0.000018	0.000017	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000054	0.000056	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	0.0052	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	0.0087	0.0049	n/a
Aggregate Organics																								
COD	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-5. Water Quality Relative Percent Difference Results, 2012

Sample ID (new)	BJ U/S of CC			BIR2			L1 (1 m)			BJ 200m D/S			BJ U/S			SC2			BJ Shallow (1 m)			SC1		
Date Sampled	29-Jun-12			29-Jun-12			1-Jul-12			4-Jul-12			21-Aug-12			5-Sep-12			8-Sep-12			5-Oct-12		
ALS Sample ID	L1171618-1	L1171618-5	RPD (%)	L1171541-5	L1171541-8	RPD (%)	L1171541-15	L1171541-9	RPD (%)[a]	L1174986-4	L1174986-7	RPD (%)	L1199717-2	L1199717-7	RPD (%)	L1206302-6	L1206302-12	RPD (%)	L1207289-1	L1207289-3	RPD (%)	L1221669-21	L1221669-24	RPD (%)
Physical Tests																								
Colour, True (CU)	<5.0	<5.0	n/a	<5.0	<5.0	n/a	19.3	19.4	n/a[b]	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a
Conductivity (µS/cm)	47.5	47.6	0.2	93.5	98.5	5.2	13.3	13.2	0.8	55.5	54.1	2.6	48.7	49.2	1.0	132	133	0.8	49.3	48.7	1.2	156	157	0.6
Hardness (as $CaCO_3$)	21.3	21.1	0.9	44.1	47.3	7.0	5.9	6	1.7	22.7	22.5	0.9	21.4	21.4	0.0	54.9	58.7	6.7	21.4	21.5	0.5	65.6	65.9	0.5
pH	7.45	7.52	0.9	7.93	7.8	1.7	6.58	6.55	0.5	7.92	7.33	7.7	8.04	8.08	0.5	7.74	7.86	1.5	7.73	7.75	0.3	7.99	8.06	0.9
Total Suspended Solids	<3.0	<3.0	n/a	23.2	204	n/a	<3.0	<3.0	n/a	67.3	52	n/a	<3.0	<3.0	n/a	80.9	78.7	n/a	<3.0	<3.0	n/a	3.5	4.1	n/a
Total Dissolved Solids	26	27	n/a	41	81	n/a	23	17	n/a	34	31	n/a	31	29	n/a	84	82	2.4	29	21	n/a	109	98	10.6
Turbidity (NTU)	0.77	0.7	9.5	196	184	6.3	1.12	1.06	5.5	41.1	29.8	*31.9*	0.79	0.75	5.2	54.9	57	3.8	1.03	1.16	11.9	17.7	18.1	2.2
Acidity (as $CaCO_3$)	1.7	1.5	n/a	1.1	1.7	n/a	2.3	2.4	n/a	2.4	3.4	n/a	2.5	2.3	n/a	2.9	2.6	n/a	2	2	n/a	4.4	3.6	n/a
Alkalinity, Bicarbonate (as $CaCO_3$)	13.8	13.7	0.7	30.1	32.9	8.9	4.8	4.9	n/a	12.2	11.8	3.3	14.1	14.1	0.0	27.1	27.4	1.1	14.7	14.9	1.4	31.8	31.8	0.0
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	13.8	13.7	0.7	30.1	32.9	8.9	4.8	4.9	n/a	12.2	11.8	3.3	14.1	14.1	0.0	27.1	27.4	1.1	14.7	14.9	1.4	31.8	31.8	0.0
Anions																								
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	<0.020	<0.020	n/a	0.034	0.036	n/a	<0.020	<0.020	n/a	0.02	<0.020	n/a	<0.020	<0.020	n/a	0.055	0.059	n/a	<0.020	<0.020	n/a	0.031	0.031	n/a
Sulphate (SO_4)	9.27	9.18	1.0	13.6	15.2	11.1	1.14	1.15	n/a	12.5	12.4	0.8	8.62	8.63	0.1	35.7	35.7	0.0	8.41	8.39	0.2	41	40.6	1.0
Nutrients																								
Ammonia, Total (as N)	<0.0050	<0.0050	n/a	0.0088	0.0067	n/a	<0.0050	<0.0050	n/a	0.0106	0.0148	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	0.0055	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.028	0.019	n/a	0.071	0.0707	0.4	0.169	0.172	1.8	0.011	0.012	n/a	<0.0050	<0.0050	n/a	0.016	0.0163	n/a	<0.0050	<0.0050	n/a	0.0402	0.04	0.5
Nitrite (as N)	0.0018	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	<0.050	<0.050	n/a	0.189	0.259	n/a	0.091	0.138	n/a	0.075	0.065	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Total Nitrogen	0.029	0.019	n/a	0.26	0.33	n/a	0.26	0.31	n/a	0.086	0.077	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	n/a	0.0029	0.0023	n/a	<0.0010	<0.0010	n/a	<0.0010	0.0011	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Phosphorus (P)-Total	<0.0020	<0.0020	n/a	0.328	0.24	n/a	0.006	0.0061	n/a	0.118	0.074	n/a	<0.0020	<0.0020	n/a	0.09	0.132	n/a	<0.0020	<0.0020	n/a	0.0102	0.0103	n/a
Cyanides																								
Cyanide, Weak Acid Diss	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	-	-	n/a	<0.0010	<0.0010	n/a	-	-	n/a
Cyanide, Total	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Organic / Inorganic Carbon																								
Total Organic Carbon	0.6	<0.50	n/a	3.94	3.43	13.8	4.76	5.12	7.3	<0.50	<0.50	n/a	<0.50	<0.50	n/a	0.52	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Total Metals																								
Aluminum (Al)	0.031	0.04	*25.4*	3.88	4.53	15.5	0.18	0.181	0.6	1.28	1.19	7.3	0.039	0.042	7.4	2.51	2.61	3.9	0.05	0.0492	1.6	0.811	1.12	*32.0*
Antimony (Sb)	0.00016	0.00016	n/a	0.00028	0.00034	n/a	<0.00010	<0.00010	n/a	0.00065	0.00057	n/a	0.00021	0.00022	n/a	0.00073	0.00075	n/a	0.00021	0.00021	n/a	0.00112	0.00118	5.2
Arsenic (As)	0.00064	0.0006	n/a	0.00224	0.00236	5.2	<0.00010	<0.00010	n/a	0.00759	0.00561	*30.0*	0.00067	0.00065	n/a	0.0035	0.00343	2.0	0.00071	0.00068	n/a	0.00169	0.00179	5.7
Barium (Ba)	0.0295	0.0301	2.0	0.11	0.102	7.5	0.00799	0.0081	1.4	0.059	0.0542	8.5	0.0315	0.0325	3.1	0.0694	0.0688	0.9	0.0335	0.0333	0.6	0.0473	0.0546	14.3
Beryllium (Be)	<0.00010	<0.00010	n/a	0.00016	0.00014	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.0001	0.00011	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00057	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	0.01	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.000010	<0.000010	n/a	0.000144	0.000112	n/a	<0.000010	<0.000010	n/a	0.000092	0.000071	n/a	<0.000010	<0.000010	n/a	0.000804	0.000776	n/a	<0.000010	<0.000010	n/a	0.000045	0.000046	n/a
Calcium (Ca)	8.16	7.97	2.4	13.8	13.9	0.7	1.63	1.65	1.2	8.53	8.53	0.0	8.05	8.31	3.2	20.8	20.8	0.0	8.3	8.27	0.4	22.6	23.1	2.2
Chromium (Cr)	0.00017	0.00015	n/a	0.0105	0.013	*21.3*	0.0007	0.0006	n/a	0.00026	0.0002	n/a	<0.00010	<0.00010	n/a	0.00233	0.00232	0.4	<0.00010	<0.00010	n/a	0.001	0.001	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	0.00462	0.00374	*21.1*	0.0001	<0.00010	n/a	0.00099	0.00077	n/a	<0.00010	<0.00010	n/a	0.00208	0.00214	n/a	<0.00010	<0.00010	n/a	0.00053	0.00056	n/a
Copper (Cu)	<0.00050	<0.00050	n/a	0.0123	0.0107	n/a	0.00079	0.00063	n/a	0.00417	0.00289	n/a	<0.00050	<0.00050	n/a	0.0709	0.0715	n/a	<0.00050	0.00063	n/a	0.00665	0.00701	n/a
Iron (Fe)	<0.030	<0.030	n/a	5.67	6.43	12.6	0.09	0.09	n/a	2.79	1.88	*39.0*	0.033	0.03	n/a	4.54	4.87	7.0	0.04	0.034	n/a	0.797	0.87	8.8
Lead (Pb)	<0.000050	0.000055	n/a	0.00213	0.00191	n/a	0.000052	<0.000050	n/a	0.00433	0.00344	*22.9*	0.000052	<0.000050	n/a	0.00229	0.00232	n/a	<0.000050	0.000064	n/a	0.0009	0.0009	n/a
Lithium (Li)	<0.00050	<0.00050	n/a	0.00443	0.00511	n/a	<0.00050	<0.00050	n/a	0.00208	0.00165	n/a	<0.00050	<0.00050	n/a	0.00171	0.00181	n/a	<0.00050	<0.00050	n/a	0.00087	0.00083	n/a
Magnesium (Mg)	0.278	0.28	0.7	4.97	5.52	10.5	0.447	0.458	2.4	0.57	0.498	13.5	0.268	0.28	4.4	2.64	2.69	1.9	0.28	0.279	0.4	2.07	2.17	4.7
Manganese (Mn)	0.00925	0.0096	3.7	0.233	0.183	*24.0*	0.0091	0.00925	1.6	0.113	0.0927	19.7	0.00481	0.0048	0.2	0.153	0.153	0.0	0.0048	0.00484	0.8	0.0526	0.0548	4.1
Mercury (Hg)	<0.000010	<0.000010	n/a	0.000041	0.000034	n/a	<0.000010	<0.000010	n/a	<0.000050	<0.000050	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000321	0.000275	n/a	0.00064	0.000794	n/a	<0.000050	<0.000050	n/a	0.000374	0.000335	n/a	0.000309	0.000321	n/a	0.0014	0.00145	n/a	0.00034	0.000343	n/a	0.000915	0.00096	n/a
Nickel (Ni)	<0.00050	<0.00050	n/a	0.0177	0.0187	n/a	0.00211	0.00125	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00252	0.00254	n/a	<0.00050	<0.00050	n/a	0.0006	0.0006	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-5. Water Quality Relative Percent Difference Results, 2012

Sample ID (new)	BJ U/S of CC			BIR2			L1 (1 m)			BJ 200m D/S			BJ U/S			SC2			BJ Shallow (1 m)			SC1		
Date Sampled	29-Jun-12			29-Jun-12			1-Jul-12			4-Jul-12			21-Aug-12			5-Sep-12			8-Sep-12			5-Oct-12		
ALS Sample ID	L1171618-1	L1171618-5	RPD (%)	L1171541-5	L1171541-8	RPD (%)	L1171541-15	L1171541-9	RPD (%)[a]	L1174986-4	L1174986-7	RPD (%)	L1199717-2	L1199717-7	RPD (%)	L1206302-6	L1206302-12	RPD (%)	L1207289-1	L1207289-3	RPD (%)	L1221669-21	L1221669-24	RPD (%)
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.068	0.063	n/a	1.04	1.19	13.5	0.063	0.063	n/a	0.461	0.391	n/a	0.078	0.081	n/a	1.36	1.38	1.5	0.091	0.085	n/a	0.599	0.78	*26.3*
Selenium (Se)	<0.00010	<0.00010	n/a	0.00052	0.00054	n/a	<0.00010	<0.00010	n/a	0.00014	0.00011	n/a	<0.00010	<0.00010	n/a	0.00075	0.00083	n/a	0.00021	0.00014	n/a	0.00037	0.00036	n/a
Silicon (Si)	0.6	0.59	1.7	8.51	10.6	*21.9*	1.23	1.27	3.2	2.94	2.61	11.9	0.59	0.6	1.7	5.62	5.77	2.6	0.58	0.57	1.7	2.38	3.36	*34.1*
Silver (Ag)	<0.000010	0.000015	n/a	0.000041	0.000046	n/a	<0.000010	<0.000010	n/a	0.000456	0.000382	n/a	<0.000010	<0.000010	n/a	0.000047	0.000047	n/a	<0.000010	0.000092	n/a	0.000023	0.000024	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.0509	0.0511	0.4	0.11	0.113	2.7	0.0203	0.0207	2.0	0.0562	0.0559	0.5	0.0511	0.051	0.2	0.116	0.118	1.7	0.0531	0.0525	1.1	0.129	0.135	4.5
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	0.000043	0.00005	n/a	<0.000010	<0.000010	n/a	0.000034	0.000029	n/a	<0.000010	<0.000010	n/a	0.000036	0.000037	n/a	<0.000010	<0.000010	n/a	0.000015	0.00002	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00012	<0.00010	n/a	0.0001	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	0.00019	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	0.089	0.119	*28.8*	<0.010	<0.010	n/a	0.033	0.028	n/a	<0.010	<0.010	n/a	0.159	0.163	2.5	<0.010	<0.010	n/a	0.02	0.03	n/a
Uranium (U)	0.000025	0.000024	n/a	0.000099	0.000092	n/a	<0.000010	<0.000010	n/a	0.000091	0.00008	n/a	0.000023	0.000022	n/a	0.000209	0.000223	n/a	0.000023	0.000026	n/a	0.000056	0.000057	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	0.0111	0.0127	n/a	<0.0010	<0.0010	n/a	0.0019	0.0015	n/a	<0.0010	<0.0010	n/a	0.0085	0.009	n/a	<0.0010	<0.0010	n/a	0.0022	0.0031	n/a
Zinc (Zn)	0.0033	<0.0030	n/a	0.0255	0.0269	n/a	<0.0030	<0.0030	n/a	0.0146	0.0115	n/a	<0.0030	<0.0030	n/a	0.0622	0.0634	1.9	<0.0030	<0.0030	n/a	0.0069	0.007	n/a
Dissolved Metals																								
Aluminum (Al)	0.011	0.012	n/a	0.123	0.0562	**74.6**	0.13	0.126	3.1	0.0206	0.011	n/a	0.005	0.0049	n/a	0.0265	0.0278	n/a	0.004	0.0046	n/a	0.0463	0.0413	11.4
Antimony (Sb)	0.00014	0.00014	n/a	0.00011	0.00013	n/a	<0.00010	<0.00010	n/a	0.00021	0.0002	n/a	0.00019	0.0002	n/a	0.00041	0.00042	n/a	0.0002	0.00019	n/a	0.00092	0.00093	n/a
Arsenic (As)	0.00044	0.00043	n/a	0.00023	0.00018	n/a	<0.00010	<0.00010	n/a	0.00023	0.00024	n/a	0.0006	0.0005	n/a	<0.00010	<0.00010	n/a	0.00049	0.00053	n/a	0.00036	0.00035	n/a
Barium (Ba)	0.0298	0.0297	0.3	0.0278	0.0286	2.8	0.00754	0.0073	3.2	0.0301	0.0293	2.7	0.0368	0.0313	16.2	0.0304	0.0291	4.4	0.0313	0.0322	2.8	0.0294	0.0294	0.0
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000035	0.000039	n/a	<0.000010	<0.000010	n/a	0.000302	0.000394	*26.4*	<0.000010	<0.000010	n/a	0.000031	0.00003	n/a
Calcium (Ca)	8.07	7.98	1.1	12.3	13.2	7.1	1.64	1.66	1.2	8.57	8.49	0.9	8.03	8.12	1.1	19.3	20.9	8.0	8.15	8.15	0.0	23.2	23.4	0.9
Chromium (Cr)	<0.00010	0.00012	n/a	0.00041	0.00026	n/a	0.00047	0.00037	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	0.00023	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00015	0.00016	n/a	<0.00010	<0.00010	n/a	0.00037	0.0006	n/a	<0.00010	<0.00010	n/a	0.00016	0.00016	n/a
Copper (Cu)	<0.00050	<0.00050	n/a	0.0006	<0.00050	n/a	0.00082	0.00063	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00076	0.00079	n/a	<0.00050	<0.00050	n/a	0.00064	0.00053	n/a
Iron (Fe)	<0.030	<0.030	n/a	0.038	0.09	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.00050	<0.00050	n/a	0.00069	0.00076	n/a	<0.00050	<0.00050	n/a	0.00051	0.00054	n/a	<0.00050	<0.00050	n/a	<0.00050	0.00061	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Magnesium (Mg)	0.279	0.282	1.1	3.26	3.52	7.7	0.435	0.438	0.7	0.31	0.314	1.3	0.315	0.266	16.9	1.61	1.59	1.3	0.264	0.271	2.6	1.87	1.83	2.2
Manganese (Mn)	0.00701	0.00733	4.5	0.00522	0.00438	17.5	0.00461	0.00439	4.9	0.0441	0.044	0.2	0.00259	0.00212	20.0	0.0739	0.08	7.9	0.00172	0.00189	9.4	0.0323	0.0321	0.6
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000274	0.000267	n/a	0.000664	0.000663	0.2	<0.000050	<0.000050	n/a	0.000244	0.000238	n/a	0.000307	0.000307	n/a	0.00119	0.00124	4.1	0.000321	0.000319	n/a	0.000895	0.000923	3.1
Nickel (Ni)	<0.00050	<0.00050	n/a	0.00079	0.00073	n/a	0.00206	0.00115	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	0.00065	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.066	0.069	n/a	0.334	0.318	n/a	0.069	0.059	n/a	0.113	0.106	n/a	0.097	0.07	n/a	0.785	0.776	1.2	0.073	0.071	n/a	0.309	0.3	n/a
Selenium (Se)	<0.00010	<0.00010	n/a	0.00046	0.00045	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.0007	0.00072	n/a	0.00016	<0.00010	n/a	0.00037	0.00036	n/a
Silicon (Si)	0.57	0.57	0.0	1.72	1.93	11.5	1.17	1.17	0.0	0.62	0.6	3.3	0.51	0.53	3.8	0.86	0.906	5.2	0.5	0.49	2.0	0.905	0.903	0.2
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.0501	0.0494	1.4	0.0951	0.102	7.0	0.0195	0.0199	2.0	0.0548	0.0547	0.2	0.0499	0.0504	1.0	0.111	0.112	0.9	0.051	0.0508	0.4	0.126	0.133	5.4
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	0.00012	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000019	0.00002	n/a	0.000014	0.000014	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000023	0.000018	n/a	0.00002	0.000024	n/a	0.000019	0.000018	n/a	0.00004	0.000041	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	0.0056	0.0109	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Aggregate Organics																								
COD	-	-	n/a	-	-	n/a	-	-	n/a	<20	<20	n/a	<20	<20	n/a	-	-	n/a	-	-	n/a	-	-	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-5. Water Quality Relative Percent Difference Results, 2012

Sample ID (new)	BJ U/S of CC			BJ U/S			BJ U/S of CC			BJ U/S			L1 (1.5 m)		
Date Sampled	29-Oct-12			27-Nov-12			27-Nov-12			13-Dec-12			15-Dec-12		
ALS Sample ID	L1232163-5	L1232163-2	RPD (%)	L1243651-1	L1243651-8	RPD (%)	L1243651-2	L1243651-7	RPD (%)	L1250701-28	L1250701-29	RPD (%)	L1250701-30	L1250701-31	RPD (%)
Physical Tests															
Colour, True (CU)	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	21.4	21.5	n/a
Conductivity (µS/cm)	50.4	52	3.1	54	53.8	0.4	54.3	53.9	0.7	57.1	56.3	1.4	20	19.8	1.0
Hardness (as $CaCO_3$)	22.8	22.7	0.4	23.9	23.9	0.0	23.8	23.9	0.4	24.5	24.9	1.6	7.75	7.81	0.8
pH	7.36	7.89	7.0	7.86	7.8	0.8	7.85	7.78	0.9	8.08	8.03	0.6	7.67	7.6	0.9
Total Suspended Solids	<3.0	<3.0	n/a	<3.0	<3.0	n/a	<3.0	<3.0	n/a	<3.0	<3.0	n/a	<3.0	<3.0	n/a
Total Dissolved Solids	32	31	n/a	27	29	n/a	30	26	n/a	31	39	n/a	25	37	n/a
Turbidity (NTU)	0.66	0.8	19.2	0.45	0.35	n/a	0.57	0.75	*27.3*	0.22	0.24	n/a	0.54	0.56	3.6
Acidity (as $CaCO_3$)	2.5	2.4	n/a	1.8	2	n/a	1.9	2.1	n/a	1.8	1.8	n/a	3.1	3.2	n/a
Alkalinity, Bicarbonate (as $CaCO_3$)	15	15.4	2.6	15.9	15.7	1.3	15.7	15.8	0.6	17.4	16.9	2.9	6.9	7.2	n/a
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	15	15.4	2.6	15.9	15.7	1.3	15.7	15.8	0.6	17.4	16.9	2.9	6.9	7.2	n/a
Anions															
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a
Sulphate (SO_4)	9.4	9.38	0.2	9.6	9.62	0.2	9.65	9.69	0.4	9.92	9.84	0.8	1.84	1.83	n/a
Nutrients															
Ammonia, Total (as N)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	0.0825	0.0856	n/a
Nitrate (as N)	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	0.0711	0.0737	3.6
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	0.4	0.3	n/a
Total Nitrogen	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	0.427	0.395	n/a
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Phosphorus (P)-Total	<0.0020	<0.0020	n/a	0.0022	<0.0020	n/a	<0.0020	<0.0020	n/a	<0.0020	<0.0020	n/a	0.0078	0.0083	n/a
Cyanides															
Cyanide, Weak Acid Diss	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Cyanide, Total	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Organic / Inorganic Carbon															
Total Organic Carbon	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	6.33	6.26	1.1
Total Metals															
Aluminum (Al)	0.0222	0.0226	n/a	0.0191	0.0193	n/a	0.025	0.0227	n/a	0.0083	0.0085	n/a	0.126	0.126	0.0
Antimony (Sb)	0.00021	0.0002	n/a	0.00023	0.00022	n/a	0.00023	0.00023	n/a	0.00021	0.00021	n/a	<0.00010	<0.00010	n/a
Arsenic (As)	0.00049	0.00049	n/a	0.00055	0.0005	n/a	0.00057	0.00056	n/a	0.00053	0.00055	n/a	<0.00010	<0.00010	n/a
Barium (Ba)	0.033	0.033	0.0	0.0345	0.0345	0.0	0.0351	0.0341	2.9	0.033	0.0339	2.7	0.00918	0.00899	2.1
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	0.00019	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Calcium (Ca)	8.68	8.31	4.4	9.16	9.09	0.8	9.19	9.17	0.2	9.14	9.44	3.2	2.12	2.06	2.9
Chromium (Cr)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00018	<0.00010	n/a	0.00042	0.001	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00016	0.00013	n/a
Copper (Cu)	0.001	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00413	<0.00050	n/a	0.00113	0.011	n/a
Iron (Fe)	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	0.128	0.136	n/a
Lead (Pb)	0.0001	0.0001	n/a	<0.000050	<0.000050	n/a	0.0001	0.0001	n/a	<0.000050	<0.000050	n/a	0.0001	0.0001	n/a
Lithium (Li)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Magnesium (Mg)	0.276	0.273	1.1	0.293	0.302	3.0	0.296	0.302	2.0	0.295	0.289	2.1	0.594	0.584	1.7
Manganese (Mn)	0.00266	0.00262	1.5	0.00184	0.00201	8.8	0.00286	0.00271	5.4	0.00572	0.00584	2.1	0.0367	0.0345	6.2
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000050	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000334	0.000318	n/a	0.000358	0.000366	n/a	0.000353	0.000367	n/a	0.000426	0.000345	n/a	<0.000050	<0.000050	n/a
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.0011	0.00113	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-5. Water Quality Relative Percent Difference Results, 2012

Sample ID (new)	BJ U/S of CC			BJ U/S			BJ U/S of CC			BJ U/S			L1 (1.5 m)		
Date Sampled	29-Oct-12			27-Nov-12			27-Nov-12			13-Dec-12			15-Dec-12		
ALS Sample ID	L1232163-5	L1232163-2	RPD (%)	L1243651-1	L1243651-8	RPD (%)	L1243651-2	L1243651-7	RPD (%)	L1250701-28	L1250701-29	RPD (%)	L1250701-30	L1250701-31	RPD (%)
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.078	0.086	n/a	0.09	0.09	n/a	0.088	0.088	n/a	0.108	0.071	n/a	0.131	0.112	n/a
Selenium (Se)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Silicon (Si)	0.508	0.518	1.9	0.506	0.493	2.6	0.508	0.516	1.6	0.52	0.54	3.8	0.8	0.791	1.1
Silver (Ag)	0.000011	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	0.000021	n/a	0.000014	0.000012	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.0549	0.0515	6.4	0.0622	0.06	3.6	0.0607	0.0606	0.2	0.0576	0.0592	2.7	0.026	0.0255	1.9
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000019	0.00002	n/a	0.000021	0.000026	n/a	0.000022	0.000021	n/a	0.00002	0.000025	n/a	<0.000010	<0.000010	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Dissolved Metals															
Aluminum (Al)	0.004	0.0041	n/a	<0.0030	<0.0030	n/a	0.0038	0.0031	n/a	<0.0030	0.0036	n/a	0.112	0.11	1.8
Antimony (Sb)	0.00021	0.00021	n/a	0.00023	0.00022	n/a	0.00022	0.00021	n/a	0.0002	0.0002	n/a	<0.00010	<0.00010	n/a
Arsenic (As)	0.00041	0.00044	n/a	0.00049	0.00046	n/a	0.00046	0.00043	n/a	0.00048	0.00048	n/a	<0.00010	<0.00010	n/a
Barium (Ba)	0.0331	0.0336	1.5	0.0344	0.0338	1.8	0.0343	0.0337	1.8	0.0338	0.0347	2.6	0.00881	0.00898	1.9
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Calcium (Ca)	8.67	8.65	0.2	9.08	9.06	0.2	9.06	9.07	0.1	9.33	9.5	1.8	2.1	2.14	1.9
Chromium (Cr)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.0003	0.0003	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00012	<0.00010	n/a
Copper (Cu)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Iron (Fe)	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	0.048	0.049	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Magnesium (Mg)	0.281	0.276	1.8	0.291	0.296	1.7	0.295	0.298	1.0	0.304	0.296	2.7	0.607	0.602	0.8
Manganese (Mn)	0.000525	0.000387	n/a	0.000578	0.000687	17.2	0.000867	0.000814	6.3	0.00465	0.00475	2.1	0.0341	0.0313	8.6
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000336	0.00034	n/a	0.000351	0.000347	n/a	0.000339	0.000345	n/a	0.000347	0.000343	n/a	<0.000050	<0.000050	n/a
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00107	0.00106	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.084	0.083	n/a	0.088	0.087	n/a	0.081	0.084	n/a	0.109	0.075	n/a	0.13	0.117	n/a
Selenium (Se)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Silicon (Si)	0.484	0.479	1.0	0.468	0.47	0.4	0.46	0.463	0.7	0.528	0.529	0.2	0.793	0.799	0.8
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.0542	0.0547	0.9	0.0603	0.0598	0.8	0.0582	0.0597	2.5	0.0582	0.0591	1.5	0.026	0.0263	1.1
Sulphur (S)	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000017	0.000018	n/a	0.00002	0.00002	n/a	0.000019	0.000019	n/a	0.000018	0.000021	n/a	<0.000010	<0.000010	n/a
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Aggregate Organics															
COD	<20	<20	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-6. Water Quality Relative Percent Difference Results, 2013

Sample ID	TRIB2			TRIB3			TRIB3			TRIB3			BJ U/S			BJ/US			BJ U/S		
Date Sampled	20-NOV-13			15-Jul-13			21-SEP-13			22-OCT-13			29-JAN-13			20-FEB-13			06-JUN-13		
ALS Sample ID	L1395276-11	L1395276-14	RPD (%)	L1334719-6	L1334719-7	RPD (%)	L1366991-12	L1366991-14	RPD (%)	L1383767-3	L1383767-12	RPD (%)	L1264309-10	L1264309-4	RPD (%)	L1271673-10	L1271673-14	RPD (%)	L1313730-9	L1313730-10	RPD (%)
Physical Tests																					
Colour, True (CU)	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a
Conductivity (µS/cm)	112	113	0.9	25.9	25.6	1.2	75.8	78.2	3.1	77.3	75.8	2.0	54.5	55.4	1.6	55.4	55.9	0.9	50.4	50.5	0.2
Hardness (as $CaCO_3$)	51.2	50.0	2.4	10.8	10.7	0.9	32.2	33.0	2.5	34.3	33.4	2.7	23.8	24.1	1.3	24.4	24.3	0.4	21.6	21.6	0.0
pH	7.54	7.88	4.4	7.81	7.77	0.5	7.90	7.95	0.6	7.64	7.60	0.5	7.56	7.73	2.2	7.75	7.80	0.6	7.87	7.87	0.0
Total Suspended Solids	<1.0	<1.0	n/a	88.5	85.3	3.7	292	306	4.7	22.9	21.5	6.3	<3.0	3.2	n/a	<3.0	<3.0	n/a	11.1	9.8	12.4
Total Dissolved Solids	74	73	1.4	19	17	11.1	60	62	3.3	47	45	4.3	37	41	10.3	30	28	6.9	31	33	6.3
Turbidity (NTU)	0.12	0.32	**90.9**	23.7	22.2	6.5	346	213	*47.6*	14.1	13.8	2.2	1.03	0.25	**121.9**	0.23	0.29	*23.1*	11.1	11.8	6.1
Acidity (as $CaCO_3$)	2.9	2.4	18.9	1.8	1.9	5.4	2.4	2.3	4.3	1.9	2.0	5.1	2.9	2.9	0.0	2.1	1.9	10.0	2.1	2.8	*28.6*
Alkalinity, Bicarbonate (as $CaCO_3$)	32.0	31.9	0.3	5.7	5.9	3.4	19.4	20.2	4.0	17.4	17.4	0.0	16.7	16.7	0.0	17.2	17.6	2.3	12.6	12.3	2.4
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	32.0	31.9	0.3	5.7	5.9	3.4	19.4	20.2	4.0	17.4	17.4	0.0	16.7	16.7	0.0	17.2	17.6	2.3	12.6	12.3	
Anions																					
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.028	0.029	3.5	<0.020	<0.020	n/a	0.026	0.028	7.4	0.027	0.026	3.8	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a
Sulphate (SO_4)	22.0	21.9	0.5	4.59	4.61	0.4	14.1	14.2	0.7	18.4	17.6	4.4	9.64	9.63	0.1	9.42	9.43	0.1	8.69	8.71	0.2
Nutrients																					
Ammonia, Total (as N)	0.0060	0.0095	*45.2*	<0.0050	<0.0050	n/a	0.0427	0.0481	11.9	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0148	0.0132	11.4	0.0083	0.0066	*22.8*	0.0203	0.0182	10.9	0.0360	0.0352	2.2	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a	0.0099	0.0092	7.3
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	<0.050	<0.050	n/a	<0.050	<0.050	n/a	0.284	0.341	18.2	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Total Nitrogen	<0.050	<0.050	n/a	<0.050	<0.050	n/a	0.304	0.360	16.9	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0031	0.0025	*21.4*	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Phosphorus (P)-Total	<0.0020	<0.0020	n/a	0.175	0.154	12.8	0.380	0.324	15.9	0.0175	0.0273	*43.8*	<0.0020	0.0025	n/a	<0.0020	<0.0020	n/a	0.0159	0.0171	7.3
Cyanides																					
Cyanide, Weak Acid Diss	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Cyanide, Total	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Organic / Inorganic Carbon																					
Total Organic Carbon	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	0.77	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	0.52	n/a
Total Metals																					
Aluminum (Al)	0.0057	0.0072	*23.3*	2.56	2.22	14.2	7.24	6.60	9.2	0.605	0.746	*20.9*	0.0280	0.0155	**57.5**	0.0094	0.0108	13.9	0.307	0.426	*32.5*
Antimony (Sb)	0.00029	0.00028	3.5	0.00019	0.00017	11.1	0.00092	0.00097	5.3	0.00019	0.00020	5.1	0.00022	0.00023	4.4	0.00022	0.00022	0.0	0.00026	0.00027	3.8
Arsenic (As)	0.00188	0.00183	2.7	0.00307	0.00274	11.4	0.0198	0.0184	7.3	0.00154	0.00174	12.2	0.00072	0.00064	11.8	0.00060	0.00059	1.7	0.00208	0.00224	7.4
Barium (Ba)	0.0441	0.0438	0.7	0.0858	0.0915	6.4	0.369	0.355	3.9	0.0595	0.0638	7.0	0.0371	0.0361	2.7	0.0351	0.0342	2.6	0.0407	0.0412	1.2
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00020	0.00022	9.5	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.000010	<0.000010	n/a	0.000018	0.000020	10.5	0.000142	0.000157	10.0	0.000025	0.000030	18.2	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	0.000013	n/a
Calcium (Ca)	19.3	19.5	1.0	4.49	4.33	3.6	13.4	14.3	6.5	12.8	12.0	6.5	9.07	9.13	0.7	9.47	9.17	3.2	8.09	8.18	1.1
Chromium (Cr)	<0.00010	<0.00010	n/a	0.00026	0.00023	12.2	0.00425	0.00391	8.3	0.00018	0.00026	*36.4*	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00017	0.00023	*30.0*
Cobalt (Co)	<0.00010	<0.00010	n/a	0.00089	0.00081	9.4	0.00303	0.00282	7.2	0.00063	0.00068	7.6	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00020	0.00022	9.5
Copper (Cu)	<0.00050	<0.00050	n/a	0.00229	0.00238	3.9	0.0141	0.0138	2.2	0.00163	0.00153	6.3	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00085	0.00091	6.8
Iron (Fe)	<0.030	<0.030	n/a	1.87	1.60	15.6	7.55	7.51	0.5	0.668	0.752	11.8	<0.030	<0.030	n/a	<0.030	<0.030	n/a	0.504	0.616	*20.0*
Lead (Pb)	<0.000050	<0.000050	n/a	0.000949	0.000875	8.1	0.00591	0.00631	6.5	0.000438	0.000408	7.1	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.000570	0.000631	10.2
Lithium (Li)	0.00097	0.00083	15.6	0.00125	0.00090	*32.6*	0.00492	0.00468	5.0	0.00086	0.00119	*32.2*	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Magnesium (Mg)	0.434	0.441	1.6	0.612	0.528	14.7	2.18	2.06	5.7	0.758	0.801	5.5	0.308	0.309	0.3	0.306	0.300	2.0	0.349	0.364	4.2
Manganese (Mn)	0.000647	0.000581	10.7	0.106	0.102	3.8	0.364	0.353	3.1	0.0745	0.0807	8.0	0.00333	0.00318	4.6	0.00231	0.00247	6.7	0.0360	0.0360	0.0
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000025	0.000013	**63.2**	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000638	0.000630	1.3	0.000399	0.000346	14.2	0.00491	0.00487	0.8	0.000829	0.000805	2.9	0.000380	0.000361	5.1	0.000367	0.000374	1.9	0.000284	0.000312	9.4
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00168	0.00147	13.3	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-6. Water Quality Relative Percent Difference Results, 2013

Sample ID	TRIB2			TRIB3			TRIB3			TRIB3			BJ U/S			BJ/US			BJ U/S		
Date Sampled	20-NOV-13			15-Jul-13			21-SEP-13			22-OCT-13			29-JAN-13			20-FEB-13			06-JUN-13		
ALS Sample ID	L1395276-11	L1395276-14	RPD (%)	L1334719-6	L1334719-7	RPD (%)	L1366991-12	L1366991-14	RPD (%)	L1383767-3	L1383767-12	RPD (%)	L1264309-10	L1264309-4	RPD (%)	L1271673-10	L1271673-14	RPD (%)	L1313730-9	L1313730-10	RPD (%)
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	0.31	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.069	0.065	6.0	0.650	0.564	14.2	3.18	2.95	7.5	0.249	0.271	8.5	0.082	0.083	1.2	0.073	0.079	7.9	0.188	0.206	9.1
Selenium (Se)	0.00027	0.00026	3.8	<0.00010	<0.00010	n/a	0.00012	0.00013	8.0	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Silicon (Si)	1.36	1.35	0.7	4.27	4.27	0.0	15.7	11.9	*27.5*	1.50	1.76	16.0	0.617	0.614	0.5	0.585	0.540	8.0	1.13	1.32	15.5
Silver (Ag)	<0.000010	<0.000010	n/a	0.000021	0.000019	10.0	0.00320	0.00330	3.1	0.000035	0.000035	0.0	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000049	0.000057	15.1
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.104	0.103	1.0	0.0521	0.0470	10.3	0.130	0.135	3.8	0.156	0.144	8.0	0.0606	0.0584	3.7	0.0617	0.0591	4.3	0.0520	0.0512	1.6
Thallium (Tl)	<0.000010	<0.000010	n/a	0.000028	0.000024	15.4	0.000244	0.000238	2.5	<0.000010	0.000011	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000011	0.000014	*24.0*
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	0.052	0.053	1.9	0.149	0.100	*39.4*	0.014	0.015	6.9	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000062	0.000057	8.4	0.000106	0.000110	3.7	0.000322	0.000358	10.6	0.000130	0.000123	5.5	0.000027	0.000024	11.8	0.000025	0.000028	11.3	0.000029	0.000032	9.8
Vanadium (V)	<0.0010	<0.0010	n/a	0.0034	0.0032	6.1	0.0096	0.0088	8.7	<0.0010	0.0011	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	0.0080	0.0073	9.2	0.0360	0.0414	14.0	0.0059	0.0064	8.1	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Dissolved Metals																					
Aluminum (Al)	<0.0030	<0.0030	n/a	0.0195	0.0107	**58.3**	0.867	0.313	**93.9**	0.0137	0.0143	4.3	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	0.0099	0.0083	17.6
Antimony (Sb)	0.00025	0.00026	3.9	<0.00010	<0.00010	n/a	0.00055	0.00059	7.0	0.00012	0.00012	0.0	0.00020	0.00021	4.9	0.00021	0.00021	0.0	0.00018	0.00017	5.7
Arsenic (As)	0.00179	0.00178	0.6	0.00013	<0.00010	n/a	0.00096	0.00091	5.3	<0.00010	<0.00010	n/a	0.00053	0.00052	1.9	0.00056	0.00055	1.8	0.00040	0.00041	2.5
Barium (Ba)	0.0435	0.0443	1.8	0.0230	0.0221	4.0	0.0724	0.0494	*37.8*	0.0484	0.0507	4.6	0.0357	0.0364	1.9	0.0346	0.0352	1.7	0.0310	0.0324	4.4
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000011	<0.000010	n/a	0.000019	0.000018	5.4	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Calcium (Ca)	19.8	19.3	2.6	3.98	3.96	0.5	11.7	12.1	3.4	12.6	12.2	3.2	9.05	9.16	1.2	9.27	9.22	0.5	8.20	8.22	0.2
Chromium (Cr)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00015	0.00013	14.3	<0.00010	<0.00010	n/a	0.00022	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00015	0.00011	*30.8*	0.00024	0.00024	0.0	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	<0.00050	<0.00050	n/a	0.00058	<0.00050	n/a	0.00074	0.00053	*33.1*	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Iron (Fe)	<0.030	<0.030	n/a	<0.030	<0.030	n/a	0.201	0.133	*40.7*	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.000179	0.000133	*29.5*	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	0.00078	0.00089	13.2	<0.00050	<0.00050	n/a	0.00077	0.00065	16.9	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Magnesium (Mg)	0.433	0.458	5.6	0.207	0.207	0.0	0.717	0.682	5.0	0.690	0.709	2.7	0.299	0.298	0.3	0.298	0.300	0.7	0.264	0.272	3.0
Manganese (Mn)	0.000071	0.000081	13.2	0.0226	0.0220	2.7	0.124	0.118	5.0	0.0521	0.0534	2.5	0.00261	0.00216	18.9	0.00188	0.00194	3.1	0.00933	0.00997	6.6
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000635	0.000671	5.5	0.000257	0.000234	9.4	0.00392	0.00382	2.6	0.000774	0.000742	4.2	0.000431	0.000366	16.3	0.000353	0.000351	0.6	0.000272	0.000269	1.1
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.066	0.087	*27.5*	0.074	<0.050	n/a	0.849	0.653	*26.1*	0.113	0.119	5.2	0.080	0.080	0.0	0.076	0.078	2.6	0.085	0.088	3.5
Selenium (Se)	0.00026	0.00028	7.4	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Silicon (Si)	1.33	1.31	1.5	0.171	0.164	4.2	2.45	1.93	*23.7*	0.481	0.494	2.7	0.575	0.568	1.2	0.539	0.556	3.1	0.598	0.593	0.8
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000072	0.000043	**50.4**	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.104	0.110	5.6	0.0411	0.0402	2.2	0.112	0.114	1.8	0.145	0.138	4.9	0.0579	0.0589	1.7	0.0588	0.0592	0.7	0.0509	0.0499	2.0
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000040	0.000022	**58.1**	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.023	0.017	*30.0*	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000056	0.000055	1.8	<0.000010	<0.000010	n/a	0.000098	0.000091	7.4	0.000021	0.000024	13.3	0.000021	0.000022	4.7	0.000020	0.000024	18.2	0.000014	0.000013	7.4
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	0.0042	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Aggregate Organics																					
COD	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-6. Water Quality Relative Percent Difference Results, 2013

