APPENDIX 15-D
2009 AQUATIC RESOURCES BASELINE REPORT

Seabridge Gold Inc.

KSM PROJECT
2009 Aquatic Resources Baseline Report

SEABRIDGE GOLD

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KSM PROJECT
2009 AQUATIC RESOURCES BASELINE REPORT

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Prepared for:

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Executive Summary

The 2009 stream and lake aquatic ecology baseline program was designed to continue the physical, chemical, and biological characterization of streams, rivers, and lakes located close to the proposed KSM Project area. Aquatics studies complement water quality sampling.

The aquatic ecology baseline program focused on twenty-seven sites on stream and river systems and four lakes that could be affected by Project development and operation. These sites are found within the Mitchell/Sulphurets/Unuk, Teigen/Snowbank/Bell-Irving, and Treaty/Bell-Irving watersheds. The baseline studies continued the collection of sediment quality (physical, organics, metals, nutrients) and primary and secondary producers at these sites.

Stream sediments in the KSM Project area had naturally high concentrations of metals. Mitchell Creek, and sections of Sulphurets Creek and Treaty Creek had the highest natural metal concentrations and most frequently exceeded existing BC and CCME Sediment Quality Guidelines for the Protection of Aquatic Life. At approximately 90% of the stream sites, the sediments were nutrient poor and were composed mainly of sand with only small amounts of fine particles.

The periphyton and benthic invertebrate communities at Teigen Creek, South Teigen Creek, North Treaty Creek Tributary, and Snowbank Creek were abundant and diverse compared to the biological communities in Treaty Creek, Mitchell Creek, and in most of the Sulphurets Creek drainage which were quite sparse. The periphyton communities in the streams and rivers of the KSM Project area tended to be dominated by diatoms and the benthic invertebrate communities tended to be dominated by Diptera (primarily chironomids), Plecoptera (stoneflies) and Ephemeroptera (mayflies).

Sulphurets Lake (SUL) and Knipple Glacier Lake (KGL) are glacier-fed lakes, located at relatively high elevations and are surrounded by glaciers. These lakes are characterized by turbid, nutrient poor waters. Sediments at SUL were characterized by naturally high concentrations of metals that frequently exceeded BC and CCME guidelines. In contrast, West Teigen Lake (LAL) and Todedada Lake (TDL) are located at lower elevations in vegetated valleys. These lakes are stream fed and characterized by clearer water and higher nutrient and organic carbon contents and generally had lower concentrations of metals in their sediments compared to levels in the glacial fed lakes.

Phytoplankton biomass, density, and diversity were low in SUL, with greater levels being measured at KGL, TDL, and LAL. Zooplankton density was low in both the glacial lakes, KGL and SUL (<400 organisms/m), indicating naturally low productivity in these cold, nutrient-poor lakes. TDL and LAL had higher zooplankton densities, genus richness, and diversities than the glacial lakes, particularly in the deeper zones. As with zooplankton, the benthic invertebrate community in SUL and KGL was sparse, while diverse and abundant communities were observed in LAL and TDL. The limited phytoplankton, zooplankton, and benthic invertebrate measured at the glacier lakes (SUL and KGL) indicate that there is minimal biological activity present at these lakes.

KSM PROJECT
2009 AQUATIC RESOURCES BASELINE REPORT

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Acronyms and Abbreviations

BC	British Columbia
CCME	Canadian Council of Ministers of the Environment
KSM	Kerr Sulphurets Mitchell
EPT	Ephemeroptera, Plecoptera and Trichoptera
ISQG	Interim freshwater sediment quality guidelines
LAL	West Teigen Lake
KGL	Knipple Glacier Lake
MMER	Metal Mining Effluent Regulations
Not PAG	Not Potentially Acid Generating
PAG	Potentially Acid Generating
PEL	Probable Effects Levels
SCT	Scott Creek
SUNR	South Unuk River
SUL	Sulphurets Lake
SQG	Sediment Quality Guidelines
TDL	Todedada Lake

1. Introduction

1.1 PROJECT PROPONENT

The proponent for the KSM (Kerr-Sulphurets-Mitchell) Project is Seabridge Gold Inc. (Seabridge), a publicly traded junior gold company with common shares trading on the Toronto Stock Exchange in Canada and on the American Stock Exchange in the United States.

1.2 KSM PROJECT LOCATION

The KSM Project is a gold/copper project located in the mountainous terrain of northwestern British Columbia, approximately 950 km northwest of Vancouver, British Columbia, and approximately 65 km northwest of Stewart, British Columbia (Figure 1.2-1). The proposed Project lies approximately 20 km southeast of Barrick Gold's recently-closed Eskay Creek Mine and 30 km northeast of the Alaska border. The proposed processing plant and tailing management facility will be located about 15 km southwest of the community of Bell II on Highway 37.

The north and west parts of the Project area drain towards the Unuk River, which crosses into Alaska and enters the Pacific Ocean at Burroughs Bay. The eastern part of the Project area drains towards the Bell-Irving River, which joins the Nass River and empties into the Canadian waters of Portland Inlet. Elevations in the Project area range from under 240 m at the confluence of Sulphurets Creek with the Unuk River, to over 2,300 m at the nearby peak of the Unuk Finger.

1.3 KSM PROJECT DESCRIPTION

The KSM Project is a large proposed gold-copper mining project. Reserve figures released in a preliminary feasibility study announced on March 31, 2010 include 1.6 billion tonnes of ore containing 30.2 million ounces of gold, 7 billion pounds of copper, 133 million ounces of silver and 210 million pounds of molybdenum in the proven and probable categories. This environmental baseline study was designed to address a wide range of alternatives that have been assessed from engineering and cost perspective at various times during the baseline studies. The following project description is the base case for the March 2010 Preliminary Feasibility Study. Maps in subsequent sections of this baseline report may depict slightly different footprint configurations relating to earlier designs that prevailed at the time the fieldwork was completed.

The proposed Project as defined for the purposes of this environmental baseline study will be comprised of two distinct and geographically separate areas (the mining area and processing plant and tailing management area), shown in Figure 1.3-1. The proposed mining area is located in the drainage basin of Sulphurets Creek, a major tributary of the Unuk River. The proposed location of the processing plant and tailing management facility is in the headwaters of tributaries of Teigen and Treaty Creeks, which flow to the Bell-Irving River. The two areas will be connected by a pair of parallel tunnels. An overview of these proposed mine components is provided in the following two Sections.

1.3.1 Mining Area

It is proposed that the mining area will be accessed by a new road to be constructed from the current Eskay Creek mine road. The access road will be used to transport personnel, heavy mining equipment, mining supplies, and explosives. This new road will trend southwestwards to the headwaters of Coulter Creek and then follow the general course of Coulter Creek to the Unuk River. After crossing the Unuk

FIGURE 1.2-1

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KSM Project Location

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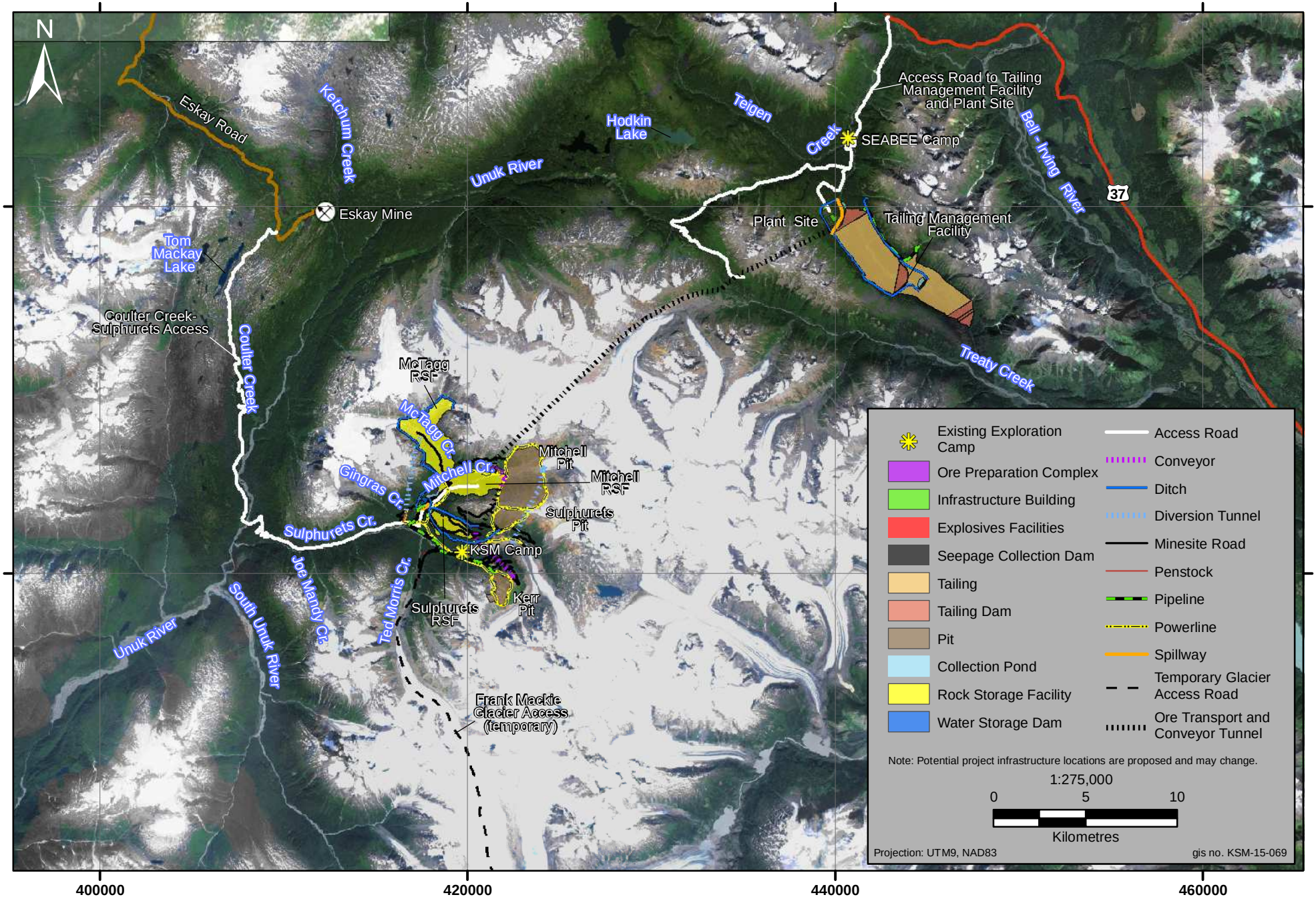

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KSM Project Layout and Road Access

FIGURE 1.3-1

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River it will follow the north side of the Sulphurets Creek Valley and cross Mitchell Creek. The Unuk River is considered navigable water under the *Navigable Waters Protection Act*. Branch roads will lead to each of the Kerr, Sulphurets and Mitchell deposits. Another branch road will head south parallel to Ted Morris Creek towards the toe of the north flowing tongue of Frank Mackie Glacier to provide access to the explosives manufacturing plant and related explosives magazines.

The support facilities for the mining area are proposed in the vicinity of the confluence of Sulphurets and Mitchell creeks. They will include accommodation for mine employees and administration and maintenance facilities.

The ore deposits will be bulk mined with large shovels and trucks and will use conventional drilling and blasting methods. The Kerr deposit is located on a ridge south of Sulphurets Lake. It is proposed that ore and non-ore mined rock will be transported from the Kerr deposit by conveyor to a tunnel portal (Sulphurets Mitchell tunnel) on the north side of Sulphurets Creek. These materials will be transported through the tunnel by conveyor to the Mitchell Creek Valley where they will be transported to the ore preparation complex or the Mitchell-McTagg rock storage facilities, respectively.

The Sulphurets deposit is located on the south side of the ridge north of Sulphurets Lake. It is proposed that ore will be transported by truck to the Sulphurets Mitchell tunnel and then by conveyor to the ore preparation complex. Non-ore mined rock will be transported to the Sulphurets rock storage facility on the south side of the ridge between the Mitchell Creek and Sulphurets Creek valleys, or to the Mitchell-McTagg rock storage facilities.

The Mitchell deposit straddles the Mitchell Creek Valley in an area recently exposed by the recession of the Mitchell Glacier. Mining of the deposit is proposed on both sides of the valley and to a depth of over 400 m below the current valley bottom. Seabridge proposes to construct a diversion tunnel from near the toe of the Mitchell Glacier, southwards towards the Sulphurets Creek Valley upstream of Sulphurets Lake to divert the flow of Mitchell Creek away from the proposed open pit area. It is proposed that the significant hydraulic head created by this tunnel will be used to drive a hydro-electric plant to generate a small portion of the electricity requirements of the Project.

Large volumes of low grade or barren rock will be removed in order to access the ore in each of the deposits. Non-ore rock removed to access ore will consist of both potentially acid generating (PAG) and not potentially acid generating (not PAG) rock. Rock storage areas have been defined in the Mitchell Creek and McTagg Creek valleys and on the south-facing side of the ridge between Sulphurets Creek and Mitchell Creek valleys. Runoff and seepage from the rock storage areas will be collected in a water storage facility contained behind a dam, to be located in the lower reaches of Mitchell Creek, and treated prior to discharge to the environment. The piped flow from the storage facility to the water treatment plant may be used to drive a hydro-electric plant.

A second diversion tunnel is proposed to direct the flow of McTagg Creek to the Sulphurets Creek Valley, thus avoiding the rock storage areas. The discharge from this tunnel will be available to drive a hydro-electric plant.

A run-of-river hydro-electric plant is proposed to harness the hydraulic head of the cascade in the lower reaches of Sulphurets Creek.

Ore from the deposits will be transported to an ore preparation complex, consisting of crushing and grinding facilities and related ore storage stockpiles, located on the north side of the Mitchell Creek Valley west of the Mitchell pit. Prepared ore will be mixed with water and pumped through one of two parallel 23 km-long tunnels to the process plant, proposed to be located in the drainage of a north-

flowing tributary of Teigen Creek. The tunnels will daylight for a short distance near the divide between the Unuk River drainage and Treaty Creek before proceeding to the plant site in the Teigen Creek drainage. They will accommodate two pipelines to transport ore slurry as well as a return water pipeline, a diesel fuel pipeline, and a transmission line. The tunnels will slope towards Mitchell Creek so that all drainage can be controlled at the mine site and treated as necessary prior to release to the environment.

1.3.2 Processing and Tailing Management Area

The tunnel from the Mitchell Creek Valley will terminate on the south side of the valley formed by a north flowing tributary of Teigen Creek (South Teigen Creek) and a south flowing tributary of Treaty Creek (North Treaty Creek Tributary), adjacent to the plant site.

The plant will use a conventional grinding and flotation flowsheet to produce separate copper/gold and molybdenum concentrates, gold doré and tailing. It will process up to 120,000 tonnes per day of ore to produce an average of 1,200 tonnes per day of concentrate. The concentrate will be dried and transported to the port of Stewart by truck. It is anticipated that approximately 20 to 30 round trips per day will be required using 40 tonne payload trucks.

Vehicle access to the plant site will be by a 14 km long road along Teigen Creek from Highway 37. This road will require bridges to cross Teigen creek, which may be considered to be navigable water, and smaller tributaries.

The tailing will be pumped through pipelines to the tailing management facility located in the upper reaches of the Teigen Creek Valley, extending southeast over the divide into a tributary of the Treaty Creek drainage. The facility will be constructed in two phases: the north cell will be developed between a north dam, to be located across the valley of the south tributary of Teigen Creek near the plant site, and a south dam, to be located near the crest of the valley floor; and a south cell that will be retained by a southeast dam, to be located in the headwaters of the north tributary of Treaty Creek. The proposed facility will have storage capacity for the life of the Project within an area about 8 km long and 1.5 km wide. Seepage from the south and southeast dams will be pumped back into the impoundment to reduce any potential impact on the Treaty Creek drainage. Water diversion channels will be constructed on both flanks of the impoundment, where feasible, to divert clean water away from the impoundment. Supernatant water will be recovered from the impoundment using barge mounted pumps and recycled to the plant for process water. In the event that discharge is required, the excess water in the impoundment will be pumped over the northern dam towards the Teigen Creek drainage. Treatment of discharge water may be required to meet permit conditions.

It is assumed that electricity to power the plant and mine site will be obtained from the provincial electricity grid. A secondary transmission line will be constructed from a switching station, to be located near the point where Highway 37 crosses Snowbank Creek. The secondary line will follow the general alignment of the access road, to the plant site, and then pass through the tunnel to the mine site.

2. Objectives

A comprehensive stream and lake aquatic ecology baseline was initiated in the KSM Project area in 2008. The purpose of the 2009 stream and lake aquatic ecology baseline assessment was to continue the physical, chemical, and biological characterization of streams, rivers, and lakes close to the proposed project study area. These are key components of stream and lake habitat, together with water quality.

Sediment is deposited on the bottom of streams, rivers, and lakes and accumulates over time. Sediment chemistry provides a useful tool for assessing changes in aquatic habitats. Sediment influences the quality of the overlying waters, integrates chemical exposure over time (through adsorption, desorption and absorption), and is the substrate for the benthic community. Consequently, it is a key component to assess and monitor in stream, river, and lake environments.

The primary and secondary producers monitored in Project streams were periphyton and benthic invertebrates. Periphyton (algae growing on substrates) provides energy, nutrients, and organic material to stream systems, and therefore contributes to the food base of stream life. Changes in periphyton community structure can indicate altered water quality, which can impact other aquatic life. Benthic invertebrates are important in nutrient and organic cycling and ecosystem diversity. They constitute an important food source for fish and respond rapidly to environmental stimuli, and thus serve as an early warning indicator in the event of adverse effects to the aquatic environment. Benthic invertebrates typically form the backbone of effects monitoring programs, and collecting quantitative baseline data supports the development of future monitoring programs. Characterizing the benthic communities is also important in assessing the productivity of streams.

The primary and secondary producers monitored in Project lakes were phytoplankton, zooplankton, and benthic invertebrates. Phytoplankton are microscopic plants which manufacture their energy via photosynthesis and form the organic compounds which are required through the food web. Zooplankton and benthic invertebrates area secondary producers and contribute to the food base of lake life. Changes in these communities can indicate altered water or sediment quality. These organisms also form the basis for nutrition and energy requirements of fish, amphibians and waterfowl.

The objectives of the 2009 KSM stream aquatic ecology baseline studies were to:

- Continue the information gathering initiated in 2008.
- Obtain baseline information of sediment quality (physical, organics, metals, nutrients) in rivers and streams within the proposed Project area.
- Obtain baseline information regarding the density, diversity, and distribution of algal and benthic invertebrate communities in stream and river habitat within the Project area.

As with the streams, there is minimal information regarding the aquatic ecology and sediment quality of the lakes in the Project area. Thus, the objectives of the 2009 lake aquatic ecology baseline assessment were to:

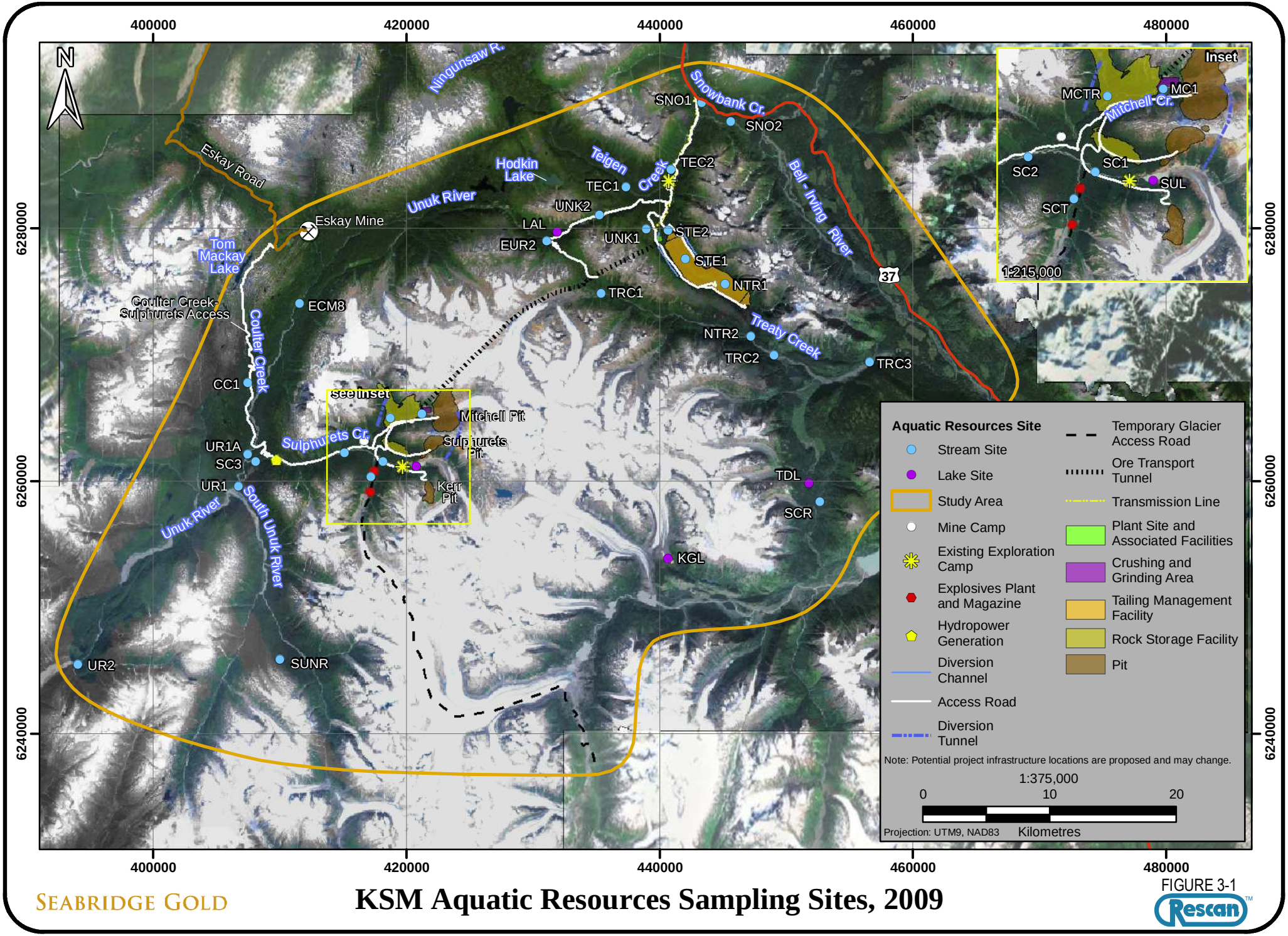
- Continue the information gathering initiated in 2008.
- Obtain baseline information on sediment, physical limnology, phytoplankton, zooplankton, and benthic invertebrate communities in key lakes in the Project areas.

3. Study Area

The 2009 KSM Project stream aquatic ecology baseline assessment focused on the watersheds that could potentially be affected by Project development and operation (i.e., Mitchell/Sulphurets/Unuk, Teigen/Snowbank/Bell-Irving, and Treaty/Bell-Irving) (Figure 3-1).

A total of twenty-seven stream and river sites within the Project area were included in the aquatic ecology program. These sites included two reference sites: Scott Creek (SCT) and South Unuk River (SUNR). Sites in the Snowbank Creek and Teigen Creek drainages were selected to address the potential impacts of the proposed tailing management facility and associated roads. Teigen Creek sites, as well as sites on the Unuk River, were selected to assess the systems along the proposed road. Coulter, McTagg, Sulphurets, and Mitchell creeks, and Unuk River were selected to examine the area potentially affected by the proposed mine site and the associated roads. A detailed list of study sites and rationale is provided in Table 3-1.

Four lakes were monitored as part of the 2009 study. Sulphurets Lake (SUL), West Teigen Lake (LAL), and Knipple Glacier Lake (KGL) were sampled in 2008. In 2008, KGL was used as a reference lake for SUL and LAL. The limnological, biological, and chemical data collected in 2008 indicated that KGL was a suitable reference site for SUL but not for LAL. Todedada Lake (TDL) was therefore added to the 2009 field program to provide an appropriate reference site for LAL. SUL is located downstream of the Sulphurets deposit and proximal to the existing exploration camp. LAL is located near the proposed roads associated with the ore transport tunnel saddle portals. Both KGL and SUL are glacial headwater lakes. Lake sampling occurred during late August 2009.



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KSM Aquatic Resources Sampling Sites, 2009

FIGURE 3-1

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Table 3-1. 2009 Aquatics Sampling Sites, Water Bodies and Study Components for the KSM Aquatic Resources Baseline Studies

	Watershed	Site Code	Site Name	Periphyton	Sediment	Benthic 5 Hess	Benthic 3 Hess	Benthic Kick-net	Rationale
	Unuk River								
1		EUR2	Unuk River, upstream	1	1		1		Monitor for potential impacts from road
3		ECM8	Unuk River, near Eskay Creek mine, downstream	1	1		1		Long-term Eskay Cr upstream control site; annual due to lack of access most of year
4		CC1	Coulter Creek, tributary of Unuk River	1	1		1	1	Monitor for water quality impacts resulting from road construction and operation
5		UR1	Unuk River, mid	1	1	1			Monitor downstream of confluence of Sulphurets Creek and Unuk River
6		UR2	Unuk River, lower	1	1		1		Far-field downstream Unuk River site, just upstream of BC-Alaska border. Established at the request of the US government
7		UR1A	Unuk River, upstream of Sulphurets	1	1	1			Reference site just upstream of confluence of Sulphurets with Unuk
	South Unuk River								
8		SUNR	South Unuk River REF	1	1	1		1	Reference stream to compare to SC3 lower Sulphurets exposure area.
	Teigen Creek								
9		STE1	Teigen Creek, in tailings pond	1	1		1		Stream under footprint of TMF
10		STE2	Teigen Creek, at discharge of tailings pond	1	1	1		1	Potential discharge location from TMF
11		UNK1	Teigen Creek Upper Tributary	1	1		1		Stream close to Plant site
12		UNK2	Teigen Creek, upstream	1	1	1			Monitor for potential impacts from road
13		TEC1	Teigan Creek, alternate tails area	1	1	1		1	Reference stream on Teigen Creek (north tributary)
14		TEC2	Teigen Creek, downstream	1	1	1			Mid-field exposure site on Teigen Cr for potential TMF and along road access route
15		SNO1	Snowbank Creek, upstream.	1	1	1			Reference on Snowbank Creek upstream of Snowbank Creek mouth. Snowbank Creek is a tributary of Teigen.
16		SNO2	Teigen Creek, downstream of Snowbank Creek	1	1	1			Mid-field exposure site on Teigen Creek, downstream of Snowbank Creek
	Treaty Creek								
17		TRC1	Treaty Creek, upstream	1	1		1		Monitor water qaulity into Treaty Creek.
18		TRC2	Treaty Creek, mid	1	1	1			Monitor water quality for potential seepage from South dam of TMF into Treaty Creek
19		TRC3	Treaty Creek, downstream	1	1		1		Treaty Creek downstream of TRC 2, potential impacts from TMF and road corridor monitoring
20		NTR1	Treaty Creek Tributary, upper	1	1		1		North Treaty Creek, under footprint of potential TMF
21		NTR2	Treaty Creek Tributary, lower	1	1	1		1	Near-field monitoring of seepage from S dam of potential TMF into North Treaty Creek
	Mitchell Creek								
22		MC1	Mitchell Creek	1	1	1			Near-field site downstream of Mitchell deposit
23		MCTR	Mitchell Creek Tributary	1	1	1			Mitchell Creek tributary (potential waste rock storage)
	Sulphurets Creek								
27		SC1	Sulpurets Creek Upstream	1	1	1			Downstream of Kerr deposit, exploration camp, and Sulphurets Lake
28		SC2	Sulphurets Creek mid	1	1	1			Midway downstream on Sulphurets, monitor mixed Mitchell and Sulphurets creeks.
29		SC3	Sulphurets Creek lower	1	1	1			Sulphurets Creek at mouth before it joins Unuk RIver
30		SCT	Sulphurets Creek Tributary	1	1		1		Sulphurets Creek tributary, temporary Frank Mackie Glacier access route, access to explosives manufacturing plant
	Scott Creek								
31		SCR	Scott Creek REF	1	1	1		1	Scott Creek, far-field stream reference site
			Total	**27**	**27**	**17**	**10**	**6**	

	LAKES Watershed	Site Code	Site Name	Phytoplankton	Zooplankton	Benthic	Sediment	Rationale
1	Sulperets Creek	SUL	Sulphurets Lake	1	1	1	1	Close to Kerr and Sulphurets pit, exploration camp
2	Bowser River	KGL	Knipple Glacier (Small Lake - not Knipple Lake)	1	1	1	1	Reference lake for SUL
3	Teigen Creek	LAL	West Teigen Lake	1	1	1	1	Lake in upper Teigen Creek Watershed, monitor for water quality impacts resulting from road construction and operation
4	Scott Creek	TDL	Todedada Lake	1	1	1	1	Reference lake for LAL
			Total	**4**	**4**	**4**	**4**	

4. Methodology

4.1 STREAMS

4.1.1 Site Characterization

Prior to sampling at the majority of the stream sites, photos were taken facing upstream, downstream, and across the section of stream to be sampled to characterize the site conditions. Further, a photo of a characteristic portion of the sample area substrate was taken to assist in the interpretation of data.

Velocity measurements were taken at each biology replicate station (benthos and periphyton) using a meter stick. The meter stick was held with the narrow edge directed into the current to measure flowing water depth first (D1) and then the meter stick was turned with the broad side directed into the current to measure the depth of stagnation (or the build up of water against a fixed object) (D2). The difference between the depth of the water and the depth of stagnation was calculated (D2-D1 (m)). Velocity (m/s) was calculated using formula (BC MoE, 2009):

$$\text{Velocity (m/s)} = \sqrt{(2*(D2-D1)*9.81)}$$

4.1.2 Sediment Quality

Sediment samples were collected at 27 stream and river sites, and analyzed for moisture, particle size, cyanides, nutrients, organic carbon, and total metal concentrations. A list of sediment quality variables determined from the stream sites is presented in Table 4.1-1. The lowest commercial analytical detection limits was used for all analyses. Metal analyses were done on the fine (<0.63 µm) fraction of the sediment because metals are predominantly associated with the fine-grained fraction in aquatic sediments. In smaller grain sizes the fraction of silica decreases, surface area increases, ion exchange capacity increases, and clay mineral content increases, consequently increasing the capacity for metals to bind to these fractions (Filion and Morin 2000). Whole sediment samples were analyzed for particle size distribution.

Sediment samples were collected in triplicate at each stream station using appropriate sampling equipment. Sampling was conducted at three distinct areas per site (different braids or different stretches of the main channel), covering a total stretch of 50 to 250 m, depending on site width and access. For larger rivers, sediment sampling was conducted in depositional areas near the shoreline that could be accessed safely by wading. A plastic bowl and spoon were used to collect multiple grab subsamples within or alongside streams and river stations. Sediment was spooned from the top 2 cm (when possible) at three points along the stream. The sample was pooled (excess water drained off) and manually homogenized for one minute in the mixing bowl (Plate 4.1-1).

Sediment was then carefully spooned into clean, pre-labeled Whirl-Pak bags, sealed (no air bubbles), and kept cool in the dark until the samples were shipped to and analyzed by ALS Environmental Services (Vancouver, BC).

The bowl and spoon were rinsed with diluted nitric acid and sample water between sample sites. For quality assurance/quality control (QA/QC) purposes, field homogenization duplicates were collected for 10% of all samples and labelled as ‘QAQC_#’ to avoid lab bias during sample analysis.

Table 4.1-1. Sediment Quality Analytical Detection Limits, KSM Project 2009

Physical Tests	
% Moisture	0.1
pH	0.1
Particle Size	
% Gravel (> 2mm)	1
% Sand (2.0 mm - 0.063 mm)	1
% Silt (0.063 mm – 4 µm)	1
% Clay (<4 µm)	1
Nutrients	
Total Nitrogen	0.02
Total Phosphorus	90
Total Sulphur	0.1
Cyanides	
Cyanide, Total	3
Organic / Inorganic Carbon	
$CaCO_3$ Equivalent (%)	0.7
Inorganic Carbon (%)	0.09
Total Carbon (%)	0.1
Total Organic Carbon (%)	0.1
Plant Available Nutrients	
Available Phosphate-P	2
Metals	
Aluminum (Al)	50
Antimony (Sb)	10
Arsenic (As)	5

Metals	
Beryllium (Be)	0.5
Bismuth (Bi)	20
Barium (Ba)	1
Cadmium (Cd)	0.5
Calcium (Ca)	50
Chromium (Cr)	2
Cobalt (Co)	2
Copper (Cu)	1
Iron (Fe)	50
Lead (Pb)	30
Lithium (Li)	2
Magnesium (Mg)	50
Manganese (Mn)	1
Mercury (Hg)	0.01
Molybdenum (Mo)	4
Nickel (Ni)	5
Phosphorus (P)	50
Potassium (K)	200
Selenium (Se)	0.1 to 11
Silver (Ag)	2
Sodium (Na)	200
Strontium (Sr)	0.5
Sulfur (S)	100
Thallium (Tl)	1
Tin (Sn)	5
Titanium (Ti)	1
Vanadium (V)Total Sulphur	20.1
Zinc (Zn)Vanadium (V)	12
Zinc (Zn)	1

**All units are in mg/kg unless otherwise noted*

For data interpretation purposes, values below the detection limit ("non-detects") were considered to be half of the detection limit. Data were summarized by site and watershed and compared to both CCME and BC sediment quality guidelines (BC MoE 2006; CCME 1999). The BC working guidelines are predominantly based on the CCME Interim Sediment Quality Guideline (ISQG) and Probable Effect Level (PEL) guidelines. The exceptions to this generalization are the working guidelines for iron, nickel, selenium and silver, which are based on the screening level concentration to give both the Lowest Effect Level (SEL) and Severe Effect Level. CCME guidelines consist of ISQG and the PEL.

Plate 4.1-1. Stream sediment sampling at KSM Project Streams, 2009.

Variations in environmental conditions across Canada and BC will affect sediment quality in different ways and site specific conditions will influence the assimilative capacity and sensitivity of species (CCME, 1999). Sediment quality guidelines are tools used to evaluate the toxicological significance of sediment chemistry data and support management decisions. Sediment chemical concentrations below the guidelines are not expected to be associated with any adverse biological effects.

4.1.3 Primary Producers – Periphyton

Three periphyton replicate samples were collected from each of the 27 aquatic biology stream sites. Where possible, rocks were collected within the riffle zone. At larger streams, rocks were collected in areas of moving water, within 1 meter from the shore. Periphyton was gently scraped off two to three rocks per site (spaced a minimum of 5 m apart) using a 2x2 cm^2 rubber stencil, a small brush, funnel and squirt bottle. When rocks were not available, woody debris was selected for algal sampling. As woody debris provides a different habitat for colonization, this method was only utilized at one stream (NTR1) where no rocks were present and the results are highlighted in the following discussion. For each rock, multiple discs (i.e., squares of known size) were collected and combined in order to accurately characterize periphyton coverage on each rock. For each rock, two discs were collected from the same side of the exposed surface of the rock (i.e., not the bottom). One disc was collected in one 500 ml plastic jar for taxonomy and the second disc was collected in a second 500 ml plastic jar for biomass (as chlorophyll *a*). For each rock, this process was repeated for multiple discs and for three to four of the exposed rock surfaces resulting in a final composite sample consisting of scrapings from a variety of exposed rock surfaces taken from a variety of rocks.

Taxonomy samples were preserved with Lugol's iodine solution and were shipped to G3 Consulting Limited (Surrey, BC) for identification and enumeration to the lowest possible taxonomic level. For each sample, density, genus richness, relative abundance, evenness, diversity (as Shannon and

Simpson's diversity indices), and Bray-Curtis similarities were calculated and mean and standard error by site was determined and graphed.

Chlorophyll *a* (biomass) samples were prepared by filtering the sample through a 0.45 µm filter, folding the filter in half, and wrapping it in aluminum foil. It was then labeled and frozen until analysis was done by ALS Environmental Services (Vancouver, BC). Biomass as chlorophyll *a* (mean ± SE) was plotted on graphs by site and watershed.

4.1.4 Secondary Producers – Benthic Invertebrate

Stream benthos samples were collected from the 27 aquatic biology stream sites using a 250 µm mesh size Hess-net sampler (Plate 4.1-2). Five composite replicate samples were collected at 17 of the key sites, and three composite replicates at the remaining 10 sites. A comparison of the results of these two different sample sizes is presented in the Quality Assurance/Quality Control section. Each composite was composed of three grabs from spatially separated riffle sections along the site (different braids or riffle areas a minimum of 10 m apart). At larger streams, samples were collected in areas of moving water, within 1 to 2 meters from the shore. Samples were stored in 500 ml plastic jars, preserved with buffered formalin (to a 10% final concentration), and shipped to Jack Zloty Environmental Research & Consulting (Summerland, BC) for identification and enumeration to the lowest possible taxonomic level. All samples were transferred to 70% ethanol prior to analysis and storage.

Plate 4.1-2. Using a Hess-net sampler to collect benthic invertebrate samples at KSM Project Streams, 2009.

At six key sites, BC Ministry of Environment (BC MoE) staff accompanied the field crew on stream surveys and conducted kick-net sampling based on the Canadian Aquatic Biomonitoring Network (CABIN) protocol. The kick-net method uses a triangular kick-net with a 400 µm mesh size with cod-end removable cup. The kick-net was used to traverse a stream section, moving upstream in a zigzag

pattern from bank to bank (where feasible and safe), for precisely 3 minutes (Environment Canada, 2001). This sampling occurred at the same as the sites were sampled using the Hess-net sampler. One replicate kick-net sample was collected at each site. BC MoE samples were also submitted to Jack Zloty Environmental Research & Consulting (Summerland, BC) for identification.

The kick-net sampling was conducted for two reasons: 1) to compare the Hess sample method that has been used at the KSM Project and kick-net method in terms of various benthic community variables, and 2) to support the development of the provincial stream benthic invertebrate database using the reference condition approach (RCA) as a predictive assessment tool in stream monitoring programs.

For each sample, density, genus richness, relative abundance, evenness, diversity (as Shannon and Simpson's diversity indices), EPT genus richness and Bray-Curtis similarities were calculated and graphed.

4.2 LAKES

4.2.1 Physical Limnology

At the newly added reference site, Todedada Lake (TDL), basic bathymetry (spot measurements using a hand-held device) was first conducted to determine the deeper areas. As was done for KGL, SUL, and LAL in 2008, three spatially separated zones were then selected at TDL, covering shallow (0-3 m), medium (approximately one half total depth), and deep depths (1 m less than maximum depth) to fully characterize the lake habitat. With few exceptions, the same zones and sites sampled in 2008 at KGL, LAL, and SUL were re-sampled in 2009. In 2008, the shallow zone at KGL and SUL was found to be composed of heavily compacted sediment and could not be sampled using the Ekman sampler. Consequently, the shallow zone was resurveyed to assess if a more suitable sampling zone could be found. More suitable shallow sites were found.

Temperature and dissolved oxygen profiles were taken at each depth zone to determine the water column structure at each lake. A YSI temperature and dissolved oxygen probe was lowered down through the water column in 1 m intervals, recording stabilized water parameter readings at each stop.

Water transparency was measured at each depth zone, using a Secchi disk (weighted to keep the line as vertical as possible), which was lowered on a metered line through the water until it disappeared from view. The line was then raised very slowly until the disk could just be seen, and the depth of the disk was recorded.

4.2.2 Sediment Quality

The sediment quality variables analyzed from lakes are the same as those listed for stream sediment samples (Table 4.1-1). Duplicate sediment samples were collected in three depth zones of each lake (shallow, mid and deep). For quality assurance/quality control (QA/QC) purposes, field homogenization duplicates were collected for 10% of all samples (Plate 4.2-1).

To ensure that limnology and plankton sampling were uncompromised, both sediment and benthos were sampled *after* all other sampling to avoid contaminating the water column with suspended sediment and benthos. Within each of the three zones at each site, two composite replicate sediment samples were collected. Each replicate consisted of three field sub-samples taken from areas a minimum of 5 to 25 m apart (depending on size of the site).

Plate 4.2-1. Lake sediment sampling at KSM Project Lakes, 2009.

Sediment samples were collected using an Ekman grab sampler. Collection depth and sediment descriptions were noted along with photographs of each sediment sample.

Sediment chemistry and grain size analyses were conducted by ALS Environmental (Vancouver, BC). Sample container, preservation, and handling requirements for lake sediment samples were the same as for stream samples.

4.2.3 Primary Producers – Phytoplankton

For each lake, duplicate phytoplankton samples were collected near the surface of each depth zone at 1 m depth. Samples for phytoplankton taxonomy were preserved using Lugol's iodine solution and shipped to G3 Consulting Limited (Surrey, BC) for identification and enumeration to the lowest possible taxonomic level. Biomass samples were field filtered onto a 0.45 µm filter, wrapped in foil, and frozen. Samples were shipped frozen to ALS Environmental (Vancouver, BC) for analysis.

For each taxonomy sample, genus richness, relative abundance, evenness, and diversity (as Shannon and Simpson's diversity indices) were calculated and mean and standard error by site were determined and graphed.

4.2.4 Secondary Producers – Zooplankton

At each lake, zooplankton samples were collected in duplicate from each of the three depth zones. Samples were collected with a standard zooplankton net. The depth of water sampled was recorded to allow calculation of volume sampled and density of zooplankton (# organisms per m^3). A small mesh size was used (118 µm). All zooplankton samples were collected in 500 ml plastic jars, preserved with borax-buffered formalin (to a 5% final concentration), and shipped to G3 Consulting Limited (Surrey, BC) for identification and enumeration to the lowest possible taxonomic level. All samples were transferred to 70% ethanol prior to analysis and storage.

For each sample, genus richness, relative abundance, evenness, and diversity (as Shannon and Simpson's diversity indices) were calculated and the mean and standard error at each site were determined and graphed.

4.2.5 Secondary Producers – Benthic Invertebrates

Lake benthos samples were collected in duplicate from each depth zone. Samples were collected using an Ekman grab, noting the depth at which the sample was collected. Sediments containing benthos were sieved through 250 µm mesh, transferred to 500 ml plastic jars, and preserved with formalin to a final concentration of 10%. All benthos samples were shipped to Jack Zloty Environmental Research & Consulting (Summerland, BC) for identification and enumeration to the lowest possible taxonomic level. All samples were transferred to 70% ethanol prior to analysis and storage.

For each sample, genus richness, relative abundance, evenness, and diversity (as Shannon and Simpson's diversity indices) were calculated and the mean and standard error at each site were determined and graphed.

4.3 DATA ANALYSIS

The following methods were used to analyze the biological data collected from streams and lakes as part of the aquatic ecology baseline study.

The number of organisms per sample was converted to density (organisms/m^2 for benthos, organisms/cm^2 for periphyton, organisms/L for phytoplankton and zooplankton) by dividing the number in each sample by the area or volume sampled. Measures of evenness, diversity, and Bray-Curtis Similarity, for the stream periphyton and benthos communities were calculated using Primer software (Clark and Gorley 2006).

The Bray-Curtis analysis compares each sample to all other samples, resulting in a matrix of similarity coefficients scored from 0% (completely dissimilar pair of samples) to 100% (completely identical types and densities of each species). For each watershed, a reference site was selected. The median abundance for each taxon from all replicates of the reference site was determined. This approach provided data for an artificial 'median reference sample'. The similarity of the 'median reference sample' to all exposure site samples was then plotted. This process was done for all watersheds to determine which benthic communities were most similar among reference and exposure sites within each watershed.

Richness was defined as the number of separate genera or species present in a sample. In assessing genus richness for benthic invertebrates, multiple species of the same genus were pooled together. All life stages and sexes were also pooled by genus. For sites where the available data only occurred at higher taxonomic levels (e.g., Family or Order), a single genus was considered to be present in the sample. This method was also used to calculate EPT (Ephemeroptera, Plecoptera and Trichoptera) richness for streams.

Pielou's evenness index quantifies how equal the community is. Evenness ranges from 0 to 1, the less variation in the number of species within a community, the closer the values is to 1 (Krebs 2001). The formula used to calculate this index is:

$$J = H/\ln S$$

where H is the number derived from the Shannon diversity index and S is the total number of species.

For periphyton, phytoplankton, and zooplankton data, species richness was used. The Shannon diversity index uses richness and abundance to calculate a measure of diversity that can be compared among samples. This index ranges from 1 to 3.5 in typical communities. The formula used to calculate this index is:

$$H = \sum_{i=1} [p_i * \ln(p_i)],$$

where p_i is the proportion of the total number of organisms in the sample made up by species *i*.