Sample ID	BJ U/S			BJ U/S of CC			Adit			BJ OF			BJ 200m D/S			BJ 200m D/S			BJ U/S 200m D/S		
Date Sampled	20-NOV-13			14-AUG-13			27-APR-13			21-SEP-13			19-FEB-13			14-MAR-13			27-APR-13		
ALS Sample ID	L1395276-13	L1395276-15	RPD (%)	L1350233-3	L1350233-4	RPD (%)	L1294990-1	L1294990-4	RPD (%)	L1366991-13	L1366991-9	RPD (%)	L1271673-8	L1271673-9	RPD (%)	L1279839-11	L1279839-12	RPD (%)	L1294990-2	L1294990-3	RPD (%)
Physical Tests																					
Colour, True (CU)	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a
Conductivity (µS/cm)	61.4	59.1	3.8	52.7	50.3	4.7	543	540	0.6	65.0	80.8	*21.7*	86.6	99.4	13.8	146	148	1.4	107	105	1.9
Hardness (as $CaCO_3$)	26.1	25.8	1.2	23.6	23.1	2.1	108	105	2.8	26.8	31.4	15.8	29.8	31.8	6.5	40.6	41.2	1.5	31.8	32.7	2.8
pH	7.92	6.86	14.3	7.61	7.47	1.9	8.28	8.29	0.1	7.54	7.92	4.9	7.87	7.87	0.0	7.91	7.97	0.8	7.94	7.90	0.5
Total Suspended Solids	2.4	2.5	4.1	6.2	4.4	*34.0*	33.8	31.1	8.3	24.8	90.3	**113.8**	3.8	5.2	*31.1*	3.9	<3.0	n/a	5.8	5.8	0.0
Total Dissolved Solids	43	43	0.0	35	39	10.8	347	356	2.6	35	44	22.8	49	57	15.1	99	98	1.0	65	65	0.0
Turbidity (NTU)	3.85	4.08	5.8	4.74	4.37	8.1	33.2	33.6	1.2	14.6	24.3	*49.9*	3.33	5.16	*43.1*	3.23	3.56	9.7	4.07	4.54	10.9
Acidity (as $CaCO_3$)	2.0	4.0	**66.7**	1.8	1.7	5.7	<1.0	<1.0	n/a	3.3	2.3	*35.7*	1.8	2.0	10.5	2.9	2.4	18.9	1.6	1.9	17.1
Alkalinity, Bicarbonate (as $CaCO_3$)	17.4	17.4	0.0	13.7	15.2	10.4	119	120	0.8	16.2	20.0	*21.0*	22.8	25.6	11.6	34.0	34.5	1.5	27.2	26.8	1.5
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	17.4	17.4	0.0	13.7	15.2	10.4	119	120	0.8	16.2	20.0	*21.0*	22.8	25.6	11.6	34.0	34.5	1.5	27.2	26.8	1.5
Anions																					
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	<0.50	<0.50	n/a	<0.50	<0.50	n/a	2.54	2.54	0.0	<0.50	<0.50	n/a	<0.50	<0.50	n/a	0.52	0.53	1.9	<0.50	<0.50	n/a
Fluoride (F)	<0.020	<0.020	n/a	<0.020	<0.020	n/a	0.430	0.420	2.4	0.022	0.031	*34.0*	0.036	0.046	*24.4*	0.080	0.082	2.5	0.049	0.048	2.1
Sulphate (SO_4)	10.6	10.6	0.0	8.54	8.53	0.1	150	150	0.0	13.9	16.3	15.9	17.8	21.3	17.9	35.1	35.8	2.0	23.5	23.2	1.3
Nutrients																					
Ammonia, Total (as N)	0.0096	0.0083	14.5	<0.0050	<0.0050	n/a	0.706	0.695	1.6	0.0106	0.0149	*33.7*	0.0552	0.0687	*21.8*	0.223	0.225	0.9	0.0732	0.0690	5.9
Nitrate (as N)	0.0492	0.0484	1.6	0.0061	0.0060	1.7	1.40	1.40	0.0	0.0312	0.0496	*45.5*	0.0656	0.0945	*36.1*	0.315	0.319	1.3	0.145	0.142	2.1
Nitrite (as N)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.464	0.462	0.4	0.0014	0.0032	**78.3**	0.0197	0.0293	*39.2*	0.0884	0.0909	2.8	0.0431	0.0412	4.5
Total Kjeldahl Nitrogen	<0.050	<0.050	n/a	<0.050	<0.050	n/a	1.04	0.86	18.9	<0.050	0.070	n/a	0.117	0.101	14.7	0.24	0.24	0.0	0.069	0.055	*22.6*
Total Nitrogen	0.052	0.060	14.3	<0.050	<0.050	n/a	2.91	2.73	6.4	0.070	0.123	**54.9**	0.202	0.225	10.8	0.640	0.653	2.0	0.257	0.238	7.7
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0020	0.0019	5.1	<0.0010	<0.0010	n/a	0.0014	0.0014	0.0	0.0023	0.0022	4.4	<0.0010	<0.0010	n/a
Phosphorus (P)-Total	0.0029	0.0031	6.7	0.0030	0.0026	14.3	0.0183	0.0187	2.2	0.0343	0.133	**118.0**	0.0062	0.0061	1.6	0.0054	0.0067	*21.5*	0.0067	0.0076	12.6
Cyanides																					
Cyanide, Weak Acid Diss	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0019	0.0017	11.1	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Cyanide, Total	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0030	0.0027	10.5	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Organic / Inorganic Carbon																					
Total Organic Carbon	<0.50	<0.50	n/a	0.64	<0.50	n/a	0.93	0.69		<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Total Metals																					
Aluminum (Al)	0.298	0.140	**72.1**	0.208	0.256	*20.7*	0.380	0.249	*41.7*	0.655	1.87	**96.2**	0.0988	0.0825	18.0	0.0725	0.0875	18.8	0.0845	0.0621	*30.6*
Antimony (Sb)	0.00053	0.00050	5.8	0.00031	0.00033	6.3	0.0159	0.0169	6.1	0.00059	0.00111	**61.2**	0.00067	0.00080	17.7	0.00220	0.00229	4.0	0.00164	0.00151	8.3
Arsenic (As)	0.00067	0.00063	6.2	0.00085	0.00085	0.0	0.0131	0.0139	5.9	0.00347	0.0134	**117.7**	0.00186	0.00224	18.5	0.00375	0.00384	2.4	0.00212	0.00198	6.8
Barium (Ba)	0.0519	0.0459	12.3	0.0432	0.0452	4.5	0.0461	0.0435	5.8	0.0537	0.0922	**52.8**	0.0365	0.0371	1.6	0.0351	0.0356	1.4	0.0352	0.0365	3.6
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.119	0.123	3.3	<0.010	0.010	n/a	0.010	0.012	18.2	0.023	0.024	4.3	0.013	0.012	8.0
Cadmium (Cd)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000037	0.000043	15.0	0.000076	0.000156	**69.0**	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000012	0.000013	8.0
Calcium (Ca)	9.96	9.87	0.9	8.69	9.21	5.8	34.6	35.1	1.4	10.2	10.8	5.7	10.9	11.3	3.6	14.9	15.1	1.3	11.7	12.3	5.0
Chromium (Cr)	0.00012	<0.00010	n/a	0.00013	<0.00010	n/a	0.00021	0.00016	*27.0*	0.00031	0.00080	**88.3**	0.00011	<0.00010	n/a	0.00011	0.00011	0.0	<0.00010	<0.00010	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00019	0.00020	5.1	0.00057	0.00100	**54.8**	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	<0.00050	<0.00050	n/a	<0.00050	0.00050	n/a	0.00339	0.00460	*30.3*	0.00263	0.00547	**70.1**	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Iron (Fe)	0.056	0.036	*43.5*	0.063	0.084	*28.6*	0.174	0.147	16.8	0.743	2.01	**92.0**	0.074	0.070	5.6	<0.030	<0.030	n/a	0.100	0.094	6.2
Lead (Pb)	0.000352	0.000302	15.3	0.000126	0.000173	*31.4*	0.00145	0.00155	6.7	0.00140	0.00418	**99.6**	0.000352	0.000359	2.0	0.000196	0.000219	11.1	0.000492	0.000443	10.5
Lithium (Li)	0.00146	0.00140	4.2	0.00070	0.00084	18.2	0.263	0.265	0.8	0.00271	0.0107	**119.2**	0.0135	0.0188	*32.8*	0.0398	0.0411	3.2	0.0224	0.0196	13.3
Magnesium (Mg)	0.356	0.325	9.1	0.298	0.305	2.3	4.57	4.78	4.5	0.500	0.944	**61.5**	0.522	0.596	13.2	1.10	1.12	1.8	0.710	0.674	5.2
Manganese (Mn)	0.00448	0.00385	15.1	0.00976	0.0101	3.4	0.124	0.129	4.0	0.0769	0.127	*49.1*	0.0149	0.0176	16.6	0.0283	0.0285	0.7	0.0259	0.0265	2.3
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000369	0.000379	2.7	0.000321	0.000355	10.1	0.00376	0.00414	9.6	0.000430	0.000689	*46.3*	0.000550	0.000589	6.8	0.000913	0.000938	2.7	0.000664	0.000651	2.0
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00119	0.00131	9.6	<0.00050	0.00052	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-6. Water Quality Relative Percent Difference Results, 2013

Sample ID	BJ U/S			BJ U/S of CC			Adit			BJ OF			BJ 200m D/S			BJ 200m D/S			BJ U/S 200m D/S		
Date Sampled	20-NOV-13			14-AUG-13			27-APR-13			21-SEP-13			19-FEB-13			14-MAR-13			27-APR-13		
ALS Sample ID	L1395276-13	L1395276-15	RPD (%)	L1350233-3	L1350233-4	RPD (%)	L1294990-1	L1294990-4	RPD (%)	L1366991-13	L1366991-9	RPD (%)	L1271673-8	L1271673-9	RPD (%)	L1279839-11	L1279839-12	RPD (%)	L1294990-2	L1294990-3	RPD (%)
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.294	0.204	*36.1*	0.139	0.177	*24.1*	5.67	5.82	2.6	0.401	1.06	**90.2**	0.375	0.455	19.3	1.01	1.04	2.9	0.670	0.627	6.6
Selenium (Se)	<0.00010	0.00011	n/a	<0.00010	<0.00010	n/a	0.00018	0.00020	10.5	0.00013	0.00032	**84.4**	0.00011	<0.00010	n/a	0.00012	0.00013	8.0	0.00011	0.00012	8.7
Silicon (Si)	1.08	0.775	*32.9*	0.783	0.896	13.5	3.94	3.41	14.4	1.47	3.53	**82.4**	0.893	0.866	3.1	1.20	1.22	1.7	0.904	0.874	3.4
Silver (Ag)	0.000023	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000061	0.000055	10.3	0.000195	0.000856	**125.8**	0.000027	0.000018	*40.0*	0.000015	0.000019	*23.5*	0.000049	0.000037	*27.9*
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	68.5	69.9	2.0	<2.0	3.7	n/a	5.2	6.9	*28.1*	13.5	13.4	0.7	7.5	7.0	6.9
Strontium (Sr)	0.0744	0.0706	5.2	0.0619	0.0644	4.0	1.22	1.29	5.6	0.0762	0.106	*32.7*	0.121	0.146	18.7	0.262	0.268	2.3	0.167	0.159	4.9
Thallium (Tl)	0.000019	0.000010	**62.1**	<0.000010	<0.000010	n/a	0.000185	0.000172	7.3	0.000030	0.000080	**90.9**	0.000012	0.000012	0.0	0.000026	0.000028	7.4	0.000023	0.000021	9.1
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	0.025	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000045	0.000038	16.9	0.000032	0.000032	0.0	0.00123	0.00126	2.4	0.000070	0.000143	**68.5**	0.000053	0.000058	9.0	0.000108	0.000118	8.8	0.000127	0.000116	9.1
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0012	0.0042	**111.1**	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	0.0059	0.0060	1.7	0.0112	0.0204	**58.2**	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Dissolved Metals																					
Aluminum (Al)	0.0103	0.0105	1.9	0.0083	0.0095	13.5	0.0159	0.0166	4.3	0.0273	0.0612	**76.6**	0.0047	0.0051	8.2	0.0069	0.0060	14.0	0.0047	0.0049	4.2
Antimony (Sb)	0.00051	0.00048	6.1	0.00032	0.00031	3.2	0.0168	0.0164	2.4	0.00043	0.00085	**65.6**	0.00061	0.00079	*25.7*	0.00215	0.00219	1.8	0.00164	0.00155	5.6
Arsenic (As)	0.00044	0.00045	2.2	0.00060	0.00062	3.3	0.0117	0.0115	1.7	0.00029	0.00085	**98.2**	0.00146	0.00192	*27.2*	0.00350	0.00358	2.3	0.00150	0.00140	6.9
Barium (Ba)	0.0418	0.0410	1.9	0.0365	0.0365	0.0	0.0318	0.0327	2.8	0.0357	0.0324	9.7	0.0335	0.0340	1.5	0.0323	0.0322	0.3	0.0339	0.0335	1.2
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	0.010	<0.010	n/a	<0.010	<0.010	n/a	0.121	0.122	0.8	<0.010	0.011	n/a	0.011	0.012	8.7	0.023	0.024	4.3	0.015	0.014	6.9
Cadmium (Cd)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000041	0.000022	**60.3**	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Calcium (Ca)	9.91	9.82	0.9	9.00	8.81	2.1	35.3	34.5	2.3	10.1	11.7	14.7	11.1	11.8	6.1	14.5	14.7	1.4	11.6	12.0	3.4
Chromium (Cr)	0.00016	<0.00010	n/a	<0.00010	0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00011	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Cobalt (Co)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00015	0.00015	0.0	0.00019	0.00013	*37.5*	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	0.00060	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Iron (Fe)	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a
Lead (Pb)	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.000100	0.000092	8.3	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a
Lithium (Li)	0.00114	0.00110	3.6	0.00051	0.00077	*40.6*	0.263	0.267	1.5	0.00215	0.00994	**128.9**	0.0137	0.0197	*35.9*	0.0388	0.0405	4.3	0.0230	0.0213	7.7
Magnesium (Mg)	0.321	0.316	1.6	0.277	0.276	0.4	4.68	4.64	0.9	0.366	0.504	*31.7*	0.521	0.598	13.8	1.06	1.11	4.6	0.710	0.687	3.3
Manganese (Mn)	0.00136	0.00133	2.2	0.000575	0.000545	5.4	0.115	0.114	0.9	0.0473	0.0651	*31.7*	0.0126	0.0158	*22.5*	0.0262	0.0269	2.6	0.0245	0.0238	2.9
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000432	0.000378	13.3	0.000356	0.000369	3.6	0.00402	0.00394	2.0	0.000384	0.000669	**54.1**	0.000522	0.000617	16.7	0.000864	0.000885	2.4	0.000660	0.000674	2.1
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00115	0.00113	1.8	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.156	0.150	3.9	0.097	0.096	1.0	5.84	5.70	2.4	0.191	0.378	**65.7**	0.331	0.427	*25.3*	0.939	0.990	5.3	0.669	0.635	5.2
Selenium (Se)	0.00012	0.00010	18.2	<0.00010	<0.00010	n/a	0.00018	0.00018	0.0	<0.00010	0.00011	n/a	<0.00010	<0.00010	n/a	0.00012	0.00010	18.2	0.00012	0.00012	0.0
Silicon (Si)	0.549	0.541	1.5	0.499	0.499	0.0	3.02	3.03	0.3	0.545	0.666	20.0	0.704	0.766	8.4	1.01	1.01	0.0	0.793	0.784	1.1
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	70.0	69.7	0.4	<2.0	3.6	n/a	4.7	6.5	*32.1*	12.6	12.9	2.4	7.3	7.0	4.2
Strontium (Sr)	0.0734	0.0697	5.2	0.0609	0.0613	0.7	1.28	1.26	1.6	0.0734	0.111	*40.8*	0.121	0.143	16.7	0.252	0.258	2.4	0.164	0.163	0.6
Thallium (Tl)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000161	0.000149	7.7	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000023	0.000022	4.4	0.000017	0.000016	6.1
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000036	0.000033	8.7	0.000024	0.000024	0.0	0.00121	0.00117	3.4	0.000023	0.000050	**74.0**	0.000043	0.000053	*20.8*	0.000107	0.000105	1.9	0.000104	0.000101	2.9
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	0.0036	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Aggregate Organics																					
COD	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-6. Water Quality Relative Percent Difference Results, 2013

Sample ID	BJ 200m D/S			BJ2			SCO			BJ (2.5 m)			BJ (30 m)			SUL (2 m)		
Date Sampled	19-MAY-13			29-JAN-13			13-JUN-13			15-MAR-13			09-AUG-13			10-AUG-13		
ALS Sample ID	L1304309-9	L1304309-15	RPD (%)	L1264309-5	L1264309-3	RPD (%)	L1317318-3	L1317318-10	RPD (%)	L1279841-1	L1279841-6	RPD (%)	L1346151-12	L1346151-15	RPD (%)	L1346151-16	L1346151-18	RPD (%)
Physical Tests																		
Colour, True (CU)	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a	<5.0	<5.0	n/a
Conductivity (µS/cm)	81.7	81.0	0.9	107	108	0.9	109	109	0.0	52.1	54.6	4.7	52.6	53.1	0.9	53.3	57.5	7.6
Hardness (as $CaCO_3$)	29.7	29.6	0.3	32.6	32.8	0.6	49.3	49.3	0.0	23.8	25.3	6.1	23.5	23.3	0.9	24.0	24.2	0.8
pH	7.72	7.77	0.6	7.84	7.75	1.2	7.70	7.92	2.8	7.37	7.76	5.2	8.12	8.10	0.2	8.18	7.95	2.9
Total Suspended Solids	30.1	28.8	4.4	<3.0	5.2	n/a	473	471	0.4	<3.0	<3.0	n/a	3.2	2.6	*20.7*	74.4	61.7	18.7
Total Dissolved Solids	61	55	10.3	68	54	23.0	64	73	13.1	34	37	8.5	35	38	8.2	39	40	2.5
Turbidity (NTU)	35.2	32.1	9.2	1.36	0.69	**65.4**	394	373	5.5	0.28	0.23	19.6	2.69	3.81	*34.5*	62.9	67.3	6.8
Acidity (as $CaCO_3$)	1.9	2.0	5.1	2.6	3.1	17.5	1.9	1.5	*23.5*	3.4	2.6	*26.7*	2.4	2.6	8.0	1.8	2.5	*32.6*
Alkalinity, Bicarbonate (as $CaCO_3$)	18.9	19.5	3.1	27.0	27.0	0.0	30.0	29.8	0.7	15.6	15.6	0.0	4.4	15.2	**110.2**	16.3	15.9	2.5
Alkalinity, Carbonate (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Hydroxide (as $CaCO_3$)	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Alkalinity, Total (as $CaCO_3$)	18.9	19.5	3.1	27.0	27.0	0.0	30.0	29.8	0.7	15.6	15.6	0.0	4.4	15.2	**110.2**	16.3	15.9	2.5
Anions																		
Bromide (Br)	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Chloride (Cl)	0.71	0.64	10.4	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a
Fluoride (F)	0.029	0.029	0.0	0.049	0.049	0.0	0.029	0.030	3.4	<0.020	<0.020	n/a	<0.020	<0.020	n/a	<0.020	<0.020	n/a
Sulphate (SO_4)	18.5	18.2	1.6	24.0	24.0	0.0	22.9	23.3	1.7	8.94	9.51	6.2	9.38	9.40	0.2	9.61	9.72	1.1
Nutrients																		
Ammonia, Total (as N)	0.0369	0.0359	2.7	0.0764	0.0756	1.1	<0.0050	<0.0050	n/a	0.0093	0.0051	**58.3**	<0.0050	<0.0050	n/a	<0.0050	<0.0050	n/a
Nitrate (as N)	0.0679	0.0644	5.3	0.156	0.155	0.6	0.0179	0.0170	5.2	<0.0050	<0.0050	n/a	0.0447	0.0452	1.1	0.0080	0.0088	9.5
Nitrite (as N)	0.0130	0.0122	6.3	0.0321	0.0325	1.2	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Total Kjeldahl Nitrogen	0.071	0.067	5.8	0.110	0.110	0.0	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a	<0.050	<0.050	n/a
Total Nitrogen	0.152	0.143	6.1	0.298	0.297	0.3	<0.050	<0.050	n/a	<0.050	<0.050	n/a	0.068	<0.050	n/a	<0.050	<0.050	n/a
Orthophosphate-Dissolved (as P)	<0.0010	<0.0010	n/a	0.0021	0.0024	13.3	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	0.0014	n/a
Phosphorus (P)-Total	0.0289	0.0364	*23.0*	0.0058	0.0038	*41.7*	0.700	0.738	5.3	<0.0020	<0.0020	n/a	0.0023	0.0029	*23.1*	0.0730	0.0774	5.9
Cyanides																		
Cyanide, Weak Acid Diss	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Cyanide, Total	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Organic / Inorganic Carbon																		
Total Organic Carbon	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	<0.50	<0.50	n/a	0.51	<0.50	n/a	<0.50	<0.50	n/a
Total Metals																		
Aluminum (Al)	0.830	0.884	6.3	0.0294	0.0408	*32.5*	12.2	10.9	11.3	0.0044	0.0038	14.6	0.305	0.371	19.5	2.99	2.81	6.2
Antimony (Sb)	0.00087	0.00092	5.6	0.00074	0.00076	2.7	0.00696	0.00685	1.6	0.00022	0.00023	4.4	0.00044	0.00041	7.1	0.00156	0.00164	5.0
Arsenic (As)	0.00480	0.00533	10.5	0.00242	0.00231	4.7	0.0354	0.0344	2.9	0.00058	0.00063	8.3	0.00071	0.00069	2.9	0.00644	0.00622	3.5
Barium (Ba)	0.0547	0.0546	0.2	0.0365	0.0372	1.9	0.348	0.299	15.1	0.0352	0.0351	0.3	0.0422	0.0436	3.3	0.0890	0.0832	6.7
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00033	0.00030	9.5	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	0.013	0.014	7.4	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.000076	0.000080	5.1	<0.000010	<0.000010	n/a	0.000647	0.000642	0.8	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000097	0.000093	4.2
Calcium (Ca)	10.9	11.0	0.9	12.1	12.2	0.8	30.1	28.9	4.1	9.32	9.86	5.6	9.08	8.93	1.7	9.08	8.81	3.0
Chromium (Cr)	0.00026	0.00027	3.8	0.00010	<0.00010	n/a	0.0106	0.00983	7.5	0.00022	<0.00010	n/a	0.00010	0.00011	9.5	0.00186	0.00181	2.7
Cobalt (Co)	0.00068	0.00070	2.9	<0.00010	<0.00010	n/a	0.00861	0.00841	2.4	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00150	0.00142	5.5
Copper (Cu)	0.00272	0.00216	*23.0*	<0.00050	<0.00050	n/a	0.0886	0.0862	2.7	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.0133	0.0131	1.5
Iron (Fe)	1.23	1.36	10.0	<0.030	<0.030	n/a	22.5	21.2	5.9	<0.030	<0.030	n/a	0.078	0.088	12.0	3.35	3.45	2.9
Lead (Pb)	0.00368	0.00310	17.1	0.000169	0.000188	10.6	0.0238	0.0215	10.2	<0.000050	<0.000050	n/a	0.000217	0.000238	9.2	0.00373	0.00364	2.4
Lithium (Li)	0.00655	0.00683	4.2	0.0205	0.0211	2.9	0.0107	0.00986	8.2	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00180	0.00182	1.1
Magnesium (Mg)	0.605	0.627	3.6	0.670	0.678	1.2	7.84	7.39	5.9	0.307	0.322	4.8	0.319	0.318	0.3	1.55	1.51	2.6
Manganese (Mn)	0.103	0.104	1.0	0.0205	0.0206	0.5	0.796	0.772	3.1	0.000634	0.000450	*33.9*	0.00508	0.00522	2.7	0.129	0.124	4.0
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	0.000074	0.000255	**110.0**	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	0.000014	n/a
Molybdenum (Mo)	0.000500	0.000525	4.9	0.000626	0.000636	1.6	0.00190	0.00182	4.3	0.000365	0.000369	1.1	0.000353	0.000341	3.5	0.000503	0.000509	1.2
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00899	0.00842	6.5	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00157	0.00157	0.0

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Table A8-6. Water Quality Relative Percent Difference Results, 2013

Sample ID	BJ 200m D/S			BJ2			SCO			BJ (2.5 m)			BJ (30 m)			SUL (2 m)		
Date Sampled	19-MAY-13			29-JAN-13			13-JUN-13			15-MAR-13			09-AUG-13			10-AUG-13		
ALS Sample ID	L1304309-9	L1304309-15	RPD (%)	L1264309-5	L1264309-3	RPD (%)	L1317318-3	L1317318-10	RPD (%)	L1279841-1	L1279841-6	RPD (%)	L1346151-12	L1346151-15	RPD (%)	L1346151-16	L1346151-18	RPD (%)
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	0.71	0.67	5.8	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.552	0.576	4.3	0.452	0.468	3.5	3.44	3.18	7.9	0.075	0.078	3.9	0.221	0.241	8.7	0.865	0.810	6.6
Selenium (Se)	0.00016	0.00020	*22.2*	<0.00010	<0.00010	n/a	0.00058	0.00050	14.8	<0.00010	0.00011	n/a	<0.00010	<0.00010	n/a	0.00011	0.00013	16.7
Silicon (Si)	2.16	2.07	4.3	0.868	0.856	1.4	18.4	16.4	11.5	0.550	0.561	2.0	0.981	1.10	11.4	6.19	6.42	3.6
Silver (Ag)	0.000298	0.000314	5.2	<0.000010	0.000012	n/a	0.000529	0.000507	4.2	<0.000010	<0.000010	n/a	0.000010	0.000012	18.2	0.000076	0.000096	*23.3*
Sodium (Na)	2.7	2.7	0.0	7.2	6.9	4.3	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.0959	0.0963	0.4	0.169	0.171	1.2	0.160	0.149	7.1	0.0628	0.0618	1.6	0.0657	0.0656	0.2	0.0520	0.0502	3.5
Thallium (Tl)	0.000036	0.000038	5.4	<0.000010	<0.000010	n/a	0.000185	0.000174	6.1	<0.000010	<0.000010	n/a	0.000020	0.000021	4.9	0.000038	0.000037	2.7
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00016	0.00015	6.5	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	0.016	0.018	11.8	<0.010	<0.010	n/a	0.329	0.280	16.1	<0.010	<0.010	n/a	<0.010	<0.010	n/a	0.092	0.101	9.3
Uranium (U)	0.000097	0.000093	4.2	0.000070	0.000065	7.4	0.000270	0.000321	17.3	0.000025	0.000025	0.0	0.000039	0.000038	2.6	0.000055	0.000055	0.0
Vanadium (V)	0.0014	0.0014	0.0	<0.0010	<0.0010	n/a	0.0427	0.0403	5.8	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	0.0074	0.0071	4.1
Zinc (Zn)	0.0118	0.0114	3.4	<0.0030	<0.0030	n/a	0.0918	0.0901	1.9	<0.0030	<0.0030	n/a	<0.0030	0.0030	n/a	0.0175	0.0204	15.3
Dissolved Metals																		
Aluminum (Al)	0.0160	0.0760	**130.4**	0.0047	0.0048	2.1	0.238	0.0980	**83.3**	<0.0030	<0.0030	n/a	0.0118	0.0065	**57.9**	0.136	0.115	16.7
Antimony (Sb)	0.00057	0.00056	1.8	0.00070	0.00069	1.4	0.00135	0.00121	10.9	0.00020	0.00022	9.5	0.00039	0.00039	0.0	0.00049	0.00050	2.0
Arsenic (As)	0.00053	0.00072	*30.4*	0.00206	0.00214	3.8	0.00127	0.00102	*21.8*	0.00055	0.00060	8.7	0.00047	0.00043	8.9	0.00071	0.00067	5.8
Barium (Ba)	0.0341	0.0359	5.1	0.0357	0.0349	2.3	0.0427	0.0331	*25.3*	0.0342	0.0343	0.3	0.0422	0.0356	17.0	0.0215	0.0209	2.8
Beryllium (Be)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Bismuth (Bi)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Boron (B)	<0.010	<0.010	n/a	0.014	0.014	0.0	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Cadmium (Cd)	0.000035	0.000037	5.6	<0.000010	<0.000010	n/a	0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Calcium (Ca)	11.1	11.1	0.0	12.0	12.0	0.0	17.5	17.5	0.0	9.04	9.64	6.4	8.82	8.86	0.5	8.67	8.77	1.1
Chromium (Cr)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	0.00011	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Cobalt (Co)	0.00027	0.00028	3.6	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Copper (Cu)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	0.00092	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Iron (Fe)	<0.030	0.048	n/a	<0.030	<0.030	n/a	0.045	<0.030	n/a	<0.030	<0.030	n/a	<0.030	<0.030	n/a	0.062	0.043	*36.2*
Lead (Pb)	<0.000050	0.000106	n/a	<0.000050	<0.000050	n/a	0.000197	<0.000050	n/a	<0.000050	<0.000050	n/a	<0.000050	<0.000050	n/a	0.000086	0.000058	*38.9*
Lithium (Li)	0.00603	0.00602	0.2	0.0209	0.0207	1.0	0.00073	0.00066	10.1	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Magnesium (Mg)	0.474	0.486	2.5	0.668	0.679	1.6	1.36	1.38	1.5	0.298	0.309	3.6	0.358	0.291	*20.6*	0.568	0.562	1.1
Manganese (Mn)	0.0639	0.0665	4.0	0.0197	0.0197	0.0	0.00494	0.000573	**158.4**	0.000216	0.000180	18.2	0.000430	0.000313	*31.5*	0.00349	0.00331	5.3
Mercury (Hg)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Molybdenum (Mo)	0.000416	0.000431	3.5	0.000608	0.000570	6.5	0.00108	0.00107	0.9	0.000339	0.000400	16.5	0.000327	0.000335	2.4	0.000371	0.000374	0.8
Nickel (Ni)	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a	<0.00050	<0.00050	n/a
Phosphorus (P)	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a	<0.30	<0.30	n/a
Potassium (K)	0.295	0.323	9.1	0.450	0.458	1.8	0.396	0.358	10.1	0.081	0.079	2.5	0.167	0.122	*31.1*	0.133	0.131	1.5
Selenium (Se)	<0.00010	0.00011	n/a	<0.00010	<0.00010	n/a	0.00023	0.00023	0.0	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Silicon (Si)	0.786	0.860	9.0	0.820	0.820	0.0	0.899	0.797	12.0	0.525	0.558	6.1	0.488	0.494	1.2	0.437	0.389	11.6
Silver (Ag)	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Sodium (Na)	2.7	2.6	3.8	7.1	7.1	0.0	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a	<2.0	<2.0	n/a
Strontium (Sr)	0.0931	0.0904	2.9	0.161	0.157	2.5	0.101	0.0976	3.4	0.0597	0.0632	5.7	0.0616	0.0627	1.8	0.0471	0.0473	0.4
Thallium (Tl)	<0.000010	0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a	<0.000010	<0.000010	n/a
Tin (Sn)	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a	<0.00010	<0.00010	n/a
Titanium (Ti)	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a	<0.010	<0.010	n/a
Uranium (U)	0.000032	0.000037	14.5	0.000065	0.000065	0.0	0.000046	0.000039	16.5	0.000021	0.000025	17.4	0.000024	0.000025	4.1	0.000015	0.000014	6.9
Vanadium (V)	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a	<0.0010	<0.0010	n/a
Zinc (Zn)	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	0.0031	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a	<0.0030	<0.0030	n/a
Aggregate Organics																		
COD	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a	-	-	n/a

Notes:

[a] *Relative percent difference (RPD)*

[b] *Not applicable when values are less than five times the detection limit.*

Red and italicized values exceed the 20% relative percent difference and are more than five times the detection limit.

Red and bold values exceed the 50% relative percent difference and are more than five times the detection limit.

Appendix 9

Photos of Baseline Monitoring Locations, Brucejack Gold Mine Project, 2008-2013

Plate A9-1. Baseline Monitoring Locations, from Upstream to Downstream, within the Brucejack Watershed (Proposed Mine Site Area) and Sulphurets and Unuk Watersheds (Mine- and Far-field Receiving Environments)

Plate A9-2. Baseline Monitoring Locations in Off-site Areas, from Upstream to Downstream, Bowser/Scott/Todedada/Wildfire Watersheds

APPENDIX 9. PHOTOS OF BASELINE MONITORING LOCATIONS, BRUCEJACK GOLD MINE PROJECT, 2008-2013

Plate A9-1. Baseline Monitoring Locations, from Upstream to Downstream, within the Brucejack Watershed (Proposed Mine Site Area) and Sulphurets and Unuk Watersheds (Mine- and Far-field Receiving Environments)

a) Northern Tributary to Brucejack Lake (Trib2)

b) Southern tributary to Brucejack Lake (Trib3)

c) Brucejack Lake (BJ)

d) Upper Brucejack Creek (BJ U/S)

e) Brucejack Creek, upstream of Camp Creek (BJ U/S of CC)

f) Camp Creek (CC)

g) BJ Intermediate (BJ Inter)

h) Existing adit (ADIT)

i) Brucejack Outflow (BJ OF)

j) Brucejack 200m Downstream (BJ 200m D/S)

k) VOK Creek (VOK)

l) Brucejack Creek 350m D/S (BJ 350m D/S)

m) Lower Brucejack Creek (BJ2)

n) Brucejack Creek, Upstream of Sulphurets Glacier (BJ3)

o) Sulphurets Creek, Downstream of Sulphurets Glacier (SC0)

p) Sulphurets Lake (SUL)

q) Sulphurets Creek, downstream of Sulphurets Lake (SC1)

r) Sulphurets Creek, downstream of Mitchel Creek (SC2)

s) Sulphurets Creek, upstream of the Unuk River (SC3)

t) Unuk River, upstream of Sulphurets Creek confluence (UR1A)

u) UnuK River, upstream of Canada-USA international border (UR2)

v) UnuK River, upstream of Canada-USA international border (UR2)

Plate A9-2. Baseline Monitoring Locations in Off-Site Areas, from Upstream to Downstream, Bowser/Scott/Todedada/Wildfire Watersheds

a) Knipple Glacier, high elevation (KG High)

b) Knipple Glacier, mid elevation (KG Mid)

c) Knipple Glacier, low elevation (KG low)

d) Knipple Glacier Outflow (KG OF)

e) Knipple Lake Inflow (KL IF), Bowser River Watershed

f) Knipple Lake, Bowser River Watershed

g) Knipple Lake Outflow, Bowser River Watershed

h) Bowser River, East of Knipple Lake (BR)

i) Bowser River (BR1)

j) Bowser River (BR2)

k) Bowser Lake (BL)

l) Wetland 1 (WL1)

m) Upstream on Scott Creek (ST1)

n) Downstream on Scott Creek (ST2)

o) Upstream on Todedada Creek (TC1)

p) Downstream on Todedada Creek (TC2, TC 3)

q) Todedada Lake (TL)

r) Todd Creek

s) Wildfire Creek, upstream of Lake 1 (WC4)

t) Wildfire Creek, downstream of Lake 1 (WC2)

u) Wildfire Creek, downstream of Lake 1 (WC5)

v) Wildfire Creek, at mouth of Creek (WC1)

w) Lakes 1 and 2, Wildfire Creek Watershed

Appendix 10

Characterization of Baseline Surface Water Quality of the Brucejack Watershed

BRUCEJACK GOLD MINE PROJECT

Cumulative Surface Water Quality Baseline Report

Pretium Resources Inc.

BRUCEJACK GOLD MINE PROJECT

Characterization of Baseline Surface Water Quality of the Brucejack Watershed

April 2014

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BRUCEJACK GOLD MINE PROJECT

Characterization of Baseline Surface Water Quality of the Brucejack Watershed

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1. INTRODUCTION

This report provides supplementary information on the approach used for baseline water quality characterization of watercourses within the Brucejack watershed for the Cumulative Surface Water Quality Baseline Report (Rescan 2014). The objective is to describe: 1) the approach to baseline dataset curation to provide conservative estimates of baseline water quality; and 2) the use of composite site data to characterize water quality within lower Brucejack Creek.

2. BASELINE DATASET CURATION

Historical data (1987 to 2001) were accessed from the *Environmental and Socioeconomic Impact Assessment for the Sulphurets Property* (Newhawk Gold Mines Ltd. 1989) as well as MEND Report 9.1c (Price 2005; *Case Studies of ML/ARD Assessment and Mitigation: Placement of the Sulphurets Waste Rock in Brucejack Lake*), collected during the Newcana Joint Venture exploration and reclamation work. Studies focused on the downstream pathway flowing west from Brucejack Lake into Brucejack Creek, Sulphurets Creek, and eventually into the Unuk River (Newhawk 1989; Price 2005).

These historical datasets were used to supplement the ongoing Project-specific lake and stream water quality monitoring program completed by Pretivm beginning in 2011. The objective was to curate the existing water quality data for the Project area to minimize the influence of both historical and ongoing mining and mineral exploration activities in the definition of baseline conditions. This data curation effort will support an environmental effects assessment of potential Project-related water quality effects. The construction of the curated baseline database involved the following:

- assessment and analyses of available historical water quality data (1987 to 2010) and site activity records to determine the best available approximation of pre-disturbance water quality conditions;
- use of the data identified in (i) as the base/reference case to provide a conservative means of identifying and removing affected data in the more recent database (2011 to 2013); and
- use of curated baseline dataset as a basis for describing baseline or background conditions of the Brucejack watershed.

For assessment, historical water quality results for watercourses within the Brucejack watershed (Brucejack Lake, Brucejack Creek, and Camp Creek) were grouped into six discrete cohorts of data based on sampling year, with each period demarcated by a documented site activity relative to years of little to no site activity; the entire dataset from the most recent sampling program was also included for comparison:

- **1987 to 1990:** excavation of adit and active dewatering;
- **1991 to 1998:** no to little documented site activity, passive adit discharge;
- **1999:** deposition of weathered waste rock and lime into Brucejack Lake, passive adit discharge;
- **2000 to 2001 and 2009 to 2010**: no to little documented site activity; passive adit discharge;
- **2011 to 2012:** current mineral exploration, bulk sampling activities, active adit dewatering; and, sewage treatment plant (STP) operation.
- **2013:** Water Treatment Plant (WTP) operation. Analysis of TSS concentrations versus total and dissolved metals indicated that total metal concentrations in adit discharge (effluent) and in the Brucejack Creek catchment (e.g., Camp Creek) are closely linked to TSS concentrations within the 2011 to 2012 cohort. A water treatment plant was installed and

began operations in January 2013 to reduce TSS and associated elevated total metals concentrations in adit discharge.

Comparison of the water quality among cohorts, as well as to water quality guidelines, allowed for the identification of water quality most likely representative of pre-disturbance baseline conditions for the Brucejack watershed, including parameters with elevated concentrations that are likely reflective of the natural mineralization of the catchment.

A detailed summary of water quality condition of Brucejack Lake, Brucejack Creek and Camp Creek during periods of high site activity relative to years of little to no site activity is provided below (Section 2.1) and in Tables 2-1 and 2-2. Results indicate that post-mining water quality data collected from 1991 to 1998, as well as 2000/2001 and 2009/2010 are a reasonable approximation of pre-disturbance conditions of Brucejack Creek and Camp Creek. This assertion is based on assessment of adit loadings during this period, combined with documentation of no/little site presence/ disturbance, as well as observed minima in incidences of guideline exceedances (Table 2-2). Results of these analyses also confirmed that upper Brucejack Creek (BJ U/S) remained uninfluenced by site activities within the Project area over the 1987-2001 period, as documented in the MEND Report 9.1c (Price 2005); no data were excluded from this site. Observable water quality of Brucejack Lake was only affected following periods of waste rock deposition (Table 2-1); only data from these periods were excluded for subsequent baseline characterization of the lake.

2.1 WATER QUALITY OF THE BRUCEJACK WATERSHED (1987 TO 2013)

2.1.1 Brucejack Lake

Brucejack Lake has remained largely uninfluenced by site activities within the Project area, exhibiting generally consistent physicochemistry as well as concentrations of nutrients, anions, total metals and dissolved metals, regardless of sampling period (Table 2-1). Concentrations of total and dissolved metals were also low and in general remained less than or close to detection limits within all sampling cohorts (1987-2001, 2009/2010). However, historic waste rock deposition (1999) was associated with short-term increases in alkalinity, hardness, TSS, conductivity, sulphate, chloride, copper, lead, and zinc concentrations, which decreased over subsequent cohorts (Table 2-1), and this period was subsequently excluded from baseline definition (Rescan 2014). Guideline exceedances were observed only for copper concentrations (1999, 2000-2001; Table 2-1).

Increases in concentrations of water quality parameters were observed within the most recent cohort, corresponding to current Project-related exploration activities and waste rock deposition into Brucejack Lake (December 2012). Similar to the 1999 event, increases were observed for alkalinity, conductivity, TSS as well as concentrations of nitrate, phosphorus, ammonia, lead, potassium, manganese, silicon, and total and dissolved concentrations of aluminum, relative to historical ranges of these parameters (pre-2009 data not available for nitrate, aluminum silicon, ammonia, phosphorus, and potassium); this period was subsequently excluded from baseline definition (Rescan 2014).