Simpson's Diversity Index ranges from 0 (no diversity) to 1 (maximum diversity). It is a dominance-type index and is calculated based on the formula:

$$(1-D_s) = 1 - \sum_{i=1}^{s} [(n_i/N)^2]$$

where n_i is the number of individuals in the i^{th} species and N is the total number of individuals.

The Shannon diversity index places more emphasis on the richness of the community while the Simpson's diversity index places more weight on those species that dominate the community (Krebs 2001). Similar Shannon and Simpson's indices indicate that there are limited numbers of rare species present in the community of interest. In contrast, a high Shannon index and a comparatively low Simpson's index indicates that there is a large number of species present in the community, but many were present in low numbers.

4.4 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

4.4.1 Power Analysis

To assess the ability of the existing sample programs to detect potential future effects on the aquatic environment, power analyses were performed. The ability to detect change is based on existing natural variation in a system and level of sampling intensity of the sampling program. Power analyses were conducted on periphyton, benthic invertebrate, and sediment quality data.

For stream periphyton and stream benthic invertebrate data density, genus richness, Simpson's Diversity, Shannon Diversity and evenness were examined. For sediment, power analyses were performed on nitrogen, copper, iron and nickel. For each data set, three pairs of exposure/reference sites were selected. These sites included site SCR (reference), paired with the potential exposure site TEC2, and the reference site SUNR paired with the potential exposure site SC3. The upstream reference site UR1A was compared to the downstream potential exposure site UR1. All power tests were conducted using GPOWER statistical software (Buchnert *et al.*, 2001). One-tailed t-tests based on differences between independent means were calculated, with $\alpha = 0.1$ (p value) and $\beta = 0.9$ (power). Three different effect sizes were used to provide a range of potential changes to the exposure site dataset. Effect sizes were subtracted from exposure group values in each case, to simulate an impact, and included:

1. 2SD (2 x standard deviation) of reference group subtracted from exposure site average;
2. 25% of average of reference group subtracted from minimum replicate of exposure site; and
3. 50% of average of reference group subtracted from minimum replicate of exposure site.

Where an effect size reduction caused a negative value for the exposure group (which is not possible for the biological metrics assessed), a value of zero was used. Each exposure site was then compared to its matched reference site, once an artificial 'Effect Size' value was calculated and applied to baseline values from the exposure site. Note that the Effect Size was subtracted (for biology) or added (for sediment chemistry) to simulate an adverse effect to the exposure group only. Reference values remained the same.

4.4.2 Co-efficient of Variation

Five benthic invertebrate composite replicate samples were collected at 17 key stream sites in the Project Study Area, and three composite replicates were collected at the remaining 10 sites. The coefficient of variation was calculated (standard deviation divided by the mean) to better compare the variation resulting from the two different number of replications.

5. Results

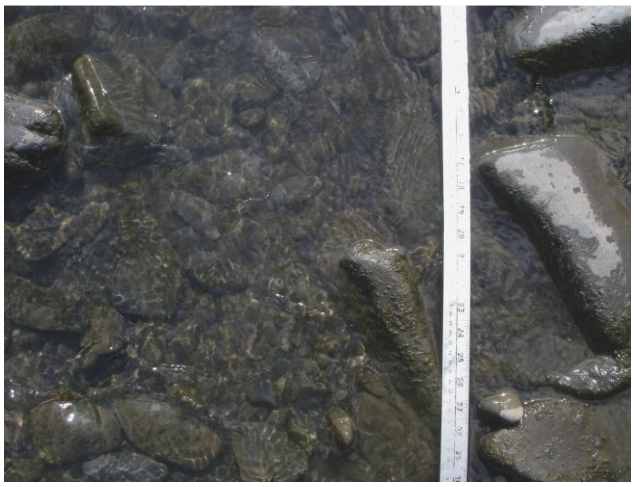
5.1 STREAMS

The stream and river sites sampled in the KSM Project area can be divided into four general types. Sites on the lower Unuk (UR1A, UR1, and UR2), Treaty Creek (TRC2 and TRC3), Mitchell Creek (MC1), and the South Unuk River (SUNR) are characterized by wide, large, braided channels (Plate 5.1-1a). Sites in the Sulphurets watershed (SC1, SC2, SC3, and SCT), the upper Treaty (TRC1), Snowbank Creek (SNO1 and SNO2), and Scott Creek (SCR) tended to have slightly narrower channels that had deep, fast flows, and turbid waters (Plate 5.1-1b). The south Teigen (STE2), the north Treaty (NTR2), McTagg Creek (MCTR), Teigen Creek (TEC1 and TEC2) and the upper portions of the Unuk watershed (EUR2 and ECM8) were slightly smaller streams, though the water level was still high and the water was fast moving and slightly turbid (Plate 5.1-1c) at the time of sampling. The remaining sites (CC1, UNK1, UNK2, NTR1, and STE1) were smaller streams, with reduced flow (Plate 5.1-1d).

(a) ***(b)*** ***(c)*** ***(d)***

Plate 5.1-1. Select stream and river sampling locations in the KSM Project area: (a) TRC2, (b) SCR, (c) STE2, and (d) CC1.

The substrate in the streams in the KSM Project study area generally consisted of a mix of gravel, cobble and boulders (Plate 5.1-2). Due to the high velocity and deep depth of the streams, biological and sediment samples were collected within one to two metres of the shore for safety purposes. The average velocity measured at benthic invertebrate sample sites was 0.8 m/s and ranged from 0.6 m/s (CC1) to 1.2 m/s (TRC3). The greatest velocities were measured at sites on Treaty Creek (Table 5.1-1). The velocity at periphyton sample sites ranged from 0.5 m/s (TRC3) to 0.8 m/s (SC3) with an average velocity 0.6 m/s. Periphyton samples were generally collected closer to shore in slightly more sheltered areas than benthic invertebrate samples as these communities are sensitive to disturbance from scour and high velocity water.



(a)

(b)

(c)

Plate 5.1-2. Stream substrates in the KSM Project area: (a) NTR2, (b) UR2, and (c) SCR.

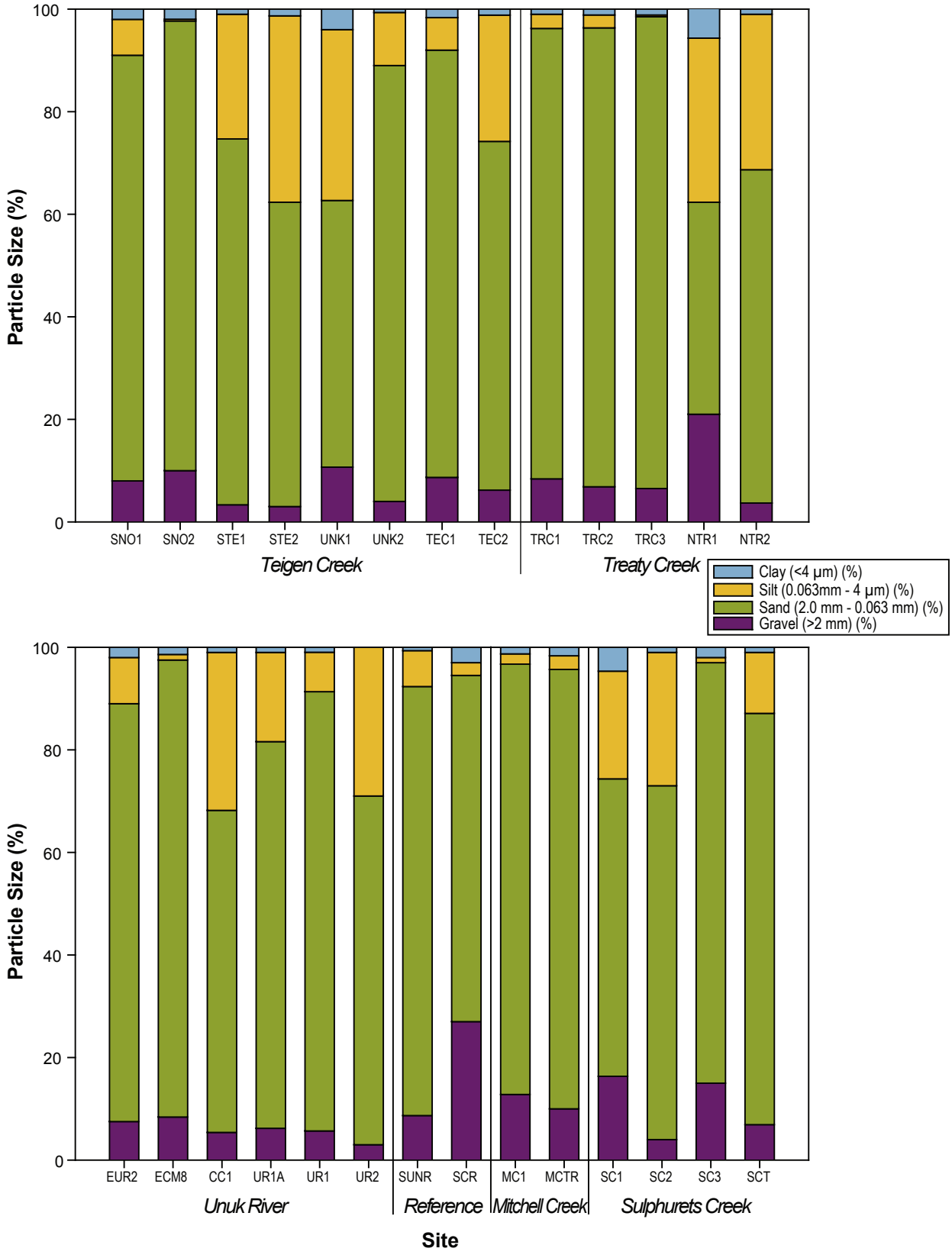
Table 5.1-1. Velocity Measurements Taken at Periphyton and Benthic Invertebrate Sample Sites, KSM Project Streams, August 2009

Site	Benthos		Periphyton	
	Mean	SE	Mean	SE
SNO1	not measured		not measured	
SNO2	not measured		not measured	
STE1	0.71	0.09	0.55	0.11
STE2	0.91	0.10	0.57	0.06
UNK1	0.71	0.09	0.79	0.11
UNK2	0.97	0.14	0.79	0.11
TEC1	0.80	0.09	0.73	0.16
TEC2	0.84	0.09	0.53	0.04
TRC1	1.20	0.03	0.52	0.04
TRC2	1.09	0.09	0.72	0.09
TRC3	1.29	0.11	0.49	0.05
NTR1	0.63	0.00	0.50	0.06
NTR2	0.76	0.04	0.50	0.06
EUR2	0.88	0.06	0.63	0.00
ECM8	0.85	0.04	0.55	0.11
CC1	0.61	0.09	0.50	0.06
SUNR	0.84	0.09	0.64	0.10
MC1	0.71	0.03	0.67	0.07
MCTR	0.76	0.04	0.69	0.06
SCR	0.84	0.03	0.67	0.06
SC1	0.90	0.06	0.63	0.07
SC2	0.69	0.09	0.57	0.06
SC3	0.88	0.05	0.83	0.03
SCT	0.90	0.13	0.50	0.06
Maximum	1.29		0.83	
Minimum	0.61		0.49	
Mean	0.85		0.62	

5.1.1 Sediment Quality

5.1.1.1 Particle Size

An indication of the amount of energy present in the water flow at a site can be gained by examining the distribution of particle sizes present in the sediment sample. The presence of larger particle sizes in the sediment (i.e., sand) indicates a high energy flow regime compared to sediments that contain high proportions of smaller particle sizes (e.g., silt). Streams and rivers in the KSM Project area are predominantly characterized by high flow and high velocity water. Accordingly, sand was the dominate particle size at all stream sites (41 to 89%). Silt (0.5 to 36%), gravel (3 to 27%), and clay (1 to 6%) made up lesser fractions (Figure 5.1-1).



Average Particle Size Distribution for KSM Stream Sediments, August 2009

FIGURE 5.1-1

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5.1.1.2 Nitrogen, TOC, pH, and Cyanides

Total nitrogen concentrations were low in the Project area. Concentrations were highest in Teigen Creek and North Treaty Creek tributary, ranging from below detection limits (0.02%) at SUNR to 0.26 % in a single replicate at NTR1 (Figure 5.1-2). Total organic carbon concentrations also tended to be low, ranging from below detection limits (0.1%) to 2.9 % at NTR1 (Figure 5.1-3). The stream site NTR1 is situated in a wetland area and therefore would have higher nutrient and organic concentrations compared to glacier fed streams. UNK1 and CC1 also had higher levels of total nitrogen and total organic carbon relative to many of the other sites.

The sediments of NTR1 were also more acidic pH (6.4) than the sediments of the other glacier-fed sites (Figure 5.1-4). Sediment pH at these sites ranged from 7.1 (CC1) to 8.3 (TRC1). The pH tended to be highest at the reference sites, at sites in the Mitchell and Sulphurets watersheds and at the Treaty Creek sites. The pH was often lowest at headwater locations (e.g., STE1, UNK1, NTR1, and CC1).

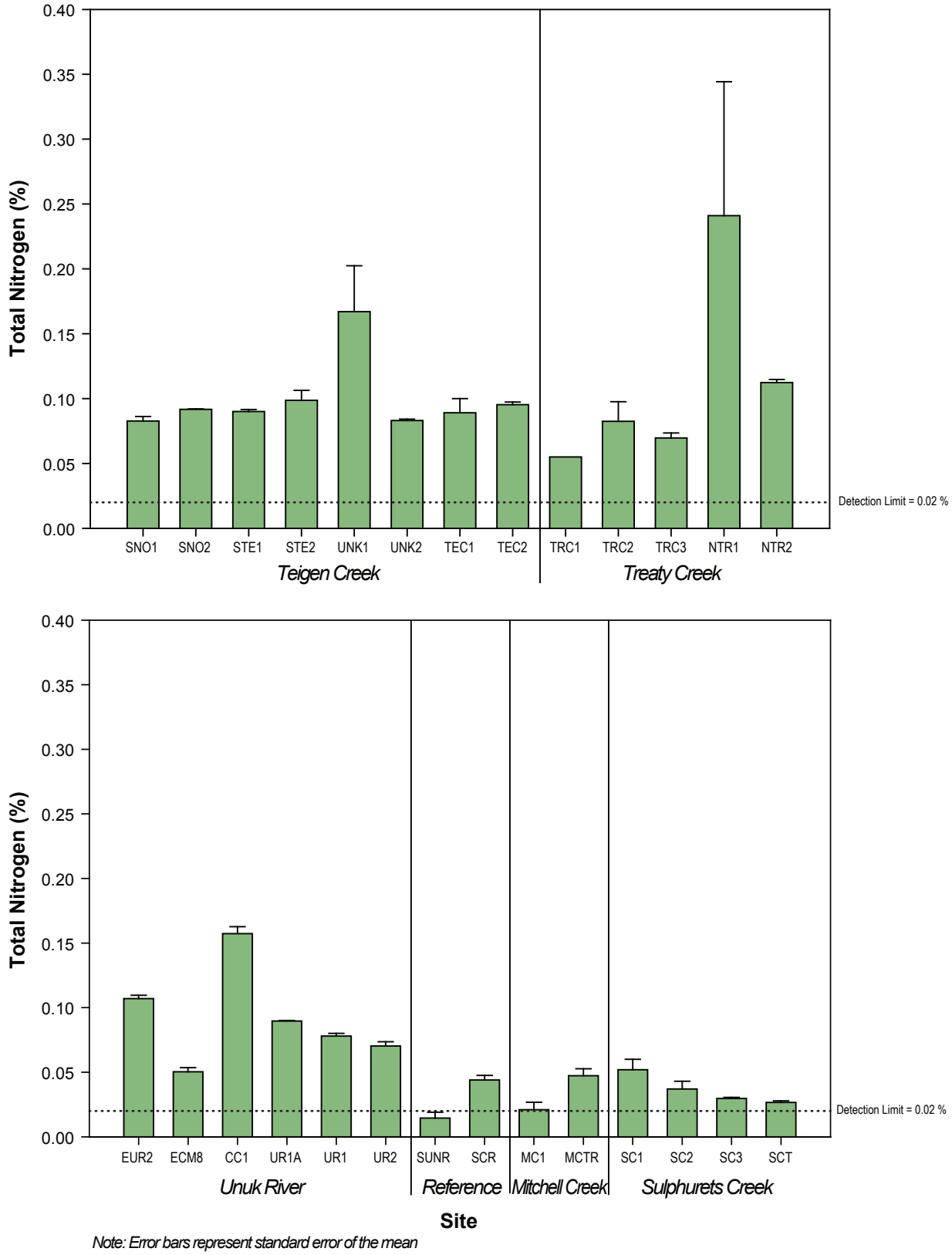
Total cyanide in sediments was below analytical detection limits (3.0 mg/kg) at all stream sites (Appendix 5.1-1).

5.1.1.3 Metals

Several of the analyzed metals had detectable concentrations in only 20% of the sediment samples or less, and are therefore not discussed. These metals include antimony, bismuth, selenium, silver, sodium, thallium and tin. All data and their detection limits are provided in Appendix 5.1-1 and 5.1-2. Analyzed metals that do not have provincial or federal guidelines are discussed before those metals that have guidelines and are not shown graphically.

Aluminum concentrations ranged from 11,303 mg/kg (SUNR) to 24,866 mg/kg (UNK2). Concentrations of barium ranged from 100 mg/kg (MC1) to 447 mg/kg (SC1). Beryllium concentrations were below analytical detection limits (0.5 mg/kg) at the reference sites, at all sites in the Mitchell and Sulphurets watersheds, and UR1, UR2, SNO1 and TRC1, TRC2 and TRC3. The highest level was measured at CC1 (1.12 mg/kg). Calcium concentrations ranged from 2,563 mg/kg (STE1) to 37,733 mg/kg (ECM8) and tended to be higher at sites on the Unuk River and at SCR and MCTR. Cobalt concentrations ranged from 14.3 mg/kg at SCR to 46.7 mg/kg at UNK1. Concentrations of lithium were greater in the Teigen and Treaty watersheds than they were at other sites in the Project area. Concentrations ranged from 6 mg/kg (SUNR) to 38 mg/kg (NTR2). Magnesium concentrations followed a similar trend, with slightly higher concentrations being measured in the Teigen and Treaty watersheds than at in other watersheds. Magnesium ranged from 5,863 mg/kg (MC1) to 17,083 mg/kg (UNK2). Manganese concentrations were within a relatively narrow range (1,500 to 4,000 mg/kg) at all sites, with the exception of UNK1, where an average concentration of 8,026 mg/kg was measured. Molybdenum concentrations were close to or below the analytical detection limit (4 mg/kg) at all the sites in the Teigen and Treaty watersheds, with slightly greater concentrations present in the Unuk, Mitchell, and Sulphurets watersheds. A maximum concentration of 34 mg/kg was measured at MC1.

Metal concentrations for which guidelines exist are presented graphically below. Of the eleven metals that have guidelines, two had 100% of stream sediment samples below detection limits (silver and selenium) and were not plotted. Of the remaining nine metals, guideline levels were exceeded at least at one stream sediment sample site. The following section discusses these parameters in detail.



Note: Error bars represent standard error of the mean

Total Nitrogen Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-2

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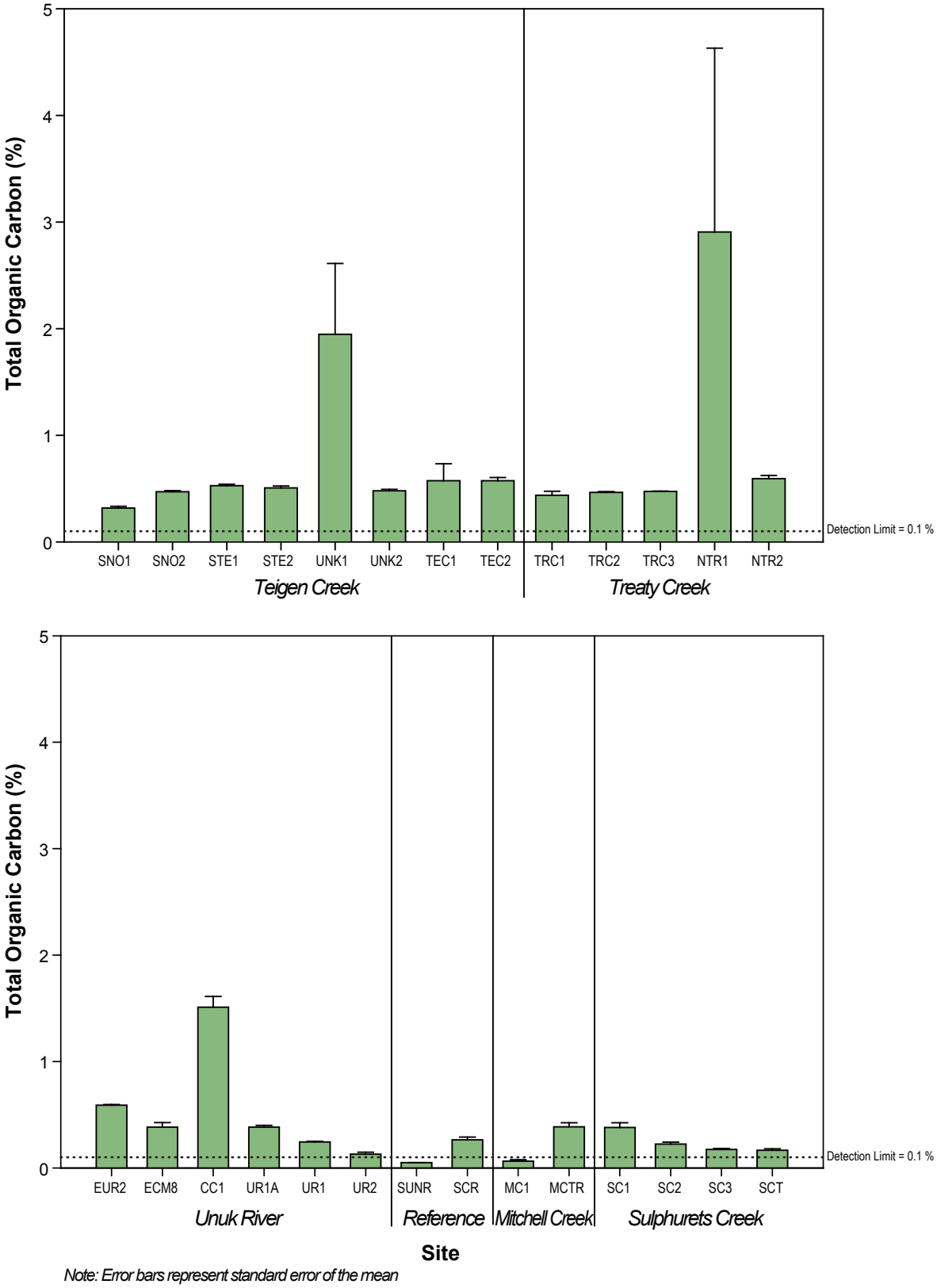

Note: Error bars represent standard error of the mean

Total Organic Carbon Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-3

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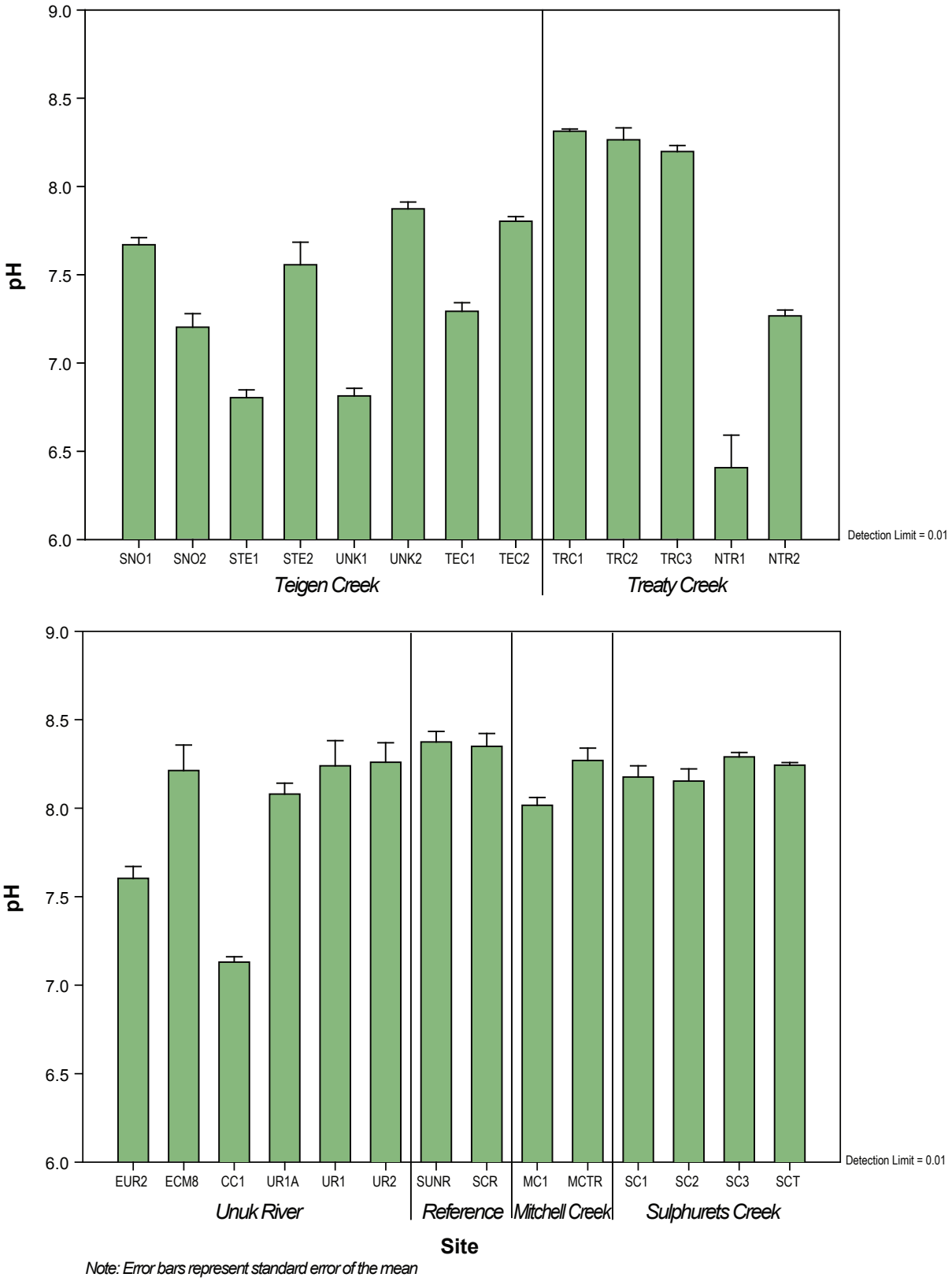

Note: Error bars represent standard error of the mean

pH in KSM Stream Sediments, August 2009

FIGURE 5.1-4

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Arsenic concentrations were naturally elevated in stream sediments throughout the Project Area. Overall, average arsenic concentrations ranged from 9 mg/kg (TEC1) to 187 mg/kg (SC1) (Figure 5.1-5). Concentrations were highest in the Sulphurets watershed, with the lowest concentrations occurring in the Teigen Creek watershed and at SUNR. Concentrations were also relatively high in the upper Mitchell Creek, in Treaty Creek, and several sites in the Unuk watershed. The relatively high concentrations of arsenic present in Treaty Creek may be related to the presence of mineralization within the headwaters of Treat Creek. The ISQG of 5.9 mg/kg was exceeded at all sites. Sixteen of the twenty-seven sites exceeded the PEL of 17 mg/kg.

Average cadmium concentrations in stream sediments were frequently low, with concentrations below or close to the analytical detection limit (0.5 mg/kg) at the majority of the sites in the Teigen Creek Watershed and many sites in the Unuk River Watershed (Figure 5.1-6). Sixty percent of the sites exceeded the ISQG of 0.6 mg/kg. The PEL of 3.6 mg/kg was exceeded by more than 6 times at CC1 (22.5 mg/kg).

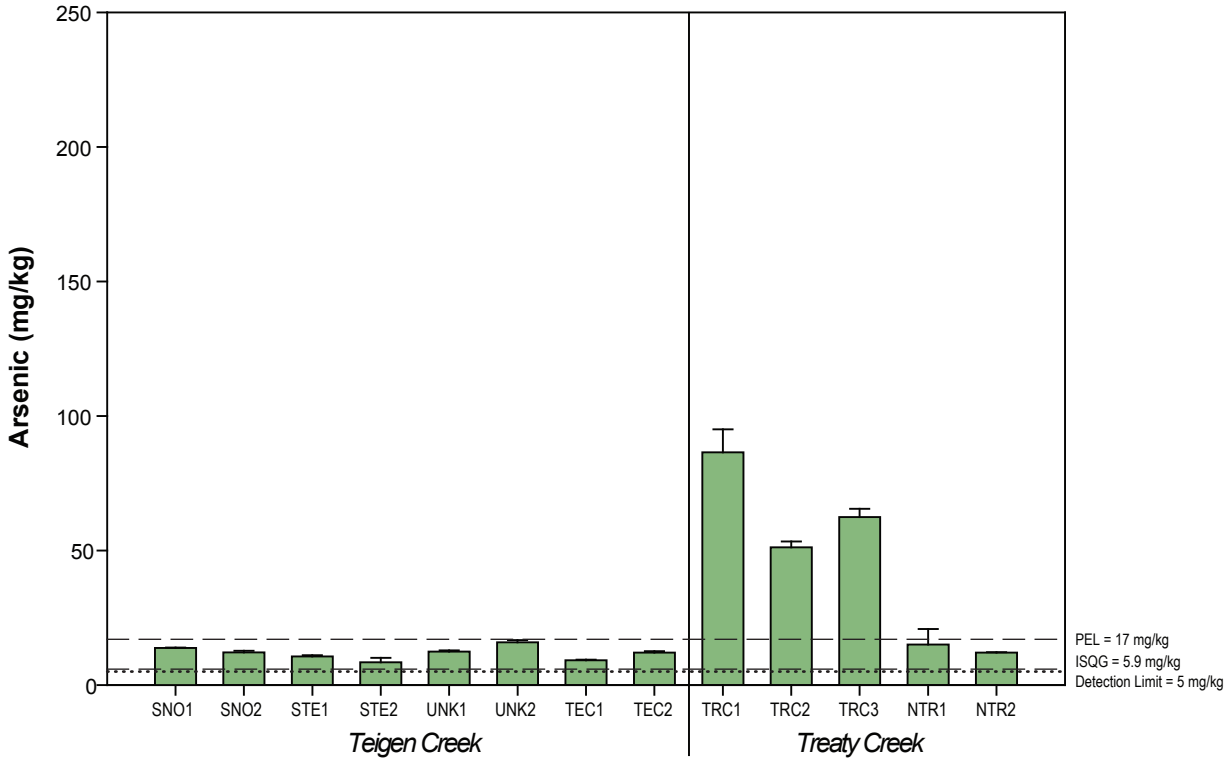
Average concentrations of chromium in stream sediments ranged from 3.3 mg/kg (MC1) to 114 mg/kg (UNK2) (Figure 5.1-7). Concentrations were highest in the Teigen Creek Watershed and in the North Treaty Creek tributary, ranging from 69 mg/kg to 114 mg/kg. Chromium concentrations were lowest in the Mitchell Creek and Sulphurets Creek watersheds where concentrations did not exceed 30 mg/kg. Concentrations at sixty percent of the sites exceeded the ISQG of 37.3 mg/kg. Four sites in the Teigen Creek Watershed also exceeded the PEL of 90 mg/kg.

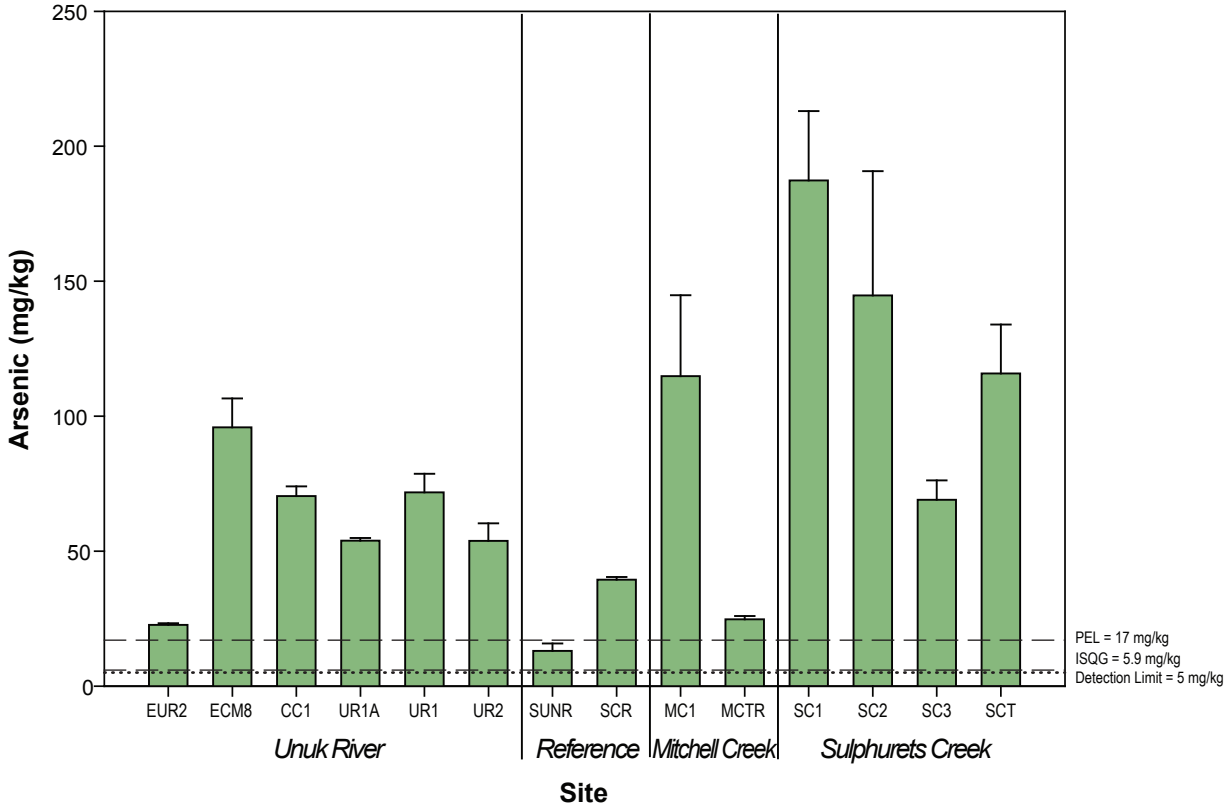
Average copper concentrations in stream sediments ranged from 31 mg/kg (SCR) to 385 mg/kg (MC1) (Figure 5.1-8). Concentrations were lowest in the Teigen Creek and Treaty Creek watersheds. Moderate levels were found in the Unuk River Watershed, with the exception of UR1, located just downstream of the confluence of the Unuk River with Sulphurets Creek. The higher concentrations found at this site can be attributed to the influence of the Sulphurets and Mitchell Creek watersheds, both of which had high copper concentrations. The ISQG of 35.7 mg/kg was exceeded at all sites except at SCR. Five sites exceeded the PEL of 197 mg/kg. These naturally-occurring concentrations of copper in sediments can be attributed to the presence of copper deposits located in the Mitchell Creek and Sulphurets Creek watersheds.

Average iron concentrations were high in the Project area stream sediments, as all sites exceeded the LEL of 21,200 mg/kg (Figure 5.1-9). Overall, concentrations ranged from 26,966 mg/kg (STE2) to 77,533 mg/kg (MC1). Sixteen of the twenty-seven sites also exceeded the SEL of 43,766 mg/kg. Iron concentrations were slightly lower in the Teigen watershed than concentrations measured at the other sites.

Seventy percent of the sites in the Project area had average lead concentrations in stream sediments below the analytical detection limit (30 mg/kg) (Figure 5.1-10) and all sites were below the PEL (91.3 mg/kg). The highest concentration was measured at SC1 (73 mg/kg) and five other sites exceeded the ISQG of 35 mg/kg.

Average mercury concentrations in stream sediments ranged from below the analytical detection limit (0.01 mg/kg) at SUNR to 0.447 mg/kg at MC1 (Figure 5.1-11). Mercury concentrations tended to be slightly lower at the reference site, in the Teigen Creek Watershed and in the main stem of Treaty Creek than they were at other sites. The ISQG of 0.17 mg/kg was exceeded at eleven sites. The PEL of 0.486 mg/kg was not exceeded.





Note: Error bars represent standard error of the mean
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Arsenic Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-5

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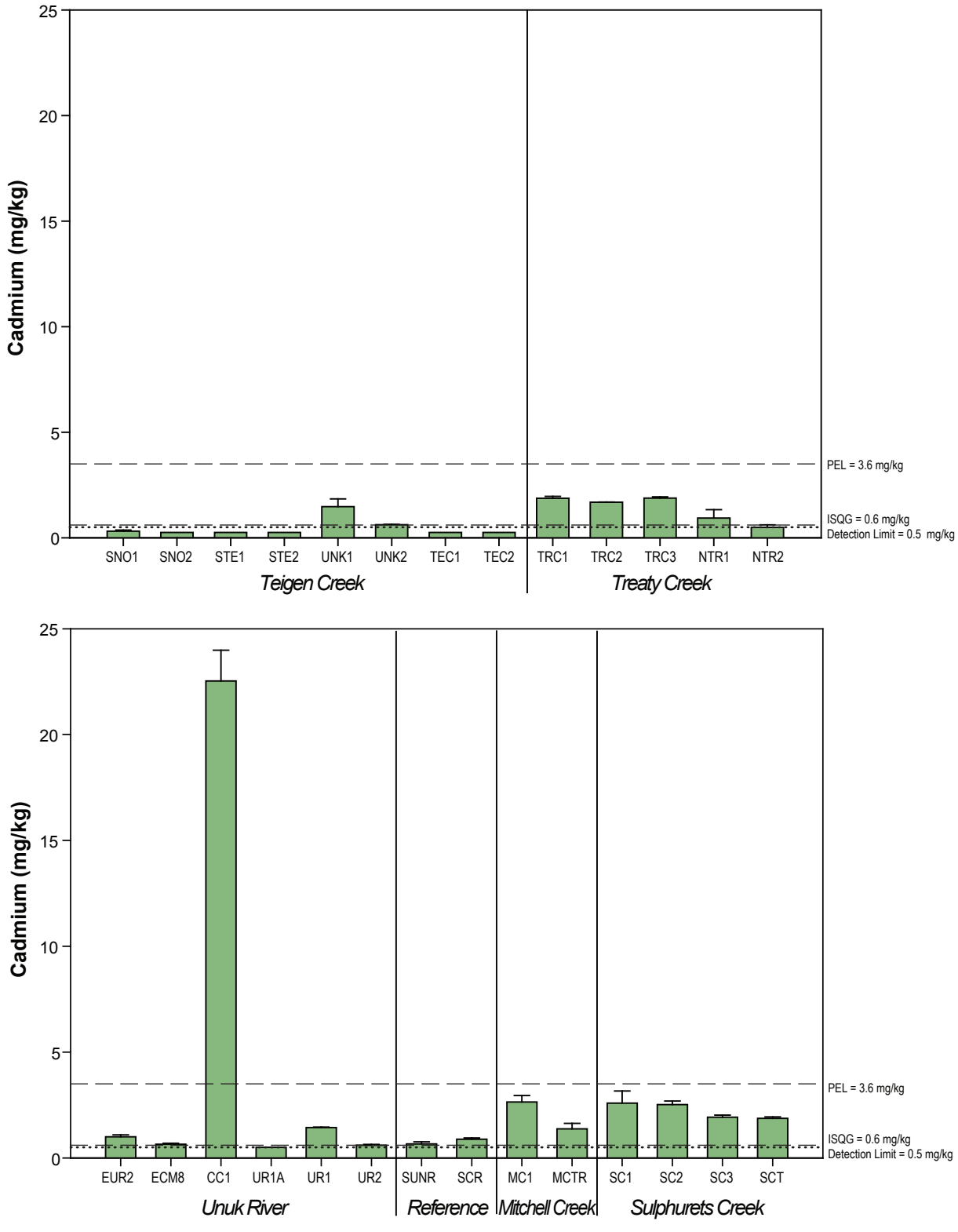

Note: Error bars represent standard error of the mean
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Cadmium Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-6

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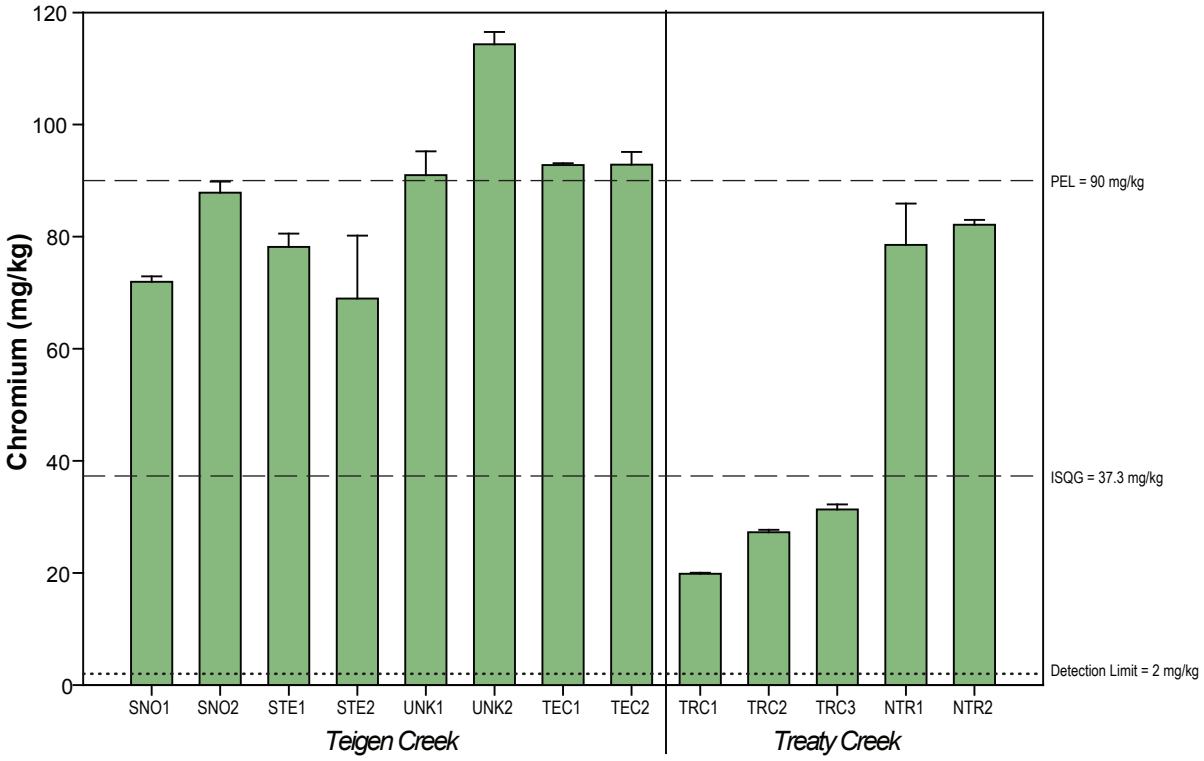