Table 2-1. Water Quality of Brucejack Lake, Brucejack Gold Mine Project, 1987 to 2013

Project Area		Mine Site Area																			
Site		Brucejack Lake																			
	Cohort[1]	1987-1989					1990-1998					1999					2000 & 2001[3]				
	Depth[2]	Water Column Averaged					Water Column Averaged					Water Column Averaged					Water Column Averaged				
		N=8					N=3					N=8					N=3				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Physical Tests																					
Colour, True	CU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	44.0	51.0	47.1	47.0	50.7	48.0	56.0	52.0	-	-	47.0	69.0	55.9	52.5	68.7	65.0	134.5	88.2	-	-
Hardness (as $CaCO_3$)	mg/L	22.0	26.0	23.1	23.0	25.1	22.0	24.0	23.3	-	-	18.0	29.0	24.6	26.0	28.8	26.0	86.0	47.0	-	-
pH	pH	6.80	7.70	7.13	7.00	7.58	7.00	7.70	7.37	-	-	6.90	8.10	7.63	7.75	8.07	6.90	7.70	7.30	-	-
Total Suspended Solids	mg/L	<1.0	8.0	2.6	1.3	7.3	3.0	7.0	4.3	-	-	<3.0	8.0	3.1	<3.0	6.6	1.5	13.5	6.3	-	-
Total Dissolved Solids	mg/L	20	40	33	34	40	38	42	40	-	-	29	40	35	35	40	34	109	61	-	-
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																					
Acidity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	mg/L	12.0	20.0	16.6	18.0	19.7	15.0	17.0	16.3	-	-	9.0	23.0	16.0	16.0	21.3	18.0	30.5	22.2	-	-
Ammonia, Total (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	mg/L	-	-	-	-	-	-	-	-	-	-									-	-
Chloride (Cl)	mg/L	<0.50	1.0	0.57	<0.50	1.00	<0.50	<0.50	<0.50	-	-	<0.50	2.0	0.75	<0.50	1.80	<0.50	1.0	<0.50	-	-
Fluoride (F)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	mg/L	4.0	6.0	5.0	5.0	6.0	5.0	10.0	8.0	-	-	8.0	12.0	9.9	9.5	12.0	12.0	28.0	17.3	-	-
Cyanides																					
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals																					
Aluminum (Al)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	mg/L	0.0010	0.0024	0.0018	0.0018	0.0024	0.0011	0.0020	0.0014	-	-	0.0008	0.0014	0.0011	0.0010	0.0014	<0.0010	0.0017	0.0011	-	-
Barium (Ba)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	-	-
Calcium (Ca)	mg/L	-	-	-	-	-	-	-	-	-	-	6.8	11.3	9.2	8.5	11.2	9.6	34.7	18.4	-	-
Chromium (Cr)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	mg/L	<0.00050	0.00100	0.000469	<0.00050	0.000825	<0.0010	<0.0010	<0.0010	-	-	<0.0010	0.0200	0.00406	<0.0010	0.0148	<0.0010	<0.0010	<0.0010	-	-
Iron (Fe)	mg/L	0.015	0.300	0.087	0.055	0.230	0.120	0.390	0.227	-	-	0.040	0.110	0.081	0.080	0.107	0.050	0.185	0.138	-	-
Lead (Pb)	mg/L	<0.00050	0.00100	0.00047	0.00050	0.00083	<0.0010	0.00100	<0.0010	-	-	0.00050	0.00200	0.00170	0.00200	0.00200	<0.0010	<0.0010	<0.0010	-	-
Lithium (Li)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	mg/L	-	-	-	-	-	-	-	-	-	-	0.270	0.350	0.308	0.290	0.350	0.300	0.775	0.458	-	-
Manganese (Mn)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	mg/L	<0.000050	0.00120	0.000319	<0.000050	0.00102	0.000006	0.000250	0.000094	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	<0.00010	-	-
Molybdenum (Mo)	mg/L	<0.0010	0.00600	0.00129	<0.0010	0.00435	<0.00010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-
Nickel (Ni)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

Table 2-1. Water Quality of Brucejack Lake, Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Brucejack Lake *(cont'd)*																			
	Cohort[1]	2009 & 2010[3]										2011 & 2012									
	Depth[2]	Shallow (< 30 m)					Deep (≥ 30 m)					Shallow (< 30 m)					Deep (≥ 30 m)				
		N=3					N=3					N=7					N=12				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Physical Tests																					
Colour, True	CU	<5.0	<5.0	<5.0	-	-	2.50	2.50	2.50	-	-	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Conductivity	µS/cm	4.7	4.8	4.8	-	-	4.9	4.9	4.9	-	-	4.9	5.4	5.1	5.1	5.4	4.9	5.2	5.0	5.0	5.2
Hardness (as $CaCO_3$)	mg/L	21.9	22.8	22.3	-	-	22.5	22.7	22.6	-	-	10.8	24.7	20.8	21.6	24.4	21.6	23.3	22.2	22.1	23.3
pH	pH	7.39	7.44	7.41	-	-	7.37	7.39	7.38	-	-	6.50	7.75	7.41	7.63	7.75	7.30	7.97	7.68	7.71	7.96
Total Suspended Solids	mg/L	1.5	1.5	1.5	-	-	1.5	1.5	1.5	-	-	1.5	15.6	3.5	1.5	11.4	1.5	4.2	1.7	1.5	2.7
Total Dissolved Solids	mg/L	21	28	25	-	-	23	30	27	-	-	5	33	26	29	32	24	35	29	27	35
Turbidity	NTU	1.07	4.40	2.74	-	-	2.60	4.00	3.27	-	-	1.27	9.80	4.61	3.20	9.41	1.05	8.20	3.91	2.85	7.21
Anions and Nutrients																					
Acidity (as $CaCO_3$)	mg/L	3.6	3.7	3.7	-	-	3.6	5.2	4.2	-	-	1.4	3.6	2.2	2.0	3.3	1.5	3.0	2.1	2.0	2.9
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.5	1.5	1.5	-	-	1.5	1.5	1.5	-	-	1.3	2.9	1.7	1.5	2.5	1.4	1.6	1.5	1.5	1.6
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	5.0	5.0	5.0	-	-	5.0	5.0	5.0	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	5.0	5.0	5.0	-	-	5.0	5.0	5.0	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Alkalinity, Total (as $CaCO_3$)	mg/L	1.5	1.5	1.5	-	-	1.5	1.5	1.5	-	-	1.3	2.9	1.7	1.5	2.5	1.4	1.6	1.5	1.5	1.6
Ammonia, Total (as N)	mg/L	<0.0050	<0.0050	<0.0050	-	-	0.0025	0.0055	0.0045	-	-	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
Bromide (Br)	mg/L	<0.50	<0.50	<0.50	-	-	0.025	0.025	0.025	-	-	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Chloride (Cl)	mg/L	<0.50	<0.50	<0.50	-	-	0.25	0.25	0.25	-	-	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fluoride (F)	mg/L	0.010	0.010	0.010	-	-	0.010	0.010	0.010	-	-	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Nitrate (as N)	mg/L	<0.0050	<0.0050	<0.0050	-	-	<0.0050	<0.0050	<0.0050	-	-	<0.0050	0.0065	0.0031	<0.0050	0.0053	<0.0050	0.0198	0.0059	<0.0050	0.0172
Nitrite (as N)	mg/L	0.0005	0.0005	0.0005	-	-	0.0005	0.0005	0.0005	-	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Total Kjeldahl Nitrogen	mg/L	2.50	2.50	2.50	-	-	2.50	2.50	2.50	-	-	2.50	5.00	2.86	2.50	4.25	2.50	2.50	2.50	2.50	2.50
Total Nitrogen	mg/L	2.50	2.50	2.50	-	-	2.50	2.50	2.50	-	-	2.50	5.00	2.86	2.50	4.25	2.50	2.50	2.50	2.50	2.50
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-	-	-	-	-	-	-	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Phosphorus (P)-Total	mg/L	1.00	1.00	1.00	-	-	1.00	1.00	1.00	-	-	1.00	1.00	1.00	1.00	1.00	1.00	3.40	1.52	1.00	3.13
Sulphate (SO_4)	mg/L	7.7	8.3	8.0	-	-	8.0	8.1	8.1	-	-	0.7	10.2	7.8	8.5	9.9	8.5	9.2	8.8	8.8	9.1
Cyanides																					
Cyanide, Weak Acid Diss	mg/L	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Metals																					
Aluminum (Al)	mg/L	0.0184	0.0432	0.0297	-	-	0.0164	0.0314	0.0245	-	-	0.006	0.0618	0.0244	0.0168	0.0553	0.004	0.0949	0.0334	0.0267	0.0838
Antimony (Sb)	mg/L	0.00023	0.00025	0.00024	-	-	0.00024	0.00026	0.00025	-	-	0.00005	0.00028	0.00020	0.00021	0.00027	0.00020	0.00030	0.00025	0.00024	0.00029
Arsenic (As)	mg/L	0.0008	0.0009	0.0008	-	-	0.0007	0.0008	0.0008	-	-	0.0002	0.0007	0.0005	0.0006	0.0007	0.0005	0.0010	0.0006	0.0006	0.0008
Barium (Ba)	mg/L	0.035	0.036	0.035	-	-	0.033	0.035	0.034	-	-	0.018	0.034	0.031	0.033	0.034	0.032	0.036	0.033	0.033	0.035
Beryllium (Be)	mg/L	0.00025	0.00025	0.00025	-	-	0.00025	0.00025	0.00025	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	-	-	0.00025	0.00025	0.00025	-	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.005	0.005	-	-	0.005	0.005	0.005	-	-	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cadmium (Cd)	mg/L	0.000005	0.000005	0.000005	-	-	0.000005	0.000005	0.000005	-	-	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Calcium (Ca)	mg/L	8.8	9.2	9.0	-	-	9.0	9.2	9.1	-	-	2.7	9.3	7.7	8.1	9.2	8.4	8.9	8.5	8.5	8.8
Chromium (Cr)	mg/L	0.00010	0.00025	0.00015	-	-	0.00010	0.00010	0.00010	-	-	0.00005	0.00015	0.00008	0.00005	0.00014	0.00005	0.00015	0.00007	0.00005	0.00014
Cobalt (Co)	mg/L	0.00005	0.00005	0.00005	-	-	0.00005	0.00005	0.00005	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Copper (Cu)	mg/L	0.000160	0.000190	0.000173	-	-	0.000140	0.000430	0.000253	-	-	0.000250	0.000560	0.000294	0.000250	0.000467	0.000250	0.00200	0.000418	0.000250	0.00119
Iron (Fe)	mg/L	0.015	0.015	0.015	-	-	0.015	0.015	0.015	-	-	0.015	0.036	0.018	0.015	0.030	0.015	0.084	0.021	0.015	0.046
Lead (Pb)	mg/L	0.00003	0.00003	0.00003	-	-	0.00003	0.00008	0.00006	-	-	0.00003	0.00010	0.00004	0.00003	0.00009	0.00003	0.00080	0.00016	0.00003	0.00071
Lithium (Li)	mg/L	0.00250	0.00250	0.00250	-	-	0.00250	0.00250	0.00250	-	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Magnesium (Mg)	mg/L	0.277	0.299	0.292	-	-	0.291	0.299	0.295	-	-	0.139	0.316	0.262	0.277	0.308	0.275	0.300	0.287	0.286	0.296
Manganese (Mn)	mg/L	0.0024	0.0041	0.0034	-	-	0.0026	0.0044	0.0034	-	-	0.0008	0.0048	0.0027	0.0026	0.0047	0.0007	0.0089	0.0035	0.0038	0.0068
Mercury (Hg)	mg/L	0.000005	0.000005	0.000005	-	-	0.000005	0.000005	0.000005	-	-	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Molybdenum (Mo)	mg/L	0.00035	0.00041	0.00038	-	-	0.00037	0.00039	0.00038	-	-	0.00010	0.00036	0.00030	0.00033	0.00035	0.00031	0.00040	0.00034	0.00034	0.00038
Nickel (Ni)	mg/L	0.00025	0.00025	0.00025	-	-	0.00025	0.00025	0.00025	-	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Phosphorus (P)	mg/L	<0.30	<0.30	<0.30	-	-	<0.30	<0.30	<0.30	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L	0.081	0.097	0.090	-	-	0.084	0.091	0.088	-	-	0.025	0.085	0.068	0.074	0.083	0.070	0.119	0.086	0.082	0.112

(continued)

Table 2-1. Water Quality of Brucejack Lake, Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*									
Site		Brucejack Lake *(cont'd)*									
	Cohort[1]	2013									
	Depth[2]	Shallow (< 30 m)					Deep (≥ 30 m)				
		N=9					N=13				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Physical Tests											
Colour, True	CU	2.50	8.30	3.14	2.50	5.98	2.50	2.50	2.50	2.50	2.50
Conductivity	µS/cm	50.3	56.2	52.8	52.1	55.8	51.7	60.7	54.7	54.3	58.5
Hardness (as $CaCO_3$)	mg/L	22.2	25.3	23.4	23.6	24.9	22.2	25.3	23.8	23.7	24.9
pH	pH	7.27	8.17	7.71	7.76	8.16	7.47	8.12	7.81	7.78	8.11
Total Suspended Solids	mg/L	1.5	3.4	2.1	1.5	3.2	1.5	15.9	4.8	4.0	10.0
Total Dissolved Solids	mg/L	26	40	34	34	39	26	42	33	33	41
Turbidity	NTU	0.17	9.3	3.68	3.61	9.00	1.23	19.6	6.49	5.35	14.44
Anions and Nutrients											
Acidity (as $CaCO_3$)	mg/L	1.2	3.4	2.3	2.3	3.2	1.0	2.9	2.3	2.4	2.8
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	14.2	16.7	15.5	15.6	16.7	4.4	17.0	14.8	15.4	16.9
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Alkalinity, Total (as $CaCO_3$)	mg/L	14.2	16.7	15.5	15.6	16.7	4.4	17.0	14.8	15.4	16.9
Ammonia, Total (as N)	mg/L	0.0025	0.0093	0.0035	0.0025	0.0076	0.0025	0.0131	0.0043	0.0025	0.0121
Bromide (Br)	mg/L	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Chloride (Cl)	mg/L	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fluoride (F)	mg/L	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Nitrate (as N)	mg/L	0.0025	0.0510	0.0253	0.0340	0.0505	0.0164	0.0676	0.0439	0.0462	0.0594
Nitrite (as N)	mg/L	0.0005	0.0013	0.0006	0.0005	0.0010	0.0005	0.0011	0.0005	0.0005	0.0007
Total Kjeldahl Nitrogen	mg/L	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Total Nitrogen	mg/L	0.03	0.071	0.04	0.03	0.066	0.03	0.077	0.05	0.059	0.072
Orthophosphate-Dissolved (as P)	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Phosphorus (P)-Total	mg/L	0.0010	0.0048	0.0024	0.0023	0.0047	0.0010	0.0085	0.0039	0.0034	0.0069
Sulphate (SO_4)	mg/L	8.8	10.0	9.2	9.0	10.0	9.1	10.5	9.6	9.4	10.3
Cyanides											
Cyanide, Weak Acid Diss	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Metals											
Aluminum (Al)	mg/L	0.0038	0.9420	0.2588	0.1760	0.7544	0.0421	0.5690	0.3389	0.3180	0.5474
Antimony (Sb)	mg/L	0.00022	0.00054	0.00036	0.00038	0.00053	0.00030	0.00068	0.00047	0.00045	0.00060
Arsenic (As)	mg/L	0.0004	0.0010	0.0007	0.0007	0.0010	0.0006	0.0018	0.0009	0.0008	0.0014
Barium (Ba)	mg/L	0.033	0.055	0.042	0.040	0.053	0.036	0.068	0.048	0.046	0.060
Beryllium (Be)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.019	0.007	0.005	0.013	0.005	0.005	0.005	0.005	0.005
Cadmium (Cd)	mg/L	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000016	0.000006	0.000005	0.000009
Calcium (Ca)	mg/L	8.5	9.9	9.1	8.9	9.7	8.8	10.0	9.3	9.3	10.0
Chromium (Cr)	mg/L	0.00005	0.00025	0.00013	0.00014	0.00024	0.00005	0.00032	0.00014	0.00014	0.00022
Cobalt (Co)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Copper (Cu)	mg/L	0.000250	0.00176	0.000782	0.000820	0.00171	0.000250	0.000960	0.000305	0.000250	0.000534
Iron (Fe)	mg/L	0.015	0.206	0.076	0.057	0.188	0.015	0.330	0.120	0.094	0.257
Lead (Pb)	mg/L	0.00003	0.00099	0.00030	0.00018	0.00095	0.00014	0.00213	0.00061	0.00030	0.00154
Lithium (Li)	mg/L	0.00025	0.00114	0.00044	0.00025	0.00112	0.00025	0.00151	0.00056	0.00025	0.00134
Magnesium (Mg)	mg/L	0.289	0.345	0.312	0.314	0.337	0.301	0.386	0.337	0.336	0.379
Manganese (Mn)	mg/L	0.0004	0.0077	0.0046	0.0061	0.0077	0.0024	0.0273	0.0095	0.0074	0.0215
Mercury (Hg)	mg/L	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Molybdenum (Mo)	mg/L	0.00033	0.00040	0.00036	0.00037	0.00040	0.00034	0.00040	0.00037	0.00036	0.00040
Nickel (Ni)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Phosphorus (P)	mg/L	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Potassium (K)	mg/L	0.075	0.316	0.174	0.171	0.289	0.123	0.441	0.274	0.272	0.382

(continued)

Table 2-1. Water Quality of Brucejack Lake, Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Brucejack Lake *(cont'd)*																			
	Cohort[1]	1987-1989					1990-1998					1999					2000 & 2001[3]				
	Depth[2]	Water Column Averaged					Water Column Averaged					Water Column Averaged					Water Column Averaged				
		N=8					N=3					N=8					N=3				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Selenium (Se)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	mg/L	<0.00010	0.00500	0.00078	<0.00010	0.00356	<0.00010	<0.00010	<0.00010	-	-	<0.00010	0.00040	0.00027	0.00030	0.00040	<0.00010	<0.00010	<0.00010	-	-
Sodium (Na)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	mg/L	<0.00050	0.170	0.0241	0.0033	0.113	<0.0050	0.0110	0.0053	-	-	<0.0050	0.0100	0.0056	0.0050	0.0097	<0.0050	<0.050	<0.050	-	-
Dissolved Metals																					
Aluminum (Al)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	mg/L	0.0007	0.0023	0.0014	0.0014	0.0022	0.0004	0.0012	0.0009	-	-	0.0003	0.0009	0.0005	0.0004	0.0009	<0.0020	0.0011	0.0008	-	-
Barium (Ba)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0010	0.000200	0.000120	0.000100	0.000180	0.000100	0.000100	0.000100	-	-
Calcium (Ca)	mg/L	-	-	-	-	-	8.3	8.9	8.6	-	-	6.6	11.2	9.3	9.8	11.1	9.8	33.3	18.0	-	-
Chromium (Cr)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	mg/L	<0.00050	0.00100	<0.00050	<0.00050	0.00085	<0.0010	<0.0010	<0.0010	-	-	<0.0010	0.0100	0.00281	<0.0010	0.00825	<0.0010	<0.0010	<0.0010	-	-
Iron (Fe)	mg/L	<0.030	0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-	-	<0.030	0.040	<0.030	<0.030	0.033	<0.030	<0.030	<0.030	-	-
Lead (Pb)	mg/L	<0.00050	0.00400	0.00093	0.00050	0.00295	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-
Lithium (Li)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	mg/L	-	-	-	-	-	0.310	-	-	-	-	0.250	0.340	0.294	0.280	0.340	0.270	0.715	0.428	-	-
Manganese (Mn)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	mg/L	<0.000050	0.0025000	0.0004375	<0.000050	0.0018813	<0.000050	-	-	-	-	-	-	-	-	-	<0.00020	-	-	-	-
Molybdenum (Mo)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-
Nickel (Ni)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	mg/L	<0.00010	0.000500	0.000114	<0.00010	0.000365	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Sodium (Na)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	mg/L	<0.00010	0.0060	0.0029	0.0040	0.0057	<0.0050	0.0070	<0.0050	-	-	<0.0050	0.0060	<0.0050	<0.0050	0.0057	0.0070	0.0250	0.0139	-	-

(continued)

Table 2-1. Water Quality of Brucejack Lake, Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Brucejack Lake *(cont'd)*																			
	Cohort[1]	2009 & 2010[3]										2011 & 2012									
	Depth[2]	Shallow (< 30 m)					Deep (≥ 30 m)					Shallow (< 30 m)					Deep (≥ 30 m)				
		N=3					N=3					N=7					N=12				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Selenium (Se)	mg/L	0.00010	0.00013	0.00011	-	-	0.00010	0.00010	0.00010	-	-	0.00005	0.00020	0.00009	0.00005	0.00019	0.00005	0.00013	0.00007	0.00005	0.00013
Silicon (Si)	mg/L	0.56	0.64	0.60	-	-	0.59	0.61	0.60	-	-	0.21	0.59	0.50	0.55	0.59	0.50	0.72	0.58	0.57	0.65
Silver (Ag)	mg/L	0.000005	0.000005	0.000005	-	-	0.000005	0.000005	0.000005	-	-	0.000005	0.000012	0.000006	0.000005	0.000010	0.000005	0.000085	0.000015	0.000005	0.000056
Sodium (Na)	mg/L	1.0	1.0	1.0	-	-	1.0	1.0	1.0	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Strontium (Sr)	mg/L	0.0525	0.0565	0.0549	-	-	0.0541	0.0557	0.0551	-	-	0.0226	0.0577	0.0495	0.0533	0.0572	0.0518	0.0575	0.0542	0.0535	0.0571
Thallium (Tl)	mg/L	0.000050	0.000050	0.000050	-	-	0.000050	0.000050	0.000050	-	-	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Tin (Sn)	mg/L	0.00005	0.00005	0.00005	-	-	0.00005	0.00005	0.00005	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Titanium (Ti)	mg/L	0.005	0.005	0.005	-	-	0.005	0.005	0.005	-	-	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Uranium (U)	mg/L	0.000032	0.000037	0.000034	-	-	0.000031	0.000033	0.000032	-	-	0.000005	0.000026	0.000021	0.000023	0.000026	0.000019	0.000031	0.000024	0.000023	0.000029
Vanadium (V)	mg/L	0.0005	0.0005	0.0005	-	-	0.0005	0.0005	0.0005	-	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Zinc (Zn)	mg/L	0.0013	0.0016	0.0014	-	-	0.0012	0.0045	0.0023	-	-	0.0015	0.0063	0.0022	0.0015	0.0049	0.0015	0.0015	0.0015	0.0015	0.0015
Dissolved Metals																					
Aluminum (Al)	mg/L	0.0037	0.0049	0.0043	-	-	0.0034	0.0073	0.0055	-	-	0.0015	0.0210	0.0076	0.0033	0.0201	0.0015	0.0061	0.0037	0.0041	0.0055
Antimony (Sb)	mg/L	0.00021	0.00025	0.00023	-	-	0.00024	0.00024	0.00024	-	-	0.00005	0.00022	0.00018	0.00020	0.00022	0.00021	0.00025	0.00022	0.00022	0.00024
Arsenic (As)	mg/L	0.0007	0.0008	0.0007	-	-	0.0006	0.0007	0.0007	-	-	0.0002	0.0006	0.0005	0.0005	0.0006	0.0004	0.0006	0.0005	0.0005	0.0006
Barium (Ba)	mg/L	0.032	0.035	0.033	-	-	0.032	0.032	0.032	-	-	0.020	0.034	0.031	0.032	0.034	0.032	0.033	0.032	0.032	0.033
Beryllium (Be)	mg/L	0.00025	0.00025	0.00025	-	-	0.00025	0.00025	0.00025	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	-	-	0.00025	0.00025	0.00025	-	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.005	0.005	-	-	0.005	0.005	0.005	-	-	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cadmium (Cd)	mg/L	0.000005	0.000005	0.000005	-	-	0.000005	0.000005	0.000005	-	-	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Calcium (Ca)	mg/L	8.3	8.7	8.5	-	-	8.5	8.6	8.6	-	-	4.0	9.4	7.9	8.2	9.2	8.2	8.9	8.4	8.4	8.9
Chromium (Cr)	mg/L	0.00010	0.00025	0.00015	-	-	0.00010	0.00010	0.00010	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Cobalt (Co)	mg/L	0.00005	0.00005	0.00005	-	-	0.00005	0.00005	0.00005	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Copper (Cu)	mg/L	0.00005	0.00005	0.00005	-	-	0.00005	0.00015	0.00010	-	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Iron (Fe)	mg/L	0.015	0.015	0.015	-	-	0.015	0.015	0.015	-	-	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Lead (Pb)	mg/L	0.000025	0.000025	0.000025	-	-	0.000025	0.000025	0.000025	-	-	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025
Lithium (Li)	mg/L	0.0025	0.0025	0.0025	-	-	0.0025	0.0025	0.0025	-	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Magnesium (Mg)	mg/L	0.265	0.283	0.276	-	-	0.275	0.281	0.277	-	-	0.176	0.310	0.268	0.275	0.305	0.272	0.287	0.279	0.279	0.286
Manganese (Mn)	mg/L	0.00006	0.00081	0.00035	-	-	0.00048	0.00087	0.00071	-	-	0.00003	0.00178	0.00078	0.00049	0.00169	0.00003	0.00112	0.00027	0.00017	0.00079
Mercury (Hg)	mg/L	0.0000050	0.0000050	0.0000050	-	-	0.0000050	0.0000050	0.0000050	-	-	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050
Molybdenum (Mo)	mg/L	0.000328	0.000378	0.000358	-	-	0.000335	0.000378	0.000351	-	-	0.000142	0.000346	0.000305	0.000327	0.000345	0.000302	0.000352	0.000328	0.000331	0.000350
Nickel (Ni)	mg/L	0.00025	0.00025	0.00025	-	-	0.00025	0.00025	0.00025	-	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Phosphorus (P)	mg/L	0.15	0.15	0.15	-	-	0.15	0.15	0.15	-	-	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Potassium (K)	mg/L	0.07	0.09	0.08	-	-	0.08	0.09	0.08	-	-	0.03	0.08	0.07	0.07	0.07	0.07	0.09	0.08	0.08	0.08
Selenium (Se)	mg/L	0.00005	0.00010	0.00008	-	-	0.00010	0.00010	0.00010	-	-	0.00005	0.00011	0.00006	0.00005	0.00009	0.00005	0.00005	0.00005	0.00005	0.00005
Silicon (Si)	mg/L	0.53	0.55	0.54	-	-	0.56	0.58	0.57	-	-	0.27	0.57	0.47	0.49	0.56	0.47	0.59	0.53	0.53	0.57
Silver (Ag)	mg/L	0.000005	0.000005	0.000005	-	-	0.000005	0.000005	0.000005	-	-	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Sodium (Na)	mg/L	1.0	1.0	1.0	-	-	1.0	1.0	1.0	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Strontium (Sr)	mg/L	0.0490	0.0520	0.0508	-	-	0.0509	0.0521	0.0516	-	-	0.0327	0.0588	0.0505	0.0519	0.0576	0.0500	0.0554	0.0526	0.0525	0.0553
Thallium (Tl)	mg/L	0.000050	0.000050	0.000050	-	-	0.000050	0.000050	0.000050	-	-	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Tin (Sn)	mg/L	0.00005	0.00005	0.00005	-	-	0.00005	0.00005	0.00005	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Titanium (Ti)	mg/L	0.005	0.005	0.005	-	-	0.005	0.005	0.005	-	-	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Uranium (U)	mg/L	0.000027	0.000034	0.000030	-	-	0.000026	0.000028	0.000027	-	-	0.000005	0.000023	0.000018	0.000020	0.000023	0.000016	0.000023	0.000020	0.000021	0.000023
Vanadium (V)	mg/L	0.0005	0.0005	0.0005	-	-	0.0005	0.0005	0.0005	-	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Zinc (Zn)	mg/L	0.0005	0.0017	0.0009	-		0.0005	0.0023	0.0011	-	-	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015

(continued)

Table 2-1. Water Quality of Brucejack Lake, Brucejack Gold Mine Project, 1987 to 2013 (completed)

Project Area		Mine Site Area *(cont'd)*									
Site		Brucejack Lake *(cont'd)*									
	Cohort[1]	2013									
	Depth[2]	Shallow (< 30 m)					Deep (≥ 30 m)				
		N=9					N=13				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Selenium (Se)	mg/L	0.00005	0.00016	0.00008	0.00005	0.00016	0.00005	0.00016	0.00008	0.00005	0.00015
Silicon (Si)	mg/L	0.48	2.60	0.98	0.77	2.04	0.58	2.21	1.29	1.10	2.13
Silver (Ag)	mg/L	0.000005	0.000072	0.000021	0.000005	0.000070	0.000005	0.000185	0.000040	0.000016	0.000130
Sodium (Na)	mg/L	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Strontium (Sr)	mg/L	0.0593	0.0745	0.0639	0.0618	0.0734	0.0607	0.0787	0.0672	0.0657	0.0762
Thallium (Tl)	mg/L	0.000005	0.000023	0.000013	0.000012	0.000023	0.000005	0.000039	0.000023	0.000023	0.000034
Tin (Sn)	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Titanium (Ti)	mg/L	0.005	0.014	0.006	0.005	0.010	0.005	0.005	0.005	0.005	0.005
Uranium (U)	mg/L	0.000019	0.000063	0.000035	0.000032	0.000058	0.000028	0.000060	0.000042	0.000039	0.000058
Vanadium (V)	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0012	0.0006	0.0005	0.0008
Zinc (Zn)	mg/L	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0032	0.0017	0.0015	0.0031
Dissolved Metals											
Aluminum (Al)	mg/L	0.0015	0.0138	0.0084	0.0110	0.0137	0.0047	0.0189	0.0106	0.0096	0.0179
Antimony (Sb)	mg/L	0.00020	0.00046	0.00032	0.00034	0.00046	0.00028	0.00052	0.00040	0.00039	0.00048
Arsenic (As)	mg/L	0.0004	0.0006	0.0005	0.0004	0.0006	0.0004	0.0007	0.0005	0.0005	0.0006
Barium (Ba)	mg/L	0.032	0.042	0.036	0.035	0.042	0.034	0.046	0.038	0.037	0.044
Beryllium (Be)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cadmium (Cd)	mg/L	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Calcium (Ca)	mg/L	8.4	9.6	8.9	9.0	9.5	8.4	9.6	9.0	9.0	9.5
Chromium (Cr)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Cobalt (Co)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Copper (Cu)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Iron (Fe)	mg/L	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Lead (Pb)	mg/L	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003
Lithium (Li)	mg/L	0.0003	0.0011	0.0004	0.0003	0.0010	0.0003	0.0012	0.0004	0.0003	0.0011
Magnesium (Mg)	mg/L	0.285	0.309	0.294	0.292	0.307	0.291	0.358	0.309	0.303	0.341
Manganese (Mn)	mg/L	0.00015	0.00185	0.00073	0.00076	0.00161	0.00031	0.0210	0.00322	0.00078	0.0161
Mercury (Hg)	mg/L	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050
Molybdenum (Mo)	mg/L	0.000298	0.000400	0.000340	0.000339	0.000385	0.000324	0.000372	0.000345	0.000339	0.000370
Nickel (Ni)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Phosphorus (P)	mg/L	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500
Potassium (K)	mg/L	0.08	0.15	0.11	0.11	0.15	0.10	0.17	0.14	0.13	0.16
Selenium (Se)	mg/L	0.00005	0.00013	0.00007	0.00005	0.00013	0.00005	0.00013	0.00007	0.00005	0.00012
Silicon (Si)	mg/L	0.45	0.56	0.51	0.50	0.55	0.48	0.54	0.50	0.50	0.54
Silver (Ag)	mg/L	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Sodium (Na)	mg/L	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Strontium (Sr)	mg/L	0.0556	0.0718	0.0613	0.0596	0.0717	0.0551	0.0779	0.0636	0.0616	0.0741
Thallium (Tl)	mg/L	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Tin (Sn)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Titanium (Ti)	mg/L	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Uranium (U)	mg/L	0.000020	0.000030	0.000024	0.000023	0.000030	0.000022	0.000038	0.000028	0.000026	0.000035
Vanadium (V)	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Zinc (Zn)	mg/L	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0049	0.0018	0.0015	0.0029

Notes:

- Parameter not reported

In cases where N ≤ 3, median and 95th Percentile statistics were not calculated.

Grey highlighted values exceed BC chronic water quality guidelines for the protection of aquatic life; bolded font values exceed BC acute (maximum) water quality guidelines.

Italicized font indicates exceedance of CCME guidelines for the protection of aquatic life, applied in the absence of an applicable BC guideline.

[1] *Water quality results are presented for six distinct cohorts based on sampling year; each cohort is demarcated by either a significant site activity and observable water quality effect relative to years of little to no site activity (see text).*

[2] *Reported water quality parameters were averaged over entire water column within historical reports (Price 2005).*

[3] *2000/2001 & 2009/2010 cohort broken up due to averaging of water quality parameters over entire water column within historical reports (Price 2005).*

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013

Project Area		Mine Site Area																			
Site		Upper Brucejack Creek, Upstream of Adit (BJ U/S)																			
	Cohort[1]	1987-1990					1991-1998					1999					2000 & 2001, 2009 & 2010*				
		N=25					N=20					N=8					N=5*				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Physical Tests																					
Colour, True	CU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	32.0	84.0	48.4	47.0	61.6	41.0	54.0	48.3	48.0	52.3	44.0	61.0	54.5	55.0	60.7	60.0	63.0	61.0	60.0	62.7
Hardness (as $CaCO_3$)	mg/L	19.0	26.0	22.8	23.0	25.5	14.0	25.0	21.3	21.5	25.0	21.0	27.0	23.6	23.0	26.6	22.5	25.0	23.6	24.0	24.8
pH	pH	6.78	7.80	7.30	7.37	7.78	6.70	8.00	7.41	7.40	7.91	6.50	8.10	7.44	7.60	8.07	6.40	7.80	7.34	7.54	7.77
Total Suspended Solids	mg/L	<1.0	8.0	3.0	3.0	7.8	<1.0	14.0	4.7	3.0	13.1	<3.0	7.0	3.2	2.5	6.3	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	mg/L	<1.0	60.0	37.0	40.0	48.0	20.0	66.0	33.7	31.0	45.6	15.0	42.0	29.6	30.0	39.8	22.0	54.0	32.6	30.0	50.0
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	mg/L	11.0	21.0	16.5	16.5	21.0	12.0	21.0	16.3	16.5	18.5	14.0	21.0	16.0	15.5	20.0	16.0	17.0	16.7	17.0	17.0
Ammonia, Total (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	-	-
Bromide (Br)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.025	0.025	0.025	-	-
Chloride (Cl)	mg/L	<0.50	15.0	1.19	<0.50	5.28	<0.5	15.0	0.36	0.25	1.00	<0.5	1.00	0.70	1.00	1.00	<0.5	1.00	<0.5	<0.5	<0.5
Fluoride (F)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.02	-	-
Nitrate (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	-	-
Nitrite (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	-	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	mg/L	2.0	12.0	6.0	5.7	9.8	4.0	11.0	6.6	6.0	11.0	7.0	13.0	9.6	10.0	12.0	8.7	11.0	9.7	10.0	10.8
Cyanides	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total [1]	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (Al)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*0.0189*	0.0222	0.0206	-	-
Antimony (Sb)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0002	0.0003	0.0002	-	-
Arsenic (As)-Total	mg/L	0.0005	0.0024	0.0017	0.0018	0.0024	0.0009	**0.0150**	0.0026	0.0018	**0.0055**	0.0008	0.0014	0.0011	0.0012	0.0014	<0.001	0.0017	0.0011	0.0008	0.0017
Barium (Ba)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.035	0.036	0.035	-	-
Beryllium (Be)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00025	<0.00025	<0.00025	-	-
Bismuth (Bi)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00025	<0.00025	<0.00025	-	-
Boron (B)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	-
Cadmium (Cd)-Total	mg/L	-	-	-	-	-	<0.0002	**0.00500**	<0.001	<0.001	**0.00160**	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Calcium (Ca)-Total	mg/L	-	-	-	-	-	4.8	13.5	8.3	8.4	10.0	6.8	10.3	8.7	8.4	10.2	8.6	9.7	9.1	9.2	9.6
Chromium (Cr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	-	-
Cobalt (Co)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	-	-
Copper (Cu)-Total	mg/L	<0.0001	**0.0700**	0.00326	0.000500	0.00213	<0.001	**0.00700**	0.00125	<0.001	0.00225	<0.001	**0.0100**	0.00344	<0.001	**0.0100**	0.00011	0.00050	0.00040	0.00050	0.00050
Iron (Fe)-Total	mg/L	0.001	0.120	0.038	0.015	0.098	<0.03	0.720	0.202	0.145	0.407	0.030	0.210	0.090	0.080	0.172	<0.03	0.200	0.092	0.060	0.194
Lead (Pb)-Total	mg/L	<0.0005	0.0010	0.0005	0.0005	0.0009	<0.001	0.0030	<0.001	<0.001	0.0025	<0.001	0.0030	0.0019	0.0020	0.0028	<0.00005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium (Li)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	-	-
Magnesium (Mg)-Total	mg/L	-	-	-	-	-	0.260	0.920	0.369	0.305	0.750	0.260	0.340	0.296	0.280	0.338	0.280	0.350	0.306	0.300	0.341
Manganese (Mn)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0040	0.0052	0.0046	-	-
Mercury (Hg)-Total	mg/L	<0.00005	0.000080	0.000022	0.000025	0.000056	<0.00001	0.00500	0.000401	<0.00001	0.00275	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0002	<0.0002	<0.00001	<0.0002
Molybdenum (Mo)-Total	mg/L	<0.001	<0.005	0.0011	0.0005	0.0025	<0.001	0.0150	0.0021	<0.001	0.0131	<0.001	0.0020	<0.001	<0.001	0.0017	0.0004	0.0005	0.0005	0.0005	0.0005
Nickel (Ni)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	-	-
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.30	<0.30	<0.30	-	-
Potassium (K)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.095	0.104	0.100	-	-

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																				
Site		Upper Brucejack Creek, Upstream of Adit (BJ U/S; *cont'd*)															Camp Creek					
	Cohort[1]	2000 & 2001, 2009 & 2010*					2011-2012					2013					1989	1991-1998				
		N=5*					N=20					N=18					N=1	N=16				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Value	Min	Max	Mean	Median	95th P
Physical Tests																						
Colour, True	CU	-	-	-	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	-	-	-	-	-	-
Conductivity	µS/cm	60.0	63.0	61.0	60.0	62.7	48.7	65.3	55.2	53.8	65.2	41.0	61.4	54.2	55.4	60.0	44.0	50.0	230	95.6	73.5	186
Hardness (as $CaCO_3$)	mg/L	22.5	25.0	23.6	24.0	24.8	21.4	29.9	24.1	23.8	28.0	17.8	26.1	23.6	24.2	25.8	19.0	19.0	65.0	35.9	33.5	61.3
pH	pH	6.40	7.80	7.34	7.54	7.77	7.53	8.16	7.87	7.89	8.08	6.66	7.95	7.62	7.75	7.93	6.50	4.40	7.90	6.16	6.15	7.23
Total Suspended Solids	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	10.9	2.6	<3.0	10.7	1.5	26.0	6.6	3.4	19.1	45.0	<1.0	67.0	10.4	7.5	27.3
Total Dissolved Solids	mg/L	22.0	54.0	32.6	30.0	50.0	23.0	46.0	31.6	31.0	40.3	22.0	43.0	35.1	35.5	43.0	30.0	30.0	162	66.9	61.0	122
Turbidity	NTU	-	-	-	-	-	0.220	9.56	1.73	0.605	7.40	0.230	27.8	7.38	4.44	19.5	-	-	-	-	-	-
Anions and Nutrients	mg/L	-	-	-	-	-																
Acidity (as $CaCO_3$)	mg/L	-	-	-	-	-	<1.0	5.1	2.3	2.2	3.5	1.4	5.2	2.5	2.1	4.7	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	14.1	18.4	15.8	15.8	17.7	12.3	18.1	15.7	16.7	17.7	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	1.0	1.0	1.0	1.0	1.0	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	1.0	1.0	1.0	1.0	1.0	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	mg/L	16.0	17.0	16.7	17.0	17.0	14.1	18.4	15.8	15.8	17.7	12.3	18.1	15.7	16.7	17.7	2.0	<1.0	14.0	4.3	2.5	11.4
Ammonia, Total (as N)	mg/L	<0.005	<0.005	<0.005	-	-	<0.005	0.0229	<0.005	<0.005	0.01454	<0.005	0.009600	0.003661	<0.005	0.008495	-	-	-	-	-	-
Bromide (Br)	mg/L	0.025	0.025	0.025	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-
Chloride (Cl)	mg/L	<0.5	1.00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.00	0.44	<0.5	1.00
Fluoride (F)	mg/L	<0.02	<0.02	<0.02	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.023	0.011	0.010	0.012	-	-	-	-	-	-
Nitrate (as N)	mg/L	<0.005	<0.005	<0.005	-	-	<0.005	0.021	0.005	<0.005	0.016	<0.005	0.049	0.016	0.010	0.049	-	-	-	-	-	-
Nitrite (as N)	mg/L	<0.001	<0.001	<0.001	-	-	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001	0.001	-	-	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	<0.05	0.237	<0.05	<0.05	0.142	<0.05	0.106	0.030	0.025	0.037	-	-	-	-	-	-
Total Nitrogen	mg/L	-	-	-	-	-	<0.025	0.244	0.031	<0.025	0.151	<0.025	0.119	0.036056	0.025000	0.076	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000500	0.000500	0.000500	0.000500	-	-	-	-	-	-
Phosphorus (P)-Total	mg/L	-	-	-	-	-	<0.002	0.019	0.00389	<0.002	0.011495	<0.002	0.032000	0.007617	0.003400	0.019335	-	-	-	-	-	-
Sulphate (SO_4)	mg/L	8.7	11.0	9.7	10.0	10.8	8.6	13.3	10.0	9.5	12.2	7.0	10.6	9.5	9.6	10.6	13.0	18.0	104.0	38.5	35.0	74.6
Cyanides	mg/L	-	-	-	-	-																
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-
Cyanide, Total [1]	mg/L	-	-	-	-	-	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-
Total Metals	mg/L	-	-	-	-	-											-	-	-	-	-	-
Aluminum (Al)-Total	mg/L	*0.0189*	0.0222	0.0206	-	-	0.0070	*0.317*	0.0540	0.0192	*0.269*	0.0065	*1.07*	*0.305*	*0.237*	*0.901*	-	-	-	-	-	-
Antimony (Sb)-Total	mg/L	0.0002	0.0003	0.0002	-	-	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	0.0002	0.0006	0.0003	0.0003	0.0005	-	-	-	-	-	-
Arsenic (As)-Total	mg/L	<0.001	0.0017	0.0011	0.0008	0.0017	0.0005	0.0026	0.0008	0.0006	0.0025	0.0006	0.0045	0.0013	0.0008	0.0027	0.0021	0.0001	**0.0070**	0.0016	0.0008	**0.0063**
Barium (Ba)-Total	mg/L	0.035	0.036	0.035	-	-	0.032	0.052	0.035	0.034	0.043	0.034	0.060	0.043	0.040	0.056	-	-	-	-	-	-
Beryllium (Be)-Total	mg/L	<0.00025	<0.00025	<0.00025	-	-	<0.0001	<0.001	<0.001	<0.001	<0.001	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-
Bismuth (Bi)-Total	mg/L	<0.00025	<0.00025	<0.00025	-	-	<0.0005	<0.2	<0.2	<0.2	<0.2	0.000250	0.000250	0.000250	0.000250	0.000250	-	-	-	-	-	-
Boron (B)-Total	mg/L	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.005	0.005	0.005	0.005	0.005	-	-	-	-	-	-
Cadmium (Cd)-Total	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	**0.00078**	**0.00007**	0.00001	**0.00048**	0.00001	**0.00002**	0.00001	0.00001	**0.00002**	-	<0.0002	0.00500	0.00093	0.00045	0.00500
Calcium (Ca)-Total	mg/L	8.6	9.7	9.1	9.2	9.6	8.1	11.0	9.0	8.9	10.7	7.1	10.0	9.0	9.2	9.9	-	7.0	24.2	13.3	12.2	22.4
Chromium (Cr)-Total	mg/L	<0.0005	<0.0005	<0.0005	-	-	<0.0001	**0.00350**	0.00050	0.00050	0.00065	0.00005	0.00041	0.00015	0.00012	0.00036	-	-	-	-	-	-
Cobalt (Co)-Total	mg/L	<0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0003	<0.0003	<0.0003	<0.0003	0.0001	0.0005	0.0001	0.0001	0.0003	-	-	-	-	-	-
Copper (Cu)-Total	mg/L	0.00011	0.00050	0.00040	0.00050	0.00050	<0.0005	0.00413	0.00068	0.00050	0.00211	0.00025	0.00209	0.00056	0.00025	0.00128	0.00300	<0.001	0.0390	0.00666	0.00300	0.0210
Iron (Fe)-Total	mg/L	<0.03	0.200	0.092	0.060	0.194	<0.03	0.409	0.069	<0.03	0.404	0.015	**1.38**	0.268	0.091	0.740	**1.39**	0.015	**1.96**	0.345	0.230	0.813
Lead (Pb)-Total	mg/L	<0.00005	<0.0005	<0.0005	<0.0005	<0.0005	0.0000	0.0031	0.0003	0.0003	0.0007	0.0000	0.0017	0.0004	0.0002	0.0011	0.0030	<0.001	0.0070	0.0016	0.0010	0.0039
Lithium (Li)-Total	mg/L	<0.005	<0.005	<0.005	-	-	0.0003	0.0025	0.0017	0.0025	0.0025	0.0003	0.0015	0.0006	0.0003	0.0014	-	-	-	-	-	-
Magnesium (Mg)-Total	mg/L	0.280	0.350	0.306	0.300	0.341	0.260	0.420	0.311	0.294	0.382	0.276	0.471	0.341	0.320	0.434	-	0.290	1.26	0.668	0.635	1.20
Manganese (Mn)-Total	mg/L	0.0040	0.0052	0.0046	-	-	0.0018	0.0686	0.0100	0.0039	0.0364	0.0014	0.0801	0.0190	0.0112	0.0481	-	-	-	-	-	-
Mercury (Hg)-Total	mg/L	<0.00001	<0.0002	<0.0002	<0.00001	<0.0002	<0.00001	0.000025	<0.00001	<0.00001	<0.00001	0.000005	0.000016	0.000006	0.000005	0.000007	0.000080	<0.00001	0.005000	0.000721	<0.00001	0.003375
Molybdenum (Mo)-Total	mg/L	0.0004	0.0005	0.0005	0.0005	0.0005	0.0003	0.0005	0.0004	0.0005	0.0005	0.0002	0.0004	0.0003	0.0004	0.0004	<0.001	0.0005	0.0170	0.0026	0.0005	0.0156
Nickel (Ni)-Total	mg/L	<0.0005	<0.0005	<0.0005	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003	0.0003	0.0003	0.0003	0.0003	-	-	-	-	-	-
Phosphorus (P)-Total	mg/L	<0.30	<0.30	<0.30	-	-	<0.3	<0.3	<0.3	<0.3	<0.3	0.150000	0.150000	0.150000	0.150000	0.150000	-	-	-	-	-	-
Potassium (K)-Total	mg/L	0.095	0.104	0.100	-	-	0.071	1.000	0.680	1.000	1.000	0.073	0.452	0.211	0.181	0.444	-	-	-	-	-	-