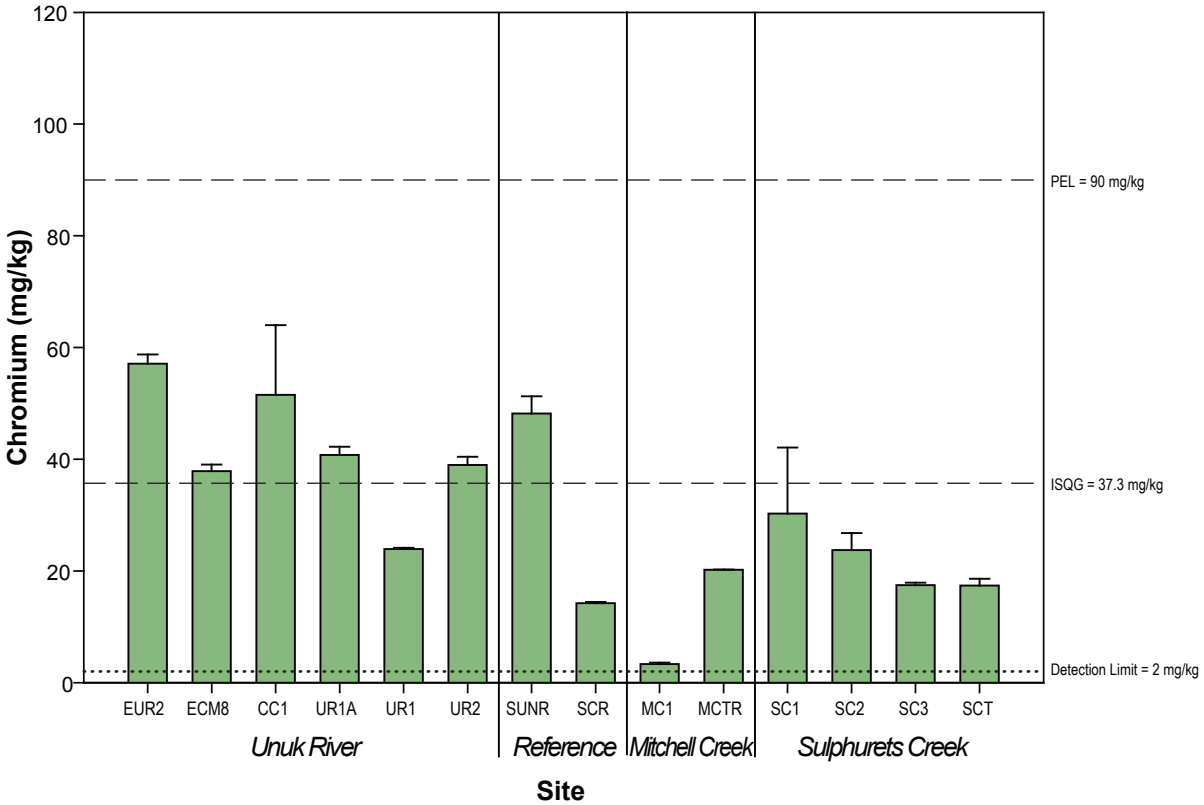

Note: Error bars represent standard error of the mean
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Chromium Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-7

SEABRIDGE GOLD

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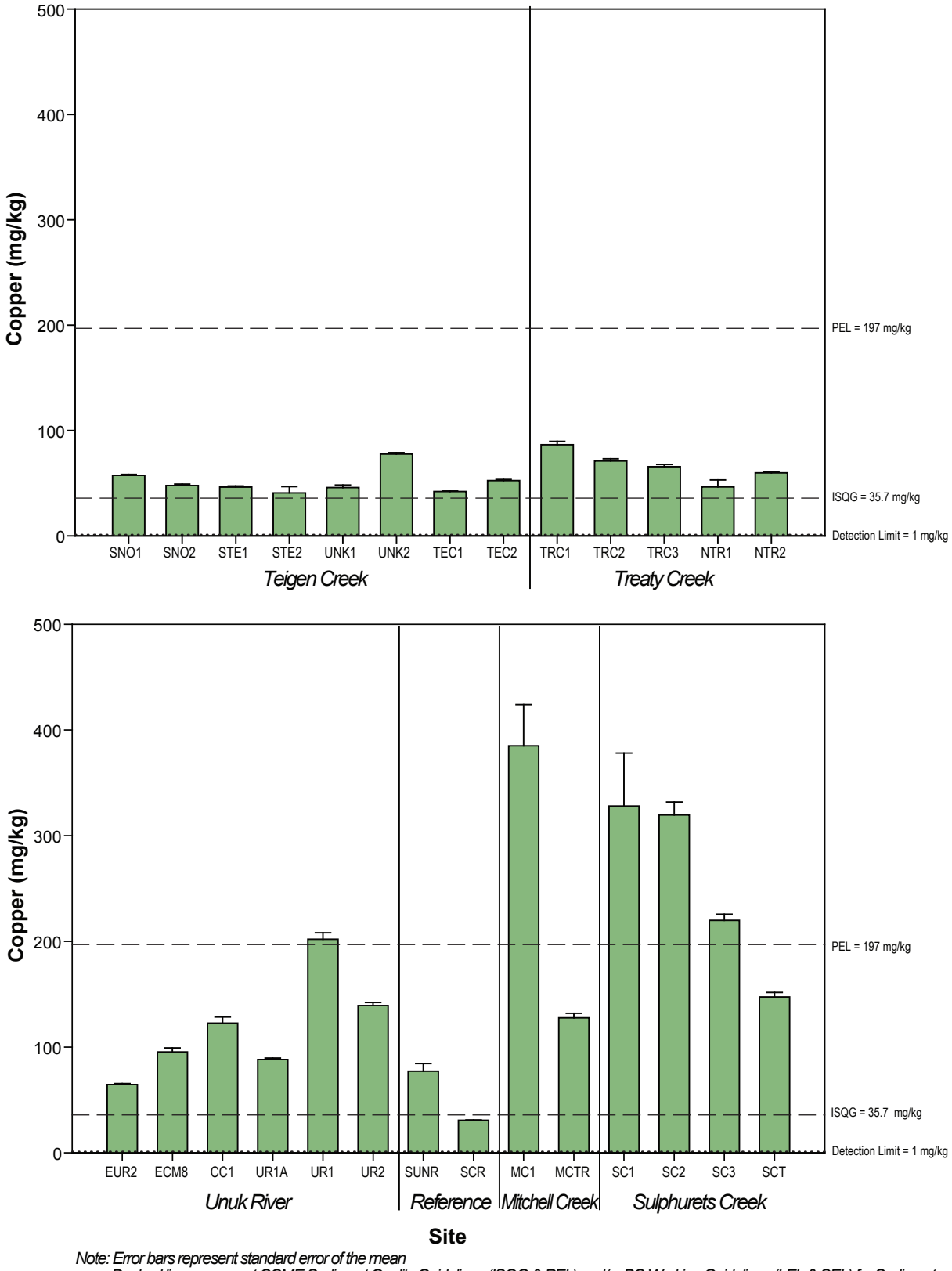

Note: Error bars represent standard error of the mean
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Copper Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-8

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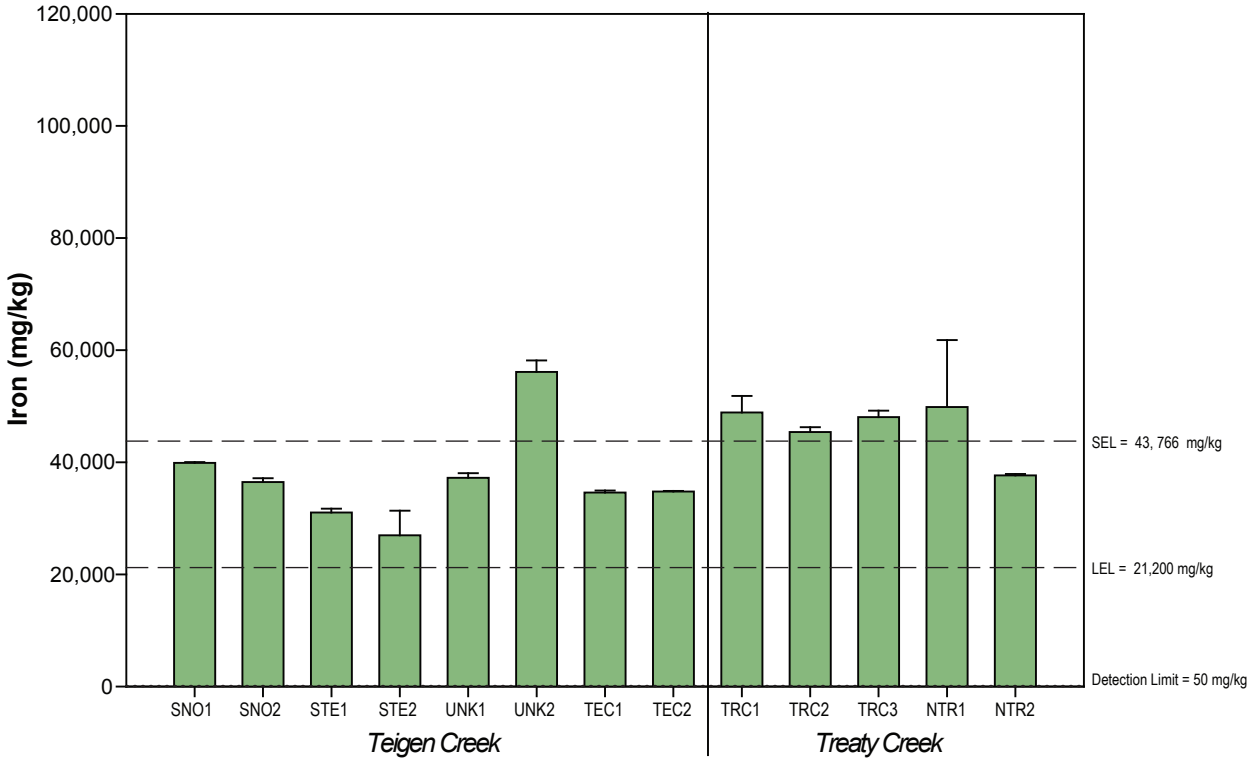

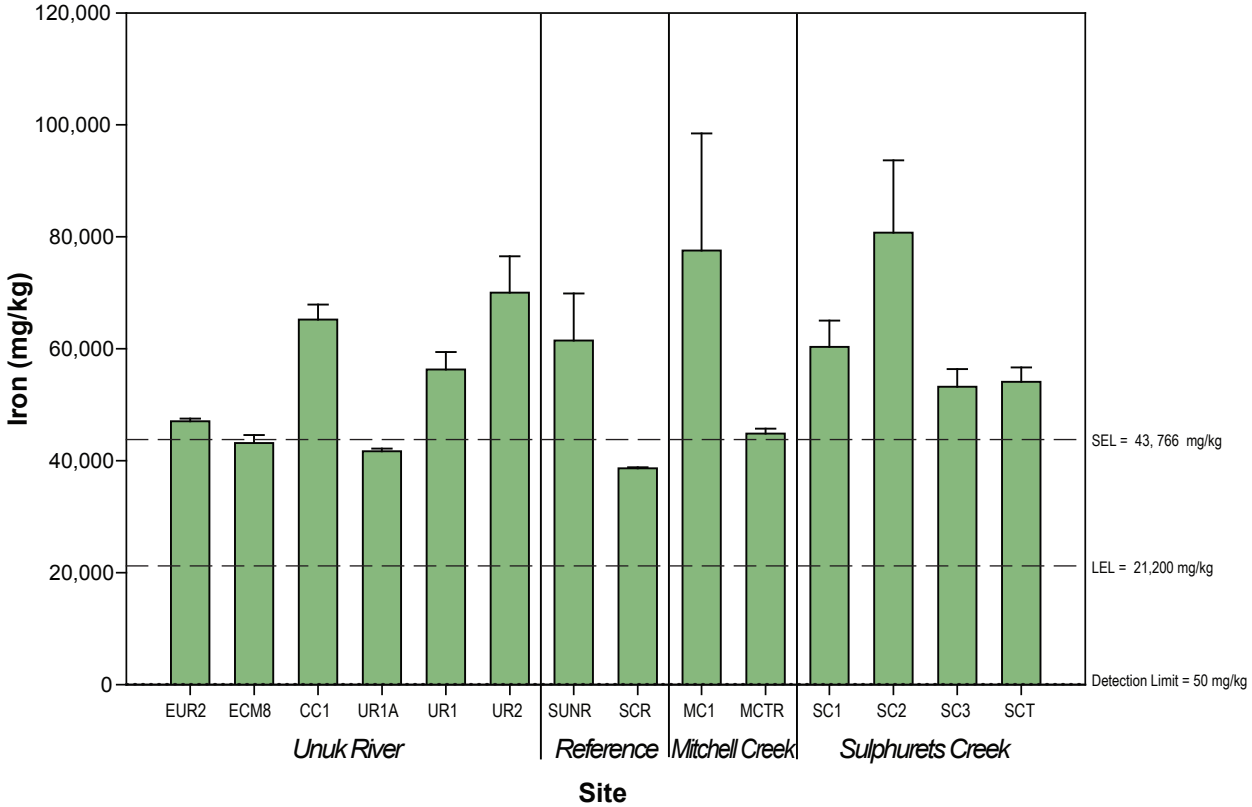

Note: Error bars represent standard error of the mean
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Iron Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-9

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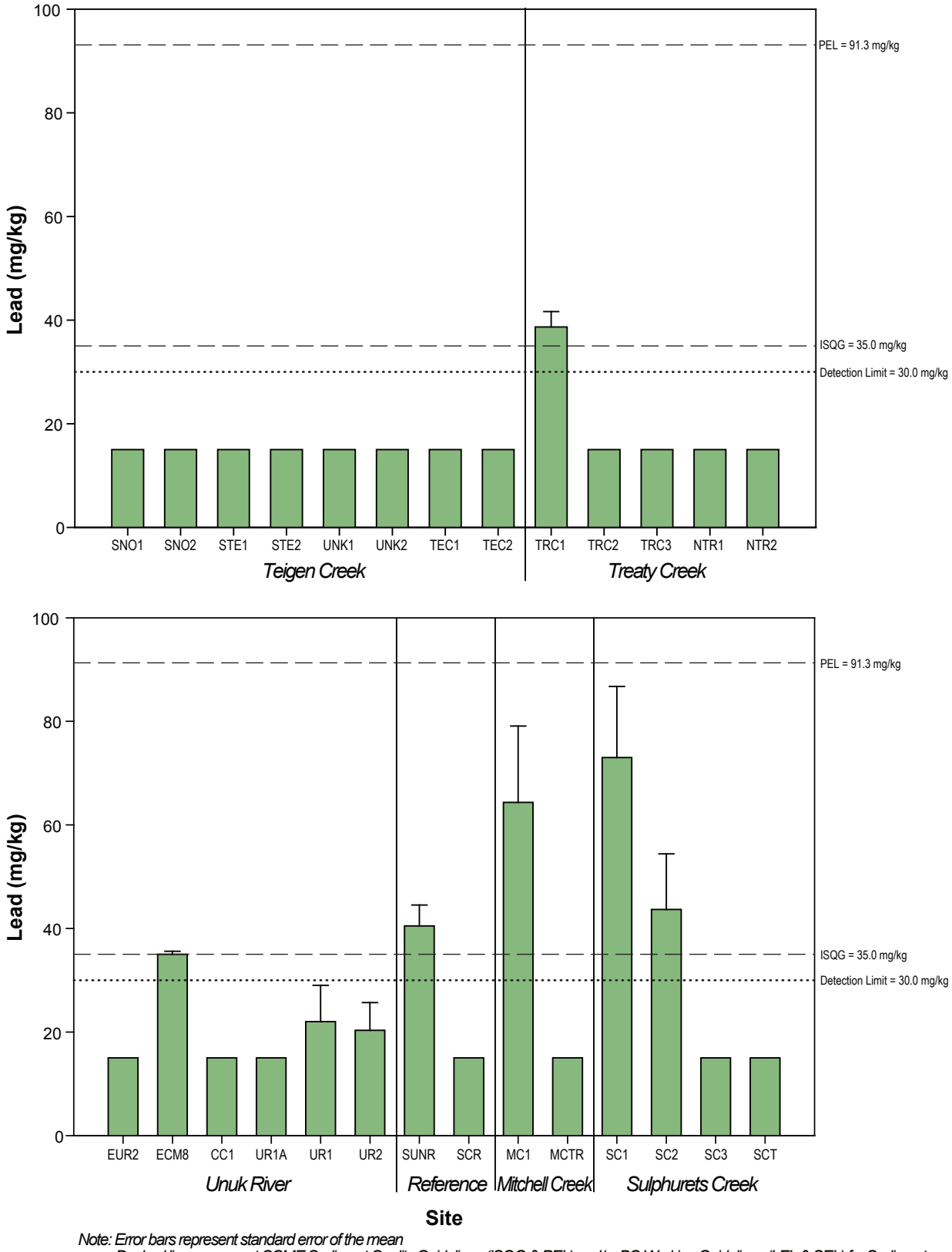

Note: Error bars represent standard error of the mean
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Lead Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-10

SEABRIDGE GOLD

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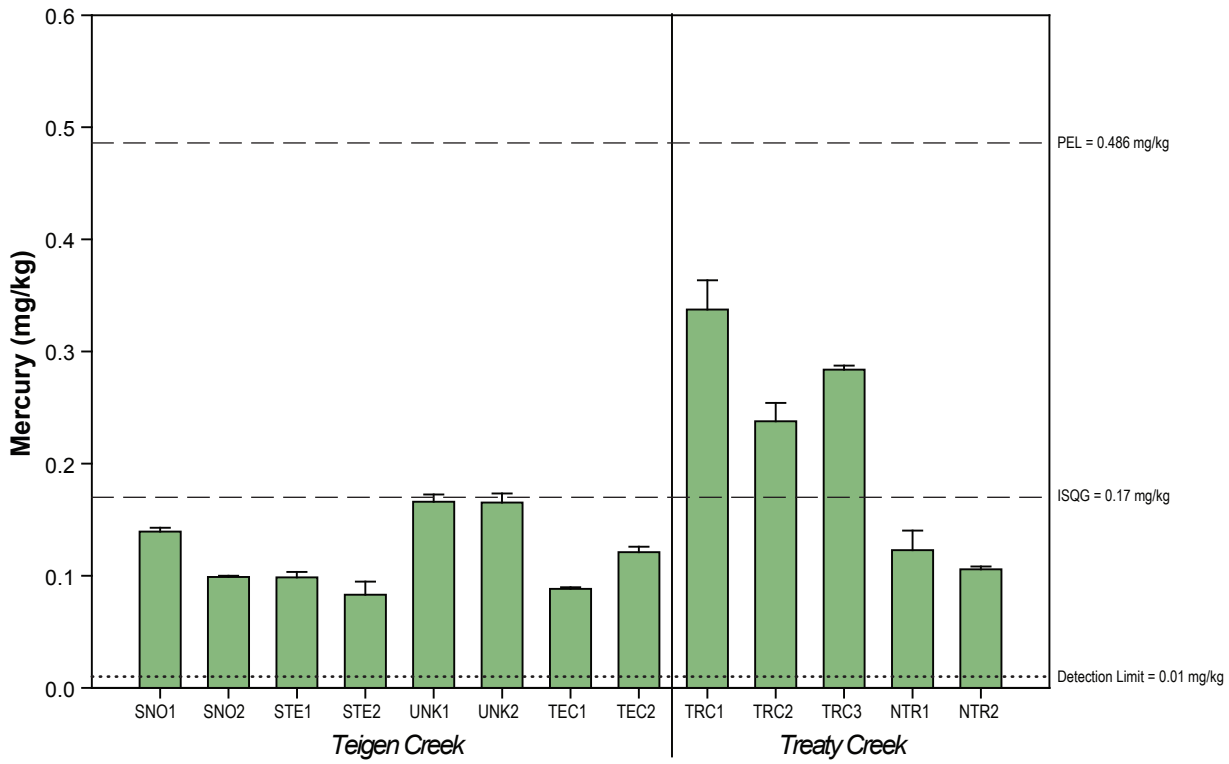

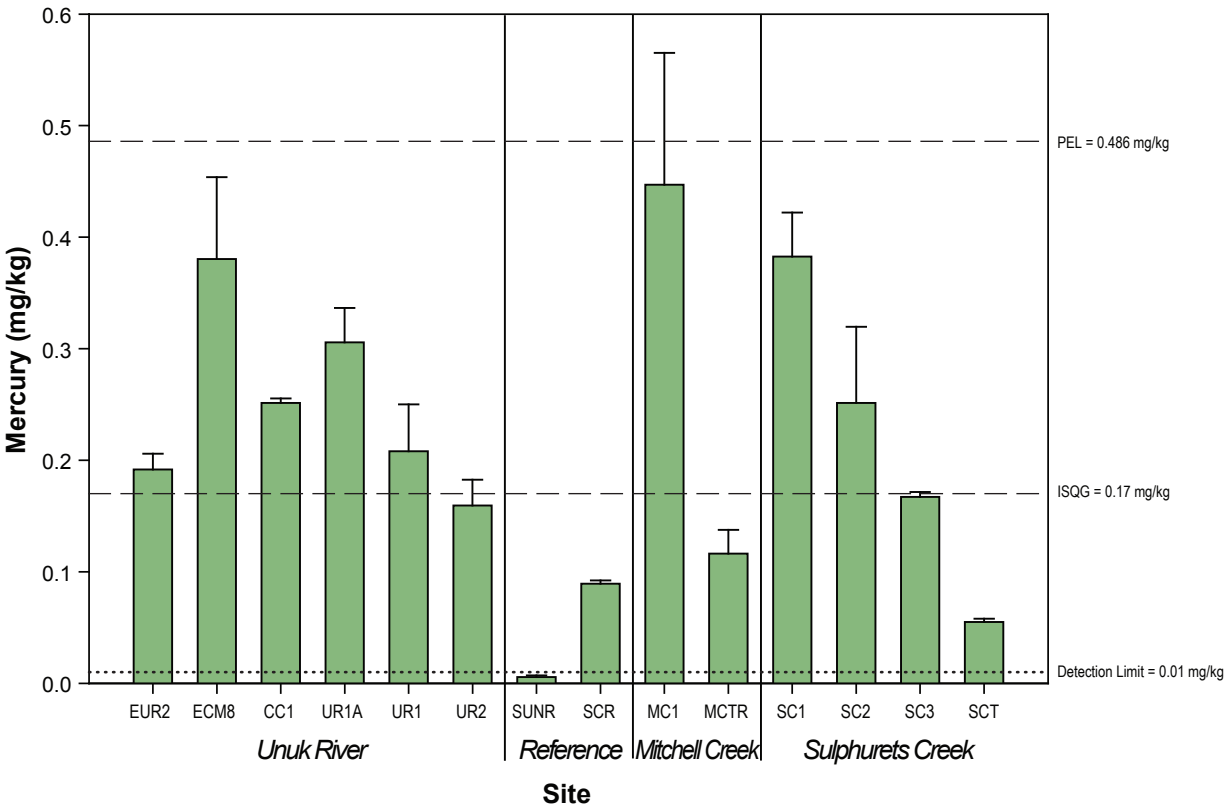

Note: Error bars represent standard error of the mean
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment
Guidelines are for inorganic mercury

Mercury Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-11

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Average nickel concentrations in stream sediments ranged from close to the analytical detection limit (5 mg/kg) at MC1 to 148 mg/kg at UNK1 and UNK2 (Figure 5.1-12). With the exception of MC1, nickel concentrations at all stream sites exceeded the LEL of 16 mg/kg. Twelve sites within the Teigen Creek, Treaty Creek, and Unuk River Watersheds were above the SEL of 75 mg/kg.