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Camp Creek *(cont'd)*																			
	Cohort[1]	1999					2000 & 2001, 2009 & 2010*					2011-2012					2013				
		N=4					N=5*					N=6					N=11				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Physical Tests																					
Colour, True	CU	-	-	-	-	-	<5.0	<5.0	<5.0	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	30.2	7.12	<5.0	21.5
Conductivity	µS/cm	54.0	177	118	120	174	75.2	146	112	113	146	77.7	347	156	107	310	32.1	597	264	180	588
Hardness (as $CaCO_3$)	mg/L	19.0	69.0	45.3	46.5	68.3	18.0	57.0	42.3	51.9	56.6	29.4	157.0	65.3	40.7	139.5	12.7	189	84.8	69.0	175
pH	pH	5.30	6.60	5.83	5.70	6.48	6.00	7.76	6.50	6.20	7.48	6.47	8.20	7.51	7.57	8.08	4.88	7.89	7.03	7.23	7.87
Total Suspended Solids	mg/L	<3.0	13.0	5.6	4.0	11.8	<3.0	27.1	6.9	<3.0	22.3	1.5	608.0	243.3	159.5	567.8	1.5	324	94.1	32.1	301
Total Dissolved Solids	mg/L	38.0	106	74.8	77.5	105	46.0	105	70.6	66.0	102	51.0	231	97.8	64.5	203	23.0	357	162	119	337
Turbidity	NTU	-	-	-	-	-	20.5	20.5	20.5	-	-	1.55	487	210	158	463	3.02	348	91.2	31.2	321
Anions and Nutrients	mg/L																				
Acidity (as $CaCO_3$)	mg/L	-	-	-	-	-	3.7	3.7	3.7	-	-	1.8	3.8	2.5	2.3	3.6	1.8	7.6	4.0	3.9	6.7
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	-	-	<2.0	104	20.5	4.0	79.9	<2.0	120	29.6	2.7	96
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as $CaCO_3$)	mg/L	<1.0	2.0	1.4	1.5	2.0	<1.0	2.0	1.1	<1.0	1.9	<2.0	104	20.5	4.0	79.9	<2.0	120	29.6	2.7	96
Ammonia, Total (as N)	mg/L	-	-	-	-	-	<0.005	<0.005	<0.005	-	-	0.022	0.088	0.044	0.036	0.079	0.019	21.1	3.86	0.168	14.6
Bromide (Br)	mg/L	-	-	-	-	-	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chloride (Cl)	mg/L	<0.50	2.00	0.88	0.63	1.85	<0.50	1.00	0.55	<0.50	1.00	<0.50	1.18	0.41	0.25	0.95	0.25	43.8	8.95	1.85	31.6
Fluoride (F)	mg/L	-	-	-	-	-	<0.02	0.033	0.022	-	-	0.039	0.199	0.078	0.050	0.171	0.010	0.208	0.095	0.081	0.183
Nitrate (as N)	mg/L	-	-	-	-	-	<0.005	0.020	0.011	-	-	<0.004	0.047	0.027	0.026	0.046	0.012	0.632	0.207	0.141	0.612
Nitrite (as N)	mg/L	-	-	-	-	-	<0.001	<0.001	<0.001	-	-	<0.001	0.001	<0.001	<0.001	<0.001	0.001	0.046	0.012	0.002	0.037
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	<0.05	<0.05	<0.05	-	-	0.100	0.316	0.187	0.166	0.305	0.025	22.400	4.286	0.302	16.055
Total Nitrogen	mg/L	-	-	-	-	-	<0.05	<0.05	<0.05	-	-	0.056	0.340	0.206	0.197	0.335	0.057	22.6	4.50	0.485	16.5
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.001	0.001	<0.001	<0.001	0.001	0.000500	2.67	0.460	0.000500	1.88
Phosphorus (P)-Total	mg/L	-	-	-	-	-	0.0143	0.0143	0.0143	-	-	0.0028	0.716	0.288	0.151	0.692	0.0229	2.70	0.685	0.362	2.03
Sulphate (SO_4)	mg/L	19.0	73.0	47.3	48.5	72.0	29.3	60.0	41.6	30.0	59.8	26.8	89.2	52.2	40.4	86.1	9.9	157	82.2	73.5	156
Cyanides	mg/L																				
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	<0.001	<0.001	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide, Total [1]	mg/L	-	-	-	-	-	0.0013	0.0013	0.0013	-	-	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001
Total Metals	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Aluminum (Al)-Total	mg/L	-	-	-	-	-	*0.0503*	*0.881*	0.466	-	-	*0.154*	*7.91*	*3.93*	*3.58*	*7.68*	*0.183*	*5.53*	*2.05*	*1.32*	*4.95*
Antimony (Sb)-Total	mg/L	-	-	-	-	-	0.0001	0.0002	0.0002	-	-	0.0003	0.0034	0.0020	0.0020	0.0033	0.0002	0.0032	0.0010	0.0005	0.0025
Arsenic (As)-Total	mg/L	<0.0001	0.0007	0.0003	0.0002	0.0006	<0.0001	0.0025	0.0007	0.0001	0.0021	0.0027	**0.0858**	**0.0324**	**0.0153**	**0.0814**	0.0012	**0.0408**	**0.0118**	0.0044	**0.0326**
Barium (Ba)-Total	mg/L	-	-	-	-	-	0.043	0.055	0.049	-	-	0.021	0.343	0.169	0.158	0.325	0.023	0.190	0.077	0.066	0.172
Beryllium (Be)-Total	mg/L	-	-	-	-	-	<0.0005	<0.0005	<0.0005	-	-	<0.0001	0.0005	0.0002	0.0002	0.0005	0.0001	0.0003	0.0001	0.0001	0.0002
Bismuth (Bi)-Total	mg/L	-	-	-	-	-	<0.0005	<0.0005	<0.0005	-	-	<0.0005	0.1000	0.0169	<0.0005	0.0751	0.0003	0.0003	0.0003	0.0003	0.0003
Boron (B)-Total	mg/L	-	-	-	-	-	<0.01	<0.01	<0.01	-	-	<0.01	0.050	0.018	<0.01	0.047	0.005	0.635	0.099	0.013	0.422
Cadmium (Cd)-Total	mg/L	**0.00020**	**0.00060**	**0.00040**	**0.00040**	**0.00060**	<0.00001	**0.00050**	**0.00027**	**0.00023**	**0.00048**	**0.00002**	**0.00049**	**0.00033**	**0.00038**	**0.00047**	**0.00006**	**0.00117**	**0.00040**	**0.00031**	**0.00088**
Calcium (Ca)-Total	mg/L	7.2	25.9	16.7	16.8	25.5	3.7	21.0	15.3	20.3	20.9	11.1	54.0	24.1	16.4	48.7	4.8	68.3	30.8	21.3	65.4
Chromium (Cr)-Total	mg/L	-	-	-	-	-	<0.0002	<0.0005	<0.0005	-	-	<0.001	**0.00415**	**0.00122**	<0.001	**0.00358**	0.00016	**0.00129**	0.00051	0.00044	**0.00108**
Cobalt (Co)-Total	mg/L	-	-	-	-	-	<0.0001	0.0019	0.0010	-	-	0.0001	0.0073	0.0038	0.0039	0.0066	0.0007	0.0106	0.0035	0.0035	0.0077
Copper (Cu)-Total	mg/L	0.00300	**0.0900**	**0.0263**	0.00600	**0.0776**	0.00023	**0.00800**	0.00363	0.00394	**0.00720**	0.00100	**0.0215**	**0.0119**	**0.0113**	**0.0210**	0.00197	**0.0272**	0.00826	0.00752	**0.0193**
Iron (Fe)-Total	mg/L	0.110	0.330	0.205	0.190	0.309	0.060	**1.10**	0.314	0.071	0.934	0.768	**25.2**	**9.00**	**5.78**	**22.6**	0.200	**12.40**	**3.66**	**1.34**	**10.31**
Lead (Pb)-Total	mg/L	<0.001	0.0070	0.0021	<0.001	0.0060	0.0001	0.0010	0.0005	0.0005	0.0009	0.0016	**0.0332**	0.0129	0.0050	**0.0326**	0.0002	0.0213	0.0054	0.0014	0.0166
Lithium (Li)-Total	mg/L	-	-	-	-	-	<0.005	<0.005	<0.005	-	-	0.0024	0.0149	0.0077	0.0065	0.0141	0.0011	0.0064	0.0038	0.0037	0.0057
Magnesium (Mg)-Total	mg/L	0.370	2.55	1.39	1.31	2.37	0.190	1.10	0.789	0.969	1.09	0.797	4.39	2.32	2.26	4.06	0.352	3.83	2.02	1.68	3.52
Manganese (Mn)-Total	mg/L	-	-	-	-	-	0.0087	0.2590	0.1338	-	-	0.0909	0.9790	0.5155	0.4825	0.9030	0.1240	1.0500	0.5697	0.5330	0.8975
Mercury (Hg)-Total	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000288	0.000067	0.000024	0.000231	0.000005	0.000062	0.000028	0.000013	0.000061
Molybdenum (Mo)-Total	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.0001	0.0014	0.0006	0.0005	0.0012	0.0001	0.0016	0.0008	0.0008	0.0015	0.0001	0.0011	0.0003	0.0002	0.0008
Nickel (Ni)-Total	mg/L	-	-	-	-	-	<0.0005	0.0008	0.0005	-	-	<0.0004	0.0023	0.0017	0.0021	0.0023	0.0003	0.0050	0.0019	0.0015	0.0037
Phosphorus (P)-Total	mg/L	-	-	-	-	-	<0.30	<0.30	<0.30	-	-	0.000005	0.89	0.34	**0.15**	0.80	0.150000	3.09	0.71	0.31	2.14
Potassium (K)-Total	mg/L	-	-	-	-	-	0.149	0.305	0.227	-	-	0.493	2.910	1.726	1.775	2.758	0.272	8.480	2.549	1.470	6.485

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Adit (Effluent)[2]																			
	Cohort[1]	1987-1990					1991-1998					1999					2000 & 2001, 2009 & 2010				
		N=17					N=24					N=4					N=10				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Physical Tests																					
Colour, True	CU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity	µS/cm	307	806	539	519	698	360	659	448	411	642	353	394	378	383	393	53.5	375	263	354	373
Hardness (as $CaCO_3$)	mg/L	33.0	209	138	149	186	76.0	227	159	160	220	141	152	146	145	151	22.6	164	102	125	160
pH	pH	7.50	8.20	7.82	7.80	8.04	6.80	8.30	7.44	7.40	8.26	6.90	7.70	7.15	7.00	7.61	6.80	8.40	7.68	7.87	8.23
Total Suspended Solids	mg/L	66.0	5320	1559	806	5248	<1.0	256	27.8	1.0	171	<3.0	7.0	2.9	<3.0	6.2	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	mg/L	270	590	416	399	574	222	580	332	295	565	239	276	250	243	272	34.0	231	161	208	226
Turbidity	NTU	-	-	-	-	-						-	-	-	-	-	1.02	5.49	2.75	2.25	5.10
Anions and Nutrients	mg/L																				
Acidity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	4.9	2.5	2.2	4.6
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.4	84.0	32.7	16.2	74.0
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	<2.0	<1.0	<1.0	<2.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	<2.0	<1.0	<1.0	<2.0
Alkalinity, Total (as $CaCO_3$)	mg/L	52.0	356	126	110	224	59.0	130	84.5	80.0	128	69.0	73.0	71.3	71.5	73.0	14.4	84.0	52.1	66.0	78.8
Ammonia, Total (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005
Bromide (Br)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005
Chloride (Cl)	mg/L	<0.50	16.0	3.22	2.00	12.0	0.15	31.0	1.94	0.25	2.90	<0.50	1.00	0.81	1.00	1.00	<0.50	1.00	<0.50	<0.50	1.00
Fluoride (F)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	0.160	0.068	<0.02	0.158
Nitrate (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	0.029	0.011	<0.005	0.027
Nitrite (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
Total Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	0.0192	0.0081	0.0061	0.0178
Sulphate (SO_4)	mg/L	81.0	339	160	138	337	96.0	207	137	126	187	116	120	118	117	120	9.7	113	78.6	106	112
Cyanides	mg/L																				
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide, Total [1]	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001
Total Metals	mg/L																				
Aluminum (Al)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0266	0.348	0.104	0.0430	0.293
Antimony (Sb)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0002	0.0014	0.0007	0.0005	0.0013
Arsenic (As)-Total	mg/L	0.0200	0.610	0.160	0.0900	0.602	0.0006	0.0300	0.0099	0.0075	0.0254	0.0076	0.0114	0.0092	0.0089	0.0111	0.0007	0.0121	0.0062	0.0064	0.0109
Barium (Ba)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.012	0.046	0.028	0.034	0.043
Beryllium (Be)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Bismuth (Bi)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron (B)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	0.030	0.014	<0.01	0.029
Cadmium (Cd)-Total	mg/L	-	-	-	-	-	0.00010	0.00500	0.00067	0.00040	0.00148	0.00030	0.00030	0.00030	0.00030	0.00030	<0.00001	0.00030	0.00017	0.00016	0.00030
Calcium (Ca)-Total	mg/L	-	-	-	-	-	43.2	84.0	56.5	55.8	76.3	49.4	53.2	51.6	51.9	53.1	8.8	57.9	36.2	42.7	57.0
Chromium (Cr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	0.00025	0.00017	0.00019	0.00025
Cobalt (Co)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	0.0005	0.0002	0.0002	0.0004
Copper (Cu)-Total	mg/L	<0.001	1.72	0.238	0.0400	1.06	<0.001	0.0230	0.00288	0.00200	0.00740	0.00200	0.00200	0.00200	0.00200	0.00200	<0.0005	0.00300	0.00152	0.00194	0.00255
Iron (Fe)-Total	mg/L	0	82.7	20.0	10.1	75.7	<0.015	1.00	0.203	0.200	0.485	0.200	0.300	0.250	0.250	0.300	<0.030	0.641	0.226	0.200	0.533
Lead (Pb)-Total	mg/L	<0.001	1.4900	0.4182	0.2650	1.4900	<0.001	0.0120	0.0045	0.0040	0.0099	0.0040	0.0080	0.0060	0.0060	0.0079	0.0001	0.0090	0.0047	0.0044	0.0090
Lithium (Li)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	0.0301	0.0122	0.0025	0.0288
Magnesium (Mg)-Total	mg/L	-	-	-	-	-	4.15	6.60	5.42	5.40	6.54	4.61	5.17	4.95	5.00	5.15	0.322	5.30	3.20	4.02	5.08
Manganese (Mn)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0065	0.1640	0.0848	0.1120	0.1558
Mercury (Hg)-Total	mg/L	0.000080	0.000710	0.000330	0.000200	0.000659	<0.00001	0.005000	0.000474	<0.00001	0.003125	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0002	<0.0002	<0.00001	<0.0002
Molybdenum (Mo)-Total	mg/L	0.0010	0.0930	0.0230	0.0160	0.0874	<0.0005	0.0130	0.0023	0.0015	0.0060	<0.001	0.0010	0.0009	0.0010	0.0010	0.0003	0.0013	0.0008	0.0008	0.0013
Nickel (Ni)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.085	1.740	0.768	0.321	1.712

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Adit (Effluent)[2] *(cont'd)*										Lower Brucejack Creek 200 m Downstream of Adit									
	Cohort[1]	2011-2012					2013					1987-1990					1991-1998				
		N=20					N=10					N=12					N=20				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Physical Tests																					
Colour, True	CU	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.30	<5.0	<5.0	<5.0	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	389	548	447	438	540	505	568	536	542	559	42.4	86.0	57.4	52.0	86.0	46.0	107	56.7	52.0	70.9
Hardness (as $CaCO_3$)	mg/L	109	180	149	151	173	88.7	124	107	106	121	17.0	31.0	25.6	25.4	31.0	17.0	46.0	24.1	22.0	28.0
pH	pH	7.89	8.30	8.06	8.07	8.18	8.14	8.29	8.24	8.26	8.28	6.80	7.80	7.21	7.20	7.69	6.50	7.80	7.18	7.30	7.60
Total Suspended Solids	mg/L	1.5	10100	457	17.7	352	31.1	614	113	55.6	378	8.0	55.6	28.3	27.0	51.6	<1.0	34.0	7.8	5.0	21.0
Total Dissolved Solids	mg/L	231	371	284	268	355	310	378	349	351	376	2.0	1117	129	35.0	564	28.0	86.0	39.3	37.0	60.4
Turbidity	NTU	1.82	291	51.8	19.8	220	1.16	73.5	31.7	33.4	60.6	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients	mg/L																				
Acidity (as $CaCO_3$)	mg/L	0.5	4.2	2.7	2.6	4.0	0.5	2.2	1.0	0.8	1.8	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	19.6	110	93.0	96.7	107	111	129	121	122	128	-	-	-	-	-	-	-	-	-	-
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as $CaCO_3$)	mg/L	19.6	110	93.0	96.7	107	111	129	121	122	128	10.0	24.0	17.2	17.6	22.9	12.0	31.0	16.2	16.0	20.6
Ammonia, Total (as N)	mg/L	0.003	1.78	0.187	0.050	1.23	0.123	0.901	0.490	0.530	0.883	-	-	-	-	-	-	-	-	-	-
Bromide (Br)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.03	0.03	0.03	0.03	0.03	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	mg/L	<0.50	2.59	0.80	0.60	1.84	1.66	2.90	2.28	2.34	2.85	<0.50	8.17	1.04	<0.50	4.23	<0.30	1.00	0.35	<0.30	1.00
Fluoride (F)	mg/L	0.188	0.412	0.276	0.246	0.399	0.401	0.477	0.429	0.429	0.461	-	-	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	0.011	3.34	0.298	0.019	2.38	0.70	1.96	1.29	1.28	1.85	-	-	-	-	-	-	-	-	-	-
Nitrite (as N)	mg/L	<0.001	0.452	0.023	0.001	0.061	0.087	0.556	0.316	0.328	0.532	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	<0.050	1.40	0.223	0.099	1.24	0.105	1.18	0.710	0.755	1.11	-	-	-	-	-	-	-	-	-	-
Total Nitrogen	mg/L	0.017	4.620	0.501	0.126	3.38	1.05	3.65	2.32	2.72	3.24	-	-	-	-	-	-	-	-	-	-
Orthophosphate-Dissolved (as P)	mg/L	<0.001	0.003	0.001	<0.001	0.003	0.00	0.004	0.002	0.002	0.003	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	mg/L	0.0010	11.7	0.5306	0.0330	0.4316	0.0093	0.717	0.109	0.0408	0.409	-	-	-	-	-	-	-	-	-	-
Sulphate (SO_4)	mg/L	106	171	130	120	161	132	156	146	146	155	6.6	19.1	11.2	9.5	18.5	5.0	38.0	10.9	9.0	15.0
Cyanides	mg/L																				
Cyanide, Weak Acid Diss	mg/L	<0.001	0.0025	0.0015	0.0025	0.0025	<0.001	0.0036	0.0015	0.0011	0.0035	-	-	-	-	-	-	-	-	-	-
Cyanide, Total [1]	mg/L	<0.001	0.0076	0.0018	0.0025	0.0025	<0.001	0.0051	0.0021	0.0021	0.0049	-	-	-	-	-	-	-	-	-	-
Total Metals	mg/L																				
Aluminum (Al)-Total	mg/L	0.0351	43.1	2.40	0.307	3.09	0.249	7.43	1.68	0.778	5.73	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	mg/L	0.0013	0.0355	0.0064	0.0026	0.0280	0.0055	0.0169	0.0108	0.0099	0.0164	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Total	mg/L	0.0039	0.898	0.0892	0.0346	0.372	0.0101	0.121	0.0268	0.0185	0.0697	0.0015	0.0039	0.0025	0.0022	0.0037	0.0003	0.0035	0.0017	0.0017	0.0024
Barium (Ba)-Total	mg/L	0.010	7.77	0.369	0.032	0.326	0.036	0.283	0.098	0.066	0.234	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Total	mg/L	<0.0001	0.0075	0.0006	0.0005	0.0005	0.0001	0.0003	0.0001	0.0001	0.0002	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Total	mg/L	0.0003	0.100	0.0522	0.100	0.100	0.000250	0.000250	0.000250	0.000250	0.000250	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	mg/L	0.034	0.197	0.065	0.050	0.112	0.085	0.123	0.107	0.107	0.121	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)-Total	mg/L	0.00005	0.0196	0.00125	0.00038	0.00217	0.00002	0.00081	0.00011	0.00005	0.00042	<0.005	<0.005	<0.005	<0.0005	<0.005	<0.00020	**0.0110**	**0.00074**	<0.00020	**0.00155**
Calcium (Ca)-Total	mg/L	39.1	133	56.3	54.8	61.6	32.4	43.8	37.0	36.3	41.3	-	-	-	-	-	6.5	47.7	10.8	8.8	14.2
Chromium (Cr)-Total	mg/L	0.00005	0.02200	0.00144	0.00050	0.00289	0.00016	0.00424	0.00087	0.00046	0.00269	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Total	mg/L	0.0002	0.0471	0.0031	0.0008	0.0040	0.0002	0.0044	0.0008	0.0004	0.0025	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Total	mg/L	0.00025	0.300	0.0188	0.00410	0.0426	0.00339	0.0545	0.0111	0.00525	0.0344	<0.001	0.00300	0.00084	<0.001	0.00300	<0.001	**0.0120**	0.00248	0.00200	**0.00700**
Iron (Fe)-Total	mg/L	0.150	90.7	6.54	1.67	17.9	0.147	13.1	1.91	0.574	7.43	<0.030	0.620	0.170	0.080	0.595	<0.030	0.490	0.220	0.190	0.440
Lead (Pb)-Total	mg/L	0.0007	1.0300	0.0641	0.0156	0.1289	0.0010	0.0277	0.0051	0.0029	0.0155	<0.0005	0.0130	0.0021	0.0005	0.0085	<0.0010	**0.0210**	0.0023	<0.0010	0.0050
Lithium (Li)-Total	mg/L	0.0488	0.2090	0.1040	0.0923	0.2012	0.2060	0.2650	0.2334	0.2340	0.2639	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Total	mg/L	3.87	7.42	4.88	4.82	5.42	4.06	6.44	4.74	4.60	5.82	<1.0	1.60	<1.0	<1.0	1.49	<0.0010	0.820	0.356	0.320	0.532
Manganese (Mn)-Total	mg/L	0.1620	4.3400	0.5183	0.3030	1.0326	0.1240	0.5780	0.2251	0.1915	0.4317	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Total	mg/L	<0.00001	0.000235	0.000019	<0.00001	0.000051	0.000005	0.000036	0.000008	0.000005	0.000019	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.00001	0.005000	0.000423	<0.00001	0.002875
Molybdenum (Mo)-Total	mg/L	0.0016	0.0959	0.0061	0.0021	0.0046	0.0033	0.0099	0.0052	0.0049	0.0084	<0.001	0.0030	0.0013	<0.001	0.0028	0.0005	0.0240	0.0023	0.0005	0.0150
Nickel (Ni)-Total	mg/L	<0.00050	0.0250	0.0018	0.0005	0.0039	0.0009	0.0056	0.0016	0.0013	0.0035	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	mg/L	<0.30	10.9	0.61	<0.30	0.44	0.15	0.62	0.19	0.15	0.36	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Total	mg/L	<2.0	30.200	3.448	2.150	4.614	3.750	7.900	5.738	5.770	7.636	-	-	-	-	-	-	-	-	-	-

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Lower Brucejack Creek 200 m Downstream of Adit *(cont'd)*																			
	Cohort[1]	1999					2000 & 2001, 2009 & 2010*					2011-2012					2013				
		N=8					N=3*					N=10					N=17				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Physical Tests																					
Colour, True	CU	-	-	-	-	-	-	-	-	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity	µS/cm	54.0	86.0	73.5	75.5	83.9	78.0	86.0	82.0	-	-	52.2	197	79.3	64.4	151	46.8	148	89.4	81.7	146
Hardness (as $CaCO_3$)	mg/L	28.0	39.0	32.2	32.0	37.6	29.0	35.0	32.3	-	-	22.1	55.7	29.7	28.2	45.2	19.3	41.2	30.2	29.7	40.7
pH	pH	6.70	8.00	7.50	7.50	7.93	7.00	7.70	7.43	-	-	7.15	8.22	7.81	7.92	8.21	7.56	7.97	7.84	7.87	7.95
Total Suspended Solids	mg/L	<3.0	14.0	7.3	7.5	13.7	<3.0	8.0	4.5	-	-	<3.0	624	89.5	16.5	381	1.5	78	19.9	8.6	76.6
Total Dissolved Solids	mg/L	39.0	60.0	46.8	40.0	59.2	38.0	64.0	49.3	-	-	31.0	130.0	49.3	36.0	97.6	30.0	99.0	57.7	55.0	98.2
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	0.36	765	96.8	13.5	458	2.92	75.6	16.1	5.59	46.6
Anions and Nutrients	mg/L																				
Acidity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	1.1	4.7	2.6	2.3	4.6	1.1	3.6	2.1	2.0	3.0
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	11.8	46.1	18.7	15.6	35.5	11.5	36.0	21.8	19.5	34.8
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	<1.0	<2.0	<1.0	<2.0	<2.0	1.0	1.0	1.0	1.0	1.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	<1.0	<2.0	<1.0	<2.0	<2.0	1.0	1.0	1.0	1.0	1.0
Alkalinity, Total (as $CaCO_3$)	mg/L	11.0	26.0	14.8	13.5	22.5	15.0	19.0	16.7	-	-	11.8	46.1	18.7	15.6	35.5	11.5	36.0	21.8	19.5	34.8
Ammonia, Total (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.005	0.332	0.054	0.013	0.218	0.003	0.225	0.054	0.036	0.223
Bromide (Br)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	0.025000	0.025000	0.025000	0.025000	0.025000
Chloride (Cl)	mg/L	<0.50	1.00	0.55	<0.50	1.00	<0.50	1.00	0.75	-	-	<0.50	0.68	<0.50	<0.50	<0.50	0.25	0.71	0.34	0.25	0.65
Fluoride (F)	mg/L	-	-	-	-	-	-	-	-	-	-	**<0.020**	0.115	0.030	0.021	0.080	0.010	0.084	0.041	0.036	0.082
Nitrate (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0050	0.494	0.076	0.017	0.322	0.005	0.319	0.096	0.066	0.316
Nitrite (as N)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	0.046	0.007	<0.00010	0.031	0.001	**0.091**	0.023	0.013	**0.089**
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	<0.050	0.400	0.091	0.069	0.265	0.025	0.240	0.071	0.050	0.240
Total Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	<0.050	0.923	0.162	0.051	0.619	0.025	0.653	0.195	0.143	0.643
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0010	0.002200	<0.0010	<0.0010	0.002	0.000500	0.002	0.000947	0.000500	0.002
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0020	0.6300	0.0948	0.0253	0.3996	0.0048	0.0755	0.0202	0.0158	0.0513
Sulphate (SO_4)	mg/L	14.0	30.0	21.6	21.0	29.7	18.0	22.0	19.7	-	-	10.0	47.4	17.7	14.0	35.4	9.7	35.8	19.7	18.2	35.2
Cyanides	mg/L																				
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total [1]	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Metals	mg/L																				
Aluminum (Al)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	0.0358	*6.77*	*1.36*	*0.701*	*4.75*	0.0621	*2.14*	*0.572*	*0.341*	*1.77*
Antimony (Sb)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	0.0002	0.0100	0.0015	0.0005	0.0064	0.0003	0.0023	0.0010	0.0009	0.0022
Arsenic (As)-Total	mg/L	0.0012	0.0030	0.0019	0.0020	0.0029	<0.0010	0.0019	0.0014	-	-	0.0008	**0.0662**	**0.0096**	0.0021	**0.0398**	0.0010	**0.0087**	0.0034	0.0029	**0.0069**
Barium (Ba)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	0.036	0.545	0.103	0.047	0.355	0.035	0.088	0.049	0.042	0.076
Beryllium (Be)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	0.0008	0.0002	<0.00010	0.0006	0.0001	0.0001	0.0001	0.0001	0.0001
Bismuth (Bi)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000250	0.000250	0.000250	0.000250	0.000250
Boron (B)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.010	0.045	<0.010	<0.010	0.030	0.005	0.024	0.010	0.005	0.023
Cadmium (Cd)-Total	mg/L	<0.0002	**0.00050**	**0.00026**	**0.00020**	**0.00046**	<0.00020	**0.00020**	**0.00013**	-	-	**0.00002**	**0.00110**	**0.00016**	**0.00007**	**0.00065**	0.00001	0.00010	0.00004	0.00001	0.00009
Calcium (Ca)-Total	mg/L	0.0	14.6	9.8	11.9	14.1	10.6	12.9	11.8	-	-	8.4	24.8	11.7	10.9	19.2	7.6	15.1	11.3	11.0	14.9
Chromium (Cr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	**0.00200**	0.00037	0.00017	**0.00132**	0.00005	0.00063	0.00019	0.00015	0.00040
Cobalt (Co)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	0.0034	0.0007	0.0005	0.0023	0.0001	0.0009	0.0003	0.0001	0.0008
Copper (Cu)-Total	mg/L	0.00300	**0.0200**	**0.00800**	**0.00600**	**0.0165**	0.00200	0.00300	0.00233	-	-	0.00077	**0.0250**	**0.00542**	0.00145	**0.0208**	0.00025	0.00359	0.00133	0.00126	0.00289
Iron (Fe)-Total	mg/L	0.030	1.00	0.455	0.330	0.948	0.150	0.240	0.203	-	-	0.042	**6.36**	**1.41**	0.614	**4.75**	0.015	**2.60**	0.62	0.156	**2.06**
Lead (Pb)-Total	mg/L	0.0020	0.0040	0.0028	0.0025	0.0039	<0.0010	<0.0010	<0.0010	-	-	0.0005	**0.0792**	0.0105	0.0011	**0.0493**	0.0002	0.0039	0.0014	0.0008	0.0037
Lithium (Li)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00050	0.0548	0.0083	0.0019	0.0346	0.0003	0.0411	0.0142	0.0079	0.0401
Magnesium (Mg)-Total	mg/L	0.440	0.550	0.480	0.470	0.536	0.450	0.600	0.540	-	-	0.346	1.64	0.604	0.495	1.20	0.327	1.12	0.652	0.605	1.104
Manganese (Mn)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	0.0264	0.4070	0.0968	0.0656	0.2747	0.0086	0.1620	0.0559	0.0285	0.1188
Mercury (Hg)-Total	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00010	<0.00010	<0.00010	-	-	<0.000010	0.000060	0.000016	<0.000010	0.000044	0.000005	0.000005	0.000005	0.000005	0.000005
Molybdenum (Mo)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	0.0005	-	-	0.0003	0.0044	0.0008	0.0003	0.0028	0.0003	0.0010	0.0006	0.0005	0.0010
Nickel (Ni)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00050	0.0021	0.0004	<0.00050	0.0013	0.0003	0.0006	0.0003	0.0003	0.0003
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.30	0.72	<0.30	<0.30	0.46	0.15	0.15	0.15	0.15	0.15
Potassium (K)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	0.092	5.590	0.957	0.330	3.822	0.160	1.040	0.598	0.576	1.016

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

		Mine Site Area *(cont'd)*									
Site		Lower Brucejack Creek, 2km downstream of Adit (BJ 2)**									
	Cohort[1]	2011-2012 N=20					2013 N=10				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Physical Tests											
Colour, True	CU	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity	µS/cm	53.5	183	73.5	60.3	131	49.80	150	89.6	87.7	146
Hardness (as $CaCO_3$)	mg/L	20.5	53.9	28.0	25.7	42.7	19.40	42.20	30.11	31.60	41.88
pH	pH	7.54	8.13	7.86	7.82	8.12	7.34	8.13	7.73	7.76	7.98
Total Suspended Solids	mg/L	<3.0	325	62.0	19.2	291	1.50	288	42.9	8.0	150
Total Dissolved Solids	mg/L	27.0	105.0	44.8	38.0	84.6	30.00	99.00	56.65	50.00	95.80
Turbidity	NTU	2.52	389	43.1	12.7	186	0.69	288	36.3	5.63	119
Anions and Nutrients	mg/L										
Acidity (as $CaCO_3$)	mg/L	<1.0	3.1	2.3	2.5	3.1	1.2	6.7	2.4	1.8	5.7
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	10.8	44.0	16.2	13.9	28.3	11.0	36.4	21.1	17.9	34.9
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	0.5	1.0	1.0	1.0	1.0
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	0.5	1.0	1.0	1.0	1.0
Alkalinity, Total (as $CaCO_3$)	mg/L	10.8	44.0	16.2	13.9	28.3	11.0	36.4	21.1	17.9	34.9
Ammonia, Total (as N)	mg/L	<0.005	0.189	0.024	<0.005	0.106	0.005	0.220	0.055	0.045	0.138
Bromide (Br)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025000	0.025000	0.025000	0.025000	0.025000
Chloride (Cl)	mg/L	<0.50	0.64	0.31	<0.50	0.61	0.25	0.56	0.30	0.25	0.53
Fluoride (F)	mg/L	<0.020	0.095	0.025	0.021	0.057	0.010	0.080	0.040	0.035	0.076
Nitrate (as N)	mg/L	<0.0050	0.268	0.034	0.009	0.170	0.017	0.380	0.102	0.060	0.320
Nitrite (as N)	mg/L	<0.00010	0.035	0.003	0.001	0.015	0.002	**0.085**	0.020	0.008	**0.065**
Total Kjeldahl Nitrogen	mg/L	<0.050	0.200	0.092	0.101	0.173	0.025	0.210	0.076	0.059	0.170
Total Nitrogen	mg/L	0.013	0.517	0.132	0.120	0.363	0.025	0.675	0.200	0.162	0.545
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	0.001	<0.0010	<0.0010	0.001	0.000500	0.002	0.000953	0.000500	0.002
Phosphorus (P)-Total	mg/L	0.0023	0.2500	0.0474	0.0261	0.1585	0.0038	0.3560	0.0589	0.0113	0.1832
Sulphate (SO_4)	mg/L	10.7	43.8	17.0	14.1	32.5	11.3	36.4	20.7	19.2	35.5
Cyanides	mg/L										
Cyanide, Weak Acid Diss	mg/L	<0.0010	0.001000	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Total [1]	mg/L	<0.0010	0.001100	<0.0010	<0.0010	0.001040	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Metals	mg/L										
Aluminum (Al)-Total	mg/L	0.0699	*6.99*	*1.05*	*0.373*	*3.79*	0.0258	*4.42*	*0.888*	*0.378*	*3.02*
Antimony (Sb)-Total	mg/L	0.0002	0.0100	0.0012	0.0004	0.0047	0.0004	0.0027	0.0011	0.0008	0.0025
Arsenic (As)-Total	mg/L	0.0009	**0.0361**	**0.0068**	0.0026	**0.0251**	0.0016	**0.0367**	**0.0066**	0.0029	**0.0183**
Barium (Ba)-Total	mg/L	0.031	0.305	0.064	0.041	0.167	0.036	0.171	0.060	0.042	0.116
Beryllium (Be)-Total	mg/L	<0.00010	<0.00010	0.000100	<0.00010	0.000350	0.000050	0.000190	0.000058	0.000050	0.000078
Bismuth (Bi)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000250	0.000250	0.000250	0.000250	0.000250
Boron (B)-Total	mg/L	<0.010	0.036	<0.010	<0.010	0.017	0.005	0.023	0.010	0.005	0.021
Cadmium (Cd)-Total	mg/L	**0.00004**	**0.00050**	**0.00014**	**0.00012**	**0.00034**	0.00001	**0.00037**	**0.00011**	**0.00007**	**0.00036**
Calcium (Ca)-Total	mg/L	8.5	19.7	10.7	9.9	16.3	7.67	15.2	11.3	11.5	15.1
Chromium (Cr)-Total	mg/L	0.00014	**0.00200**	0.00051	0.00028	**0.00145**	0.00005	**0.00144**	0.00030	0.00020	0.00082
Cobalt (Co)-Total	mg/L	0.000180	0.001440	0.000622	0.000490	0.001230	0.000050	0.003430	0.000684	0.000300	0.001742
Copper (Cu)-Total	mg/L	0.00085	**0.0130**	0.00304	0.00186	**0.00822**	0.00025	**0.0125**	0.00236	0.00115	**0.00617**
Iron (Fe)-Total	mg/L	0.043	**3.81**	**1.10**	0.534	**3.67**	0.015	**10.5**	**1.52**	0.267	**5.13**
Lead (Pb)-Total	mg/L	0.0001	**0.0377**	0.0047	0.0016	**0.0203**	0.0001	0.0166	0.0029	0.0007	0.0109
Lithium (Li)-Total	mg/L	0.0010	0.0426	0.0055	0.0019	0.0222	0.0020	0.0389	0.0140	0.0069	0.0373
Magnesium (Mg)-Total	mg/L	0.329	1.45	0.564	0.482	1.04	0.384	1.67	0.749	0.685	1.24
Manganese (Mn)-Total	mg/L	0.0266	0.2130	0.0900	0.0872	0.1662	0.0193	0.4740	0.1005	0.0613	0.2372
Mercury (Hg)-Total	mg/L	<0.000010	0.000025	0.000011	<0.000010	0.000025	0.000005	0.000088	0.000013	0.000005	0.000042
Molybdenum (Mo)-Total	mg/L	0.0003	0.0022	0.0005	0.0003	0.0013	0.0002	0.0011	0.0006	0.0005	0.0011
Nickel (Ni)-Total	mg/L	<0.00050	0.0010	<0.00050	0.0005	0.0008	0.0003	0.0020	0.0005	0.0003	0.0011
Phosphorus (P)-Total	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	0.15	0.33	0.16	0.15	0.19
Potassium (K)-Total	mg/L	0.110	5.130	0.724	0.348	2.500	0.287	1.660	0.703	0.585	1.308