Average zinc concentrations in stream sediments were close to 50 mg/kg at all sites in the Teigen and Treaty Creek Watersheds (Figure 5.1-13). The highest concentrations of zinc were measured at MCTR (125 mg/kg), UR2 (143 mg/kg); and SUNR (151 mg/kg), which all slightly exceeded the ISQG of 123 mg/kg. The PEL guideline (315 mg/kg) was not exceeded.

5.1.1.4 Quality Assurance and Quality Control (QA/QC)

Power Analysis

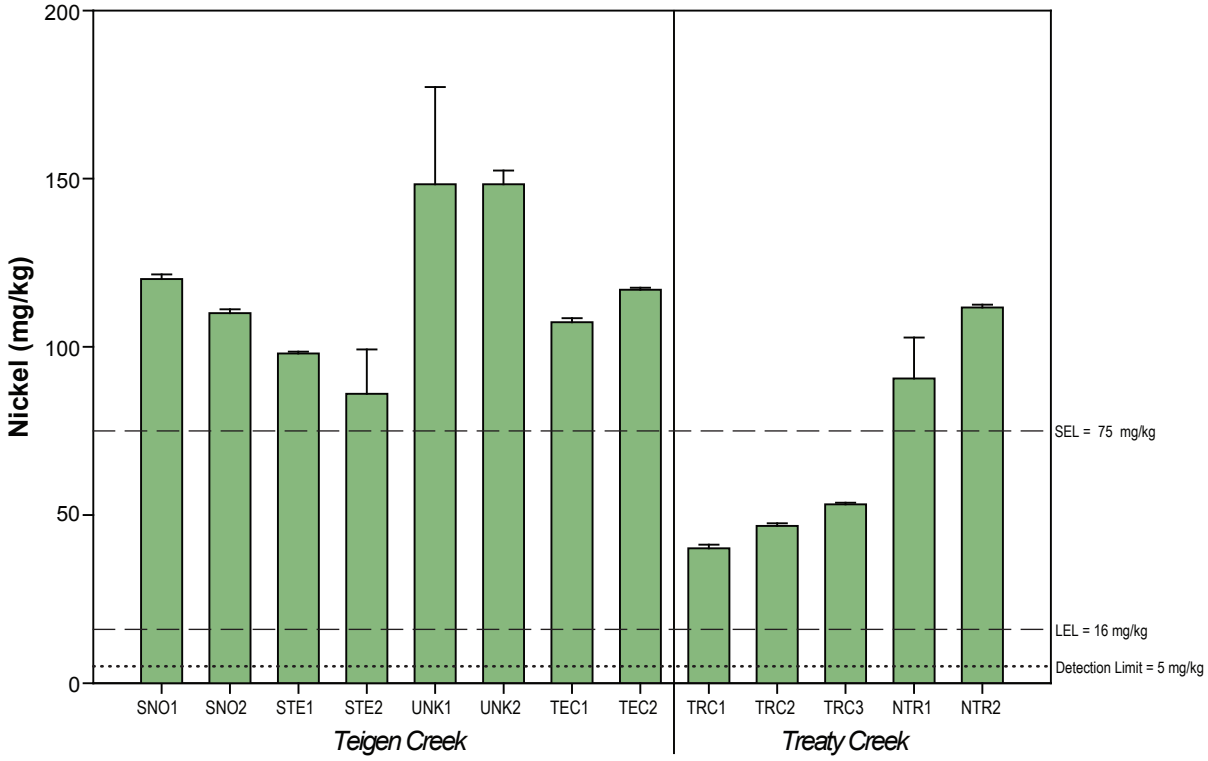
Power analysis for sediment was done for three pairs of sites; SCR (reference) paired with potential exposure site TEC2, SUNR (reference) paired with the potential exposure site SC3, and UR1A (upstream reference) paired with its downstream potential exposure site UR1.

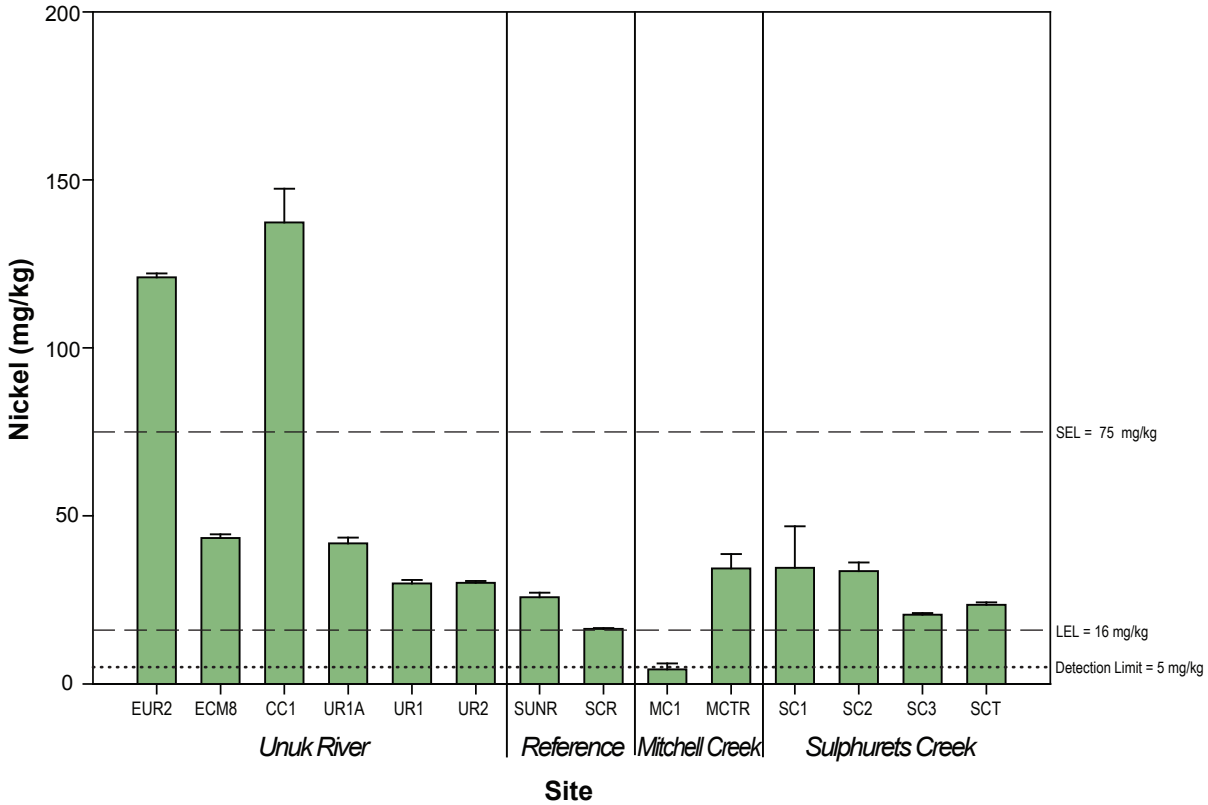
For the majority of the parameters examined, a sample size of 2 to 3 was sufficient to detect increases in metal and nutrient concentrations at the potentially effected sites (Table 5.1-2). Greater sample sizes were recommended for nickel concentrations, though large changes in concentrations were detected with a sample size of 2.

Table 5.1-2. Sample Size Required to Detect Sediment Quality Changes Based on Power Analyses of KSM 2009 Baseline Sediment Quality Data for Three Pairs of Sites

SCR (reference) and TEC2 (exposure)				
Effect	**Nitrogen**	**Copper**	**Iron**	**Nickel**
2 x reference standard deviation	2	2	2	nc
25% of reference mean	2	nc	nc	nc
50% of reference mean	2	nc	nc	nc
UR1A (reference) and UR1 (exposure)				
Effect	**Nitrogen**	**Copper**	**Iron**	**Nickel**
2 x reference standard deviation	2	2	2	3
25% of reference mean	2	2	2	37
50% of reference mean	2	nc	2	2
SUNR (reference) and SC3 (exposure)				
Effect	**Nitrogen**	**Copper**	**Iron**	**Nickel**
2 x reference standard deviation	2	2	5	112
25% of reference mean	3	2	32	27
50% of reference mean	2	2	4	2

Note: for all power analyses, alpha=0.1 (p value), beta = 0.1 (power = 90%)
The Effect Size was applied to the Exposure group only, not to the Reference group.
All sites have three composite samples
nc = the power calculation was not computable due to the difference between groups being too large.





Note: Error bars represent standard error of the mean
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Nickel Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-12

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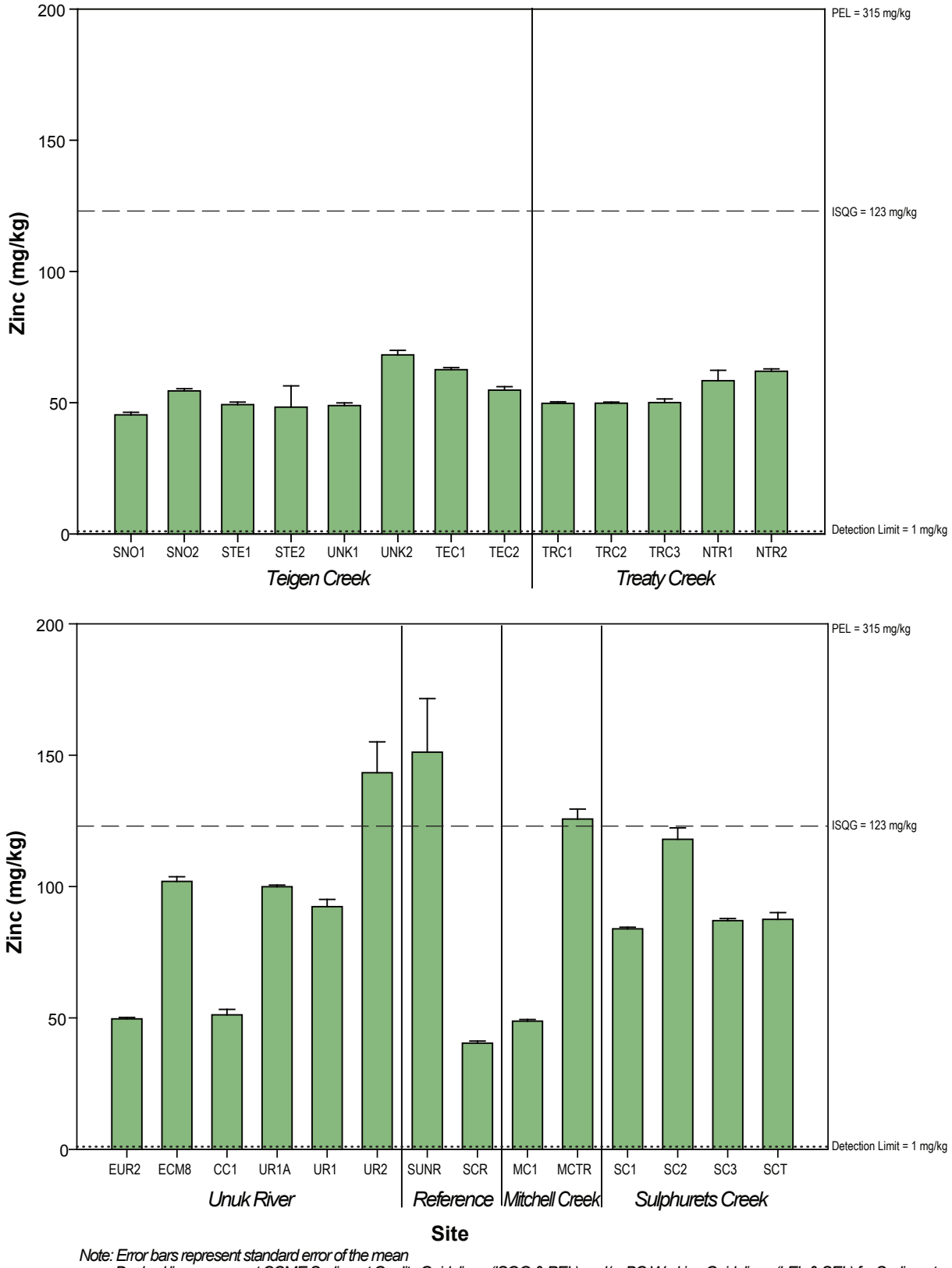

Note: Error bars represent standard error of the mean
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Zinc Concentrations in KSM Stream Sediments, August 2009

FIGURE 5.1-13

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5.1.2 Primary Producers – Periphyton

All chlorophyll *a* biomass data and algal taxonomic data are presented in Appendices 5.1-3 and 5.1-4, respectively.

5.1.2.1 Biomass and Density

Periphyton biomass concentrations were measured as chlorophyll *a* in the KSM Project streams under baseline conditions. Periphyton biomass was typically low, with an average of 0.61 μg chl *a*/cm^2 (Figure 5.1-14). Biomass ranged from 0.002 μg chl *a*/cm^2 (UR2) to 4.142 μg chl *a*/cm^2 (TEC2), and showed high variability within watersheds. It was higher in the North Treaty Creek tributary and some Teigen Creek sites and lowest in parts of the Mitchell, Sulphurets, Unuk, and Treaty systems. The BC maximum guideline of 10 μg chl *a*/cm^2 was not approached.

Average periphyton density was highest at several sites within the Teigen Creek, South Teigen Creek, North Treaty Creek tributary, and Snowbank Creek (Figure 5.1-15). Treaty Creek, Mitchell Creek, Unuk River and three of the four sites on the Sulphurets Creek had the lowest density values. Density was quite variable among stream sites, and ranged from 64 (SC2) to 1,113,806 (SNO2).

5.1.2.2 Community Composition

A total of 73 periphyton species were identified, the majority of which were diatoms (68 species). Other identified groups included chlorophytes (2 species), cyaophytes (2 species) and chrysophytes (1 species). The communities were composed almost entirely of diatoms based on density counts (96 to 100%) (Table 5.1-3). The most dominant species present were *Cymbella minuta, Hannaea arcus*, and *Gomphonema angustatum*. The exceptions were at SC3 and SCR where a higher proportion of cyanophytes (21.7 %) and chlorophytes (45.8 %) were found.

Table 5.1-3. Community Composition of Periphyton in Streams of the KSM Project Area, 2009

Station	Diatoms	Cyanophytes	Chrysophytes	Chlorophytes
EUR2	99.9	0.1	0.0	0.0
ECM8	100.0	0.0	0.0	0.0
CC1	98.9	1.1	0.0	0.0
UR1	100.0	0.0	0.0	0.0
UR2	100.0	0.0	0.0	0.0
UR1A	95.6	4.4	0.0	0.0
SUNR	100.0	0.0	0.0	0.0
STE1	100.0	0.0	0.0	0.0
STE2	100.0	0.0	0.0	0.0
UNK1	97.0	3.0	0.0	0.0
UNK2	99.5	0.5	0.0	0.0
TEC1	100.0	0.0	0.0	0.0
TEC2	100.0	0.0	0.0	0.0
SNO1	100.0	0.0	0.0	0.0
SNO2	100.0	0.0	0.0	0.0
TRC1	100.0	0.0	0.0	0.0
TRC2	98.7	0.0	1.3	0.0

(continued)

Table 5.1-3. Community Composition of Periphyton in Streams of the KSM Project Area, 2009 (completed)

Station	Diatoms	Cyanophytes	Chrysophytes	Chlorophytes
TRC3	100.0	0.0	0.0	0.0
NTR1	99.5	0.0	0.0	0.5
NRT2	100.0	0.0	0.0	0.0
MC1	100.0	0.0	0.0	0.0
MCTR	100.0	0.0	0.0	0.0
SC1	100.0	0.0	0.0	0.0
SC2	100.0	0.0	0.0	0.0
SC3	78.3	21.7	0.0	0.0
SCT	100.0	0.0	0.0	0.0
SCR	54.2	0.0	0.0	45.8

Values represent % relative abundance based on density per unit area.

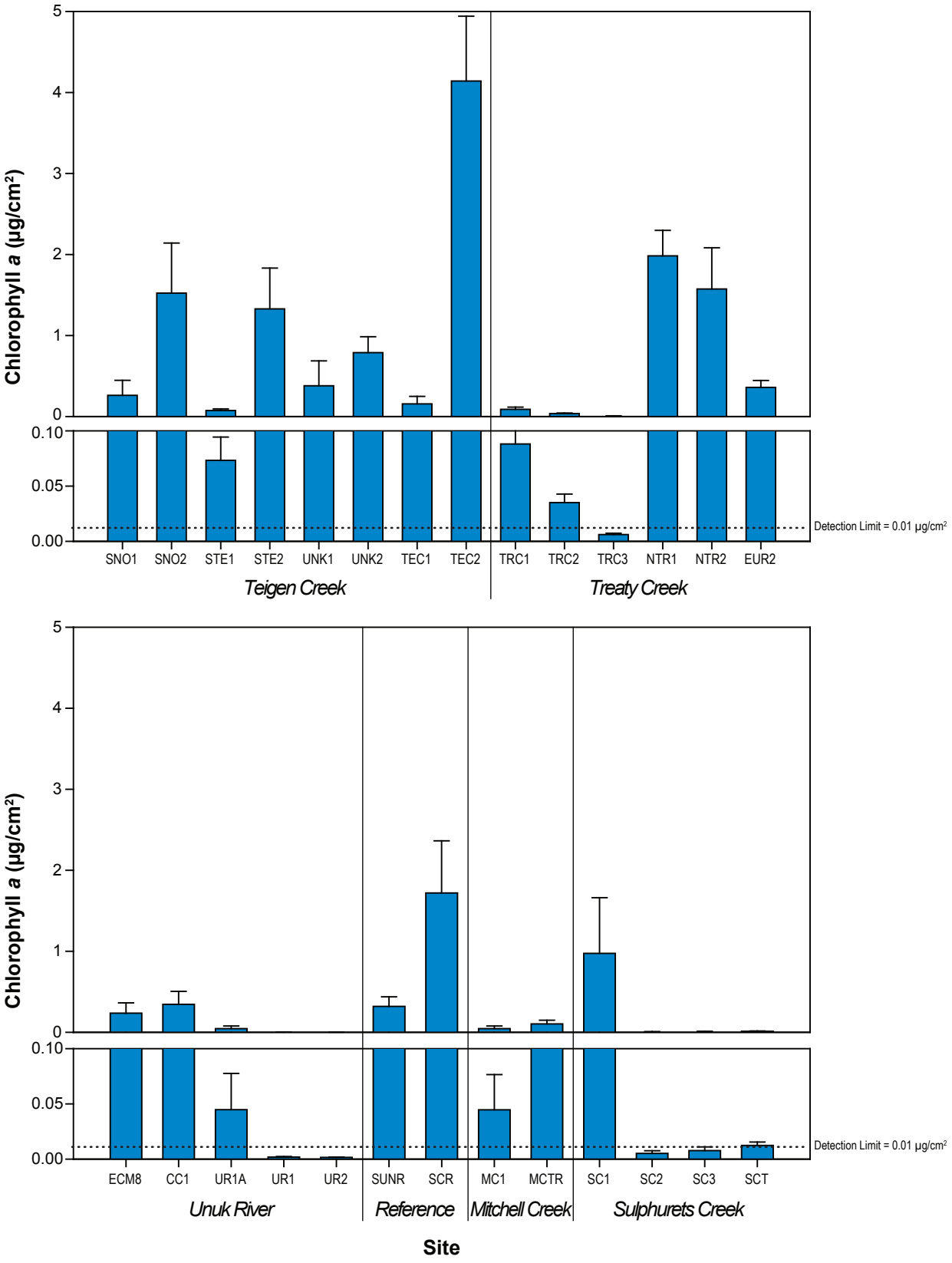
5.1.2.3 Richness, Diversity and Evenness

Average periphyton species richness ranged from 0.5 (SC2) to 20 (NTR1) (Figure 5.1-16). Richness was highest in the north Treaty Creek tributary, Teigen Creek and tributaries, upper Unuk River, Coulter Creek, and Snowbank Creek. Low richness was observed in main stem of Treaty Creek, the Unuk River downstream of the Sulphurets mouth (UR1), in Sulphurets Creek, and in Mitchell Creek.

Diversity (both Shannon and Simpson's indices) was calculated at the species level. Shannon diversity showed a strong link to richness, with high values at sites in Teigen Creek and in the north Treaty Creek tributary, and very low values in Mitchell Creek, Treaty Creek, and Sulphurets Creek (Figure 5.1-17). The sites along Snowbank Creek, the reference sites and upper Unuk River were moderately diverse, while McTagg Creek and middle sections of Unuk River had low Shannon diversity. To a large extent, Simpson's diversity showed a similar pattern as described for Shannon diversity, and ranged from 0 at several sites with very low species richness (e.g., MC1) to 0.88 at NTR1 (Figure 5.1-18). Many sites in the Teigen, Unuk, and Reference watersheds showed moderate to high Simpson's diversity. Species evenness was quite high in sites of the Unuk River (up to 0.95), moderate in sites of Teigen Creek and North Treaty Creek, and low in some sites in Treaty, Mitchell and Sulphurets creeks (Figure 5.1-19). These results are similar to the diversity scores, with the exception of the Unuk River sites which have very evenly distributed species abundances, but lower richness than at other sites (e.g., Teigen Creek) that are both high in evenness and richness.

5.1.2.4 Bray-Curtis Similarity

The Bray-Curtis similarity coefficient is used to determine similarity in biological community structure based on the type and relative abundance of organisms present. The coefficient ranges from 0 to 100%, with 0% being completely dissimilar and 100% being identical. A similarity matrix of the stream sites was generated using median periphyton density values at two reference sites (SUNR and SCR) to create reference standards for comparison (Appendix 5.1-5). Data were first transformed (log(x+1)) to standardize against non-normality among sample density distributions. Benthic invertebrate samples were then individually compared to each of these artificial reference samples to determine percent similarity (Environment Canada 2003). The average percent similarity among sites is shown on each figure.



Note: Error bars represent standard error of the mean

FIGURE 5.1-14

Periphyton Biomass as Chlorophyll *a* in KSM Project Streams, August 2009

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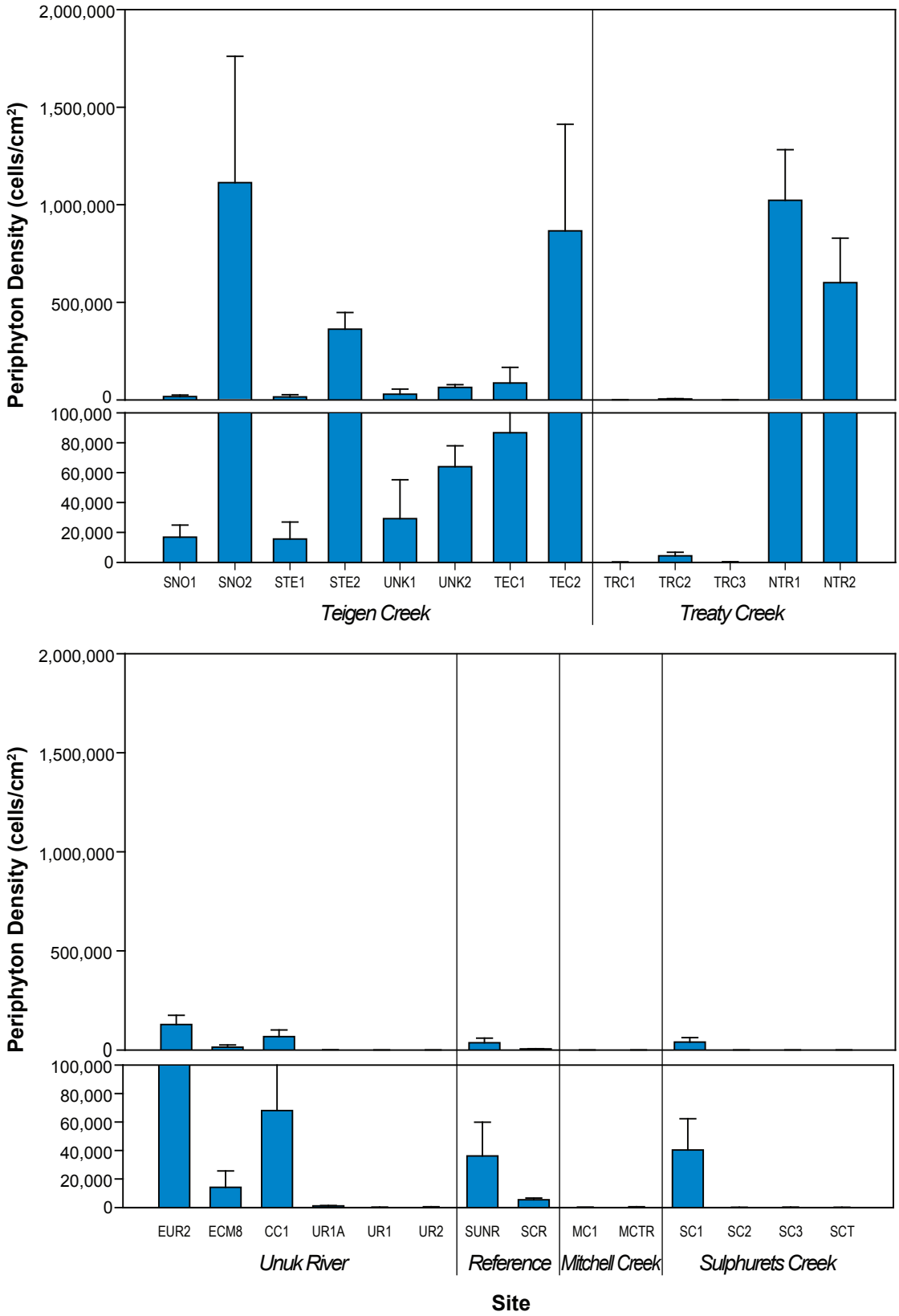

Note: Error bars represent standard error of the mean

FIGURE 5.1-15

Periphyton Density in KSM Project Streams, August 2009

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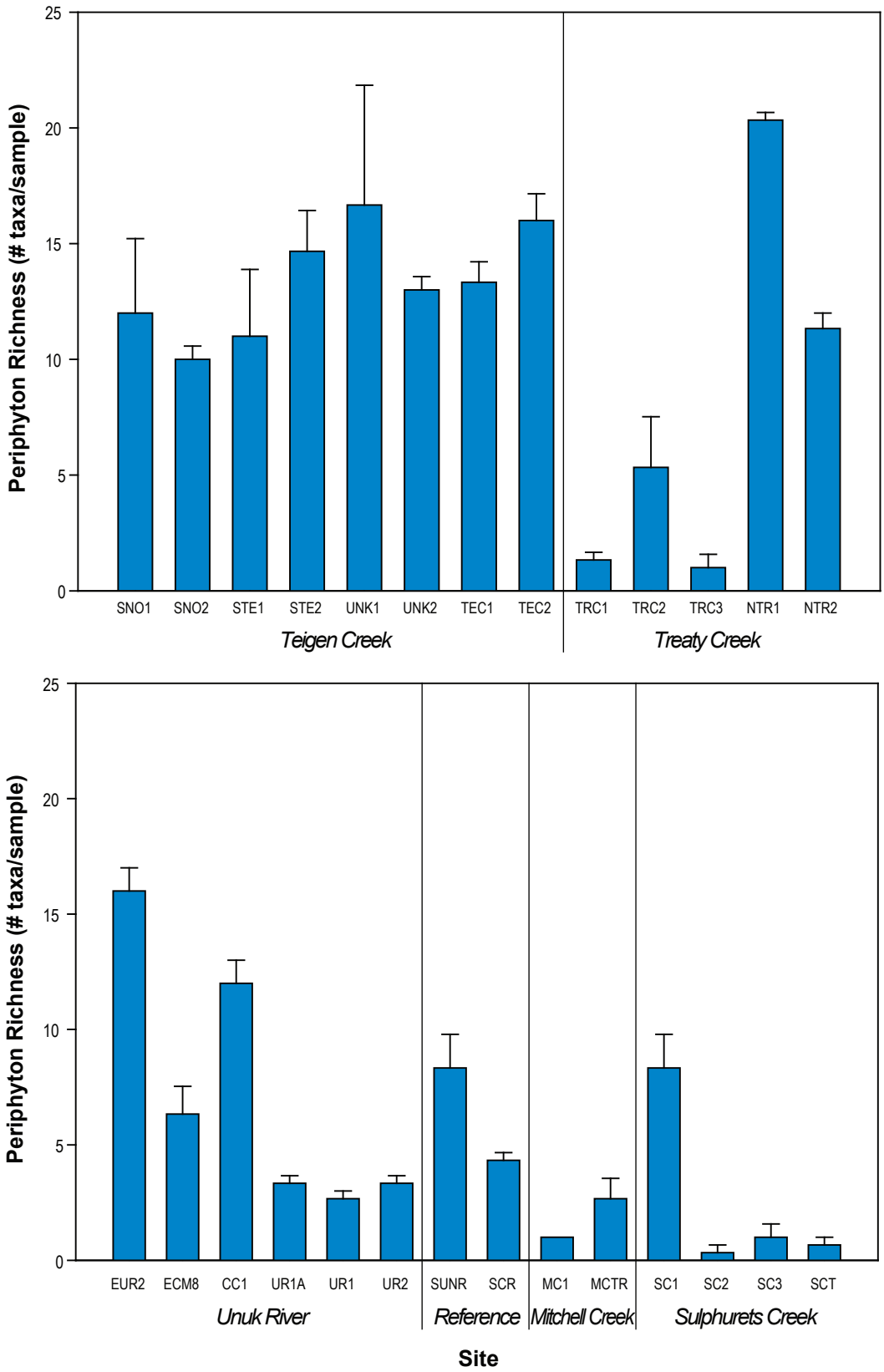

Note: Error bars represent standard error of the mean

FIGURE 5.1-16

Periphyton Species Richness in KSM Project Streams, August 2009

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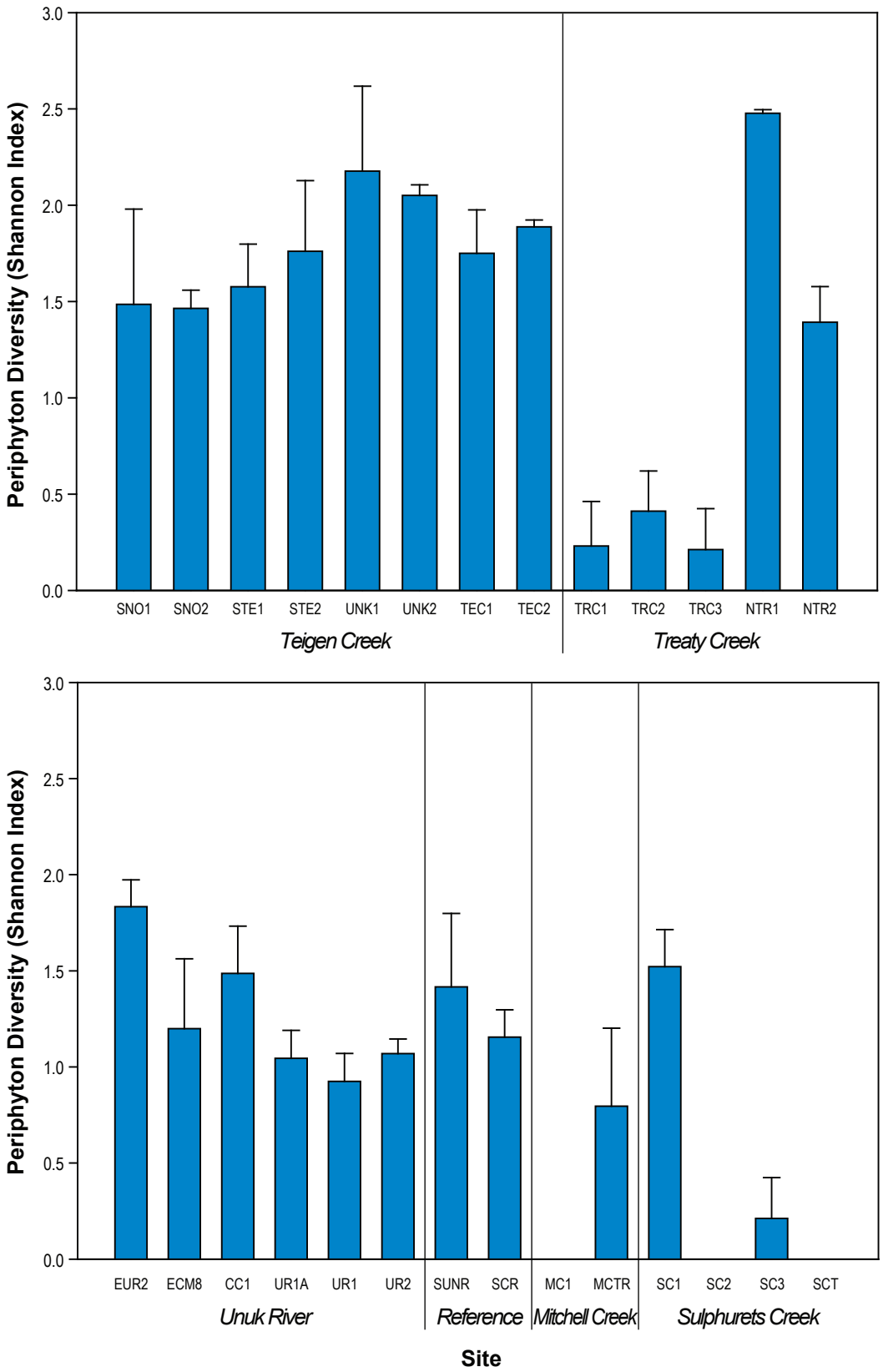

Note: Error bars represent standard error of the mean

FIGURE 5.1-17

Periphyton Shannon Diversity Index in KSM Project Streams, August 2009

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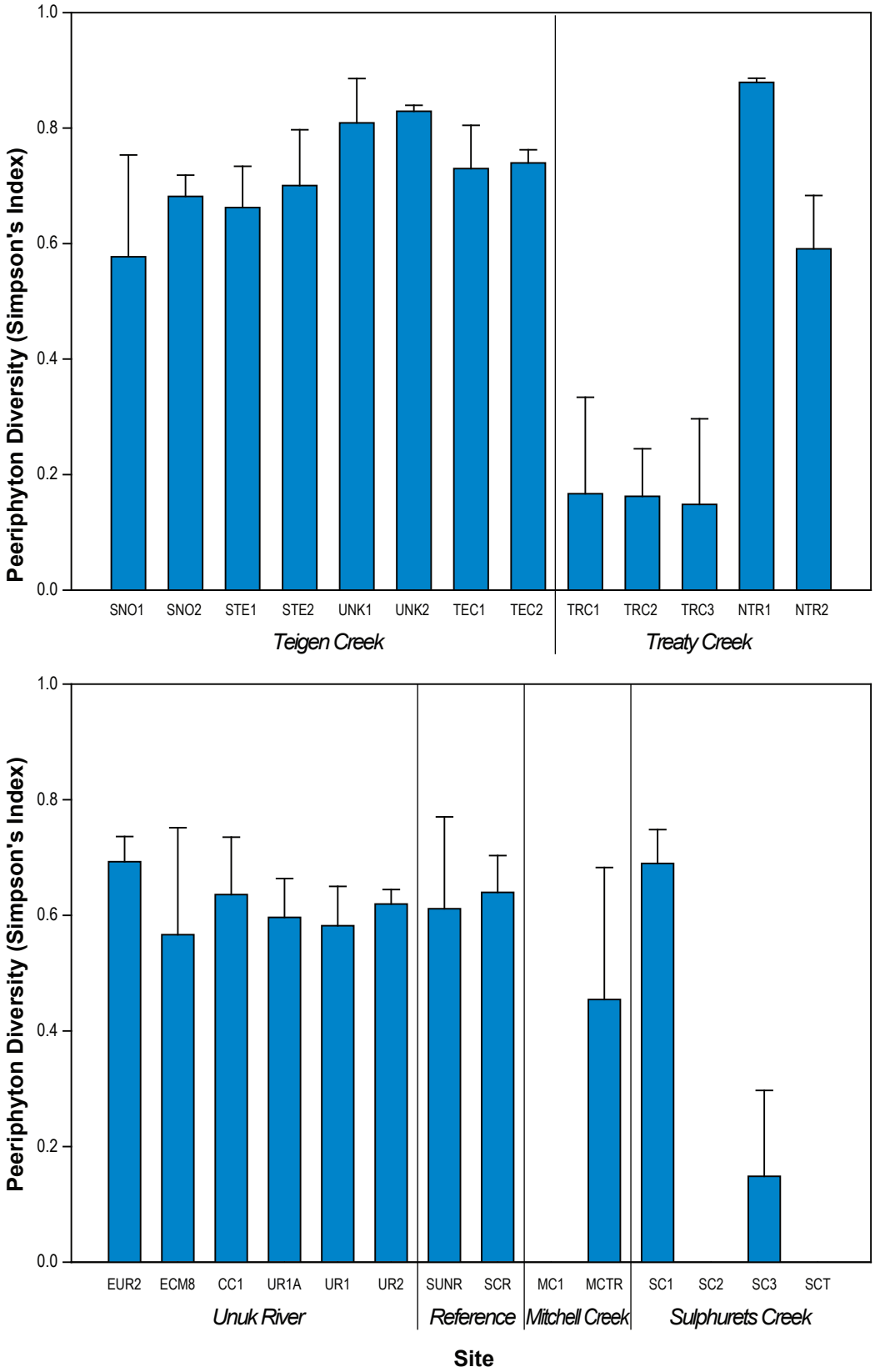

Note: Error bars represent standard error of the mean

FIGURE 5.1-18

Periphyton Simpson's Diversity Index in KSM Project Streams, August 2009

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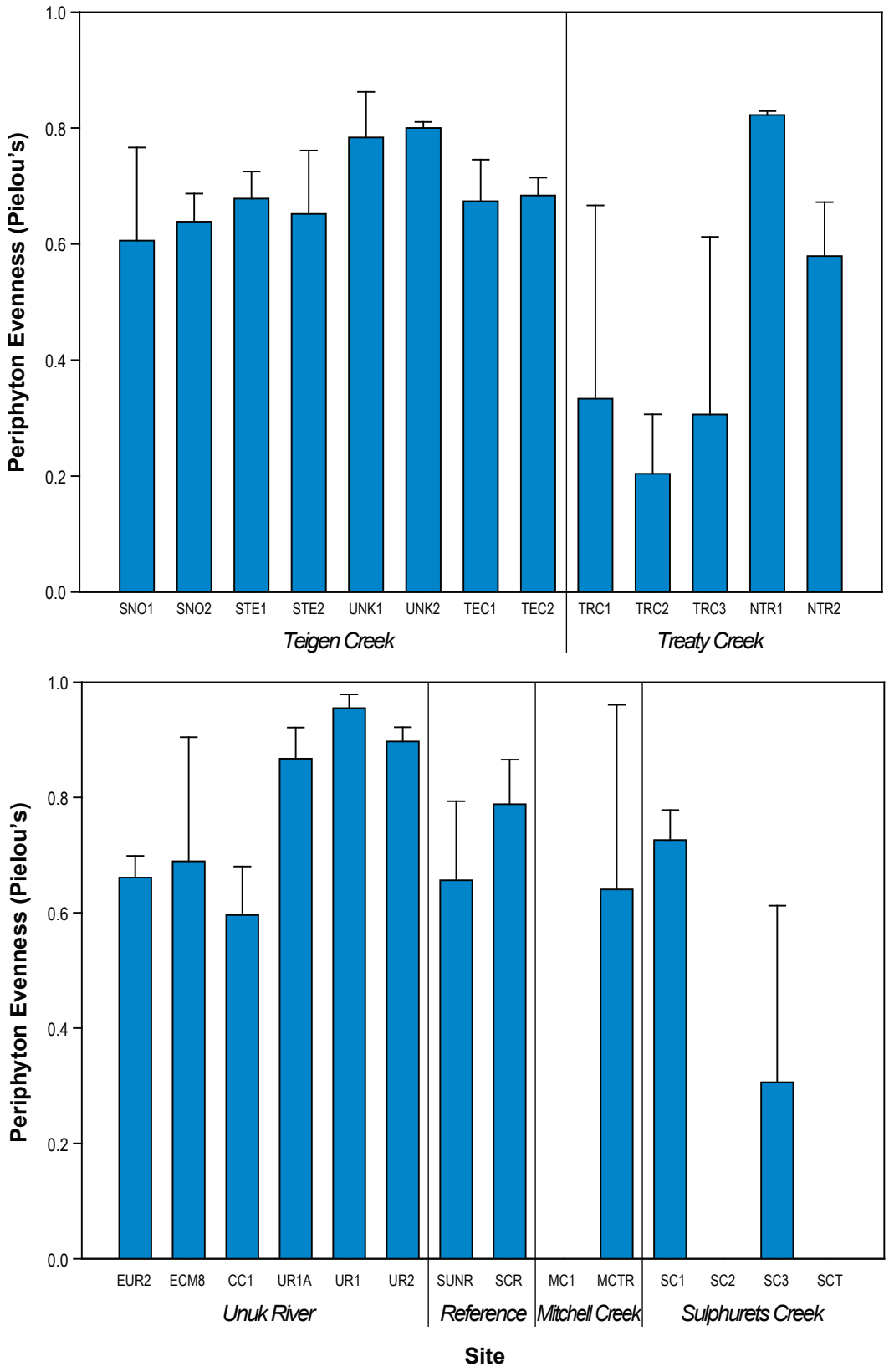

Note: Error bars represent standard error of the mean

FIGURE 5.1-19

Periphyton Evenness in KSM Project Streams, August 2009

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As expected, both SCR and SUNR showed highest similarity to their own median reference standard. Similarity to the median SCR reference stream ranged from 11 % (MCTR) to 88% (SCR) with an average similarity of 32% for all sites (Figure 5.1-20). Some sites within the Unuk River (ECM8, UR1 and UR2), and SC1, and TRC2 showed above-average similarity to the reference site on Scott Creek, with similarities ranging from 41% to 62%. A few sites including MC1 and MCTR, SC2, EUR2, TEC2, and NTR1 showed low similarity to SCR. Therefore the results did not show clear watershed-wide patterns, but did enforce the degree that Mitchell and Sulphurets creeks contain different periphyton communities compared to other sites.

Similarity to the other reference site SUNR (South Unuk River), was lowest in Sulphurets Creek (SC2; 11%) and highest in CC1% (53%), with an average similarity of 34% among sites (Figure 5.1-21). Sites in Mitchell Creek and most sites in Sulphurets (except SC1) showed very low similarity compared with SUNR. Many sites along Teigen Creek, Snowbank Creek, Coulter Creek, SC1, and some sites in Treaty Creek showed high similarity to SUNR. With an average median similarity for Teigen Creek of 42% at SUNR, the results indicate that SUNR is a better reference site than SCR site, which had an average watershed median similarity of 30%, for assessing periphyton in Teigen Creek.

5.1.2.5 Quality Assurance and Quality Control (QA/QC)

Power Analysis

Power analysis for periphyton was done for three pairs of sites: SCR (reference) paired with potential exposure site TEC2, SUNR (reference) paired with potential exposure site SC3, and UR1A (upstream reference) paired with its downstream potential exposures site UR1. Species richness, evenness, Shannon Diversity, Simpson's Diversity and density were selected as variables to examine using the power analysis.