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area																			
Site		Upper Brucejack Creek, Upstream of Adit (BJ U/S)																			
	Cohort[t]	1987-1990					1991-1998					1999					2000 & 2001, 2009 & 2010*				
		N=25					N=20					N=8					N=5*				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Selenium (Se)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00001	0.0001	0.0001	-	-
Silicon (Si)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.6	0.6	-	-
Silver (Ag)-Total	mg/L	<0.0001	**0.00250**	**0.00028**	0.00005	**0.00199**	<0.0001	**0.00750**	**0.00052**	<0.0001	**0.00142**	<0.0001	**0.00040**	**0.00027**	**0.00030**	**0.00040**	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	-	-
Strontium (Sr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0561	0.0582	0.0572	-	-
Thallium (Tl)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	-	-
Tin (Sn)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	-	-
Titanium (Ti)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	-
Uranium (U)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000036	0.000037	0.000037	-	-
Vanadium (V)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	0.0005	-	-
Zinc (Zn)-Total	mg/L	<0.000005	0.0210	<0.005	<0.005	0.0068	<0.005	0.0190	<0.005	0.0025	0.0114	<0.005	0.0100	0.0055	<0.005	0.0100	0.0011	0.0250	0.0065	0.0025	0.0205
Dissolved Metals																					
Aluminum (Al)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0038	0.0041	0.0040	-	-
Antimony (Sb)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00024	0.00025	0.00025	-	-
Arsenic (As)-Dissolved	mg/L	0.00040	0.00800	0.00172	0.00150	0.00238	<0.0001	0.00500	0.00151	0.00120	0.00405	0.00030	0.00400	0.00126	0.00070	0.00336	0.00050	0.00130	0.00085	0.00069	0.00126
Barium (Ba)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0338	0.0343	0.0341	-	-
Beryllium (Be)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00025	0.00025	0.00025	-	-
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00025	0.00025	0.00025	-	-
Boron (B)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.005	0.005	0.005	-	-
Cadmium (Cd)-Dissolved	mg/L	-	-	-	-	-	<0.0001	0.00500	<0.0001	<0.0001	0.00160	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00001	0.00010	0.00006	0.00010	0.00010
Calcium (Ca)-Dissolved	mg/L	7.3	9.3	8.6	8.7	9.2	4.3	9.4	7.9	8.0	9.0	6.6	10.3	8.6	8.3	10.2	8.5	9.6	9.0	9.2	9.5
Chromium (Cr)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00025	0.00025	0.00025	-	-
Cobalt (Co)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00005	0.00005	0.00005	-	-
Copper (Cu)-Dissolved	mg/L	<0.001	0.01500	0.00122	0.00050	0.00250	<0.001	0.00300	<0.001	<0.001	<0.001	<0.001	0.01000	0.00288	<0.001	0.00825	0.00005	0.00050	0.00032	0.00050	0.00050
Iron (Fe)-Dissolved	mg/L	<0.001	0.080	<0.03	<0.03	<0.03	<0.015	0.080	0.032	<0.030	0.071	<0.03	<0.03	<0.03	<0.03	<0.03	0.015	0.015	0.015	0.015	0.015
Lead (Pb)-Dissolved	mg/L	<0.0005	0.00250	<0.001	<0.001	<0.001	0.00050	0.00300	0.00083	0.00050	0.00253	<0.001	<0.001	<0.001	<0.001	<0.001	0.00003	0.00050	0.00031	0.00050	0.00050
Lithium (Li)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0025	0.0025	0.0025	-	-
Magnesium (Mg)-Dissolved	mg/L	0.250	0.330	0.283	0.285	0.320	<0.001	0.520	0.283	0.290	0.330	0.250	0.310	0.278	0.280	0.306	0.270	0.310	0.290	0.286	0.308
Manganese (Mn)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0002	0.0002	0.0002	-	-
Mercury (Hg)-Dissolved	mg/L	<0.00005	<0.005	<0.005	<0.00005	<0.005	0.00003	0.00500	0.00251	0.00250	0.00475	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	0.015000	0.001950	<0.001	0.012150	<0.001	<0.001	<0.001	<0.001	<0.001	0.000350	0.000500	0.000455	0.000500	0.000500
Nickel (Ni)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00025	0.00025	0.00025	-	-
Phosphorus (P)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15	0.15	0.15	-	-
Potassium (K)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.08	0.10	0.09	-	-
Selenium (Se)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00005	0.00005	0.00005	-	-
Silicon (Si)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.53	0.53	0.53	-	-
Silver (Ag)-Dissolved	mg/L	<0.0001	<0.0005	<0.0001	<0.0001	<0.0005	<0.0001	0.007500	0.000500	<0.0001	0.001350	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000005	0.000050	0.000032	0.000050	0.000050
Sodium (Na)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	-	-
Strontium (Sr)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0528	0.0541	0.0535	-	-
Thallium (Tl)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00005	0.00005	0.00005	-	-
Tin (Sn)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00005	0.00005	0.00005	-	-
Titanium (Ti)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.005	0.005	0.005	-	-
Uranium (U)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000030	0.000033	0.000032	-	-
Vanadium (V)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0005	0.0005	0.0005	-	-
Zinc (Zn)-Dissolved	mg/L	<0.005	0.0110	0.0029	0.0025	0.0037	<0.005	0.0130	<0.005	<0.005	0.0111	<0.005	0.0100	<0.005	<0.005	0.0083	0.0005	0.0250	0.0106	0.0060	0.0242

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																				
Site		Upper Brucejack Creek, Upstream of Adit (BJ U/S; *cont'd*)															Camp Creek					
	Cohort[1]	2000 & 2001, 2009 & 2010*					2011-2012					2013					1989	1991-1998				
		N=5*					N=20					N=18					N=1	N=16				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Value	Min	Max	Mean	Median	95th P
Selenium (Se)-Total	mg/L	<0.00001	0.0001	0.0001	-	-	0.0001	0.0005	0.0003	0.0005	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-
Silicon (Si)-Total	mg/L	0.6	0.6	0.6	-	-	0.5	1.2	0.6	0.6	1.1	0.5	2.2	1.1	1.0	2.0	-	-	-	-	-	-
Silver (Ag)-Total	mg/L	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00002	**0.00021**	<0.00002	<0.00002	0.00004	0.00001	**0.00017**	0.00003	0.00001	**0.00011**	<0.0001	<0.0001	0.00750	0.00063	<0.0001	0.00263
Sodium (Na)-Total	mg/L	<2.0	<2.0	<2.0	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	1.000000	1.000000	1.000000	1.000000	1.000000	-	-	-	-	-	-
Strontium (Sr)-Total	mg/L	0.0561	0.0582	0.0572	-	-	0.0510	0.0749	0.0578	0.0561	0.0715	0.0487	0.0744	0.0605	0.0612	0.0733	-	-	-	-	-	-
Thallium (Tl)-Total	mg/L	<0.0001	<0.0001	<0.0001	-	-	<0.00001	<0.0002	<0.00001	<0.0002	<0.0002	0.000005	0.000035	0.000013	0.000008	0.000033	-	-	-	-	-	-
Tin (Sn)-Total	mg/L	<0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	0.000050	0.000050	0.000050	0.000050	0.000050	-	-	-	-	-	-
Titanium (Ti)-Total	mg/L	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.005000	0.018000	0.006611	0.005000	0.016300	-	-	-	-	-	-
Uranium (U)-Total	mg/L	0.000036	0.000037	0.000037	-	-	0.000020	0.000100	0.000073	0.000100	0.000100	0.000023	0.000053	0.000034	0.000032	0.000051	-	-	-	-	-	-
Vanadium (V)-Total	mg/L	<0.001	<0.001	0.0005	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.000500	0.001800	0.000711	0.000500	0.001460	-	-	-	-	-	-
Zinc (Zn)-Total	mg/L	0.0011	0.0250	0.0065	0.0025	0.0205	<0.003	0.0231	0.0032	<0.005	0.0035	0.0015	0.0057	0.0020	0.0015	0.0051	0.0200	0.0060	0.1860	0.0396	0.0285	0.0990
Dissolved Metals																						
Aluminum (Al)-Dissolved	mg/L	0.0038	0.0041	0.0040	-	-	0.0015	0.0179	0.0042	0.0025	0.0103	0.0015	0.0149	0.0077	0.0095	0.0147	-	-	-	-	-	-
Antimony (Sb)-Dissolved	mg/L	0.00024	0.00025	0.00025	-	-	0.00019	0.00025	0.00023	0.00025	0.00025	0.00015	0.00051	0.00027	0.00021	0.00048	-	-	-	-	-	-
Arsenic (As)-Dissolved	mg/L	0.00050	0.00130	0.00085	0.00069	0.00126	0.00025	0.00082	0.00048	0.00051	0.00061	0.00033	0.00065	0.00047	0.00045	0.00063	0.00020	<0.0001	0.00400	0.00079	0.00010	0.00225
Barium (Ba)-Dissolved	mg/L	0.0338	0.0343	0.0341	-	-	0.0313	0.0400	0.0338	0.0334	0.0372	0.0275	0.0420	0.0347	0.0349	0.0418	-	-	-	-	-	-
Beryllium (Be)-Dissolved	mg/L	0.00025	0.00025	0.00025	-	-	0.00005	0.00050	0.00034	0.00050	0.00050	0.00005	0.00005	0.00005	0.00005	0.00005	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	mg/L	0.00025	0.00025	0.00025	-	-	0.00025	0.10000	0.06509	0.10000	0.10000	0.00025	0.00025	0.00025	0.00025	0.00025	-	-	-	-	-	-
Boron (B)-Dissolved	mg/L	0.005	0.005	0.005	-	-	0.005	0.050	0.034	0.050	0.050	0.005	0.010	0.005	0.005	0.006	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	mg/L	0.00001	0.00010	0.00006	0.00010	0.00010	0.00001	0.00047	0.00005	0.00001	0.00046	0.00001	0.00001	0.00001	0.00001	0.00001	-	0.00010	0.00500	0.00065	0.00040	0.00199
Calcium (Ca)-Dissolved	mg/L	8.5	9.6	9.0	9.2	9.5	8.0	11.3	9.1	9.0	10.6	6.8	9.9	9.0	9.2	9.8	6.9	7.4	24.2	13.4	13.9	22.9
Chromium (Cr)-Dissolved	mg/L	0.00025	0.00025	0.00025	-	-	0.00005	0.00170	0.00040	0.00050	0.00056	0.00005	0.00022	0.00007	0.00005	0.00017	-	-	-	-	-	-
Cobalt (Co)-Dissolved	mg/L	0.00005	0.00005	0.00005	-	-	0.00005	0.00015	0.00012	0.00015	0.00015	0.00005	0.00005	0.00005	0.00005	0.00005	-	-	-	-	-	-
Copper (Cu)-Dissolved	mg/L	0.00005	0.00050	0.00032	0.00050	0.00050	0.00025	0.00050	0.00041	0.00050	0.00050	0.00025	0.00025	0.00025	0.00025	0.00025	<0.001	<0.001	0.02200	0.00440	0.00200	0.01290
Iron (Fe)-Dissolved	mg/L	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	<0.03	<0.03	0.230	0.064	<0.03	0.216
Lead (Pb)-Dissolved	mg/L	0.00003	0.00050	0.00031	0.00050	0.00050	0.00003	0.00025	0.00017	0.00025	0.00025	0.00003	0.00003	0.00003	0.00003	0.00003	<0.001	<0.001	0.00700	0.00133	<0.001	0.00385
Lithium (Li)-Dissolved	mg/L	0.0025	0.0025	0.0025	-	-	0.0003	0.0025	0.0017	0.0025	0.0025	0.0003	0.0011	0.0004	0.0003	0.0011	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	mg/L	0.270	0.310	0.290	0.286	0.308	0.260	0.380	0.305	0.300	0.371	0.227	0.321	0.292	0.299	0.317	0.320	0.270	1.25	0.652	0.570	1.20
Manganese (Mn)-Dissolved	mg/L	0.0002	0.0002	0.0002	-	-	0.0002	0.0364	0.0043	0.0012	0.0115	0.0006	0.0177	0.0060	0.0033	0.0157	-	-	-	-	-	-
Mercury (Hg)-Dissolved	mg/L	-	-	-	-	-	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	<0.00005	<0.00005	<0.01	0.002010	0.002500	0.004500
Molybdenum (Mo)-Dissolved	mg/L	0.000350	0.000500	0.000455	0.000500	0.000500	0.000307	0.000500	0.000441	0.000500	0.000500	0.000234	0.000432	0.000336	0.000348	0.000431	<0.001	0.000500	0.015000	0.002800	0.000500	0.013600
Nickel (Ni)-Dissolved	mg/L	0.00025	0.00025	0.00025	-	-	0.00025	0.00050	0.00041	0.00050	0.00050	0.00025	0.00025	0.00025	0.00025	0.00025	-	-	-	-	-	-
Phosphorus (P)-Dissolved	mg/L	0.15	0.15	0.15	-	-	0.15	0.15	0.15	0.15	0.15	0.150000	0.150000	0.150000	0.150000	0.15	-	-	-	-	-	-
Potassium (K)-Dissolved	mg/L	0.08	0.10	0.09	-	-	0.07	1.00	0.68	1.00	1.00	0.05	0.16	0.10	0.09	0.16	-	-	-	-	-	-
Selenium (Se)-Dissolved	mg/L	0.00005	0.00005	0.00005	-	-	0.00005	0.0005	0.0003425	0.0005	0.0005	0.000050	0.000120	0.000059	0.000050	0.000103	-	-	-	-	-	-
Silicon (Si)-Dissolved	mg/L	0.53	0.53	0.53	-	-	0.47	0.69	0.55	0.55	0.64	0.45	0.68	0.55	0.55	0.61	-	-	-	-	-	-
Silver (Ag)-Dissolved	mg/L	0.000005	0.000050	0.000032	0.000050	0.000050	0.000005	0.000010	0.000008	0.000010	0.000010	0.000005	0.000005	0.000005	0.000005	0.000005	<0.0001	<0.0001	<0.015	0.000583	<0.0001	0.002600
Sodium (Na)-Dissolved	mg/L	<2.0	<2.0	<2.0	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	1.0	1.0	1.0	1.0	1.0		-	-	-	-	-
Strontium (Sr)-Dissolved	mg/L	0.0528	0.0541	0.0535	-	-	0.0499	0.0719	0.0573	0.0555	0.0709	0.0416	0.0734	0.0585	0.0589	0.0703		-	-	-	-	-
Thallium (Tl)-Dissolved	mg/L	0.00005	0.00005	0.00005	-	-	0.000005	0.0001	0.00006675	0.0001	0.0001	0.000005	0.000005	0.000005	0.000005	0.000005		-	-	-	-	-
Tin (Sn)-Dissolved	mg/L	0.00005	0.00005	0.00005	-	-	0.00005	0.00025	0.00018	0.00025	0.00025	0.000050	0.000050	0.000050	0.000050	0.000050		-	-	-	-	-
Titanium (Ti)-Dissolved	mg/L	0.005	0.005	0.005	-	-	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005		-	-	-	-	-
Uranium (U)-Dissolved	mg/L	0.000030	0.000033	0.000032	-	-	0.000018	0.000100	0.000072	0.000100	0.000100	0.000005	0.000036	0.000021	0.000022	0.000033		-	-	-	-	-
Vanadium (V)-Dissolved	mg/L	0.0005	0.0005	0.0005	-	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.000500	0.000500	0.000500	0.000500	0.000500		-	-	-	-	-
Zinc (Zn)-Dissolved	mg/L	0.0005	0.0250	0.0106	0.0060	0.0242	0.0015	0.0136	0.0027	0.0025	0.0031	0.0015	0.0051	0.0017	0.0015	0.0020	0.0110	<0.005	0.0700	0.0285	0.0200	0.0560

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Camp Creek *(cont'd)*																			
	Cohort[1]	1999					2000 & 2001, 2009 & 2010*					2011-2012					2013				
		N=4					N=5*					N=6					N=11				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Selenium (Se)-Total	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	-	-	<0.0001	0.0010	0.0004	0.0003	0.0009	0.0001	0.0007	0.0003	0.0002	0.0006
Silicon (Si)-Total	mg/L	-	-	-	-	-	0.5	1.4	1.0	-	-	2.5	10.3	7.1	7.9	10.3	1.5	9.4	4.6	3.6	8.9
Silver (Ag)-Total	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	**0.00013**	0.00006	0.00005	**0.00011**	0.00009	**0.00358**	**0.00140**	**0.00063**	**0.00351**	0.00004	**0.00371**	**0.00076**	**0.00015**	**0.00247**
Sodium (Na)-Total	mg/L	-	-	-	-	-	<2.0	<2.0	<2.0	-	-	<2.0	7.4	2.3	<2.0	6.1	1.0	29.5	9.1	2.2	27.8
Strontium (Sr)-Total	mg/L	-	-	-	-	-	0.0517	0.184	0.118	-	-	0.0612	1.00	0.240	0.0857	0.784	0.0259	0.399	0.144	0.0874	0.342
Thallium (Tl)-Total	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	-	-	0.000013	0.000371	0.000141	0.000090	0.000341	0.000016	0.000180	0.000080	0.000061	0.000157
Tin (Sn)-Total	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	-	-	<0.0001	0.000530	0.000202	0.000165	0.000460	0.000050	0.000510	0.000191	0.000140	0.000485
Titanium (Ti)-Total	mg/L	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.104000	0.054667	0.062000	0.097500	0.005000	0.084000	0.036909	0.040000	0.074500
Uranium (U)-Total	mg/L	-	-	-	-	-	0.000054	0.000081	0.000068	0.000068	0.000080	<0.0002	0.000598	0.000267	0.000166	0.000557	0.000020	0.000524	0.000151	0.000108	0.000389
Vanadium (V)-Total	mg/L	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.012600	0.006017	0.004650	0.012500	0.000500	0.007500	0.002845	0.001600	0.006450
Zinc (Zn)-Total	mg/L	0.0150	**0.4810**	**0.1488**	**0.0495**	**0.4167**	0.0016	**0.0500**	0.0247	0.0177	**0.0478**	0.0043	**0.0616**	**0.0425**	**0.0452**	**0.0613**	0.0079	**0.1270**	**0.0564**	**0.0444**	**0.1049**
Dissolved Metals																					
Aluminum (Al)-Dissolved	mg/L	-	-	-	-	-	0.0070	0.0180	0.0125	-	-	<0.003	0.0667	0.0238	0.0173	0.0569	0.0201	**1.010**	**0.1382**	0.0321	**0.585**
Antimony (Sb)-Dissolved	mg/L	-	-	-	-	-	<0.0001	0.00013	<0.0001	-	-	0.00015	0.00195	0.00050	0.00024	0.00153	0.00005	0.00045	0.00022	0.00014	0.00045
Arsenic (As)-Dissolved	mg/L	<0.0001	0.00050	0.00018	<0.0001	0.00044	<0.0001	0.00500	0.00122	0.00040	0.00410	<0.0001	0.00649	0.00125	0.00023	0.00496	0.00010	0.00348	0.00098	0.00037	0.00297
Barium (Ba)-Dissolved	mg/L	-	-	-	-	-	0.0281	0.0525	0.0403	-	-	0.0165	0.0350	0.0285	0.0298	0.0342	0.0170	0.0430	0.0289	0.0263	0.0420
Beryllium (Be)-Dissolved	mg/L	-	-	-	-	-	<0.0005	<0.0005	<0.0005	-	-	<0.0001	0.00050	0.00013	0.00005	0.00039	0.00005	0.00022	0.00007	0.00005	0.00014
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-	-	<0.0005	<0.0005	<0.0005	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)-Dissolved	mg/L	-	-	-	-	-	<0.01	<0.01	<0.01	-	-	<0.01	0.039	0.016	<0.01	0.039	0.005	0.562	0.091	0.010	0.385
Cadmium (Cd)-Dissolved	mg/L	0.00020	0.00520	0.00170	0.00070	0.00453	<0.00001	0.00060	0.00034	0.00040	0.00058	<0.00001	0.00037	0.00020	0.00021	0.00037	0.00005	0.00115	0.00032	0.00020	0.00088
Calcium (Ca)-Dissolved	mg/L	23.4	73.6	44.6	40.7	71.0	6.5	20.9	15.6	19.2	20.8	10.9	55.8	23.9	15.2	50.0	4.7	70.8	31.2	25.5	64.8
Chromium (Cr)-Dissolved	mg/L	-	-	-	-	-	<0.0002	<0.0005	<0.0002	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00005	0.00027	0.00008	0.00005	0.00019
Cobalt (Co)-Dissolved	mg/L	-	-	-	-	-	<0.0001	0.00146	0.00076	-	-	<0.0001	0.00211	0.00120	0.00128	0.00210	0.00032	0.00883	0.00257	0.00163	0.00652
Copper (Cu)-Dissolved	mg/L	0.00300	0.09000	0.02625	0.00600	0.07755	<0.0002	0.00700	0.00249	0.00200	0.00620	<0.0005	0.00130	<0.0005	<0.0005	<0.0005	0.00025	0.01100	0.00199	0.00050	0.00719
Iron (Fe)-Dissolved	mg/L	0.030	0.230	0.113	0.095	0.215	<0.030	0.090	0.033	<0.030	0.078	<0.030	0.090	<0.030	<0.030	0.071	0.015	0.110	0.045	0.031	0.108
Lead (Pb)-Dissolved	mg/L	<0.001	0.00400	0.00150	<0.001	0.00355	<0.00005	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00003	0.00013	0.00006	0.00003	0.00013
Lithium (Li)-Dissolved	mg/L	-	-	-	-	-	<0.005	<0.005	<0.005	-	-	0.0012	0.0152	0.0039	0.0017	0.0120	0.0003	0.0047	0.0024	0.0026	0.0043
Magnesium (Mg)-Dissolved	mg/L	0.360	2.74	1.43	1.31	2.53	0.300	1.10	0.788	0.933	1.09	0.518	4.30	1.41	0.715	3.60	0.212	3.73	1.67	1.260	3.49
Manganese (Mn)-Dissolved	mg/L	-	-	-	-	-	0.0042	0.2290	0.1166	-	-	0.0803	0.3700	0.2577	0.2740	0.3558	0.1090	0.8710	0.4865	0.4800	0.7835
Mercury (Hg)-Dissolved	mg/L	-	-	-	-	-	<0.00001	<0.0002	<0.0002	<0.0002	**0.000091**	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000005	0.000005	0.000005	0.000005	0.000005
Molybdenum (Mo)-Dissolved	mg/L	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.00005	0.001380	0.000581	0.000500	0.001204	<0.00005	0.001100	0.000338	0.000188	0.000950	0.000025	0.000241	0.000099	0.000071	0.000238
Nickel (Ni)-Dissolved	mg/L	-	-	-	-	-	<0.0005	0.00071	<0.0005	-	-	<0.0005	0.00160	0.00081	0.00075	0.00152	0.00025	0.00404	0.00165	0.00138	0.00319
Phosphorus (P)-Dissolved	mg/L	-	-	-	-	-	<0.30	<0.30	<0.30	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	0.150000	2.80	0.58	0.150000	1.93
Potassium (K)-Dissolved	mg/L	-	-	-	-	-	0.12	0.13	0.13	-	-	0.20	1.35	0.53	0.42	1.17	0.10	8.22	1.99	0.49	6.28
Selenium (Se)-Dissolved	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000050	0.000260	0.000118	0.000120	0.000250
Silicon (Si)-Dissolved	mg/L	-	-	-	-	-	0.43	0.67	0.55	-	-	0.70	3.53	1.45	0.95	3.11	0.27	2.07	1.25	1.38	2.00
Silver (Ag)-Dissolved	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.001	<0.001	<0.001	<0.001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000005	0.000026	0.000008	0.000005	0.000022
Sodium (Na)-Dissolved	mg/L	-	-	-	-	-	<2.0	<2.0	<2.0	-	-	<2.0	7.4	2.3	<2.0	6.1	1.0	29.5	8.9	2.2	26.9
Strontium (Sr)-Dissolved	mg/L	-	-	-	-	-	0.0490	0.1750	0.1120	-	-	0.0581	1.0600	0.2420	0.0744	0.8260	0.0234	0.3840	0.1433	0.1010	0.3375
Thallium (Tl)-Dissolved	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	-	-	<0.00001	0.000100	0.000028	0.000015	0.000081	0.000005	0.000057	0.000027	0.000027	0.000054
Tin (Sn)-Dissolved	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0005	<0.0005	<0.0001	<0.0005	0.000050	0.000210	0.000065	0.000050	0.000130
Titanium (Ti)-Dissolved	mg/L	-	-	-	-	-	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.005	0.005	0.005	0.005	0.005
Uranium (U)-Dissolved	mg/L	-	-	-	-	-	0.000015	0.000045	0.000030	-	-	<0.00001	0.000146	0.000052	0.000027	0.000135	0.000005	0.000236	0.000039	0.000019	0.000136
Vanadium (V)-Dissolved	mg/L	-	-	-	-	-	<0.001	<0.001	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.000500	0.000500	0.000500	0.000500	0.000500
Zinc (Zn)-Dissolved	mg/L	0.0170	0.5170	0.1605	0.0540	0.4485	<0.001	0.0600	0.0315	0.0280	0.0600	<0.003	0.0300	0.0107	0.0078	0.0264	0.0015	0.1020	0.0342	0.0229	0.0860

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Adit (Effluent)[2]																			
	Cohort[1]	1987-1990					1991-1998					1999					2000 & 2001, 2009 & 2010				
		N=17					N=24					N=4					N=10				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Selenium (Se)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001
Silicon (Si)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	3.1	1.7	1.3	3.1
Silver (Ag)-Total	mg/L	<0.0001	0.88000	0.10188	0.02900	0.45600	<0.0001	0.00110	0.00018	<0.0001	0.00075	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00014	<0.0001	<0.0001	0.00012
Sodium (Na)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2.0	9.9	4.3	<2.0	9.7
Strontium (Sr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0566	1.15	0.497	0.128	1.14
Thallium (Tl)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin (Sn)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium (Ti)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium (U)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000025	0.000227	0.000116	0.000082	0.000225
Vanadium (V)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)-Total	mg/L	<0.005	2.3100	0.5204	0.2400	1.8060	<0.005	0.2550	0.0531	0.0460	0.1095	0.0410	0.0460	0.0445	0.0455	0.0460	0.0015	0.0500	0.0229	0.0232	0.0464
Dissolved Metals																					
Aluminum (Al)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0058	0.0166	0.0109	0.0116	0.0157
Antimony (Sb)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00020	0.00121	0.00056	0.00028	0.00115
Arsenic (As)-Dissolved	mg/L	0.00300	0.09500	0.02724	0.02400	0.06140	0.00050	0.02700	0.00611	0.00260	0.02480	0.00220	0.00370	0.00273	0.00250	0.00354	0.00041	0.00270	0.00176	0.00207	0.00266
Barium (Ba)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0116	0.0344	0.0246	0.0320	0.0340
Beryllium (Be)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron (B)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	0.029	0.014	<0.01	0.028
Cadmium (Cd)-Dissolved	mg/L	-	-	-	-	-	<0.0002	0.00500	0.00057	0.00020	0.00180	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00001	0.00030	0.00011	0.00010	0.00030
Calcium (Ca)-Dissolved	mg/L	29.5	58.8	44.4	44.1	57.6	24.8	92.3	55.5	55.1	78.6	48.8	52.4	50.3	50.1	52.1	8.5	57.2	35.8	43.1	55.9
Chromium (Cr)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0005	<0.0005	<0.0001	<0.0005
Cobalt (Co)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	0.00016	<0.0001	<0.0001	0.00016
Copper (Cu)-Dissolved	mg/L	<0.001	0.01700	0.00388	0.00200	0.01540	<0.001	0.01800	0.00208	<0.001	0.01065	<0.001	<0.001	<0.001	<0.001	<0.001	0.00019	0.00050	0.00037	0.00040	0.00050
Iron (Fe)-Dissolved	mg/L	0.001	0.050	0.017	0.015	0.034	<0.030	0.120	0.022	0.015	0.050	<0.030	0.060	0.033	<0.030	0.057	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved	mg/L	<0.0005	0.09600	0.00825	0.00200	0.02880	<0.001	0.00800	0.00106	<0.001	0.00293	0.00050	0.00700	0.00213	0.00050	0.00603	<0.00005	0.00050	0.00029	0.00036	0.00050
Lithium (Li)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	0.0287	0.0120	<0.005	0.0277
Magnesium (Mg)-Dissolved	mg/L	3.16	6.07	4.51	4.34	5.85	3.21	7.39	5.38	5.39	6.93	4.54	5.11	4.83	4.83	5.09	0.305	5.27	3.20	4.10	5.04
Manganese (Mn)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0039	0.1500	0.0549	0.0154	0.1386
Mercury (Hg)-Dissolved	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.001	<0.005	<0.005	<0.005	-	-	-	-	-	<0.00001	<0.0002	<0.0002	<0.00001	<0.0002
Molybdenum (Mo)-Dissolved	mg/L	0.000500	0.020000	0.008294	0.007000	0.017600	0.000025	0.022000	0.002053	0.001000	0.003000	0.001000	0.001000	0.001000	0.001000	0.001000	0.000311	0.001320	0.000766	0.000750	0.001311
Nickel (Ni)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Phosphorus (P)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.08	1.72	0.73	0.19	1.69
Selenium (Se)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	0.000120	<0.0001	<0.0001	0.000116
Silicon (Si)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.55	3.14	1.59	0.73	3.10
Silver (Ag)-Dissolved	mg/L	<0.0001	0.270000	0.016056	<0.0001	0.054720	<0.001	0.001500	0.000142	<0.001	0.000378	<0.0001	<0.001	<0.001	<0.0001	<0.001	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2.0	10.2	4.3	<2.0	9.8
Strontium (Sr)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0540	1.1400	0.4892	0.1230	1.1260
Thallium (Tl)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin (Sn)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium (Ti)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium (U)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000018	0.000209	0.000096	0.000026	0.000208
Vanadium (V)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)-Dissolved	mg/L	<0.005	0.0690	0.0143	0.0050	0.0650	<0.005	0.2420	0.0541	0.0425	0.1688	<0.0001	0.0420	0.0298	0.0385	0.0416	<0.001	0.0710	0.0246	0.0199	0.0638

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Adit (Effluent)[2] *(cont'd)*										Lower Brucejack Creek 200 m Downstream of Adit									
	Cohort[1]	2011-2012					2013					1987-1990					1991-1998				
		N=20					N=10					N=12					N=20				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Selenium (Se)-Total	mg/L	<0.0001	0.0077	0.0006	0.0005	0.0006	0.0001	0.0025	0.0005	0.0002	0.0015	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Total	mg/L	3.0	74.0	7.2	3.7	9.5	3.4	11.9	5.9	4.4	11.9	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	mg/L	<0.00002	0.14400	0.00819	0.00052	0.02366	0.00006	0.00739	0.00090	0.00026	0.00372	<0.0001	**0.00025**	**0.00013**	<0.0001	**0.00025**	<0.00010	**0.00750**	**0.00047**	<0.00010	**0.00070**
Sodium (Na)-Total	mg/L	16.4	73.3	33.3	28.4	61.4	59.3	83.9	73.3	72.6	83.2	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Total	mg/L	1.01	2.27	1.21	1.18	1.41	1.10	1.31	1.22	1.22	1.30	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	mg/L	0.000014	0.003650	0.000243	0.000100	0.000364	0.000061	0.000335	0.000136	0.000117	0.000256	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	mg/L	0.000050	0.000640	0.000178	0.000250	0.000250	0.000050	0.000420	0.000112	0.000050	0.000321	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Total	mg/L	<0.01	0.271000	0.023400	<0.01	0.064000	0.005000	0.070000	0.024583	0.015000	0.069450	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	mg/L	0.000100	0.011700	0.000840	0.000340	0.001044	0.000478	0.001280	0.000921	0.000940	0.001269	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Total	mg/L	<0.001	0.068500	0.004096	<0.001	0.007640	0.000500	0.018700	0.004233	0.002000	0.014520	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	mg/L	0.0094	2.2400	0.1524	0.0499	0.3062	0.0059	0.0875	0.0191	0.0102	0.0580	0.00001	0.0160	0.0040	0.0025	0.0122	<0.0050	0.0250	0.0102	0.0070	0.0250
Dissolved Metals																					
Aluminum (Al)-Dissolved	mg/L	<0.005	0.251	0.0422	0.0134	0.207	0.0159	0.0543	0.0325	0.0281	0.0525	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Dissolved	mg/L	0.00087	0.01580	0.00265	0.00137	0.00663	0.00539	0.01680	0.01106	0.01010	0.01658	-	-	-	-	-	-	-	-	-	-
Arsenic (As)-Dissolved	mg/L	0.00018	0.10900	0.01461	0.00404	0.06544	0.00657	0.01840	0.01254	0.01210	0.01802	0.00040	0.00280	0.00152	0.00155	0.00242	<0.00010	0.00160	0.00084	0.00080	0.00150
Barium (Ba)-Dissolved	mg/L	0.0100	0.0396	0.0177	0.0186	0.0337	0.0169	0.0708	0.0408	0.0403	0.0618	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)-Dissolved	mg/L	<0.0001	<0.001	<0.001	<0.001	<0.001	0.00005	0.00005	0.00005	0.00005	0.00005	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)-Dissolved	mg/L	<0.0005	<0.2	<0.2	<0.2	<0.2	0.00025	0.00025	0.00025	0.00025	0.00025	-	-	-	-	-	-	-	-	-	-
Boron (B)-Dissolved	mg/L	0.033	0.154	0.062	0.050	0.110	0.091	0.122	0.108	0.108	0.121	0	0	-	-	-	-	-	-	-	-
Cadmium (Cd)-Dissolved	mg/L	<0.00001	0.00044	0.00013	0.00010	0.00035	0.00001	0.00003	0.00001	0.00001	0.00002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00020	0.00500	0.00044	<0.00020	0.00095
Calcium (Ca)-Dissolved	mg/L	37.6	63.9	52.2	52.7	61.0	29.0	41.9	35.6	35.2	41.0	6.4	8.6	7.5	7.5	8.5	5.8	16.6	9.1	8.9	10.5
Chromium (Cr)-Dissolved	mg/L	<0.0001	0.00050	0.00030	<0.0001	0.00050	0.00005	0.00014	0.00006	0.00005	0.00009	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)-Dissolved	mg/L	<0.0003	0.00296	0.00058	0.00039	0.00212	0.00005	0.00040	0.00019	0.00016	0.00036	-	-	-	-	-	-	-	-	-	-
Copper (Cu)-Dissolved	mg/L	<0.0005	0.00570	0.00096	<0.0005	0.00472	0.00025	0.00083	0.00041	0.00025	0.00080	0.00200	0.00250	0.00078	0.00050	0.00228	<0.0010	0.00400	0.00150	<0.0010	0.00300
Iron (Fe)-Dissolved	mg/L	<0.030	3.260	0.334	<0.030	2.544	0.015	0.015	0.015	0.015	0.015	<0.030	<0.050	<0.050	<0.03	<0.030	0.010	0.110	0.042	0.040	0.090
Lead (Pb)-Dissolved	mg/L	<0.00005	0.02780	0.00266	0.00025	0.01936	0.00003	0.00010	0.00005	0.00004	0.00010	<0.00050	0.00300	0.00094	0.00050	0.00273	0.00050	0.00400	0.00093	0.00050	0.00250
Lithium (Li)-Dissolved	mg/L	0.0456	0.219	0.106	0.0964	0.213	0.210	0.267	0.240	0.242	0.265	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)-Dissolved	mg/L	3.68	5.23	4.64	4.81	5.21	3.91	4.78	4.37	4.42	4.75	0.280	0.500	0.425	0.460	0.500	<0.0010	1.10	0.378	0.320	0.900
Manganese (Mn)-Dissolved	mg/L	0.1420	0.5580	0.2544	0.2060	0.4818	0.1040	0.2170	0.1401	0.1185	0.2099	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)-Dissolved	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000005	0.000005	0.000005	0.000005	0.000005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.010	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)-Dissolved	mg/L	0.001540	0.008220	0.002317	0.002060	0.003200	0.003010	0.009120	0.005170	0.004985	0.008273	<0.00050	0.002500	0.001136	0.000500	0.002500	<0.0010	0.018000	0.002024	<0.0010	0.015000
Nickel (Ni)-Dissolved	mg/L	<0.0005	0.00171	0.00054	<0.0005	0.00128	0.00025	0.00135	0.00085	0.00078	0.00128	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Dissolved	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	0.150000	0.150000	0.150000	0.150000	0.150000	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Dissolved	mg/L	1.75	7.54	2.04	2.00	3.45	3.55	6.34	5.29	5.77	6.27	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Dissolved	mg/L	<0.0001	0.000500	0.000302	0.000500	0.000500	0.000050	0.000410	0.000198	0.000180	0.000394	-	-	-	-	-	-	-	-	-	-
Silicon (Si)-Dissolved	mg/L	2.64	3.42	3.06	3.03	3.36	2.95	3.26	3.06	3.03	3.24	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	mg/L	<0.00001	0.000143	0.000015	<0.00001	0.000030	0.000005	0.000005	0.000005	0.000005	0.000005	0.000000	0.000050	0.000038	0.000050	0.000050	<0.00010	0.007500	0.000476	<0.00010	0.000900
Sodium (Na)-Dissolved	mg/L	16.0	72.9	32.7	28.5	61.7	59.6	84.1	73.6	74.2	83.1	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)-Dissolved	mg/L	0.9460	1.4000	1.1450	1.1400	1.3420	1.0400	1.3000	1.2008	1.2250	1.2890	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Dissolved	mg/L	0.000011	0.000251	0.000080	0.000100	0.000100	0.000037	0.000161	0.000073	0.000049	0.000154	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Dissolved	mg/L	0.000050	0.000250	0.000156	0.000250	0.000250	0.000050	0.000050	0.000050	0.000050	0.000050	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)-Dissolved	mg/L	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Dissolved	mg/L	0.000100	0.003520	0.000447	0.000270	0.000759	0.000433	0.001210	0.000810	0.000776	0.001188	-	-	-	-	-	-	-	-	-	-
Vanadium (V)-Dissolved	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.000500	0.000500	0.000500	0.000500	0.000500	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	mg/L	<0.003	0.0732	0.0210	0.0161	0.0536	0.0015	0.0052	0.0020	0.0015	0.0044	<0.0050	0.0140	<0.0050	<0.0050	0.0088	<0.0050	0.0250	0.0084	0.0060	0.0160

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (continued)

Project Area		Mine Site Area *(cont'd)*																			
Site		Lower Brucejack Creek 200 m Downstream of Adit *(cont'd)*																			
	Cohort[1]	1999					2000 & 2001, 2009 & 2010*					2011-2012					2013				
		N=8					N=3*					N=10					N=17				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Selenium (Se)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	0.0005	0.0001	0.0001	0.0003	0.0001	0.0002	0.0001	0.0001	0.0002
Silicon (Si)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	0.8	18.1	3.7	2.0	12.5	0.7	4.4	1.7	1.4	3.7
Silver (Ag)-Total	mg/L	0.00005	**0.00050**	**0.00039**	**0.00050**	**0.00050**	0.00005	0.00005	0.00005	-	-	<0.000010	**0.00974**	**0.00121**	**0.00011**	**0.00588**	0.00002	0.00049	0.00014	0.00005	0.00040
Sodium (Na)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<2.0	18.4	3.3	<2.0	11.9	1.0	13.5	5.1	2.7	13.4
Strontium (Sr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	0.0544	0.455	0.118	0.0688	0.315	0.0490	0.268	0.129	0.0995	0.263
Thallium (Tl)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.000010	0.000596	0.000088	0.000021	0.000392	0.000011	0.000083	0.000030	0.000026	0.000063
Tin (Sn)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	0.000150	<0.00010	<0.00010	0.000128	0.000050	0.000050	0.000050	0.000050	0.000050
Titanium (Ti)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.010	0.135000	0.031000	0.022000	0.093600	0.005000	0.040000	0.012235	0.005000	0.032000
Uranium (U)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	0.000027	0.001140	0.000188	0.000066	0.000758	0.000030	0.000186	0.000091	0.000097	0.000139
Vanadium (V)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0010	0.010500	0.002180	0.001050	0.007485	0.000500	0.004000	0.001147	0.000500	0.003120
Zinc (Zn)-Total	mg/L	0.0100	**0.0700**	**0.0355**	0.0325	**0.0627**	0.0160	0.0250	0.0190	-	-	0.0032	**0.1440**	0.0230	0.0099	**0.0882**	0.0015	0.0192	0.0066	0.0037	0.0139
Dissolved Metals																					
Aluminum (Al)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	0.0095	**0.107**	0.0276	0.0177	0.0750	0.0031	0.0760	0.0192	0.0145	0.0498
Antimony (Sb)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	0.00018	0.00247	0.00053	0.00022	0.00170	0.00017	0.00219	0.00090	0.00057	0.00216
Arsenic (As)-Dissolved	mg/L	0.00030	0.00070	0.00046	0.00040	0.00066	0.00050	0.00140	0.00097	-	-	0.00017	0.00705	0.00117	0.00040	0.00442	0.00028	0.00358	0.00122	0.00072	0.00352
Barium (Ba)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	0.0293	0.0354	0.0315	0.0307	0.0353	0.0276	0.0438	0.0342	0.0335	0.0400
Beryllium (Be)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.010	0.040	<0.010	<0.010	0.024	<0.010	0.024	0.009	0.005	0.023
Cadmium (Cd)-Dissolved	mg/L	<0.00020	0.00050	0.00028	0.00020	0.00050	0.00020	0.00020	0.00020	-	-	<0.000010	0.00006	0.00003	0.00003	0.00005	<0.000010	0.00007	0.00002	0.00001	0.00005
Calcium (Ca)-Dissolved	mg/L	10.4	14.7	12.1	11.9	14.2	10.8	13.0	12.0	-	-	8.4	20.3	11.1	10.7	16.5	7.3	14.7	11.2	11.1	14.5
Chromium (Cr)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	0.00011	0.00006	0.00005	0.00008
Cobalt (Co)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	0.00029	0.00014	0.00015	0.00025	0.00005	0.00028	0.00011	0.00005	0.00027
Copper (Cu)-Dissolved	mg/L	<0.0020	0.01000	0.00425	0.00400	0.00825	0.00050	0.00300	0.00133	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00025	0.00025	0.00025	0.00025	0.00025
Iron (Fe)-Dissolved	mg/L	0.010	0.320	0.125	0.120	0.268	0.015	0.050	0.035	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	0.015	0.048	0.017	0.015	0.022
Lead (Pb)-Dissolved	mg/L	<0.0010	0.00100	<0.0010	<0.0010	<0.0010	0.00050	0.00050	0.00050	-	-	<0.00005	0.00018	<0.00005	<0.00005	0.00013	0.00003	0.00011	0.00003	0.00003	0.00004
Lithium (Li)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00050	0.0524	0.0077	0.0011	0.0334	0.0003	0.0405	0.0138	0.0060	0.0391
Magnesium (Mg)-Dissolved	mg/L	0.410	0.530	0.458	0.450	0.516	0.420	0.600	0.530	-	-	0.291	1.21	0.471	0.361	0.941	0.255	1.11	0.564	0.486	1.070
Manganese (Mn)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	0.0163	0.1500	0.0484	0.0436	0.1048	0.0056	0.0739	0.0356	0.0269	0.0712
Mercury (Hg)-Dissolved	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000100	0.000100	0.000100	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	0.000005	0.000005	0.000005	0.000005
Molybdenum (Mo)-Dissolved	mg/L	<0.0010	0.002000	<0.0010	<0.0010	0.001700	0.000500	0.000500	0.000500	-	-	0.000238	0.001410	0.000448	0.000299	0.001057	0.000221	0.001010	0.000538	0.000439	0.000910
Nickel (Ni)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00025	0.00025	0.00025	0.00025	0.00025
Phosphorus (P)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	0.150000	0.150000	0.150000	0.150000	0.150000
Potassium (K)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	0.09	1.38	0.28	0.11	0.93	0.09	0.99	0.40	0.32	0.95
Selenium (Se)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	0.000150	<0.00010	<0.00010	<0.00010	0.000050	0.000120	0.000081	0.000075	0.000120
Silicon (Si)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	0.53	1.30	0.73	0.66	1.08	0.48	1.01	0.73	0.77	1.01
Silver (Ag)-Dissolved	mg/L	<0.00010	0.000100	<0.00010	<0.00010	<0.00010	0.000050	0.000050	0.000050	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	0.000011	0.000005	0.000005	0.000006
Sodium (Na)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<2.0	17.6	3.1	<2.0	11.4	1.0	13.2	4.9	2.7	13.0
Strontium (Sr)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	0.0528	0.3840	0.1077	0.0661	0.2738	0.0472	0.2580	0.1264	0.0942	0.2532
Thallium (Tl)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.000010	0.000064	0.000012	<0.000010	0.000042	0.000005	0.000023	0.000010	0.000005	0.000022
Tin (Sn)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	0.000050	0.000050	0.000050	0.000050
Titanium (Ti)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.005	0.005	0.005	0.005	0.005
Uranium (U)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.000010	0.000409	0.000069	0.000019	0.000279	0.000011	0.000175	0.000060	0.000043	0.000121
Vanadium (V)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.000500	0.000500	0.000500	0.000500	0.000500
Zinc (Zn)-Dissolved	mg/L	0.0220	0.0700	0.0396	0.0360	0.0630	0.0190	0.0290	0.0243	-	-	<0.0030	0.0054	<0.0030	<0.0030	0.0050	0.0015	0.0015	0.0015	0.0015	0.0015

(continued)

Table 2-2. Water Quality of Brucejack Creek, Camp Creek, and the Existing Adit (Mine Site Area), Brucejack Gold Mine Project, 1987 to 2013 (completed)

		Mine Site Area *(cont'd)*									
Site		Lower Brucejack Creek, 2km downstream of Adit (BJ 2)**									
	Cohort[1]	2011-2012					2013				
		N=20					N=10				
	Units	Min	Max	Mean	Median	95th P	Min	Max	Mean	Median	95th P
Selenium (Se)-Total	mg/L	<0.00010	0.000310	0.000118	<0.00010	0.000286	0.000050	0.000590	0.000156	0.000120	0.000326
Silicon (Si)-Total	mg/L	0.8	29.7	3.7	1.1	13.7	0.9	14.9	2.5	1.2	6.4
Silver (Ag)-Total	mg/L	0.00001	**0.00444**	**0.00056**	**0.00011**	**0.00230**	0.00001	**0.00202**	**0.00031**	0.00006	**0.00115**
Sodium (Na)-Total	mg/L	<2.0	14.7	2.3	<2.0	7.7	1.0	13.7	4.6	2.5	12.6
Strontium (Sr)-Total	mg/L	0.0492	0.348	0.0879	0.0583	0.200	0.0563	0.265	0.126	0.0869	0.258
Thallium (Tl)-Total	mg/L	<0.000010	0.000506	0.000067	0.000024	0.000252	0.000005	0.000169	0.000043	0.000024	0.000115
Tin (Sn)-Total	mg/L	<0.00010	0.000140	<0.00010	<0.00010	<0.00010	0.000050	0.000180	0.000058	0.000050	0.000076
Titanium (Ti)-Total	mg/L	<0.010	0.252000	0.029769	<0.010	0.121800	0.005000	0.162000	0.022471	0.005000	0.062800
Uranium (U)-Total	mg/L	0.000031	0.000628	0.000102	0.000048	0.000326	0.000053	0.000240	0.000112	0.000105	0.000233
Vanadium (V)-Total	mg/L	<0.0010	0.012100	0.001900	<0.0010	0.006700	0.000500	0.007200	0.001718	0.000500	0.005600
Zinc (Zn)-Total	mg/L	0.0030	**0.0639**	0.0140	0.0093	**0.0358**	0.0015	**0.0453**	0.0119	0.0068	0.030260
Dissolved Metals											
Aluminum (Al)-Dissolved	mg/L	0.0071	**0.261**	0.0531	0.0402	**0.142**	0.0037	**0.379**	0.0377	0.0182	**0.106**
Antimony (Sb)-Dissolved	mg/L	0.00016	0.00187	0.00037	0.00023	0.00100	0.00021	0.00265	0.00082	0.00059	0.00224
Arsenic (As)-Dissolved	mg/L	0.00028	0.00484	0.00105	0.00056	0.00353	0.00031	0.00307	0.00114	0.00107	0.00233
Barium (Ba)-Dissolved	mg/L	0.0249	0.0371	0.0309	0.0306	0.0358	0.0274	0.0487	0.0347	0.0337	0.0432
Beryllium (Be)-Dissolved	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	0.00005	0.00005	0.00005	0.00005
Bismuth (Bi)-Dissolved	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)-Dissolved	mg/L	<0.010	0.032	<0.010	<0.010	0.017	0.005	0.024	0.010	0.005	0.022
Cadmium (Cd)-Dissolved	mg/L	<0.000010	0.00017	0.00007	0.00005	0.00015	0.00001	0.00030	0.00006	0.00003	0.00018
Calcium (Ca)-Dissolved	mg/L	7.8	19.8	10.5	9.6	15.8	7.3	15.1	11.1	11.7	15.0
Chromium (Cr)-Dissolved	mg/L	<0.00010	0.00018	<0.00010	<0.00010	0.00015	0.00005	0.00017	0.00006	0.00005	0.00012
Cobalt (Co)-Dissolved	mg/L	<0.00010	0.00045	0.00023	0.00022	0.00045	0.00005	0.00085	0.00020	0.00016	0.00054
Copper (Cu)-Dissolved	mg/L	<0.00050	0.00087	<0.00050	<0.00050	0.00086	0.00025	0.00072	0.00029	0.00025	0.00055
Iron (Fe)-Dissolved	mg/L	<0.030	**0.555**	0.070	<0.030	0.325	0.015	0.319	0.033	0.015	0.076
Lead (Pb)-Dissolved	mg/L	<0.000050	0.00117	0.00020	<0.00005	0.00101	0.00003	0.00138	0.00010	0.00003	0.00030
Lithium (Li)-Dissolved	mg/L	<0.00050	0.0419	0.0052	0.0010	0.0233	0.0018	0.0382	0.0130	0.0061	0.0366
Magnesium (Mg)-Dissolved	mg/L	0.280	1.10	0.448	0.394	0.797	0.314	1.13	0.577	0.490	1.09
Manganese (Mn)-Dissolved	mg/L	0.0164	0.1450	0.0643	0.0607	0.1342	0.0120	0.1480	0.0545	0.0553	0.1376
Mercury (Hg)-Dissolved	mg/L	<0.00001	0.000010	<0.00001	<0.00001	<0.00001	0.000005	0.000005	0.000005	0.000005	0.000005
Molybdenum (Mo)-Dissolved	mg/L	0.000226	0.001030	0.000389	0.000293	0.000833	0.000230	0.000899	0.000491	0.000452	0.000891
Nickel (Ni)-Dissolved	mg/L	<0.00050	0.00055	<0.00050	<0.00050	0.00053	0.00025	0.00076	0.00028	0.00025	0.00035
Phosphorus (P)-Dissolved	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	0.150000	0.150000	0.150000	0.150000	0.150000
Potassium (K)-Dissolved	mg/L	0.10	1.07	0.25	0.15	0.71	0.12	1.12	0.41	0.34	1.01
Selenium (Se)-Dissolved	mg/L	<0.00010	0.000110	<0.00010	<0.00010	0.000105	0.000050	0.000120	0.000077	0.000050	0.000120
Silicon (Si)-Dissolved	mg/L	0.38	1.24	0.75	0.68	1.21	0.45	1.51	0.78	0.75	1.11
Silver (Ag)-Dissolved	mg/L	<0.000010	0.000109	0.000014	<0.000010	0.000052	0.000005	0.000059	0.000008	0.000005	0.000016
Sodium (Na)-Dissolved	mg/L	<2.0	15.1	2.4	<2.0	8.4	1.0	12.7	4.5	2.4	12.1
Strontium (Sr)-Dissolved	mg/L	0.0449	0.3300	0.0846	0.0583	0.1926	0.0514	0.2590	0.1217	0.0867	0.2518
Thallium (Tl)-Dissolved	mg/L	<0.000010	0.000050	0.000010	<0.000010	0.000031	0.000005	0.000032	0.000009	0.000005	0.000024
Tin (Sn)-Dissolved	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	0.00005	0.00005	0.00005	0.00005
Titanium (Ti)-Dissolved	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.005	0.005	0.005	0.005	0.005
Uranium (U)-Dissolved	mg/L	<0.000010	0.000247	0.000039	0.000021	0.000130	0.000005	0.000213	0.000055	0.000036	0.000133
Vanadium (V)-Dissolved	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	0.0005	0.0005	0.0005	0.0005
Zinc (Zn)-Dissolved	mg/L	<0.0030	0.0111	0.0037	<0.0030	0.0088	0.0015	0.0073	0.0023	0.0015	0.0060

Notes:

- Parameter not reported

Grey highlighted values exceed BC chronic water quality guidelines for the protection of aquatic life; bolded font values exceed BC acute (maximum) water quality guidelines.

Italicized font indicates exceedance of CCME guidelines for the protection of aquatic life, applied in the absence of an applicable BC guideline.

[1] *Water quality results are presented for six discrete cohorts based on sampling year; each cohort is demarcated by either a significant site activity and observable water quality effect relative to years of little to no site activity (see text).*

[2] *Monitoring location represents effluent discharge from exsiting adit and as such provincial and federal guidelines for the protection of aquatic life as well as drinking water guidelines do not apply; site was used to inform downstream water quality and constrain impacts of historical mining activities (see text).*

** Cohort constitutes historical data (Price 2005) and data from current (2008-2013) sampling campaign; some parameters were not available in the historical dataset. In such cases, N≤ 3, and median and 95th P statistics were not calculated.*

*** Sampling campaign intiated 2011-June; no historical water quality data exists for this site.*

2.1.2 Upper Brucejack Creek

Both the historical (1987 to 2001) and current (2009 to 2013) upper Brucejack Creek monitoring locations are adjacent to the outlet of Brucejack Lake, upstream of the historical waste rock pad site and discharges from the adit (Table 2-2). Upper Brucejack Creek (BJ U/S) remained uninfluenced by site activities within the Project area over the 1987-2001 period, as documented in the MEND Report 9.1c (Price 2005); no data were excluded from this site. Observable water quality of Brucejack Lake was only affected following periods of waste rock deposition (see Table 2.2-1 in Section 2.2). As in Brucejack Lake, water quality parameters in upper Brucejack Creek are largely uninfluenced by activities within the Project area and exhibit generally consistent physicochemistry as well as concentrations of nutrients, anions, total metals and dissolved metals, regardless of sampling period (Table 2-2). Further, despite the natural mineralization of the watershed (Price 2005) and historical/current activities upstream at Brucejack Lake and the Goldwedge property, total and dissolved concentrations of most metals remained below the detection limits and/or guidelines across all cohorts (Table 2-2). The exceptions were element-specific and largely restricted to:

- **Copper:** exceedances in all but the 2000-2010 cohort, with the highest concentrations associated with historical mining activities and excavation of the adit (1987-1990: < 0.0010 to 0.0700 mg/L).
- **Silver**: exceedances in all but the 2000-2010 cohort, with the highest concentrations observed within the 1990-1998 period (< 0.0010 to 0.00750 mg/L); the highest observable median concentration was associated with historic waste rock deposition (1999: 0.00030 mg/L).
- **Zinc:** persistent exceedances of maximum observed concentrations (maximum: 0.0100 to 0.0250 mg/L) across all periods but the 2013 cohort.

These are largely associated with high flow periods (e.g., freshet) and likely reflective of the natural mineralization of the catchment (Rescan 2014). Although increases of TSS, alkalinity, conductivity, sulphate, chloride and total cadmium, copper, lead, and zinc levels were associated with historical (July to August of 1999) and recent (December of 2012) waste rock deposition upstream at Brucejack Lake, corresponding increases were not observed within upper Brucejack Creek (Table 2-1). However, recent increases at BJ U/S (2011-2012, 2013) have been observed for TSS, nitrate, ammonia, phosphate, as well as total concentrations of aluminum and cadmium, corresponding to current exploration and bulk sampling activities including waste rock deposition into Brucejack Lake. These data points were subsequently excluded from baseline characterization. No guideline exceedances were observed for median concentrations for these parameters from 2011-2013 (with the exception of total aluminum in 2013).

2.1.3 Camp Creek

Camp Creek flows through the exploration camp area into Brucejack Creek, upstream of the adit, and downstream of upper Brucejack Creek. Current (2009 to 2013) and historical (1989 to 2001) monitoring data presented here represent sites located upstream of the historical waste rock pad site. It should be noted that a number of water quality parameters were not available in the historical data for this site and that all baseline data available is restricted to the months of May to September (Table 2-2).

During periods of site inactivity, waters of Camp Creek were of circumneutral pH (median: 6.15 to 6.20), soft (median: 35.5 to 51.9 mg/L), with low suspended solids (median: < 3.0 to 7.5), alkalinity (median: 2.5 to 4.0 mg/L) and moderate sulphate concentrations (median: 30.0 to 35.0 mg/L). However, trace metal concentrations in Camp Creek were elevated compared to upper Brucejack Creek and Brucejack Lake; median concentrations higher than guidelines during periods of low site presence were observed for: cadmium, copper, zinc, and aluminum (total; Table 2-2). Further, although mean and median pH during cohorts spanning inactive years remained circumneutral, pH was highly variable and at times slightly acidic (pH = 4.40 to 7.76). Moderate sulphate, variable pH and elevated metal concentrations observed in Camp Creek from 1991-1998 and 2000-2010 were the result of a natural occurring source loading upstream of the historical waste rock pad location (Price 2005).

During cohorts spanning periods of site activity (1987-1990, 1999, 2011-2012, 2013), increases were observed for a number of water quality parameters including: TSS, TDS, alkalinity, total phosphorus, ammonia, nitrate, aluminum (total and dissolved), arsenic, cobalt, chromium, iron, lead, manganese, silicon, thallium, vanadium, and silver concentrations (Table 2-2). However, the majority of these increased concentrations were restricted to 2011-2012 coinciding with site exploration activities and subsequently concentrations decreased in 2013.

2.1.4 Adit

This sampling location represents effluent discharge from the underground workings; loadings from the existing adit occur downstream of the confluence for Brucejack Creek and Camp Creek, and upstream of lower Brucejack Creek. Effluent discharges from the adit across sampling years are used to inform inputs to the downstream receiving environment only and are excluded from baseline definition of the Brucejack watershed within the Cumulative Surface Water Quality Baseline Report (Rescan 2014).

During cohorts spanning years of inactivity (i.e., passively discharging 1991-2010) alkalinity, conductivity, hardness as well as concentrations of total and dissolved metals, nutrients and anions substantially decreased at the adit (Table 2-2). However, persistent guideline exceedances of median values were observed for total aluminum, arsenic, and cadmium.

Across all cohorts of active pumping (1987-1989, 2011-2012, 2013), waters at the adit monitoring site were of slightly alkaline pH (median: 7.8 to 8.25) with high levels of TSS (maximum observed: 10,100 mg/L, December of 2012), alkalinity (median: 96.7 to 121 mg/L), sulphate (median: 120 to 146 mg/L), and nitrate (median: 0.090 to 1.36 mg/L; see Table 13.3-4). Guideline exceedances were observed for nitrite, nitrate, sulphate, total aluminum, antimony, arsenic, barium, beryllium, copper, chromium, cobalt, cadmium, iron, lead, lithium, manganese, mercury, selenium, silver, thallium, vanadium and zinc (Table 2-2). However a large subset of these were restricted to 2011-2012 as well as to maximum and 95th percentile concentrations within 2013 cohort; concentrations of all but nitrite, sulphate, total chromium, vanadium and aluminum decrease over the 2013 cohort.

2.1.5 Lower Brucejack Creek

There is slight ambiguity on the sampling location of the historically monitored "lower Brucejack Creek" with respect to current monitoring sites, BJ 200m D/S and BJ2. Site BJ2 is approximately 400 m downstream of BJ 200m D/S; inputs from VOK Creek and an unnamed tributary occur between these two sites (Rescan 2014). Statistical analyses (nonparametric Mann-Whitney, 2-sample t-test) were employed to compared median and mean values of water quality values, respectively, during high and low flow periods for these sites (p values >> 0.05, range: 0.418 to 0.687, Figure 2.1-1). Therefore, composite data (historical lower Brucejack Creek, BJ 200m D/S, BJ2) have been used to inform and describe background conditions for lower Brucejack Creek (Rescan 2014).

During cohorts spanning periods of no/low site activity, water quality of lower Brucejack Creek was similar to that of upper Brucejack Creek with minor relative increases observed for TSS, conductivity, sulphate, hardness, copper, manganese, zinc, and iron concentrations (Table 2-2). Similar to upper Brucejack Creek, guideline exceedances were observed for copper, cadmium, silver, and zinc; however, these largely constitute maximum and 95th percentile values (Table 2-2). No guideline exceedances were observed for median concentrations for any water quality parameter measured during cohorts of no/low site activity.

During cohorts spanning significant site activity (1987-1990, 1999, 2011-2012, 2013), increases relative to the upstream Brucejack Creek monitoring sites were observed for a number of water quality parameters, including: conductivity, hardness, TSS, TDS, turbidity, alkalinity, sulphate, phosphorus, ammonia, arsenic, aluminum, cadmium, chromium, copper, iron (total and dissolved), lead, silicon, silver, thallium and zinc; these data were subsequently removed from baseline characterization (Rescan 2014).

2.2 OUTLIER ANALYSES AND PRE-DISTURBANCE BASELINE APPROXIMATION

Water quality data from identified post-mining periods (collected from 1991 to 1998, as well as 2000/2001 and 2009/2010) were subsequently utilized as the reference case to statistically identify potentially affected water quality within the 2011-2013 database, and to exclude affected data from baseline definition. Subsequent selective data removal was site-specific and utilized modified Z-scores to statistically identify outliers for monitoring sites within the Brucejack watershed (Iglewicz and Hoaglin 1993). The modified Z-score applies the median computation technique to measure the deviation of the median, and in many cases provides more robust statistical detection of outliers (as opposed to the standard deviation of the mean). That is, although this approach assumes an approximately normal distribution of data (here, confirmed by normal probability plots), the variation of the average absolute deviation is less affected by extremes in the tails. Mathematically, the modified Z-score (Mi) is calculated as:

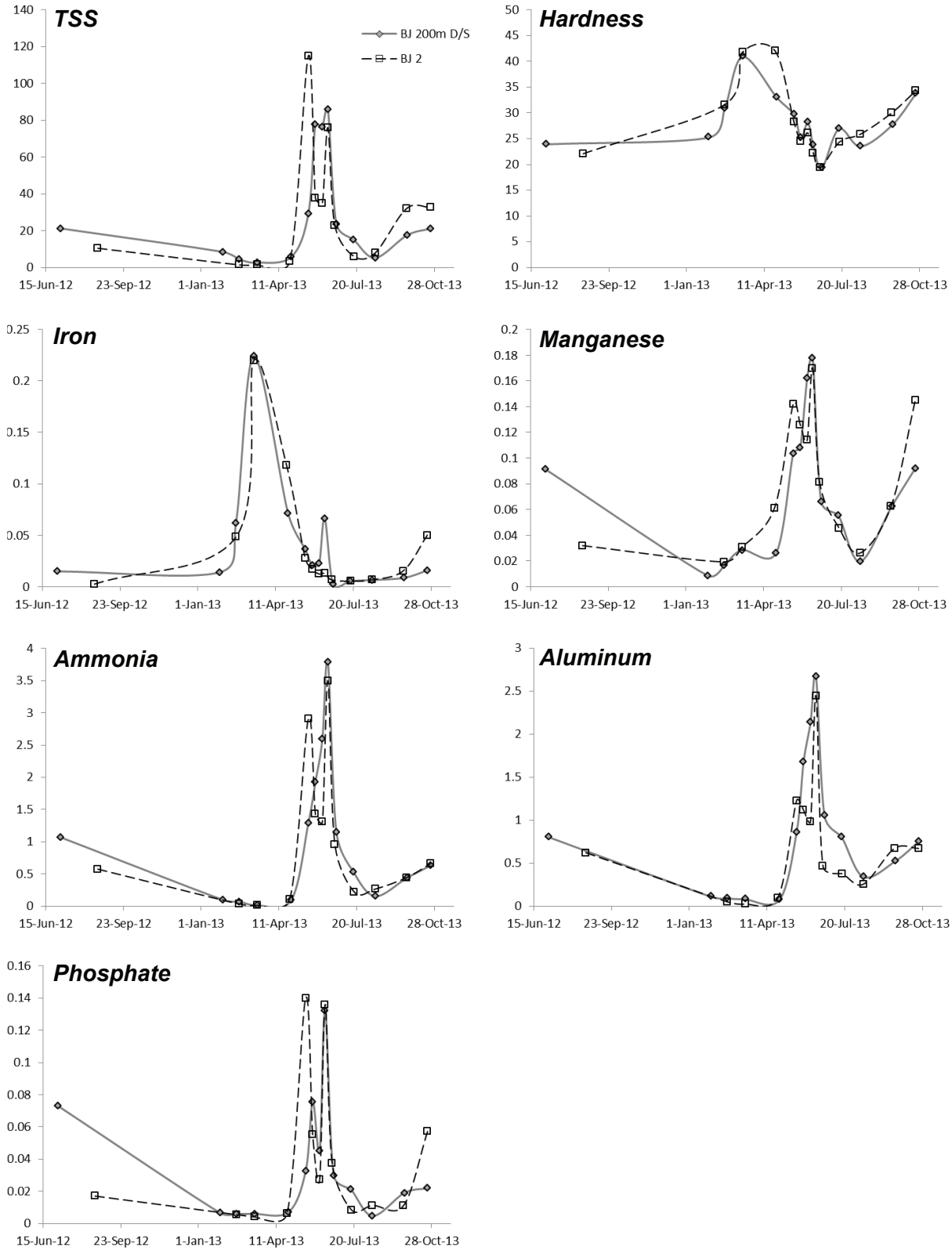
$$Mi = 0.6745 \times (Xi - Median(Xi)) / MAD$$

where MAD stands for Median Absolute Deviation, and Xi is the observation.

Iglewicz and Hoaglin (1993) also suggest that observations be classified as outliers when $|Mi| > 3.5$, through the simulation based on pseudonormal observations for sample sizes of 10, 20, and 40; this is a conservative estimate and was applied here.

Figure 2.1-1

Water Quality Results of Lower Brucejack Creek Monitoring Locations (BJ 200m D/S and BJ2)



Note: All units are in mg/L.

As the hydrological regime is an especially important determinant of surface water quality within the study area, the reference case dataset was subdivided into high and low flow periods prior to outlier identification (i.e., to identify season-specific outliers). However, during historical sampling campaigns, site access and weather conditions resulted in a greater sampling effort during high flow periods (June to October), in particular within lower Brucejack Creek (Figure 4A-1, Appendix 4). In this case, water quality of upper Brucejack Creek (BJ U/S) informed the reference case for lower Brucejack.

Identified outliers in the 2011-2013 database that coincided with a specific recordable or likely event were removed from the baseline dataset; individual samples/sampling points categorized "excluded" are presented below in Table 2.2-1. These data largely corresponded to effects from the underground dewatering trial (November 2011), active surface mineral exploration (initiated in mid-2012), and incidences of WTP bypass events from January to October 2013. Post outlier-analyses, nitrogen-species data (nitrate, nitrite, ammonia) remained slightly elevated in 2013 in lower Brucejack and Camp creeks. Masking of these outliers likely occurred due to the relatively larger proportion of impacted nutrient data versus nutrient data available within the reference/base case (i.e., data collected from 1991 to 1998, as well as 2000/2001 and 2009/2010), i.e., influenced the value of the test statistic enough so that 2013 points were not flagged as outliers. These (2013) data were also classified as uncharacteristic of baseline conditions (Table 2.2-1) and are not used to inform the approximation of pre-disturbance water quality conditions within the Brucejack watershed.

The final curated water quality baseline dataset is presented in Table 2.2-2. Removal of the affected data and subsequent creation of the curated baseline database yields a more conservative and realistic approximation of baseline conditions. The curated dataset is characterized by lower overall seasonal mean and median values for total and dissolved metals, as well as lower overall variability in the dataset (Table 2.2-2).

Table 2.2-1. List of Data Excluded from Water Quality Baseline Characterization for the Brucejack Watershed, Brucejack Gold Mine Project, 2011 to 2013

Site	Date Sampled	ALS Sample ID
BJ 200m D/S	29-Jun-12	L1171541-7
BJ 200m D/S	4-Jul-12	L1174986-4
BJ 200m D/S	21-Aug-12	L1199717-4
BJ 200m D/S	27-Nov-12	L1243651-4
BJ 200m D/S	13-Dec-12	L1250701-25
BJ 200m D/S	19-May-13	L1304309-15
BJ 200m D/S	19-May-13	L1304309-9
BJ 200m D/S	28-May-13	L1309095-3
BJ 200m D/S	6-Jun-13	L1313730-6
BJ 200m D/S	23-Sep-13	L1368502-1
BJ 200m D/S	23-Oct-13	L1384222-5
BJ 200m D/S	20-Nov-13	L1395276-9
BJ 350m D/S	29-Jun-12	**L1171618-4**
BJ 350m D/S	4-Jul-12	**L1174986-5**
BJ 350m D/S	21-Aug-12	**L1199717-5**
BJ 350m D/S	30-Oct-12	**L1232145-2**
BJ 350m D/S	22-Jun-13	L1321448-2
BJ 350m D/S	17-Jul-13	L1335330-3
BJ 350m D/S	13-Aug-13	L1348329-3
BJ 350m D/S	22-Sep-13	L1367845-5
BJ 350m D/S	23-Oct-13	L1384222-4
BJ Inter	9-Sep-12	L1207295-4
BJ OF	9-Sep-12	L1207295-6
BJ OF	29-Oct-12	L1232163-3
BJ OF	27-Nov-12	L1243651-3
BJ OF	13-Dec-12	L1250701-26
BJ OF	19-May-13	L1304309-10
BJ OF	28-May-13	L1309095-7
BJ OF	6-Jun-13	L1313730-7
BJ OF	13-Jun-13	L1317318-7
BJ OF	21-Sep-13	L1366991-13
BJ OF	21-Sep-13	L1366991-9
BJ OF	19-Nov-13	L1395276-6
BJ U/S	18-Nov-11	L1089230-4
BJ U/S	30-Dec-11	L1103237-4
BJ U/S	12-Jan-12	L1104748-4
BJ U/S	19-May-13	L1304309-14
BJ U/S	28-May-13	L1309095-1
BJ U/S	13-Jun-13	L1317318-9
BJ U/S	21-Sep-13	L1366991-11
BJ U/S	22-Oct-13	L1383767-8
BJ U/S	20-Nov-13	L1395276-13
BJ U/S	20-Nov-13	L1395276-15
BJ U/S of CC	23-Sep-13	L1368502-3
BJ U/S of CC	23-Oct-13	L1384222-10
BJ U/S of CC	23-Oct-13	L1384222-9

Site	Date Sampled	ALS Sample ID
BJ2	25-Jun-11	L1023529-1
BJ2	29-Jun-12	L1171541-6
BJ2	4-Jul-12	L1174986-6
BJ2	21-Aug-12	L1199717-6
BJ2	9-Sep-12	L1207295-5
BJ2	13-Dec-12	L1250701-24
BJ2	19-May-13	L1304309-6
BJ2	28-May-13	L1309095-4
BJ2	6-Jun-13	L1313730-5
BJ2	13-Jun-13	L1317318-5
BJ2	13-Jun-13	L1317318-6
BJ2	22-Sep-13	L1367845-4
BJ2	23-Oct-13	L1384222-3
BJ2	20-Nov-13	L1395276-8
BJ3	27-Nov-12	L1243651-6
BJ3	12-Dec-12	L1250701-17
BJ3	19-May-13	L1304309-5
BJ3	28-May-13	L1309095-5
BJ3	6-Jun-13	L1313730-4
BJ3	13-Jun-13	L1317318-4
BJ3	21-Sep-13	L1366991-5
BJ3	22-Oct-13	L1383767-1
BJ3	19-Nov-13	L1395276-4
Camp Creek	29-Jun-12	L1171618-2
Camp Creek	4-Jul-12	L1174986-2
Camp Creek	21-Aug-12	L1199717-1
Camp Creek	9-Sep-12	L1207295-2
Camp Creek	29-Oct-12	L1232163-1
Camp Creek	30-Jan-13	L1264309-11
Camp Creek	15-Mar-13	L1279839-20
Camp Creek	25-Apr-13	L1294452-10
Camp Creek	19-May-13	L1304309-13
Camp Creek	24-Jun-13	L1323906-2
Camp Creek	17-Jul-13	L1335330-7
Camp Creek	17-Jul-13	L1335330-9
Camp Creek	23-Sep-13	L1368502-2
Camp Creek	23-Oct-13	L1384222-8
Camp Creek	20-Nov-13	L1395276-12

Table 2.2-2. Baseline Water Quality of Mine Site Area and Downstream Receiving Environment Sampling Sites (Brucejack, Sulphurets and Unuk Watersheds), Brucejack Gold Mine Project

Project Area		Mine Site Area and Downstream Receiving Environment																			
Site		Brucejack Lake (BJ Lake) Open-water					Brucejack Lake (BJ Lake) Under-ice					Upper Brucejack Creek (BJ U/S)					Brucejack Creek, Upstream of Camp Creek (BJ U/S of CC)				
		N=22					N=8					N=72					N= 15				
	Units	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P
Physical Tests																					
Colour	CU	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Conductivity	µS/cm	44.0	149	49.1	58.7	121	5.1	56.0	50.1	45.3	55.1	32.0	84.0	51.4	51.1	62.1	41.0	77.0	52.0	52.6	65.5
Hardness (as $CaCO_3$)	mg/L	21.6	88.0	22.5	29.1	84.0	10.8	24.7	23.0	21.7	24.5	14.0	29.9	23.3	22.8	25.2	15.3	31.6	23.1	22.7	27.8
pH	pH	6.80	8.00	7.40	7.44	7.80	6.50	7.53	7.38	7.21	7.53	6.40	8.16	7.62	7.56	8.05	7.36	7.95	7.71	7.67	7.91
Total Suspended Solids	mg/L	0.500	15.6	1.50	4.17	14.9	0.500	3.00	1.50	1.75	3.00	0.500	14.0	1.50	3.26	9.92	1.50	8.90	1.50	2.99	8.90
Total Dissolved Solids	mg/L	21.0	123	30.0	39.3	94.0	5.00	40.0	28.0	26.6	37.9	8.0	66.0	33.0	34.0	49.0	26.0	46.0	30.0	31.8	41.1
Turbidity	NTU	0.260	2.45	0.630	0.851	2.0	0.180	0.320	0.260	0.258	0.318	0.220	11.8	0.605	2.0	9.6	0.500	14.9	0.800	3.15	9.62
Acidity	mg/L	2.30	5.20	3.60	3.37	4.60	1.40	1.70	1.50	1.52	1.66	0.50	5.10	2.05	2.31	4.18	1.40	4.00	2.00	2.11	3.23
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	14.4	14.9	14.7	14.7	14.9	2.90	15.7	15.1	12.8	15.7	12.3	18.4	15.7	15.6	17.9	6.50	15.9	15.0	14.0	15.8
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	0.500	1.00	0.500	0.722	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	0.500	1.00	0.500	0.722	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alkalinity, Total (as $CaCO_3$)	mg/L	12.0	34.0	14.9	16.9	27.4	2.90	20.0	15.7	15.0	19.7	11.9	21.0	16.0	16.1	20.5	6.5	15.9	15.0	14.0	15.8
Anions and Nutrients																					
Ammonia, Total (as N)	mg/L	0.0025	0.0055	0.0025	0.0031	0.0055	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0099	0.0025	0.0029	0.0046	0.0025	0.0571	0.0025	0.0080	0.0381
Bromide (Br)	mg/L	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
Chloride (Cl)	mg/L	0.250	1.00	0.250	0.39	1.00	0.250	1.00	0.250	0.344	0.738	0.150	15.00	0.250	0.610	1.00	0.250	0.250	0.250	0.250	0.250
Fluoride (F)	mg/L	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0230	0.0100	0.0104	0.0100	0.0100	0.0260	0.0100	0.0111	0.0148
Nitrate (as N)	mg/L	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0198	0.0065	0.0079	0.0174	0.0025	0.0334	0.0025	0.0055	0.0163	0.0025	0.0720	0.0061	0.0152	0.0460
Nitrite (as N)	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0012	0.0005	0.0005	0.0005	0.0005	0.0018	0.0005	0.0006	0.0012
Total Kjeldahl Nitrogen	mg/L	0.0250	0.0500	0.0250	0.0278	0.0400	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.025	0.0250	0.0250	0.0250	0.0250	0.0840	0.0250	0.0289	0.0427
Total Nitrogen	mg/L	0.0250	0.0500	0.0250	0.0278	0.0400	0.0250	0.0250	0.0250	0.0250	0.0250	0.0013	0.025	0.0250	0.0170	0.0250	0.0130	0.0600	0.0250	0.0284	0.0565
Orthophosphate-Dissolved (as P)	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0011	0.0005	0.0005	0.0007
Phosphorus (P)-Total	mg/L	0.0010	0.0029	0.0010	0.0012	0.0021	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0171	0.0010	0.0033	0.0142	0.0010	0.0205	0.0010	0.0037	0.0119
Sulphate (SO_4)	mg/L	4.00	33.0	8.11	9.65	23.0	0.68	10.2	8.83	7.10	10.1	2.00	11.6	8.69	7.83	11.0	7.76	17.7	9.38	9.93	13.3
Cyanides																					
Cyanide, Total [1]	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0025	0.0005	0.0012	0.0025	0.0005	0.0005	0.0005	0.0005	0.0005
Cyanide, WAD	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0025	0.0005	0.0012	0.0025	0.0005	0.0005	0.0005	0.0005	0.0005
Organic Carbon																					
Total Organic Carbon	mg/L	0.250	2.06	1.81	1.18	2.02	0.250	0.250	0.250	0.250	0.250	0.250	0.770	0.250	0.288	0.520	0.250	0.640	0.250	0.342	0.619
Total Metals																					
Aluminum (Al)	mg/L	0.0164	0.0949	0.0279	0.0372	0.0800	0.004	0.0105	0.006	0.007	0.010	0.007	*0.426*	0.0190	0.0655	*0.296*	0.0222	*0.887*	0.0400	*0.172*	*0.599*
Antimony (Sb)	mg/L	0.00023	0.00030	0.00025	0.00025	0.00029	0.00005	0.00028	0.00025	0.00022	0.00028	0.00019	0.00037	0.00025	0.00024	0.00031	0.00016	0.00044	0.00023	0.00025	0.00043
Arsenic (As)	mg/L	0.0005	0.0024	0.0010	0.0011	0.0023	0.0002	0.0020	0.0006	0.0009	0.0019	0.0005	**0.0150**	0.0013	0.0015	0.0025	0.0005	0.0041	0.0007	0.0010	0.0022
Barium (Ba)	mg/L	0.0325	0.0363	0.0347	0.0344	0.0359	0.0177	0.0339	0.0326	0.0301	0.0339	0.0315	0.0430	0.0345	0.0355	0.0411	0.0295	0.0452	0.0348	0.0357	0.0441
Beryllium (Be)	mg/L	0.00005	0.00025	0.00025	0.00017	0.00025	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00050	0.00005	0.00021	0.00050	0.00005	0.00005	0.00005	0.00005	0.00005
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.10000	0.00025	0.03350	0.10000	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.050	0.005	0.020	0.050	0.005	0.005	0.005	0.005	0.005
Cadmium (Cd)	mg/L	0.000005	0.000100	0.000005	0.000032	0.000100	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.001000	0.000009	0.000078	0.000320	0.000005	0.000094	0.000005	0.000013	0.000042
Calcium (Ca)	mg/L	8.0	35.3	9.0	12.7	34.5	2.7	9.3	8.6	7.6	9.2	4.8	13.5	8.7	8.7	9.8	5.8	12.0	8.7	8.7	10.9
Chromium (Cr)	mg/L	0.00010	0.00025	0.00012	0.00013	0.00021	0.00005	0.00011	0.00005	0.00006	0.00010	0.00005	0.00050	0.00015	0.00024	0.00050	0.00005	0.00060	0.00005	0.00012	0.00030
Cobalt (Co)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00022	0.00005	0.00010	0.00018	0.00005	0.00041	0.00005	0.00011	0.00037
Copper (Cu)	mg/L	0.0001	0.0005	0.0003	0.0003	0.0005	0.0003	0.0010	0.0003	0.0004	0.0008	0.0001	**0.0700**	0.0005	0.0017	0.0023	0.0003	0.0013	0.0003	0.0005	0.0012
Iron (Fe)	mg/L	0.0150	0.3900	0.0500	0.0922	0.2945	0.0150	0.1200	0.0150	0.0300	0.0885	0.0005	0.7200	0.0460	0.1018	0.3700	0.0150	**1.8900**	0.0150	0.1911	0.7938
Lead (Pb)	mg/L	0.000025	0.001000	0.000250	0.000329	0.000982	0.000025	0.000500	0.000040	0.000207	0.000500	0.000025	0.003000	0.000500	0.000444	0.001000	0.000025	0.001290	0.000100	0.000241	0.000692
Lithium (Li)	mg/L	0.00025	0.00250	0.00250	0.00160	0.00250	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00250	0.00025	0.00118	0.00250	0.00025	0.00215	0.00025	0.00066	0.00197
Magnesium (Mg)	mg/L	0.270	0.780	0.297	0.360	0.774	0.139	0.316	0.286	0.265	0.313	0.260	0.920	0.300	0.328	0.463	0.269	0.445	0.296	0.305	0.369
Manganese (Mn)	mg/L	0.00241	0.00892	0.00396	0.00422	0.00704	0.00071	0.00300	0.00140	0.00171	0.00291	0.00137	0.03600	0.00367	0.00742	0.02952	0.00262	0.06440	0.00960	0.01700	0.05222
Mercury (Hg)	mg/L	0.0000050	0.0012000	0.0000050	0.0000832	0.0002100	0.0000050	0.0002500	0.0000050	0.0000429	0.0001825	0.0000025	0.0000800	0.0000050	0.0000077	0.0000250	0.0000050	0.0000250	0.0000050	0.0000063	0.0000110
Molybdenum (Mo)	mg/L	0.000337	0.006000	0.000500	0.000700	0.000500	0.000005	0.000500	0.000362	0.000323	0.000500	0.000255	0.013000	0.000500	0.000905	0.002500	0.000265	0.000367	0.000318	0.000316	0.000359

(continued)

Table 2.2-2. Baseline Water Quality of Mine Site Area and Downstream Receiving Environment Sampling Sites (Brucejack, Sulphurets and Unuk Watersheds), Brucejack Gold Mine Project (continued)

Project Area		Mine Site Area and Downstream Receiving Environment *(cont'd)*															Mid and Far-field Receiving Environments				
Site		Camp Creek					Brucejack Outflow (BJ OF)					Lower Brucejack Creek (2 Sites)					Brucejack Creek 3 (BJ 3)				
		N=22					N=13					N=55					N= 7.0				
	Units	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P
Physical Tests																					
Colour	CU	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	21.0	2.50	5.14	15.5
Conductivity	µS/cm	32.1	230	77.0	96	170	46.4	102	56.7	65.3	94.0	46.0	150	64.6	74.4	145	50.3	150	90.9	92.7	143.4
Hardness (as $CaCO_3$)	mg/L	12.7	65	33.7	36.3	59.9	18.4	40.4	24.7	26.7	37.1	17.0	46.0	27.0	27.7	41.4	19.4	43.4	31.9	31.4	42.7
pH	pH	4.40	7.90	6.20	6.31	7.76	7.35	8.34	7.75	7.74	8.06	6.50	8.13	7.67	7.56	8.09	7.63	8.30	7.96	7.94	8.21
Total Suspended Solids	mg/L	0.500	67.0	5.00	10.5	29.5	1.50	18.2	1.50	6.84	17.7	0.500	34	5.55	7.5	21.6	1.50	21.5	3.20	6.0	17.8
Total Dissolved Solids	mg/L	23.0	162	60.5	65.6	108	27.0	63.0	37.0	38.8	55.2	27.0	99.0	39.0	47.1	96.2	26.0	96.0	53.0	55.3	89.7
Turbidity	NTU	20.50	31.2	25.9	25.9	30.7	0.890	16.4	2.02	5.08	14.7	0.360	14.4	4.42	5.28	13.0	0.410	12.3	1.89	3.65	10.0
Acidity	mg/L	1.80	3.70	2.75	2.75	3.61	0.500	3.70	2.10	2.22	3.54	0.500	4.70	2.35	2.36	3.82	1.20	2.60	1.90	1.93	2.57
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	0.500	2.7	1.60	1.6	2.6	11.3	24.7	15.1	17.3	24.6	11.0	36.4	17.6	20.6	34.5	12.0	34.6	23.8	23.7	34.1
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	0.500	1.00	0.75	0.75	0.98	0.500	1.00	1.00	0.875	1.00	1.00	1.00	1.00	1.00	1.00	0.500	1.00	1.00	0.929	1.00
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	0.500	1.00	0.75	0.75	0.98	0.500	1.00	1.00	0.875	1.00	1.00	1.00	1.00	1.00	1.00	0.500	1.00	1.00	0.929	1.00
Alkalinity, Total (as $CaCO_3$)	mg/L	0.500	14.0	2.00	3.54	10.4	11.3	24.7	15.1	17.3	24.6	11.0	36.4	16.0	18.7	34.2	12.0	34.6	23.8	23.7	34.1
Anions and Nutrients																					
Ammonia, Total (as N)	mg/L	0.0025	0.0289	0.0025	0.0113	0.0263	0.0025	0.1450	0.0088	0.0232	0.0971	0.0025	0.223	0.0179	0.0509	0.222	0.0025	0.231	0.0372	0.0561	0.1846
Bromide (Br)	mg/L	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
Chloride (Cl)	mg/L	0.150	1.00	0.250	0.460	1.00	0.250	0.250	0.250	0.250	0.250	0.150	1.00	0.250	0.345	1.00	0.250	0.250	0.250	0.250	0.250
Fluoride (F)	mg/L	0.0100	0.0330	0.0100	0.0177	0.0307	0.0100	0.0470	0.0100	0.0194	0.0410	0.0100	0.0820	0.0280	0.0348	0.0800	0.0100	0.0730	0.0340	0.0377	0.0685
Nitrate (as N)	mg/L	0.0025	0.0199	0.0123	0.0116	0.0191	0.0025	0.1070	0.0025	0.0284	0.0948	0.0025	0.3800	0.0229	0.0863	0.3150	0.0025	0.5400	0.0777	0.1537	0.4815
Nitrite (as N)	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0204	0.0005	0.0047	0.0196	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0387	0.0070	0.0099	0.0302
Total Kjeldahl Nitrogen	mg/L	0.0250	0.025	0.0250	0.0250	0.0250	0.0250	0.219	0.0250	0.0508	0.138	0.0250	0.240	0.070	0.082	0.227	0.0250	0.260	0.0500	0.0741	0.200
Total Nitrogen	mg/L	0.0250	0.0570	0.0410	0.0410	0.0554	0.0250	0.289	0.0505	0.0868	0.226	0.0250	0.675	0.120	0.188	0.647	0.0250	0.834	0.138	0.239	0.715
Orthophosphate-Dissolved (as P)	mg/L	0.0020	0.0020	0.0020	0.0020	0.0020	0.0005	0.0081	0.0005	0.0023	0.0068	0.0005	0.0024	0.0005	0.0010	0.0023	0.0005	0.0018	0.0005	0.0010	0.0018
Phosphorus (P)-Total	mg/L	0.0143	0.0229	0.0186	0.0186	0.0225	0.0010	0.0402	0.0044	0.0120	0.0334	0.0010	0.038	0.0067	0.0112	0.0328	0.0028	0.0280	0.0041	0.0083	0.0227
Sulphate (SO_4)	mg/L	9.86	104	30.0	37.9	62.0	1.83	23.6	11.7	13.0	21.9	5.00	38.0	13.5	15.8	35.5	10.7	35.9	19.4	20.5	34.3
Cyanides																					
Cyanide, Total [1]	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0010	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Cyanide, WAD	mg/L	0.0005	0.0013	0.0009	0.0009	0.0013	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0011	0.0005	0.0005	0.0006	0.0005	0.0005	0.0005	0.0005	0.0005
Organic Carbon																					
Total Organic Carbon	mg/L	0.250	2.190	1.220	1.22	2.09	0.250	2.14	0.690	0.800	1.76	0.250	0.800	0.250	0.285	0.475	0.250	1.10	0.250	0.429	0.965
Total Metals																					
Aluminum (Al)	mg/L	*0.0503*	*0.903*	*0.881*	*0.611*	*0.901*	0.019	*0.875*	0.070	*0.250*	*0.767*	0.026	*1.05*	*0.106*	*0.221*	*0.767*	0.011	*0.951*	0.063	*0.300*	*0.845*
Antimony (Sb)	mg/L	0.00013	0.00020	0.00018	0.00017	0.00020	0.00021	0.00114	0.00042	0.00049	0.00098	0.00017	0.00268	0.00057	0.00082	0.00225	0.00046	0.00223	0.00063	0.00104	0.00218
Arsenic (As)	mg/L	0.0001	**0.0070**	0.0006	0.0014	**0.0059**	0.0006	**0.0063**	0.0013	0.0020	0.0047	0.0003	0.0046	0.0018	0.0019	0.0038	0.0014	0.0049	0.0024	0.0027	0.0045
Barium (Ba)	mg/L	0.0380	0.0550	0.0433	0.0454	0.0538	0.0310	0.0616	0.0353	0.0403	0.0564	0.0313	0.0541	0.0367	0.0385	0.0488	0.0350	0.0602	0.0417	0.0423	0.0547
Beryllium (Be)	mg/L	0.00005	0.00025	0.00025	0.00018	0.00025	0.00005	0.00025	0.00005	0.00014	0.00025	0.00005	0.00025	0.00005	0.00006	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.005	0.005	0.005	0.005	0.005	0.016	0.005	0.007	0.016	0.005	0.024	0.005	0.009	0.023	0.005	0.022	0.005	0.010	0.020
Cadmium (Cd)	mg/L	0.000005	0.005000	0.000400	0.000741	0.004785	0.000005	0.000078	0.000032	0.000029	0.000068	0.000005	0.011000	0.000073	0.000298	0.000500	0.000005	0.000097	0.000022	0.000033	0.000090
Calcium (Ca)	mg/L	3.7	24.2	12.5	13.3	21.8	6.96	15.0	10.1	10.2	13.6	6.50	47.7	10.3	11.1	15.1	7.06	16.1	11.9	11.6	15.6
Chromium (Cr)	mg/L	0.00010	0.00025	0.00016	0.00017	0.00024	0.00005	0.00030	0.00013	0.00015	0.00027	0.00005	0.00059	0.00014	0.00015	0.00028	0.00005	0.00028	0.00012	0.00013	0.00026
Cobalt (Co)	mg/L	0.00005	0.00190	0.00066	0.00087	0.00178	0.00005	0.00044	0.00015	0.00018	0.00044	0.00005	0.00064	0.00016	0.00021	0.00049	0.00005	0.00052	0.00005	0.00015	0.00045
Copper (Cu)	mg/L	0.0002	**0.0390**	0.0030	**0.0058**	**0.0147**	0.0003	0.0018	0.0006	0.0008	0.0017	0.0003	**0.0120**	0.0010	0.0015	0.0040	0.0003	0.0019	0.0003	0.0007	0.0017
Iron (Fe)	mg/L	0.0150	**1.9600**	0.2300	0.3654	**1.0921**	0.0150	0.9360	0.0470	0.2336	0.6696	0.0150	**1.1500**	0.1600	0.2166	0.5327	0.0150	0.9360	0.0330	0.2404	0.8055
Lead (Pb)	mg/L	0.000053	0.007000	0.000500	0.001294	0.002500	0.000066	0.003290	0.000165	0.000760	0.002618	0.000062	**0.021000**	0.000500	0.001242	0.002675	0.000069	0.001840	0.000206	0.000556	0.001603
Lithium (Li)	mg/L	0.00113	0.00250	0.00250	0.00204	0.00250	0.00025	0.01820	0.00250	0.00553	0.01772	0.00025	0.04110	0.00488	0.01191	0.03940	0.00233	0.03510	0.01220	0.01388	0.03198
Magnesium (Mg)	mg/L	0.190	1.260	0.684	0.681	1.176	0.305	0.894	0.399	0.469	0.782	0.0005	1.130	0.420	0.493	1.067	0.437	1.170	0.607	0.698	1.125
Manganese (Mn)	mg/L	0.00869	0.25900	0.12400	0.13056	0.24550	0.00568	0.10200	0.02220	0.03358	0.08040	0.00855	0.13500	0.02950	0.04077	0.07931	0.01040	0.07220	0.01650	0.02689	0.06377
Mercury (Hg)	mg/L	0.0000050	0.0000100	0.0000050	0.0000054	0.0000068	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000100	0.0000050	0.0000051	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050
Molybdenum (Mo)	mg/L	0.000066	0.017000	0.000500	0.002003	0.015000	0.000300	0.001350	0.000371	0.000495	0.000973	0.000260	0.024000	0.000500	0.001217	0.000922	0.000283	0.000846	0.000511	0.000565	0.000832

(continued)

Table 2.2-2. Baseline Water Quality of Mine Site Area and Downstream Receiving Environment Sampling Sites (Brucejack, Sulphurets and Unuk Watersheds), Brucejack Gold Mine Project (continued)

Project Area		Mid and Far-field Receiving Environments *(cont'd)*																			
Site		Sulphurets Creek (SCO)					Sulphurets Lake (SUL) Open-water					Sulphurets Lake (SUL) Under-ice					Sulphurets Creek 1 (SC1)				
		N=12					N=11					N=4					N=65				
	Units	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P
Physical Tests																					
Colour	CU	2.50	21.2	2.50	4.06	10.92	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	66.5	2.50	4.76	6.60
Conductivity	µS/cm	58.7	420	137	200	399	53.3	146	78.6	88.2	145	131	400	251	258	395	2.50	438	174	221	418
Hardness (as $CaCO_3$)	mg/L	27.2	218	62.4	96.4	202	24.0	66.4	35.3	39.8	65.1	59.3	197	121	125	194	27.3	215	90.7	107	202
pH	pH	7.49	8.15	8.04	7.95	8.13	6.75	8.39	7.95	7.86	8.29	7.75	7.99	7.81	7.84	7.96	7.32	8.35	7.93	7.92	8.13
Total Suspended Solids	mg/L	1.50	319	99	125	313	10.0	95.1	52.7	47.6	84.8	1.50	34.7	17.8	17.9	34.6	1.50	293.0	9.8	37.4	122.6
Total Dissolved Solids	mg/L	46.0	290	88.0	133	275	39.0	102	54.0	59.7	98.0	96.0	280	181	184	276	25.8	299	109	147	288
Turbidity	NTU	2.2	244	54.1	96	243	6.7	121	48.9	50.9	104	0.660	63.1	31.4	31.6	62.9	0.140	352.0	10.5	42.9	132.0
Acidity	mg/L	0.500	9.20	2.05	2.48	5.79	0.500	5.90	2.50	2.41	4.65	1.70	3.70	2.60	2.65	3.66	0.500	5.90	2.60	2.73	5.48
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	18.3	91.2	32.1	46.3	86.3	15.9	29.2	18.8	20.7	28.1	29.1	69.3	46.2	47.7	68.2	16.8	83.1	39.1	47.3	81.8
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	0.500	1.00	1.00	0.958	1.00	0.500	1.00	1.00	0.955	1.00	1.00	1.00	1.00	1.00	1.00	0.500	1.00	1.00	0.921	1.00
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	0.500	1.00	1.00	0.958	1.00	0.500	1.00	1.00	0.955	1.00	1.00	1.00	1.00	1.00	1.00	0.500	1.00	1.00	0.921	1.00
Alkalinity, Total (as $CaCO_3$)	mg/L	18.3	91.2	32.1	46.3	86.3	15.9	29.2	18.8	20.7	28.1	29.1	69.3	46.2	47.7	68.2	16.8	83.1	38.6	46.5	81.8
Anions and Nutrients																					
Ammonia, Total (as N)	mg/L	0.0025	0.0098	0.0025	0.0031	0.0058	0.0025	0.0093	0.0025	0.0034	0.0072	0.0052	0.0107	0.0067	0.0073	0.0103	0.0025	0.0080	0.0025	0.0027	0.0025
Bromide (Br)	mg/L	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.025	0.025	0.025	0.025	0.025	0.025	0.345	0.025	0.030	0.025
Chloride (Cl)	mg/L	0.250	0.25	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
Fluoride (F)	mg/L	0.0100	0.0610	0.0350	0.0372	0.0610	0.0100	0.0350	0.0100	0.0186	0.0345	0.0340	0.1200	0.0575	0.0673	0.1137	0.0100	0.0890	0.0390	0.0406	0.0770
Nitrate (as N)	mg/L	0.0025	0.1130	0.0216	0.0281	0.0720	0.0080	0.0282	0.0158	0.0163	0.0281	0.0268	0.0320	0.0282	0.0288	0.0316	0.0067	0.2980	0.0382	0.0460	0.0907
Nitrite (as N)	mg/L	0.0005	0.0019	0.0005	0.0008	0.0019	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0014	0.0005	0.0005	0.0005
Total Kjeldahl Nitrogen	mg/L	0.0250	0.025	0.0250	0.0250	0.025	0.0250	0.0250	0.0250	0.0250	0.0250	0.025	0.025	0.025	0.025	0.025	0.025	0.133	0.025	0.032	0.084
Total Nitrogen	mg/L	0.0250	0.092	0.0250	0.0306	0.055	0.0250	0.0500	0.0250	0.0273	0.0375	0.025	0.025	0.025	0.025	0.025	0.025	0.340	0.050	0.061	0.130
Orthophosphate-Dissolved (as P)	mg/L	0.0005	0.0015	0.0005	0.0007	0.0014	0.0005	0.0014	0.0005	0.0008	0.0013	0.0005	0.0011	0.0005	0.0007	0.0010	0.0005	0.0091	0.0005	0.0008	0.0017
Phosphorus (P)-Total	mg/L	0.0027	0.4980	0.1529	0.1933	0.4947	0.0010	0.1060	0.0524	0.0503	0.0917	0.0010	0.0457	0.0196	0.0215	0.0446	0.0010	0.1630	0.0148	0.0313	0.1291
Sulphate (SO_4)	mg/L	8.89	143	32.4	56.8	131	9.61	40.3	16.50	20.61	39.8	33.00	150.0	79.25	85.38	145.8	9.02	147	52.1	65.2	137
Cyanides																					
Cyanide, Total [1]	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	-	-	-	-	-
Cyanide, WAD	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0030	0.0005	0.0006	0.0012
Organic Carbon																					
Total Organic Carbon	mg/L	0.250	1.50	0.250	0.493	1.34	0.250	0.880	0.250	0.405	0.755	0.250	0.250	0.250	0.250	0.250	0.250	2.98	0.250	0.386	0.808
Total Metals																					
Aluminum (Al)	mg/L	*0.114*	*8.01*	*3.29*	*3.61*	*7.95*	*1.04*	*3.75*	*2.30*	*2.35*	*3.73*	0.025	*3.030*	*1.057*	*1.292*	*2.868*	0.008	*10.600*	*0.798*	*1.554*	*4.766*
Antimony (Sb)	mg/L	0.00150	0.00497	0.00238	0.00281	0.00484	0.00107	0.00195	0.00140	0.00140	0.00180	0.00121	0.00175	0.00143	0.00146	0.00173	0.00005	0.00405	0.00133	0.00146	0.00215
Arsenic (As)	mg/L	0.0010	**0.0255**	**0.0109**	**0.0112**	**0.0250**	0.0018	**0.0079**	0.0044	0.0046	**0.0072**	0.0002	0.0044	0.0020	0.0021	0.0043	0.0002	**0.0124**	0.0018	0.0029	**0.0084**
Barium (Ba)	mg/L	0.0465	0.2330	0.1051	0.1267	0.2330	0.0531	0.1320	0.0765	0.0802	0.1235	0.0424	0.0967	0.0615	0.0655	0.0939	0.0175	0.2510	0.0473	0.0658	0.1264
Beryllium (Be)	mg/L	0.00005	0.00025	0.00005	0.00011	0.00024	0.00005	0.00025	0.00005	0.00009	0.00025	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00025	0.00025	0.00018	0.00025
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.015	0.005	0.006	0.010	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.011	0.005	0.005	0.005
Cadmium (Cd)	mg/L	0.000045	0.000403	0.000189	0.000194	0.000388	0.000059	0.000141	0.000097	0.000097	0.000135	0.000086	0.000227	0.000109	0.000133	0.000211	0.000005	0.000324	0.000079	0.000090	0.000147
Calcium (Ca)	mg/L	12.1	77.1	26.0	37.8	74.1	8.81	22.2	12.6	14.0	22.2	22.8	72.4	43.2	45.4	70.9	7.5	80.8	31.8	37.9	72.5
Chromium (Cr)	mg/L	0.00005	**0.00639**	**0.00252**	**0.00276**	**0.00612**	0.00084	**0.00379**	**0.00171**	**0.00171**	**0.00313**	0.00005	**0.00184**	0.00077	0.00086	**0.00179**	0.00005	**0.00755**	0.00089	**0.00116**	**0.00317**
Cobalt (Co)	mg/L	0.00023	0.00574	0.00226	0.00254	0.00559	0.00068	0.00194	0.00131	0.00125	0.00181	0.00113	0.00307	0.00128	0.00169	0.00281	0.00016	0.00428	0.00079	0.00102	0.00229
Copper (Cu)	mg/L	0.0012	**0.0415**	**0.0175**	**0.0194**	**0.0399**	**0.0090**	**0.0256**	**0.0132**	**0.0159**	**0.0245**	**0.0135**	**0.0780**	**0.0205**	**0.0331**	**0.0694**	0.0019	**0.0360**	0.0103	**0.0121**	**0.0219**
Iron (Fe)	mg/L	0.0960	**13.9000**	**5.1000**	**5.8468**	**13.9000**	0.8740	**4.9500**	**2.4100**	**2.5122**	**4.2500**	0.0150	**2.8000**	**1.0610**	**1.2343**	**2.6710**	0.0150	**11.9000**	0.7970	**1.7261**	**5.2640**
Lead (Pb)	mg/L	0.000141	0.013500	0.005565	0.005885	0.013170	0.001000	0.005840	0.002850	0.002922	0.004870	0.000025	0.003030	0.001378	0.001453	0.002985	0.000025	0.010100	0.000921	0.001813	0.005572
Lithium (Li)	mg/L	0.00230	0.00806	0.00373	0.00456	0.00792	0.00105	0.00258	0.00180	0.00178	0.00254	0.00159	0.00358	0.00258	0.00258	0.00350	0.00083	0.00760	0.00250	0.00241	0.00323
Magnesium (Mg)	mg/L	2.190	6.270	4.725	4.418	5.968	1.130	2.350	1.820	1.777	2.290	2.210	5.920	3.775	3.920	5.800	1.240	7.080	2.840	3.454	5.624
Manganese (Mn)	mg/L	0.04960	0.52400	0.19400	0.24053	0.51520	0.07160	0.16500	0.11900	0.11195	0.16000	0.09090	0.49900	0.16050	0.22773	0.45445	0.02680	0.32200	0.08320	0.10091	0.19760
Mercury (Hg)	mg/L	0.0000050	0.0000940	0.0000050	0.0000231	0.0000847	0.0000050	0.0000270	0.0000050	0.0000115	0.0000255	0.0000050	0.0000250	0.0000105	0.0000128	0.0000237	0.0000050	0.0000750	0.0000050	0.0000107	0.0000316
Molybdenum (Mo)	mg/L	0.000722	0.002480	0.001575	0.001613	0.002431	0.000413	0.000992	0.000690	0.000693	0.000986	0.001010	0.001890	0.001380	0.001415	0.001856	0.000305	0.001960	0.001280	0.001219	0.001714

(continued)

Table 2.2-2. Baseline Water Quality of Mine Site Area and Downstream Receiving Environment Sampling Sites (Brucejack, Sulphurets and Unuk Watersheds), Brucejack Gold Mine Project (continued)

Project Area		Mid and Far-field Receiving Environments *(cont'd)*																			
Site		Sulphurets Creek 2					Sulphurets Creek 3					Unuk River 1 (UR1)					Unuk River 1A (UR1 A)				
		N=73					N=53					N=54					N=47				
	Units	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P
Physical Tests																					
Colour	CU	2.50	95.3	2.50	6.28	4.34	2.50	2.50	2.50	2.50	2.50	2.50	55.6	2.50	5.52	26.8	2.50	8.70	2.50	3.04	5.80
Conductivity	µS/cm	2.50	473	200	253	452	92.1	446	291	278	431	2.50	335	177	190	330	84.6	237	153	152	230
Hardness (as $CaCO_3$)	mg/L	32.6	230	95	124	221	41.4	221	133	125	204	45.6	160	93.8	94.9	156	39.3	112	70.9	70.9	109
pH	pH	6.72	8.27	7.86	7.77	8.16	6.65	8.31	8.00	7.95	8.19	6.89	8.27	8.00	7.93	8.19	7.49	8.55	8.06	8.03	8.25
Total Suspended Solids	mg/L	5.30	561	64.5	119	417	1.50	859	42.4	89.3	260	1.50	602	22.3	73.2	333	1.50	415	4.20	34.2	177
Total Dissolved Solids	mg/L	46.0	326	140	171	303	53.0	306	180	177	286	33.8	220	120	124	204	50.0	147	89.0	95.1	139
Turbidity	NTU	4.11	388	52.9	87.1	233	0.430	531	42.3	73.7	268	3.08	495	26.4	56.2	220	0.250	380	3.94	29.7	147
Acidity	mg/L	0.500	9.90	2.90	3.30	6.54	0.500	12.1	2.90	3.12	5.66	0.500	6.90	2.60	2.98	5.60	0.500	11.9	2.40	2.69	4.61
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	1.00	103	35.8	48.9	97.6	2.80	100	56.3	55.6	99.6	22.7	91.8	46.4	53.5	91.0	30.4	87.7	52.1	55.4	82.2
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	0.500	1.00	1.00	0.932	1.00	0.500	1.00	1.00	0.95	1.00	0.500	1.00	1.00	0.95	1.00	0.500	1.00	1.00	0.926	1.00
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	0.500	1.00	1.00	0.932	1.00	0.500	1.00	1.00	0.95	1.00	0.500	1.00	1.00	0.95	1.00	0.500	1.00	1.00	0.926	1.00
Alkalinity, Total (as $CaCO_3$)	mg/L	1.00	103	35.8	48.9	97.6	2.80	100	45.5	54.1	99.5	22.7	91.8	46.4	53.5	91.0	30.4	87.7	52.1	55.4	82.2
Anions and Nutrients																					
Ammonia, Total (as N)	mg/L	0.0025	0.0106	0.0025	0.0031	0.0065	0.0025	0.0179	0.0025	0.0033	0.0066	0.0025	0.0218	0.0025	0.0040	0.0139	0.0025	0.0055	0.0025	0.0026	0.0025
Bromide (Br)	mg/L	0.025	0.355	0.025	0.030	0.025	0.025	0.280	0.025	0.030	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Chloride (Cl)	mg/L	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.500	0.250	0.255	0.250
Fluoride (F)	mg/L	0.0220	0.2080	0.1280	0.1173	0.1894	0.0340	0.1850	0.1210	0.1124	0.1666	0.0270	0.1000	0.0615	0.0626	0.0950	0.0100	0.0450	0.0280	0.0276	0.0441
Nitrate (as N)	mg/L	0.0064	0.6670	0.0709	0.0847	0.2428	0.0107	0.3620	0.0878	0.0927	0.2448	0.0133	0.2150	0.0656	0.0727	0.1685	0.0139	0.1750	0.0648	0.0642	0.1566
Nitrite (as N)	mg/L	0.0005	0.0011	0.0005	0.0005	0.0005	0.0005	0.0012	0.0005	0.0005	0.0005	0.0005	0.0025	0.0005	0.0005	0.0005	0.0005	0.0019	0.0005	0.0005	0.0005
Total Kjeldahl Nitrogen	mg/L	0.025	0.130	0.025	0.036	0.094	0.025	0.120	0.025	0.039	0.102	0.025	0.767	0.025	0.058	0.142	0.025	0.132	0.025	0.041	0.108
Total Nitrogen	mg/L	0.025	0.763	0.081	0.106	0.292	0.025	0.360	0.105	0.119	0.314	0.025	0.970	0.091	0.115	0.200	0.025	0.270	0.077	0.088	0.168
Orthophosphate-Dissolved (as P)	mg/L	0.0005	0.0106	0.0005	0.0009	0.0016	0.0005	0.0154	0.0005	0.0013	0.0026	0.0005	0.0031	0.0005	0.0009	0.0026	0.0005	0.0020	0.0005	0.0007	0.0016
Phosphorus (P)-Total	mg/L	0.0040	1.4600	0.1290	0.2612	0.8756	0.0010	1.4200	0.1180	0.2415	0.9824	0.0057	1.0200	0.0812	0.1408	0.4715	0.0010	0.6750	0.0100	0.0558	0.2444
Sulphate (SO_4)	mg/L	11.2	151	76.5	81.4	141	19.1	153	91.4	81.6	129	15.3	85.9	41.9	45.1	80.1	8.82	40.9	21.2	22.1	37.6
Cyanides																					
Cyanide, Total [1]	mg/L	0.0011	0.0011	0.0011	0.0011	0.0011	-	-	-	-	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	-	-	-	-
Cyanide, WAD	mg/L	0.0005	0.0019	0.0005	0.0006	0.0015	0.0005	0.0018	0.0005	0.0006	0.0013	0.0005	0.0026	0.0005	0.0009	0.0020	0.0005	0.0023	0.0005	0.0008	0.0020
Organic Carbon																					
Total Organic Carbon	mg/L	0.250	2.23	0.520	0.571	1.36	0.250	1.77	0.515	0.565	1.40	0.250	3.26	0.750	0.908	2.20	0.250	3.09	0.740	0.925	1.77
Total Metals																					
Aluminum (Al)	mg/L	*0.320*	*12.600*	*1.900*	*3.218*	*9.228*	0.039	*20.900*	*1.630*	*2.741*	*8.454*	0.090	*19.200*	*0.859*	*2.313*	*9.264*	0.010	*17.000*	*0.416*	*1.286*	*5.779*
Antimony (Sb)	mg/L	0.00021	0.00231	0.00080	0.00094	0.00161	0.00053	0.00234	0.00073	0.00086	0.00155	0.00076	0.00280	0.00131	0.00141	0.00204	0.00073	0.00407	0.00172	0.00183	0.00311
Arsenic (As)	mg/L	0.0012	**0.0786**	**0.0056**	**0.0109**	**0.0480**	0.0002	**0.0590**	0.0042	**0.0094**	**0.0324**	0.0006	**0.0263**	0.0028	0.0050	**0.0180**	0.0003	**0.0198**	0.0006	0.0017	**0.0079**
Barium (Ba)	mg/L	0.0377	0.3070	0.0591	0.0943	0.2376	0.0351	0.4100	0.0537	0.0834	0.1888	0.0309	0.3490	0.0426	0.0694	0.2030	0.0214	0.2970	0.0339	0.0465	0.1120
Beryllium (Be)	mg/L	0.00010	0.00083	0.00025	0.00026	0.00045	0.00005	0.00084	0.00025	0.00023	0.00032	0.00005	0.00059	0.00025	0.00019	0.00025	0.00005	0.00056	0.00025	0.00017	0.00025
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00073	0.00025	0.00026	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.014	0.005	0.006	0.011	0.005	0.016	0.005	0.006	0.011	0.005	0.012	0.005	0.005	0.010	0.005	0.013	0.005	0.005	0.005
Cadmium (Cd)	mg/L	0.000086	0.005760	0.001820	0.001979	0.003890	0.000168	0.005590	0.001530	0.001648	0.002940	0.000295	0.002120	0.000695	0.000705	0.001144	0.000014	0.000425	0.000044	0.000057	0.000123
Calcium (Ca)	mg/L	15.6	92.5	34.3	44.3	76.8	16.0	80.0	47.4	46.5	73.1	16.8	56.9	34.1	32.8	53.5	13.0	37.7	23.9	23.8	35.1
Chromium (Cr)	mg/L	0.00010	**0.01120**	**0.00145**	**0.00260**	**0.00843**	0.00010	**0.02370**	**0.00141**	**0.00237**	**0.00758**	0.00010	**0.02910**	0.00091	**0.00313**	**0.01346**	0.00005	**0.02970**	0.00082	**0.00242**	**0.01050**
Cobalt (Co)	mg/L	0.00066	0.01350	0.00308	0.00399	0.00804	0.00125	0.01590	0.00242	0.00339	0.00712	0.00030	0.01370	0.00138	0.00215	0.00752	0.00005	0.01100	0.00026	0.00085	0.00352
Copper (Cu)	mg/L	0.0019	**0.4740**	**0.1300**	**0.1651**	**0.3526**	**0.0386**	**0.4320**	**0.1090**	**0.1384**	**0.3190**	**0.0116**	**0.1740**	**0.0567**	**0.0628**	**0.1360**	0.0003	**0.0458**	0.0014	0.0038	**0.0137**
Iron (Fe)	mg/L	**1.4400**	**31.6000**	**5.6300**	**7.5666**	**17.9200**	0.0640	**36.6000**	**4.9900**	**6.5414**	**14.6600**	0.3300	**31.7000**	**2.7600**	**4.4957**	**17.3800**	0.0350	**23.6000**	0.5300	**1.8554**	**8.0430**
Lead (Pb)	mg/L	0.000579	0.017500	0.003130	0.004564	0.010800	0.000025	0.019300	0.002810	0.003609	0.008882	0.000154	0.013700	0.001640	0.002445	0.008748	0.000025	0.010500	0.000325	0.001040	0.004545
Lithium (Li)	mg/L	0.00111	0.00800	0.00250	0.00275	0.00561	0.00100	0.01300	0.00250	0.00255	0.00330	0.00076	0.01370	0.00250	0.00276	0.00634	0.00066	0.01240	0.00250	0.00235	0.00250
Magnesium (Mg)	mg/L	1.970	7.090	4.830	4.772	6.970	2.140	13.200	4.730	4.763	6.362	2.090	12.400	4.000	4.435	6.420	2.300	10.700	3.860	4.167	5.716
Manganese (Mn)	mg/L	0.05400	0.58100	0.30100	0.30785	0.47920	0.15300	0.97300	0.22600	0.26494	0.48300	0.04250	0.80300	0.10500	0.15366	0.42540	0.00690	0.65100	0.01800	0.05390	0.20890
Mercury (Hg)	mg/L	0.0000050	0.0000440	0.0000050	0.0000087	0.0000240	0.0000050	0.0000490	0.0000050	0.0000085	0.0000282	0.0000050	0.0000930	0.0000050	0.0000111	0.0000416	0.0000050	0.0000670	0.0000050	0.0000086	0.0000216
Molybdenum (Mo)	mg/L	0.000437	0.005810	0.002510	0.002492	0.004154	0.001110	0.006360	0.002400	0.002502	0.004234	0.000765	0.002910	0.001530	0.001585	0.002428	0.000477	0.001350	0.000890	0.000885	0.001239

(continued)

Table 2.2-2. Baseline Water Quality of Mine Site Area and Downstream Receiving Environment Sampling Sites (Brucejack, Sulphurets and Unuk Watersheds), Brucejack Gold Mine Project (continued)

Project Area		Mid and Far-field Receiving Environments *(cont'd)*				
Site		Unuk River 2 (UR2)				
		N=35				
	Units	Min	Max	Median	Mean	95th P
Physical Tests						
Colour	CU	2.50	6.80	2.50	2.70	3.28
Conductivity	µS/cm	82.4	266	117	150	260
Hardness (as $CaCO_3$)	mg/L	37.3	123	52.4	68.0	120
pH	pH	6.99	8.27	7.91	7.91	8.20
Total Suspended Solids	mg/L	1.50	769	38.9	71.2	188
Total Dissolved Solids	mg/L	49.0	171	80.0	95.3	166
Turbidity	NTU	0.550	465	36.5	53.5	145
Acidity	mg/L	0.500	12.4	1.90	2.4	4.85
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	25.3	86.4	37.0	47.0	81.6
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	0.500	1.00	1.00	0.943	1.00
Alkalinity, Hydroxide (as $CaCO_3$)	mg/L	0.500	1.00	1.00	0.943	1.00
Alkalinity, Total (as $CaCO_3$)	mg/L	25.3	86.4	37.0	47.0	81.6
Anions and Nutrients						
Ammonia, Total (as N)	mg/L	0.0025	0.0100	0.0025	0.0030	0.0074
Bromide (Br)	mg/L	0.025	0.025	0.025	0.025	0.025
Chloride (Cl)	mg/L	0.250	0.790	0.250	0.344	0.748
Fluoride (F)	mg/L	0.0230	0.0700	0.0450	0.0469	0.0673
Nitrate (as N)	mg/L	0.0220	0.3140	0.1010	0.1040	0.1795
Nitrite (as N)	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005
Total Kjeldahl Nitrogen	mg/L	0.025	0.147	0.025	0.042	0.139
Total Nitrogen	mg/L	0.025	0.460	0.134	0.134	0.263
Orthophosphate-Dissolved (as P)	mg/L	0.0005	0.0033	0.0005	0.0011	0.0026
Phosphorus (P)-Total	mg/L	0.0024	1.0400	0.0584	0.0989	0.2351
Sulphate (SO_4)	mg/L	11.4	55.9	21.5	27.8	54.2
Cyanides						
Cyanide, Total [1]	mg/L	-	-	-	-	-
Cyanide, WAD	mg/L	0.0005	0.0027	0.0005	0.0007	0.0015
Organic Carbon						
Total Organic Carbon	mg/L	0.250	2.98	0.685	0.862	2.49
Total Metals						
Aluminum (Al)	mg/L	0.035	*22.400*	*1.510*	*2.412*	*6.316*
Antimony (Sb)	mg/L	0.00039	0.00170	0.00070	0.00074	0.00126
Arsenic (As)	mg/L	0.0004	**0.0176**	0.0016	0.0026	**0.0065**
Barium (Ba)	mg/L	0.0316	0.3550	0.0469	0.0646	0.1264
Beryllium (Be)	mg/L	0.00005	0.00055	0.00025	0.00019	0.00025
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.013	0.005	0.006	0.011
Cadmium (Cd)	mg/L	0.000129	0.000728	0.000208	0.000266	0.000520
Calcium (Ca)	mg/L	13.6	44.3	20.2	25.5	42.9
Chromium (Cr)	mg/L	0.00005	**0.03470**	**0.00193**	**0.00347**	**0.00916**
Cobalt (Co)	mg/L	0.00013	0.01550	0.00103	0.00166	0.00404
Copper (Cu)	mg/L	0.0049	**0.0870**	**0.0202**	**0.0273**	**0.0654**
Iron (Fe)	mg/L	0.1400	**32.6000**	**2.3600**	**3.4949**	**8.6380**
Lead (Pb)	mg/L	0.000056	0.019000	0.001430	0.002093	0.004513
Lithium (Li)	mg/L	0.00025	0.01380	0.00250	0.00226	0.00250
Magnesium (Mg)	mg/L	1.510	13.700	2.960	3.165	4.105
Manganese (Mn)	mg/L	0.01900	0.83500	0.06280	0.10032	0.21540
Mercury (Hg)	mg/L	0.0000050	0.0000960	0.0000050	0.0000093	0.0000271
Molybdenum (Mo)	mg/L	0.001260	0.003200	0.001780	0.002000	0.002843

(continued)

Table 2.2-2. Baseline Water Quality of Mine Site Area and Downstream Receiving Environment Sampling Sites (Brucejack, Sulphurets and Unuk Watersheds), Brucejack Gold Mine Project (continued)

Project Area		Mine Site Area and Downstream Receiving Environment																			
Site		Brucejack Lake (BJ Lake) Open-water					Brucejack Lake (BJ Lake) Under-ice					Upper Brucejack Creek (BJ U/S)					Brucejack Creek, Upstream of Camp Creek (BJ U/S of CC)				
		N=22					N=8					N=72					N= 15				
	Units	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P
Total Metals *(cont'd)*																					
Nickel (Ni)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00050	0.00025	0.00033	0.00050	0.00025	0.00025	0.00025	0.00025	0.00025
Phosphorus (P)	mg/L	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
Potassium (K)	mg/L	0.0750	0.11	0.0870	0.0869	0.10	0.0250	0.0800	0.0700	0.0634	0.0784	0.0710	1.00	0.15	0.41	1.00	0.0630	0.426	0.0910	0.145	0.315
Selenium (Se)	mg/L	0.00005	0.00013	0.00010	0.00008	0.00012	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00050	0.00005	0.00020	0.00050	0.00005	0.00013	0.00005	0.00006	0.00011
Silicon (Si)	mg/L	0.555	0.719	0.598	0.608	0.682	0.210	0.600	0.560	0.502	0.596	0.493	1.32	0.579	0.658	1.11	0.51	1.62	0.740	0.800	1.39
Silver (Ag)	mg/L	0.000005	**0.005000**	0.000050	**0.000268**	0.000085	0.000005	**0.000200**	0.000005	0.000041	**0.000148**	0.000005	**0.002500**	0.000050	**0.000106**	**0.000400**	0.000005	**0.000201**	0.000005	0.000026	0.000093
Sodium (Na)	mg/L	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Strontium (Sr)	mg/L	0.0525	0.0575	0.0558	0.0555	0.0572	0.0226	0.0577	0.0535	0.0486	0.0573	0.0487	0.0713	0.0579	0.0573	0.0630	0.0363	0.0805	0.0557	0.0566	0.0692
Thallium (Tl)	mg/L	0.000005	0.000050	0.000050	0.000032	0.000050	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000100	0.000008	0.000041	0.000100	0.000005	0.000048	0.000005	0.000010	0.000031
Tin (Sn)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00025	0.00005	0.00012	0.00025	0.00005	0.00005	0.00005	0.00005	0.00005
Titanium (Ti)	mg/L	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.005	0.00500	0.00500	0.00500	0.00500	0.0190	0.00500	0.00593	0.00920
Uranium (U)	mg/L	0.00003	0.00004	0.00003	0.00003	0.00004	0.00001	0.00003	0.00002	0.00002	0.00002	0.00002	0.00010	0.00003	0.00005	0.00010	0.00002	0.00005	0.00003	0.00003	0.00004
Vanadium (V)	mg/L	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00170	0.00050	0.00058	0.00086
Zinc (Zn)	mg/L	0.00025	**0.17000**	0.00250	0.01113	0.02407	0.00150	0.01100	0.00150	0.00325	0.00890	0.00025	0.02500	0.00250	0.00337	0.00850	0.00150	0.01090	0.00150	0.00256	0.00642
Dissolved Metals																					
Aluminum (Al)	mg/L	0.00340	0.0179	0.00445	0.00602	0.0131	0.0015	0.00500	0.0015	0.00256	0.00466	0.00150	0.0179	0.00250	0.00460	0.0100	0.00310	0.0233	0.00990	0.00950	0.0188
Antimony (Sb)	mg/L	0.00021	0.00025	0.00023	0.00023	0.00025	0.00005	0.00025	0.00022	0.00019	0.00024	0.00015	0.00035	0.00023	0.00023	0.00029	0.00010	0.00036	0.00021	0.00021	0.00033
Arsenic (As)	mg/L	0.00050	0.00230	0.00070	0.00095	0.00180	0.00022	0.00100	0.00053	0.00059	0.00100	0.00005	0.00800	0.00090	0.00116	0.00236	0.00005	0.00062	0.00044	0.00043	0.00061
Barium (Ba)	mg/L	0.0318	0.0348	0.0321	0.0323	0.0338	0.0204	0.0339	0.0319	0.0301	0.0336	0.0275	0.0400	0.0339	0.0338	0.0366	0.0188	0.0365	0.0334	0.0319	0.0365
Beryllium (Be)	mg/L	0.00005	0.00025	0.00025	0.00017	0.00025	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00050	0.00005	0.00021	0.00050	0.00005	0.00005	0.00005	0.00005	0.00005
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.10000	0.00025	0.03350	0.10000	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.0500	0.0050	0.0200	0.0500	0.005	0.005	0.005	0.005	0.005
Cadmium (Cd)	mg/L	0.000005	0.000100	0.000005	0.000032	0.000100	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.001000	0.000009	0.000078	0.000320	0.000005	0.000082	0.000005	0.000014	0.000072
Calcium (Ca)	mg/L	8.21	34.0	8.55	11.8	33.0	4.02	9.36	8.53	7.84	9.26	4.30	11.3	8.85	8.60	9.55	5.73	12.0	8.77	8.64	10.6
Chromium (Cr)	mg/L	0.00005	0.00025	0.00010	0.00010	0.00018	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00050	0.00005	0.00022	0.00050	0.00005	0.00012	0.00005	0.00006	0.00011
Cobalt (Co)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00015	0.00005	0.00008	0.00015	0.00005	0.00037	0.00005	0.00008	0.00026
Copper (Cu)	mg/L	0.00005	0.00050	0.00025	0.00030	0.00050	0.00025	0.00100	0.00025	0.00041	0.00083	0.00005	0.01500	0.00050	0.00074	0.00183	0.00025	0.00055	0.00025	0.00027	0.00034
Iron (Fe)	mg/L	0.0100	0.0150	0.0150	0.0148	0.0150	0.0150	0.0300	0.0150	0.0169	0.0248	0.0005	0.0800	0.0150	0.0201	0.0555	0.0150	0.0150	0.0150	0.0150	0.0150
Lead (Pb)	mg/L	0.000025	0.004000	0.000250	0.000417	0.000500	0.000025	0.000500	0.000025	0.000203	0.000500	0.000025	0.003000	0.000500	0.000436	0.001600	0.000025	0.000065	0.000025	0.000028	0.000037
Lithium (Li)	mg/L	0.00025	0.00250	0.00250	0.00160	0.00250	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00250	0.00025	0.00117	0.00250	0.00025	0.00199	0.00025	0.00051	0.00177
Magnesium (Mg)	mg/L	0.265	0.720	0.276	0.338	0.713	0.176	0.310	0.284	0.266	0.305	0.001	0.520	0.294	0.290	0.330	0.228	0.428	0.281	0.288	0.352
Manganese (Mn)	mg/L	0.00006	0.00087	0.00018	0.00038	0.00084	0.00005	0.00148	0.00049	0.00069	0.00141	0.00015	0.01110	0.00203	0.00337	0.01010	0.00039	0.06150	0.00540	0.01098	0.04841
Mercury (Hg)	mg/L	0.000005	0.001200	0.000005	0.000100	0.000485	0.000005	0.000250	0.000005	0.000043	0.000183	0.000005	0.002500	0.000005	0.000076	0.000025	0.000005	0.000005	0.000005	0.000005	0.000005
Molybdenum (Mo)	mg/L	0.000328	0.001000	0.000439	0.000449	0.000525	0.000142	0.000500	0.000349	0.000377	0.000500	0.000234	0.012000	0.000500	0.000768	0.002500	0.000025	0.000369	0.000304	0.000293	0.000360
Nickel (Ni)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00050	0.00025	0.00033	0.00050	0.00025	0.00025	0.00025	0.00025	0.00025
Phosphorus (P)	mg/L	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
Potassium (K)	mg/L	0.070	0.088	0.076	0.078	0.087	0.025	0.083	0.074	0.066	0.082	0.052	1.000	0.096	0.391	1.000	0.066	0.160	0.084	0.091	0.131
Selenium (Se)	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0005	0.0001	0.0002	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001
Silicon (Si)	mg/L	0.528	0.579	0.545	0.549	0.573	0.274	0.590	0.560	0.509	0.586	0.446	0.692	0.549	0.550	0.622	0.418	0.861	0.499	0.537	0.778
Silver (Ag)	mg/L	0.00001	0.00050	0.00005	0.00024	0.00050	0.00001	0.00050	0.00001	0.00019	0.00050	0.00001	0.00080	0.00005	0.00007	0.00025	0.00001	0.00001	0.00001	0.00001	0.00001
Sodium (Na)	mg/L	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Strontium (Sr)	mg/L	0.0490	0.0554	0.0521	0.0526	0.0551	0.0327	0.0588	0.0519	0.0495	0.0576	0.0416	0.0708	0.0558	0.0562	0.0620	0.0352	0.0784	0.0547	0.0552	0.0664
Thallium (Tl)	mg/L	0.000005	0.000050	0.000050	0.000032	0.000050	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000100	0.000005	0.000040	0.000100	0.000005	0.000005	0.000005	0.000005	0.000005
Tin (Sn)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00025	0.00005	0.00012	0.00025	0.00005	0.00005	0.00005	0.00005	0.00005
Titanium (Ti)	mg/L	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Uranium (U)	mg/L	0.00002	0.00003	0.00003	0.00003	0.00003	0.00001	0.00002	0.00002	0.00002	0.00002	0.00001	0.00010	0.00002	0.00005	0.00010	0.00001	0.00002	0.00002	0.00002	0.00002
Vanadium (V)	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Zinc (Zn)	mg/L	0.0001	0.0250	0.0017	0.0040	0.0170	0.0003	0.0070	0.0015	0.0025	0.0063	0.0005	0.0250	0.0025	0.0033	0.0110	0.0015	0.0088	0.0015	0.0023	0.0059

(continued)

Table 2.2-2. Baseline Water Quality of Mine Site Area and Downstream Receiving Environment Sampling Sites (Brucejack, Sulphurets and Unuk Watersheds), Brucejack Gold Mine Project (continued)

Project Area		Mine Site Area and Downstream Receiving Environment *(cont'd)*															Mid and Far-field Receiving Environments				
Site		Camp Creek					Brucejack Outflow (BJ OF)					Lower Brucejack Creek (2 Sites)					Brucejack Creek 3 (BJ 3)				
		N=22					N=13					N=55					N= 7.0				
	Units	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P
Total Metals *(cont'd)*																					
Nickel (Ni)	mg/L	0.00025	0.00079	0.00025	0.00043	0.00074	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00057	0.00025	0.00027	0.00043	0.00025	0.00025	0.00025	0.00025	0.00025
Phosphorus (P)	mg/L	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
Potassium (K)	mg/L	0.149	0.31	0.27	0.242	0.30	0.09	0.682	0.179	0.291	0.679	0.0920	1.17	0.366	0.443	1.03	0.311	0.920	0.420	0.547	0.902
Selenium (Se)	mg/L	0.00005	0.00010	0.00005	0.00007	0.00010	0.00005	0.00012	0.00010	0.00008	0.00012	0.00005	0.00014	0.00010	0.00008	0.00013	0.00011	0.00013	0.00012	0.00012	0.00013
Silicon (Si)	mg/L	0.505	3.44	1.41	1.79	3.24	0.60	1.98	0.74	1.05	1.97	0.733	2.21	0.91	1.09	1.89	0.88	2.38	0.96	1.23	2.10
Silver (Ag)	mg/L	0.000005	**0.007500**	0.000050	**0.000474**	**0.000975**	0.000005	**0.000281**	0.000017	0.000062	**0.000187**	0.000005	**0.007500**	0.000050	**0.000211**	**0.000335**	0.000005	**0.000171**	0.000014	0.000043	**0.000143**
Sodium (Na)	mg/L	1.00	1.00	1.00	1.00	1.00	1.00	6.40	1.00	2.16	5.98	1.00	13.7	2.15	4.33	13.5	1.00	12.8	4.40	5.06	11.7
Strontium (Sr)	mg/L	0.0259	0.1840	0.0517	0.0872	0.1708	0.0527	0.1840	0.0744	0.0920	0.165	0.0490	0.2680	0.0895	0.120	0.264	0.0506	0.256	0.129	0.139	0.244
Thallium (Tl)	mg/L	0.000016	0.000050	0.000050	0.000039	0.000050	0.000005	0.000050	0.000036	0.000034	0.000050	0.000005	0.000050	0.000014	0.000018	0.000039	0.000005	0.000045	0.000018	0.000020	0.000039
Tin (Sn)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Titanium (Ti)	mg/L	0.00500	0.0400	0.00500	0.0167	0.0365	0.0050	0.0150	0.00500	0.00646	0.0144	0.00500	0.0160	0.00500	0.00617	0.0142	0.00500	0.0130	0.00500	0.00700	0.0124
Uranium (U)	mg/L	0.00004	0.00008	0.00005	0.00006	0.00008	0.00003	0.00012	0.00004	0.00005	0.00010	0.00003	0.00024	0.00006	0.00007	0.00012	0.00004	0.00015	0.00007	0.00008	0.00014
Vanadium (V)	mg/L	0.00050	0.00120	0.00050	0.00073	0.00113	0.0005	0.0015	0.0005	0.0007	0.0014	0.00050	0.0016	0.0005	0.0006	0.0013	0.0005	0.00190	0.00050	0.00070	0.00148
Zinc (Zn)	mg/L	0.00160	**0.18600**	0.02400	**0.03478**	**0.06900**	0.00150	0.0103	0.00330	0.00407	0.0090	0.00150	0.0250	0.00600	0.00752	0.02175	0.00150	0.0097	0.00150	0.00371	0.0089
Dissolved Metals																					
Aluminum (Al)	mg/L	0.00700	0.0251	0.0180	0.0167	0.0244	0.0015	0.0292	0.0112	0.0119	0.0277	0.00310	0.062	0.0113	0.0183	0.0455	0.0043	0.0251	0.0062	0.0121	0.0240
Antimony (Sb)	mg/L	0.00005	0.00013	0.00005	0.00008	0.00012	0.000200	0.001020	0.000220	0.000404	0.000918	0.000160	0.002650	0.000505	0.000761	0.00217	0.000250	0.002090	0.000570	0.000947	0.002075
Arsenic (As)	mg/L	0.00005	0.00500	0.00020	0.00087	0.00400	0.000290	0.00137	0.000600	0.000665	0.00121	0.000050	0.00358	0.000800	0.00105	0.00247	0.000720	0.00289	0.00130	0.00145	0.00247
Barium (Ba)	mg/L	0.0170	0.0525	0.0281	0.0325	0.0501	0.0263	0.0439	0.0328	0.0332	0.0394	0.0269	0.0374	0.0335	0.0324	0.0359	0.0267	0.0407	0.0340	0.0339	0.0398
Beryllium (Be)	mg/L	0.00005	0.00025	0.00025	0.00018	0.00025	0.00005	0.00025	0.00005	0.00014	0.00025	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.0050	0.005	0.0050	0.0050	0.00500	0.01400	0.00500	0.00631	0.01340	0.00500	0.02400	0.00500	0.00938	0.02355	0.00500	0.02200	0.00500	0.00986	0.02050
Cadmium (Cd)	mg/L	0.000005	0.005000	0.000400	0.000551	0.000700	0.000005	0.000036	0.000018	0.000017	0.000032	0.000005	0.005000	0.000060	0.000187	0.000500	0.000005	0.000060	0.000005	0.000020	0.000056
Calcium (Ca)	mg/L	4.73	24.2	13.9	13.5	22.3	6.93	14.7	9.28	10.0	13.6	5.80	16.6	10.2	10.3	14.8	7.23	15.5	11.8	11.5	15.3
Chromium (Cr)	mg/L	0.00005	0.00025	0.00010	0.00013	0.00024	0.000050	0.000250	0.000050	0.000073	0.000160	0.000050	0.000170	0.000050	0.000056	0.000083	0.000050	0.000050	0.000050	0.000050	0.000050
Cobalt (Co)	mg/L	0.00005	0.00146	0.00032	0.00061	0.00135	0.000050	0.000170	0.000050	0.000070	0.000152	0.000050	0.000450	0.000050	0.000129	0.000290	0.000050	0.000180	0.000050	0.000080	0.000165
Copper (Cu)	mg/L	0.00010	0.02200	0.00200	0.00375	0.00900	0.00010	0.00052	0.00025	0.00025	0.00036	0.00025	0.00400	0.00025	0.00082	0.00300	0.00025	0.00025	0.00025	0.00025	0.00025
Iron (Fe)	mg/L	0.0010	0.2300	0.0150	0.0541	0.2100	0.0150	0.0150	0.0150	0.0150	0.0150	0.0100	0.1360	0.0150	0.0287	0.0900	0.0150	0.0150	0.0150	0.0150	0.0150
Lead (Pb)	mg/L	0.000025	0.007000	0.000500	0.001027	0.002500	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.004000	0.000025	0.000421	0.002175	0.000025	0.000025	0.000025	0.000025	0.000025
Lithium (Li)	mg/L	0.00025	0.00250	0.00250	0.00175	0.00250	0.00025	0.01730	0.00250	0.00534	0.01628	0.00025	0.04050	0.00435	0.01173	0.03853	0.00188	0.03370	0.01240	0.01352	0.03097
Magnesium (Mg)	mg/L	0.212	1.250	0.570	0.663	1.180	0.2650	0.8860	0.3680	0.4276	0.7336	0.0005	1.13	0.3920	0.4799	1.0870	0.3260	1.1300	0.5960	0.6487	1.0940
Manganese (Mn)	mg/L	0.00422	0.22900	0.10900	0.11407	0.21700	0.00177	0.05120	0.01340	0.01688	0.04334	0.00560	0.127	0.02755	0.03268	0.06064	0.00454	0.04020	0.01170	0.01709	0.03675
Mercury (Hg)	mg/L	0.000005	0.000200	0.000005	0.000054	0.000171	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005
Molybdenum (Mo)	mg/L	0.000025	0.015000	0.000500	0.002140	0.013000	0.000258	0.001220	0.000344	0.000471	0.000908	0.000221	0.018000	0.000500	0.001089	0.000890	0.000237	0.000799	0.000496	0.000533	0.000795
Nickel (Ni)	mg/L	0.00025	0.00071	0.00025	0.00040	0.00066	0.000250	0.000250	0.000250	0.000250	0.000250	0.000250	0.000550	0.000250	0.000269	0.000393	0.000250	0.000250	0.000250	0.000250	0.000250
Phosphorus (P)	mg/L	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
Potassium (K)	mg/L	0.095	0.133	0.121	0.116	0.132	0.082	0.487	0.106	0.202	0.460	0.092	1.12	0.249	0.371	0.986	0.118	0.905	0.293	0.430	0.891
Selenium (Se)	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.000050	0.000100	0.000050	0.000065	0.000100	0.000050	0.000120	0.000050	0.000065	0.000120	0.000050	0.000120	0.000050	0.000077	0.000117
Silicon (Si)	mg/L	0.268	0.671	0.425	0.455	0.646	0.447	0.843	0.618	0.627	0.824	0.378	1.010	0.752	0.720	1.010	0.305	0.995	0.772	0.694	0.969
Silver (Ag)	mg/L	0.00001	0.00750	0.00005	0.00045	0.00050	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00750	0.00001	0.00019	0.00034	0.00001	0.00001	0.00001	0.00001	0.00001
Sodium (Na)	mg/L	1.00	1.00	1.00	1.00	1.00	1.00	6.10	1.00	2.08	5.62	1.00	12.9	1.50	4.16	12.7	1.00	12.1	4.40	4.93	11.2
Strontium (Sr)	mg/L	0.0234	0.1750	0.0490	0.0825	0.1624	0.0505	0.1790	0.0670	0.0891	0.1622	0.0449	0.2590	0.0865	0.1161	0.2553	0.0519	0.2450	0.1310	0.1361	0.2357
Thallium (Tl)	mg/L	0.000005	0.000050	0.000050	0.000035	0.000050	0.000005	0.000050	0.000005	0.000026	0.000050	0.000005	0.000032	0.000005	0.000009	0.000023	0.000005	0.000025	0.000005	0.000011	0.000023
Tin (Sn)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Titanium (Ti)	mg/L	0.005	0.005	0.005	0.005	0.005	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500
Uranium (U)	mg/L	0.00001	0.00005	0.00002	0.00002	0.00004	0.000011	0.000068	0.000026	0.000033	0.000062	0.000011	0.000213	0.000036	0.000052	0.000106	0.000013	0.000145	0.000045	0.000061	0.000132
Vanadium (V)	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Zinc (Zn)	mg/L	0.0005	0.0700	0.0200	0.0279	0.0600	0.00150	0.00300	0.00150	0.00174	0.00264	0.00150	0.0290	0.00250	0.00585	0.0211	0.00150	0.00150	0.00150	0.00150	0.00150

(continued)

Table 2.2-2. Baseline Water Quality of Mine Site Area and Downstream Receiving Environment Sampling Sites (Brucejack, Sulphurets and Unuk Watersheds), Brucejack Gold Mine Project (continued)

Project Area		Mid and Far-field Receiving Environments *(cont'd)*																			
Site		Sulphurets Creek (SCO)					Sulphurets Lake (SUL) Open-water					Sulphurets Lake (SUL) Under-ice					Sulphurets Creek 1 (SC1)				
		N=12					N=11					N=4					N=65				
	Units	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P
Total Metals *(cont'd)*																					
Nickel (Ni)	mg/L	0.00056	0.00559	0.00223	0.00260	0.00541	0.00079	0.00371	0.00134	0.00149	0.00286	0.00122	0.00242	0.00170	0.00176	0.00234	0.00025	0.00485	0.00091	0.00124	0.00269
Phosphorus (P)	mg/L	0.150	0.460	0.150	0.234	0.460	0.150	0.150	0.150	0.150	0.150	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Potassium (K)	mg/L	0.639	2.27	1.22	1.37	2.22	0.537	1.60	0.87	0.96	1.55	0.60	1.27	0.81	0.87	1.23	0.32	4.22	0.65	0.92	1.81
Selenium (Se)	mg/L	0.00017	0.00043	0.00029	0.00029	0.00040	0.00005	0.00028	0.00020	0.00018	0.00028	0.00027	0.00037	0.00035	0.00033	0.00037	0.00005	0.00089	0.00044	0.00047	0.00080
Silicon (Si)	mg/L	1.57	15.60	7.62	7.95	14.94	2.59	9.17	4.97	5.23	8.55	1.67	6.14	3.51	3.71	5.93	1.15	22.00	2.49	4.10	9.33
Silver (Ag)	mg/L	0.000005	**0.000419**	**0.000174**	**0.000163**	**0.000364**	0.000026	**0.000133**	0.000069	0.000070	**0.000132**	0.000005	0.000064	0.000024	0.000029	0.000061	0.000005	**0.000195**	0.000023	0.000037	**0.000129**
Sodium (Na)	mg/L	1.00	3.60	1.00	1.76	3.49	1.00	1.00	1.00	1.00	1.00	1.0	2.6	1.7	1.7	2.6	1.0	2.5	1.0	1.1	2.2
Strontium (Sr)	mg/L	0.0650	0.444	0.145	0.217	0.417	0.0502	0.1300	0.0789	0.0827	0.129	0.1250	0.4240	0.2395	0.2570	0.4125	0.0578	0.4650	0.1670	0.2092	0.4168
Thallium (Tl)	mg/L	0.000005	0.000129	0.000057	0.000056	0.000126	0.000020	0.000060	0.000040	0.000040	0.000056	0.000005	0.000050	0.000023	0.000025	0.000049	0.000005	0.000170	0.000050	0.000043	0.000063
Tin (Sn)	mg/L	0.00005	0.00010	0.00005	0.00005	0.00007	0.00005	0.00017	0.00005	0.00006	0.00011	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00018	0.00005	0.00006	0.00012
Titanium (Ti)	mg/L	0.00500	0.259	0.123	0.122	0.243	0.0230	0.120	0.0680	0.0705	0.113	0.005	0.065	0.031	0.033	0.064	0.005	0.261	0.020	0.043	0.145
Uranium (U)	mg/L	0.00010	0.00026	0.00017	0.00017	0.00024	0.00004	0.00011	0.00006	0.00006	0.00009	0.00006	0.00011	0.00008	0.00008	0.00010	0.00001	0.00026	0.00009	0.00009	0.00016
Vanadium (V)	mg/L	0.00050	0.0251	0.0105	0.0113	0.0246	0.0026	0.0104	0.0071	0.0065	0.0104	0.0005	0.0078	0.0029	0.0035	0.0074	0.0005	0.0330	0.0023	0.0048	0.0146
Zinc (Zn)	mg/L	0.00150	**0.0581**	0.0247	0.0263	**0.05805**	0.00830	0.0226	0.0157	0.0147	0.0215	0.01280	0.03040	0.01395	0.01778	0.02808	0.00340	**0.04230**	0.00910	0.01150	0.02484
Dissolved Metals																					
Aluminum (Al)	mg/L	0.0190	**0.2800**	0.0803	0.0927	**0.201**	0.0345	**0.276**	0.0636	0.0942	**0.206**	0.0145	0.0830	0.0462	0.0475	0.0799	0.0045	**0.4170**	0.0414	0.0501	**0.1057**
Antimony (Sb)	mg/L	0.000610	0.001800	0.001245	0.001211	0.001751	0.000480	0.000950	0.000630	0.000665	0.000940	0.00091	0.00127	0.00108	0.00108	0.00125	0.00005	0.00144	0.00106	0.00100	0.00138
Arsenic (As)	mg/L	0.000620	0.00139	0.000960	0.000916	0.00131	0.00016	0.00117	0.00045	0.000476	0.000940	0.00005	0.00053	0.00036	0.00033	0.00051	0.00005	0.00107	0.00041	0.00043	0.00079
Barium (Ba)	mg/L	0.0239	0.0495	0.0402	0.0390	0.0485	0.0209	0.0320	0.0265	0.0264	0.0316	0.0305	0.0448	0.0361	0.0369	0.0443	0.0110	0.0465	0.0303	0.0320	0.0430
Beryllium (Be)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00025	0.00005	0.00009	0.00025	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00025	0.00025	0.00018	0.00025
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cadmium (Cd)	mg/L	0.000005	0.000092	0.000020	0.000029	0.000080	0.000005	0.000036	0.000017	0.000020	0.000036	0.000025	0.000226	0.000078	0.000102	0.000211	0.000005	0.000191	0.000039	0.000046	0.000105
Calcium (Ca)	mg/L	10.0	77.1	22.2	34.2	71.1	8.67	23.7	12.7	14.1	23.2	21.1	69.5	43.1	44.2	68.6	7.1	76.6	31.9	37.2	71.5
Chromium (Cr)	mg/L	0.000050	0.000140	0.000050	0.000058	0.000091	0.000050	0.000250	0.000050	0.000106	0.000250	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00025	0.00010	0.00014	0.00025
Cobalt (Co)	mg/L	0.000050	0.000540	0.000050	0.000132	0.000419	0.000050	0.000230	0.000050	0.000105	0.000225	0.00005	0.00297	0.00065	0.00108	0.00270	0.00005	0.00114	0.00017	0.00026	0.00085
Copper (Cu)	mg/L	0.00025	0.00066	0.00025	0.00037	0.00063	0.00025	0.00100	0.00028	0.00048	0.00100	0.00025	0.04810	0.00943	0.01680	0.04368	0.00015	0.01520	0.00099	0.00298	0.00829
Iron (Fe)	mg/L	0.0150	0.0500	0.0150	0.0216	0.0440	0.0150	0.2020	0.0150	0.0388	0.1320	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.2910	0.0150	0.0220	0.0433
Lead (Pb)	mg/L	0.000025	0.000187	0.000025	0.000047	0.000125	0.000025	0.000240	0.000025	0.000056	0.000163	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000385	0.000025	0.000039	0.000077
Lithium (Li)	mg/L	0.00025	0.00342	0.00080	0.00149	0.00323	0.00025	0.00250	0.00025	0.00074	0.00250	0.00025	0.00333	0.00177	0.00178	0.00328	0.00025	0.00298	0.00250	0.00198	0.00250
Magnesium (Mg)	mg/L	0.5760	6.0900	1.7150	2.6635	5.7105	0.5620	1.7400	0.8860	1.0090	1.7250	1.6100	5.7300	3.3600	3.5150	5.6355	0.5930	6.5600	2.3650	2.8867	5.7825
Manganese (Mn)	mg/L	0.00055	0.09330	0.00654	0.02569	0.07202	0.00081	0.05130	0.01700	0.02291	0.05105	0.01750	0.49000	0.11855	0.18615	0.44695	0.00035	0.18700	0.03390	0.04316	0.09949
Mercury (Hg)	mg/L	0.000005	0.000030	0.000005	0.000007	0.000016	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000011	0.000005	0.000005	0.000005
Molybdenum (Mo)	mg/L	0.000489	0.002290	0.001215	0.001364	0.002290	0.000371	0.001020	0.000577	0.000618	0.001010	0.000970	0.001960	0.001295	0.001380	0.001903	0.000249	0.001940	0.001275	0.001151	0.001697
Nickel (Ni)	mg/L	0.000250	0.000850	0.000250	0.000411	0.000790	0.000250	0.000960	0.000250	0.000315	0.000605	0.00025	0.00235	0.00073	0.00101	0.00218	0.00025	0.00153	0.00025	0.00053	0.00119
Phosphorus (P)	mg/L	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Potassium (K)	mg/L	0.154	0.753	0.356	0.406	0.710	0.126	0.291	0.175	0.189	0.289	0.328	0.603	0.464	0.465	0.601	0.141	1.000	0.384	0.402	0.646
Selenium (Se)	mg/L	0.000050	0.000350	0.000165	0.000198	0.000323	0.000050	0.000270	0.000130	0.000145	0.000265	0.0003	0.0004	0.0003	0.0003	0.0004	0.0001	0.0009	0.0004	0.0004	0.0008
Silicon (Si)	mg/L	0.421	1.510	0.916	0.961	1.477	0.355	1.010	0.554	0.603	0.943	0.950	2.180	1.313	1.439	2.104	0.314	2.130	1.175	1.223	2.009
Silver (Ag)	mg/L	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001
Sodium (Na)	mg/L	1.00	3.50	1.00	1.70	3.34	1.00	1.00	1.00	1.00	1.00	1.0	2.6	1.6	1.7	2.5	1.0	2.4	1.0	1.1	2.1
Strontium (Sr)	mg/L	0.0551	0.4140	0.1260	0.1951	0.3849	0.0471	0.1370	0.0785	0.0804	0.1370	0.1190	0.4290	0.2410	0.2575	0.4182	0.0517	0.4630	0.1620	0.2041	0.4092
Thallium (Tl)	mg/L	0.000005	0.000011	0.000005	0.000006	0.000008	0.000005	0.000050	0.000005	0.000013	0.000050	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000050	0.000050	0.000037	0.000050
Tin (Sn)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00018	0.00005	0.00005	0.00005
Titanium (Ti)	mg/L	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.011	0.005	0.005	0.005
Uranium (U)	mg/L	0.000018	0.000202	0.000056	0.000086	0.000185	0.000005	0.000018	0.000015	0.000014	0.00002	0.00005	0.00011	0.00008	0.00008	0.00010	0.00001	0.00016	0.00005	0.00006	0.00012
Vanadium (V)	mg/L	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0012	0.0005	0.0005	0.0005
Zinc (Zn)	mg/L	0.00150	0.00310	0.00150	0.00163	0.00222	0.00050	0.00150	0.00150	0.00137	0.0015	0.0015	0.0293	0.0072	0.0113	0.0268	0.0005	0.0148	0.0015	0.0037	0.0095

(continued)

Table 2.2-2. Baseline Water Quality of Mine Site Area and Downstream Receiving Environment Sampling Sites (Brucejack, Sulphurets and Unuk Watersheds), Brucejack Gold Mine Project (continued)

Project Area		Mid and Far-field Receiving Environments *(cont'd)*																			
Site		Sulphurets Creek 2					Sulphurets Creek 3					Unuk River 1 (UR1)					Unuk River 1A (UR1 A)				
		N=73					N=53					N=54					N=47				
	Units	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P	Min	Max	Median	Mean	95th P
Total Metals *(cont'd)*																					
Nickel (Ni)	mg/L	0.00147	0.01160	0.00286	0.00369	0.00739	0.00133	0.02210	0.00251	0.00336	0.00866	0.00077	0.02790	0.00170	0.00353	0.01218	0.00025	0.02830	0.00114	0.00259	0.00872
Phosphorus (P)	mg/L	0.15	1.40	0.15	0.32	0.94	0.15	1.41	0.15	0.29	0.85	0.15	1.02	0.15	0.22	0.63	0.15	0.77	0.15	0.17	0.26
Potassium (K)	mg/L	0.60	4.69	1.80	1.93	3.17	0.64	6.17	1.63	1.81	3.24	0.68	5.20	1.14	1.34	3.26	0.35	4.55	0.58	0.76	1.88
Selenium (Se)	mg/L	0.00020	0.00473	0.00189	0.00183	0.00319	0.00041	0.00376	0.00185	0.00175	0.00291	0.00052	0.00191	0.00111	0.00106	0.00155	0.00030	0.00097	0.00056	0.00058	0.00082
Silicon (Si)	mg/L	1.90	24.70	4.69	6.78	16.72	1.98	35.70	3.80	6.27	16.32	2.03	34.10	3.11	5.85	18.04	1.64	32.10	2.19	4.18	12.57
Silver (Ag)	mg/L	0.000005	**0.000283**	0.000038	0.000070	**0.000229**	0.000005	0.000545	0.000028	0.000065	0.000300	0.000005	**0.000413**	0.000018	0.000051	**0.000200**	0.000005	**0.000253**	0.000005	0.000026	0.000093
Sodium (Na)	mg/L	1.0	4.2	1.0	1.7	3.7	1.0	3.8	1.0	1.8	3.6	1.0	3.6	1.0	1.7	3.3	1.0	3.7	1.0	1.6	3.1
Strontium (Sr)	mg/L	0.0890	0.4630	0.1800	0.2445	0.4410	0.0882	0.4150	0.2520	0.2538	0.3968	0.1030	0.3590	0.2090	0.2123	0.3272	0.1030	0.3130	0.1950	0.1973	0.2777
Thallium (Tl)	mg/L	0.000011	0.000200	0.000050	0.000056	0.000120	0.000005	0.000266	0.000050	0.000051	0.000114	0.000005	0.000224	0.000050	0.000047	0.000128	0.000005	0.000167	0.000050	0.000037	0.000050
Tin (Sn)	mg/L	0.00005	0.00045	0.00005	0.00008	0.00018	0.00005	0.00020	0.00005	0.00007	0.00016	0.00005	0.00017	0.00005	0.00006	0.00013	0.00005	0.00014	0.00005	0.00005	0.00008
Titanium (Ti)	mg/L	0.005	0.695	0.070	0.157	0.543	0.005	1.460	0.059	0.144	0.476	0.005	1.030	0.036	0.113	0.487	0.005	0.666	0.014	0.056	0.286
Uranium (U)	mg/L	0.00005	0.00082	0.00050	0.00048	0.00069	0.00009	0.00086	0.00042	0.00042	0.00065	0.00011	0.00053	0.00019	0.00021	0.00039	0.00002	0.00030	0.00004	0.00005	0.00014
Vanadium (V)	mg/L	0.0005	0.0440	0.0054	0.0103	0.0313	0.0005	0.0928	0.0044	0.0094	0.0336	0.0005	0.0859	0.0028	0.0091	0.0400	0.0005	0.0763	0.0017	0.0058	0.0272
Zinc (Zn)	mg/L	0.00910	**0.42600**	**0.12300**	**0.14119**	**0.28080**	0.02500	**0.39500**	**0.10800**	**0.11914**	**0.21680**	0.02090	**0.16600**	**0.04960**	**0.05491**	**0.09876**	0.00150	**0.07800**	0.00480	0.00815	0.02278
Dissolved Metals																					
Aluminum (Al)	mg/L	0.0041	**0.2080**	0.0328	0.0393	0.0762	0.0093	**0.2150**	0.0438	0.0513	0.0868	0.0057	**0.2600**	0.0487	0.0554	0.0992	0.0015	**0.1700**	0.0203	0.0338	**0.1241**
Antimony (Sb)	mg/L	0.00005	0.00078	0.00047	0.00046	0.00062	0.00005	0.00103	0.00047	0.00046	0.00059	0.00041	0.00196	0.00112	0.00112	0.00184	0.00063	0.00420	0.00165	0.00169	0.00322
Arsenic (As)	mg/L	0.00005	0.00044	0.00005	0.00010	0.00030	0.00005	0.00134	0.00012	0.00014	0.00027	0.00005	0.00825	0.00015	0.00034	0.00059	0.00021	0.00071	0.00028	0.00032	0.00048
Barium (Ba)	mg/L	0.0216	0.0463	0.0346	0.0348	0.0424	0.0212	0.0456	0.0339	0.0334	0.0412	0.0182	0.0451	0.0286	0.0296	0.0404	0.0147	0.0404	0.0243	0.0259	0.0375
Beryllium (Be)	mg/L	0.00005	0.00025	0.00025	0.00018	0.00025	0.00005	0.00025	0.00025	0.00016	0.00025	0.00005	0.00025	0.00025	0.00016	0.00025	0.00005	0.00025	0.00025	0.00016	0.00025
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.013	0.005	0.005	0.010	0.005	0.013	0.005	0.006	0.011	0.005	0.010	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cadmium (Cd)	mg/L	0.000028	0.004850	0.001010	0.001078	0.002586	0.000045	0.004830	0.000682	0.000719	0.001344	0.000014	0.000720	0.000312	0.000307	0.000489	0.000005	0.000041	0.000020	0.000021	0.000038
Calcium (Ca)	mg/L	11.9	80.7	32.1	41.9	75.2	14.9	78.9	46.4	44.3	71.7	16.2	54.8	28.8	30.9	53.4	12.6	36.0	22.6	22.6	35.0
Chromium (Cr)	mg/L	0.00005	0.00025	0.00011	0.00015	0.00025	0.00005	0.00025	0.00005	0.00012	0.00025	0.00005	0.00025	0.00011	0.00014	0.00025	0.00005	0.00040	0.00014	0.00016	0.00027
Cobalt (Co)	mg/L	0.00005	0.00760	0.00183	0.00197	0.00454	0.00005	0.00761	0.00129	0.00152	0.00338	0.00005	0.00152	0.00052	0.00054	0.00093	0.00005	0.00018	0.00005	0.00005	0.00005
Copper (Cu)	mg/L	0.00025	0.25600	0.00341	0.00736	0.01190	0.00025	0.25700	0.00274	0.00788	0.00534	0.00025	0.05070	0.00266	0.00408	0.00842	0.00016	0.00096	0.00030	0.00041	0.00094
Iron (Fe)	mg/L	0.0150	**2.1300**	0.0150	0.0496	0.0660	0.0150	**1.8400**	0.0150	0.0631	0.1560	0.0150	**2.1500**	0.0150	0.0739	0.1126	0.0150	0.1880	0.0150	0.0360	0.1165
Lead (Pb)	mg/L	0.000025	0.000100	0.000025	0.000027	0.000025	0.000025	0.000143	0.000025	0.000030	0.000048	0.000025	0.001060	0.000025	0.000062	0.000247	0.000025	0.000102	0.000025	0.000031	0.000075
Lithium (Li)	mg/L	0.00025	0.00250	0.00250	0.00208	0.00250	0.00025	0.00250	0.00250	0.00187	0.00250	0.00025	0.00250	0.00250	0.00181	0.00250	0.00025	0.00250	0.00250	0.00179	0.00250
Magnesium (Mg)	mg/L	0.7400	7.1900	2.6200	3.4865	6.6580	0.8670	6.1400	3.6800	3.5914	6.0240	1.2600	5.7600	3.1300	3.3292	5.6740	1.7600	5.5000	3.4300	3.4979	5.3480
Manganese (Mn)	mg/L	0.00169	0.34400	0.21800	0.19137	0.32040	0.02170	0.30800	0.18300	0.16380	0.24060	0.00131	0.11000	0.06870	0.06458	0.09840	0.00041	0.01310	0.00660	0.00667	0.01121
Mercury (Hg)	mg/L	0.000005	0.000012	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000013	0.000005	0.000005	0.000005	0.000005	0.000011	0.000005	0.000005	0.000005
Molybdenum (Mo)	mg/L	0.000025	0.002920	0.001580	0.001640	0.002704	0.000025	0.003110	0.001980	0.001786	0.002628	0.000765	0.002020	0.001180	0.001275	0.001900	0.000447	0.001220	0.000806	0.000818	0.001175
Nickel (Ni)	mg/L	0.00025	0.00325	0.00162	0.00140	0.00259	0.00025	0.00301	0.00132	0.00125	0.00220	0.00025	0.00119	0.00071	0.00065	0.00115	0.00025	0.00087	0.00025	0.00033	0.00063
Phosphorus (P)	mg/L	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Potassium (K)	mg/L	0.166	2.210	1.050	1.171	1.952	0.631	2.030	1.230	1.206	1.800	0.426	1.420	0.761	0.810	1.260	0.263	0.638	0.419	0.444	0.628
Selenium (Se)	mg/L	0.0001	0.0030	0.0013	0.0014	0.0025	0.0003	0.0026	0.0017	0.0014	0.0021	0.0004	0.0017	0.0010	0.0009	0.0014	0.0003	0.0008	0.0005	0.0005	0.0008
Silicon (Si)	mg/L	0.448	2.610	1.510	1.604	2.502	0.641	2.540	1.830	1.702	2.460	0.706	2.280	1.720	1.621	2.244	0.763	2.120	1.870	1.633	2.030
Silver (Ag)	mg/L	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00003	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
Sodium (Na)	mg/L	1.0	4.0	1.0	1.7	3.6	1.0	3.7	1.0	1.8	3.5	1.0	3.4	1.0	1.6	3.2	1.0	3.4	1.0	1.5	3.0
Strontium (Sr)	mg/L	0.0603	0.4480	0.1710	0.2302	0.4392	0.0756	0.4080	0.2510	0.2394	0.3938	0.0916	0.3470	0.1810	0.1992	0.3228	0.0926	0.2940	0.1840	0.1872	0.2797
Thallium (Tl)	mg/L	0.000005	0.000050	0.000050	0.000039	0.000050	0.000005	0.000050	0.000050	0.000036	0.000050	0.000005	0.000050	0.000050	0.000031	0.000050	0.000005	0.000050	0.000050	0.000030	0.000050
Tin (Sn)	mg/L	0.00005	0.00018	0.00005	0.00005	0.00005	0.00005	0.00032	0.00005	0.00006	0.00005	0.00005	0.00014	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005
Titanium (Ti)	mg/L	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Uranium (U)	mg/L	0.00001	0.00048	0.00006	0.00016	0.00044	0.00001	0.00043	0.00012	0.00019	0.00039	0.00001	0.00023	0.00010	0.00011	0.00021	0.00001	0.00005	0.00003	0.00003	0.00004
Vanadium (V)	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Zinc (Zn)	mg/L	0.0005	0.3250	0.0394	0.0486	0.1356	0.0005	0.3220	0.0222	0.0270	0.0547	0.0005	0.0541	0.0105	0.0120	0.0231	0.0005	0.0032	0.0015	0.0015	0.0029

(continued)

Table 2.2-2. Baseline Water Quality of Mine Site Area and Downstream Receiving Environment Sampling Sites (Brucejack, Sulphurets and Unuk Watersheds), Brucejack Gold Mine Project (completed)

Project Area		Mid and Far-field Receiving Environments *(cont'd)*				
Site		Unuk River 2 (UR2)				
		N=35				
	Units	Min	Max	Median	Mean	95th P
Total Metals *(cont'd)*						
Nickel (Ni)	mg/L	0.00025	**0.02890**	0.00166	0.00299	0.00807
Phosphorus (P)	mg/L	0.15	1.15	0.15	0.18	0.20
Potassium (K)	mg/L	0.76	5.18	1.22	1.38	2.08
Selenium (Se)	mg/L	0.00030	0.00106	0.00064	0.00066	0.00094
Silicon (Si)	mg/L	2.24	37.80	4.22	6.17	13.03
Silver (Ag)	mg/L	0.000005	**0.000319**	0.000020	0.000038	0.000091
Sodium (Na)	mg/L	1.0	3.2	1.0	1.5	3.0
Strontium (Sr)	mg/L	0.0790	0.2510	0.1200	0.1450	0.2375
Thallium (Tl)	mg/L	0.000005	0.000219	0.000050	0.000042	0.000050
Tin (Sn)	mg/L	0.00005	0.00027	0.00005	0.00006	0.00010
Titanium (Ti)	mg/L	0.005	1.600	0.093	0.156	0.397
Uranium (U)	mg/L	0.00018	0.00112	0.00029	0.00032	0.00038
Vanadium (V)	mg/L	0.0005	0.0824	0.0052	0.0086	0.0235
Zinc (Zn)	mg/L	0.01010	**0.11100**	0.01840	0.02497	**0.05232**
Dissolved Metals						
Aluminum (Al)	mg/L	0.0160	**0.8270**	0.0519	0.0865	**0.3099**
Antimony (Sb)	mg/L	0.00025	0.00111	0.00052	0.00056	0.00089
Arsenic (As)	mg/L	0.00012	0.00241	0.00023	0.00031	0.00053
Barium (Ba)	mg/L	0.0193	0.0487	0.0249	0.0295	0.0460
Beryllium (Be)	mg/L	0.00005	0.00025	0.00025	0.00018	0.00025
Bismuth (Bi)	mg/L	0.00025	0.00025	0.00025	0.00025	0.00025
Boron (B)	mg/L	0.005	0.011	0.005	0.006	0.010
Cadmium (Cd)	mg/L	0.000005	0.000378	0.000124	0.000120	0.000192
Calcium (Ca)	mg/L	13.2	43.2	18.4	23.9	42.2
Chromium (Cr)	mg/L	0.00005	0.00094	0.00025	0.00019	0.00026
Cobalt (Co)	mg/L	0.00005	0.00170	0.00015	0.00021	0.00034
Copper (Cu)	mg/L	0.00030	0.04700	0.00185	0.00339	0.00472
Iron (Fe)	mg/L	0.0150	**3.5000**	0.0150	0.1422	0.2974
Lead (Pb)	mg/L	0.000025	0.002360	0.000025	0.000110	0.000232
Lithium (Li)	mg/L	0.00025	0.00250	0.00250	0.00173	0.00250
Magnesium (Mg)	mg/L	0.9160	3.6000	1.7200	2.0212	3.5550
Manganese (Mn)	mg/L	0.00281	0.09990	0.02250	0.02581	0.03472
Mercury (Hg)	mg/L	0.000005	0.000005	0.000005	0.000005	0.000005
Molybdenum (Mo)	mg/L	0.000956	0.003000	0.001630	0.001846	0.002781
Nickel (Ni)	mg/L	0.00025	0.00199	0.00025	0.00032	0.00052
Phosphorus (P)	mg/L	0.15	0.15	0.15	0.15	0.15
Potassium (K)	mg/L	0.605	1.440	0.732	0.875	1.353
Selenium (Se)	mg/L	0.0002	0.0009	0.0005	0.0005	0.0009
Silicon (Si)	mg/L	0.929	3.070	1.750	1.950	2.715
Silver (Ag)	mg/L	0.00001	0.00001	0.00001	0.00001	0.00001
Sodium (Na)	mg/L	1.0	3.0	1.0	1.4	2.9
Strontium (Sr)	mg/L	0.0697	0.2410	0.1060	0.1329	0.2355
Thallium (Tl)	mg/L	0.000005	0.000050	0.000050	0.000033	0.000050
Tin (Sn)	mg/L	0.00005	0.00005	0.00005	0.00005	0.00005
Titanium (Ti)	mg/L	0.005	0.065	0.005	0.007	0.014
Uranium (U)	mg/L	0.00009	0.00036	0.00016	0.00020	0.00036
Vanadium (V)	mg/L	0.0005	0.0035	0.0005	0.0006	0.0005
Zinc (Zn)	mg/L	0.0010	0.0292	0.0041	0.0054	0.0101

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