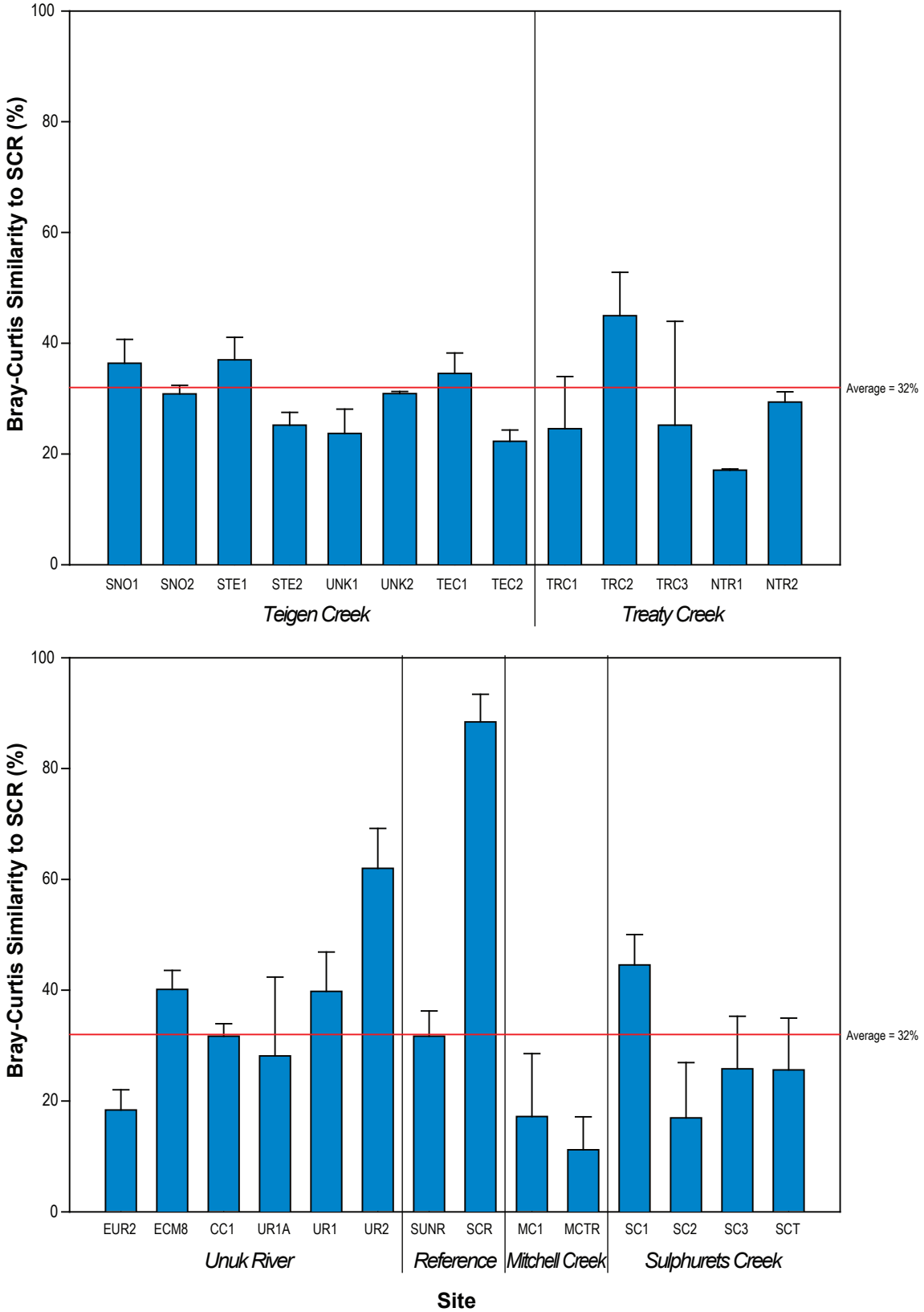
The results indicate that two to four samples collected for periphyton richness was sufficient (Table 5.1-4). Results for the other metrics were more varied, with larger sample sizes recommended for select effect sizes and metrics. Overall, UR1A and UR1 had lower recommended sample sizes than SCR and TEC2, indicating that using the upstream site to detect effects was an appropriate reference method. For numerous metrics and effect sizes, the recommended sample size for the SUNR and SC3 pairs was not capable of being calculated due to the sparse periphyton community at SC3. The naturally sparse community present at select sites in the Project study area may make changes in the periphyton community difficult to detect. Overall, the power analysis results for periphyton indicate that three replicates will be sufficient based on some metrics and that other metrics for periphyton should be interpreted with caution due to the high natural variability of the community or sampling effort should be increased.

5.1.3 Secondary Producers – Benthic Invertebrates

Benthic invertebrate stream communities were sampled at twenty-six sites in the KSM Project study area. A Hess-net sampler was used to collect three or five composite replicate samples at each site. Five replicates were collected at key monitoring sites. The differences between replicate numbers are addressed in the QA/QC section.

At six sites (TEC1, NTR2, SCR, SUNR, CC1, and STE2), the benthic invertebrate samples were also collected using the kick-net method, in addition to the Hess-net sampler as outlined by the BC MoE (2000).

Data for all samples are presented in Appendix 5.1-6.



Note: Error bars represent standard error of the mean
Red line shows average similarity to median SCR scores

Bray-Curtis Similarity Index Comparing Periphyton in Reference Stream SCR to Each KSM Project Stream, August 2009

FIGURE 5.1-20

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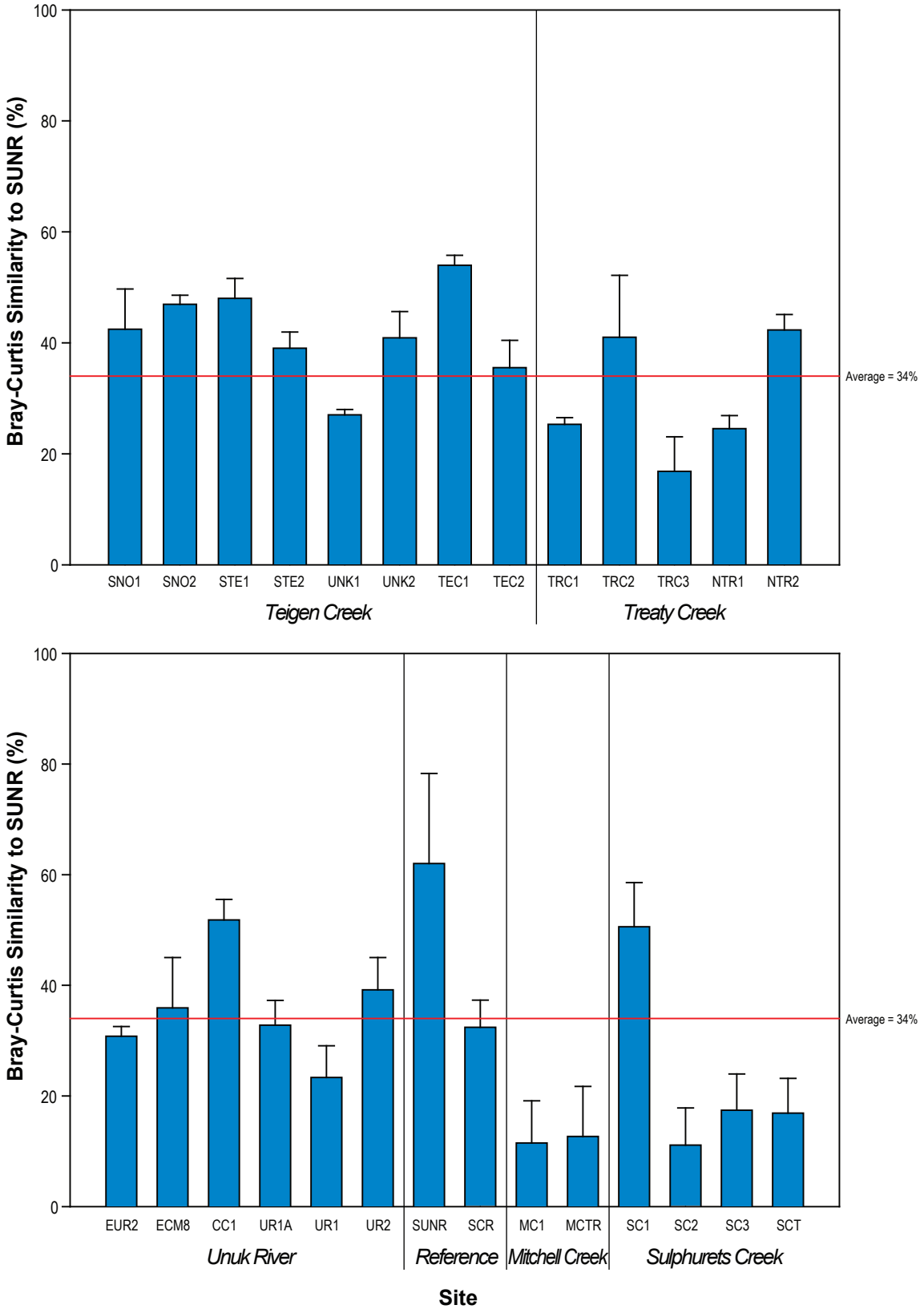

Note: Error bars represent standard error of the mean
Red line shows average similarity to median SUNR scores

Bray-Curtis Similarity Index Comparing Periphyton in Reference Stream SUNR to Each KSM Project Stream, August 2009

FIGURE 5.1-21

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Table 5.1-4. Sample Size Required Based on Power Analyses of KSM 2009 Baseline Periphyton Community Data for Three Pairs of Sites

SCR (reference) and TEC2 (exposure)					
Effect	**Richness**	**Evenness**	**Shannon**	**Simpson**	**Density**
2 x ref. st dev.	2	2	9	7	9
25% of ref. mean	2	3	3	26	9
50% of ref. mean	2	2	18	3	9
UR1A (reference) and UR1 (exposure)					
Effect	**Richness**	**Evenness**	**Shannon**	**Simpson**	**Density**
2 x ref. st dev.	3	8	3	4	nc
25% of ref. mean	3	5	7	8	2
50% of ref. mean	2	2	3	3	nc
SUNR (reference) and SC3 (exposure)					
Effect	**Richness**	**Evenness**	**Shannon**	**Simpson**	**Density**
2 x ref. st dev.	nc	4	nc	nc	nc
25% of ref. mean	nc	11	3	4	nc
50% of ref. mean	nc	6	nc	nc	nc

Note: for all power analyses, alpha=0.1 (p value), beta = 0.1 (power = 90%)
The Effect Size was applied to the Exposure group only, not the reference group.
all sites have n=3 composite samples from 2 to 3 rocks with multiple discs.
nc = the power calculation was not computable due to the difference between groups being too large.

5.1.3.1 Density

The kick-net method does not sample a specific area and consequently density for these samples is not discussed. Only Hess-net sampler density data are presented and discussed herein.

Benthic invertebrate densities ranged from 32 organims/m^2 (MC1) to 27,823 organims/m^2 (NTR1) (Figure 5.1-22). Densities were generally highest in Teigen Creek and in the north Treaty Creek Tributary (NTR1 and NTR2). Lower densities were most consistently measured in the Mitchell, Sulphurets and Treaty Creek Watersheds.

5.1.3.2 Community Composition

The benthic communities sampled using the Hess-net sampler were dominated by Diptera (primarily chironomids) at 8 of the 27 stream sites, Plecoptera were dominant at 7 of the sites and Ephemeroptera were dominant at 6 of the sites. Oligochaetes were dominant at site TRC3 (Figure 5.1-23). At seven of the sites, dominance was shared to variable degrees by Diptera, Ephemeroptera, and Plecoptera. Smaller proportions of other taxa were also observed at various sites, including Trichoptera, Nematoda, Oligochaeta, Pelecypoda, Hydracarina, Ostracoda, and Lepidoptera.

The benthic communities in Snowbank Creek (SNO1) and in Teigen Creek downstream of the confluence with Snowbank Creek (SNO2) were dominated by Ephemeroptera (37 to 54%), with Diptera and Plecoptera also present in relatively high abundances (20 to 32%). South Teigen Creek STE1 was dominated by Plecoptera (61%) while STE2 had a higher percentage of Ephemeroptera present (44%) (Figure 5.1-23). UNK1, also located in the Teigen Watershed, was dominated by Ephemeroptera (49%) and Plecoptera (24%), while the community at UNK2 was composed primarily of Diptera (75%) (Figure 5.1-23a). TEC1 on Teigen Creek was predominantly composed of Plecoptera (44%) and Ephemeroptera (43%) while dipterans dominated the abundant benthos community at TEC2. The low

density communities along Treaty Creek were dominated by Diptera, Ephemeroptera and Plecoptera, with an increasing number of Ephemeroptera, and Plecoptera present at TRC2. In contrast, TRC3 was dominated by Oligochaeta (61%). In north Treaty Creek, NTR1 and NTR2 were dominated by Diptera (58% and 32%) (Figure 5.1-23b). In the Unuk River, communities at ECM8, UR1A, UR1 and UR2 were largely made up of Diptera (11 to 41%), Plecoptera (22 to 46%) and Ephemeroptera (50 to 37%) (Figure 5.1-23c,e). The benthic community at MC1 in Mitchell Creek was dominated by Nematoda (26%), Ephemeroptera (13%), and Plecoptera (13%) though average density was low (31.3 organisms/m^2). MCTR on McTagg Creek was dominated by Diptera (56%) and Plecoptera (40%). The benthic communities in the Sulphurets Creek Watershed were dominated by Diptera (60%), and in this watershed, all sites had a small proportion of other groups present (Figure 5.1-23d).

The communities at the reference streams, SCR and SUNR, both contained a high proportion of Ephemeroptera and Plecoptera, though SCR a greater proportion of Plecoptera (72%) (Figure 5.1-23e).

When compared to the Hess-net samples, benthos communities collected using the kick-net method were largely similar although a greater proportion of Ephemeroptera and a lower proportion of Diptera were found using the latter method (Figure 5.1-23f).

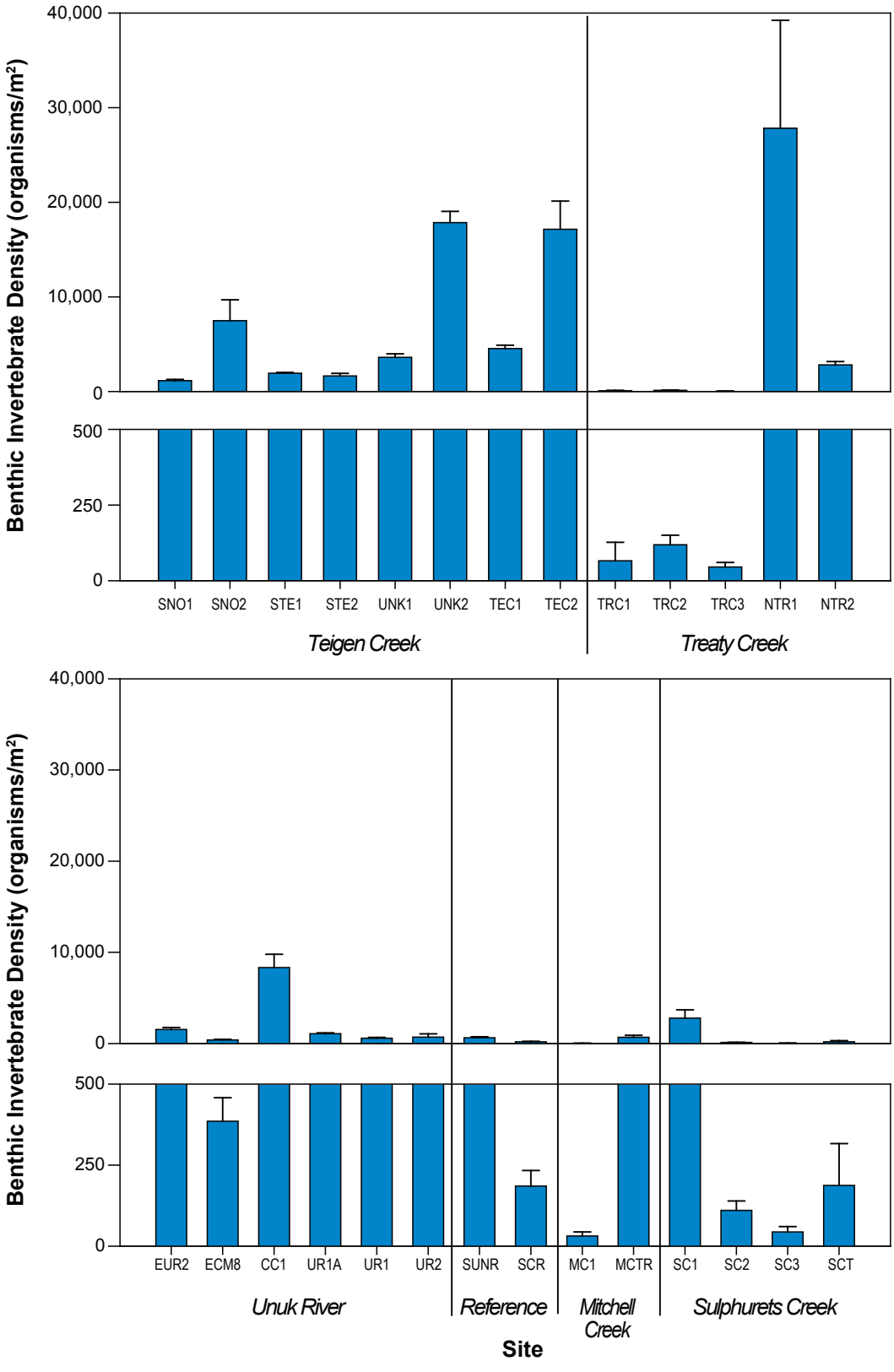
5.1.3.3 Richness, Diversity and Evenness

The Hess-net samples had average genus richness ranging from 2.2 genera/site (MC1) to 25.3 genera/site (NTR1) (Figure 5.1-24). Benthic invertebrate richness was lowest in the Treaty Creek, Mitchell Creek, and Sulphurets Creek watersheds. The kick-net samples were found to have higher richness values than those collected at the same site using the Hess-net. The difference between the two methods was most evident at SCR, where the kick-sample had a richness of 17 genera while the Hess-net samples had an average richness of 5.8 genera. Richness for the kick-net samples ranged from 14 genera/site (SUNR) to 27 genera/site (TEC1). Kick-net sampling covers a large span of the stream environment and consequently a greater variety of habitats containing a wider range of genera would have been sampled.

Ephemeroptera (mayfly), Plecoptera (stonefly) and Trichoptera (caddisfly) (EPT) richness was found to follow a similar pattern as overall benthos richness (Figure 5.1-25). Richness ranged from 0.3 EPT genera/site (NTR3) to 12.3 EPT genera/site (UNK1). As with general richness, EPT richness was lowest in the Treaty Creek, Mitchell Creek, and Sulphurets Creek watersheds. The kick-net samples also had higher EPT richness than the samples obtained using the Hess-net sampler, ranging from 8 genera at SUNR to 17 genera at CC1.

Evenness, which ranges from 0 to 1 with 1 representing complete evenness, measures how evenly abundance is distributed across the genera within a community. Evenness ranged from 0.5 (UNK2) to 0.99 at MC1 (Figure 5.1-26).

Shannon diversity varied widely among the Hess-net sampler stream samples, with average values ranging from 0.63 (MC1) to 2.52 (SNO1) (Figure 5.1-27). The lowest Shannon diversity was commonly observed in sites in Treaty Creek, Mitchell Creek, and Sulphurets Creek, while highest values were seen in Snowbank Creek, Teigen Creek, and in the north Treaty Creek tributary. The reference sites, SUNR (1.84) and SCR (1.32) had moderately diverse benthos assemblages compared to other stream sites. Shannon diversity of kick-net samples ranged from 1.60 to 2.24. Kick-net sample diversity was similar to that of Hess samples for Teigen and Treaty Creek sites, but was slightly lower at SUNR and higher in CC1 and SCR sites.



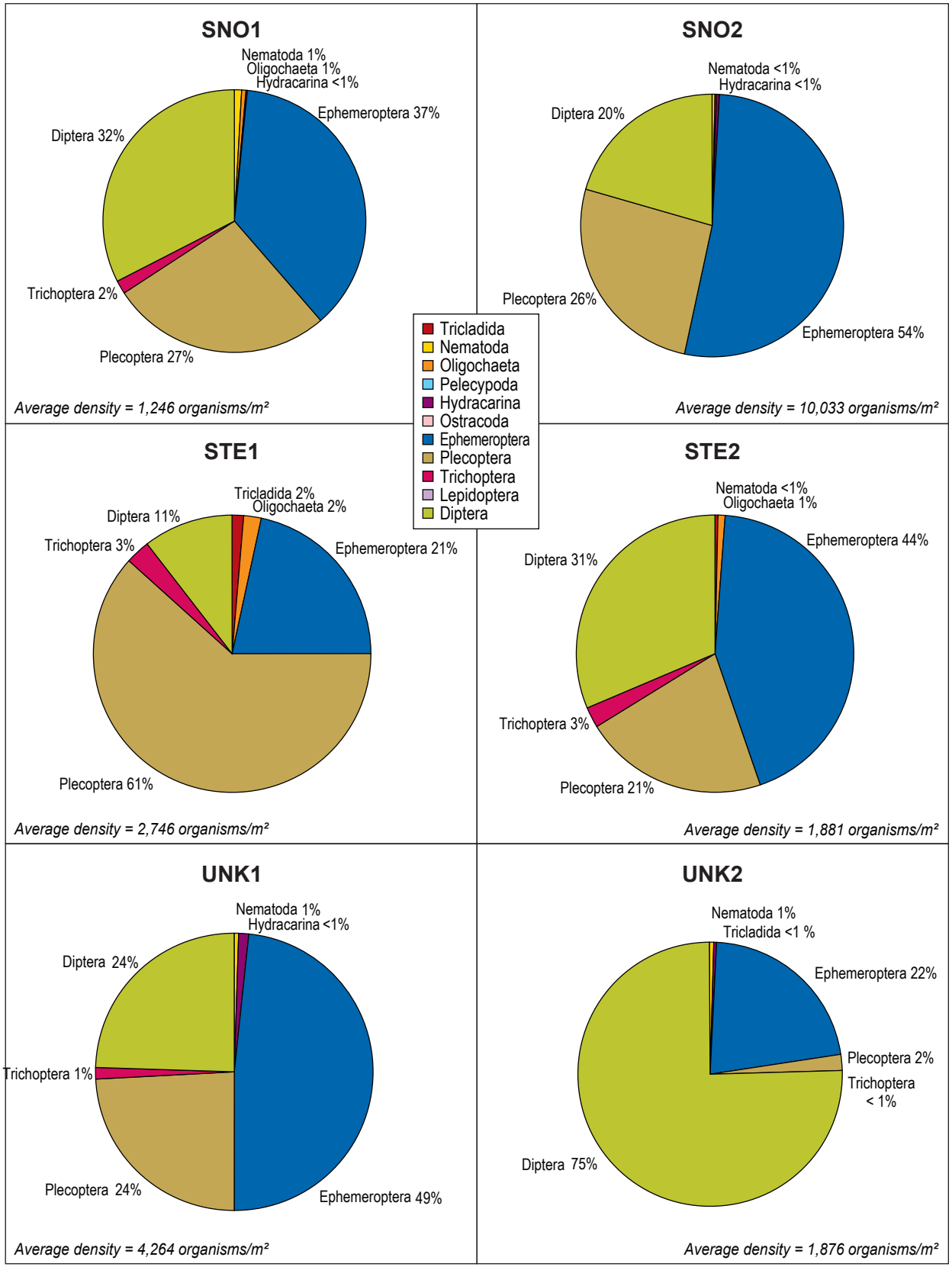
Note: Error bars represent the standard error of the mean

Benthic Invertebrate Density in KSM Project Streams, August 2009

FIGURE 5.1-22

SEABRIDGE GOLD

Rescan™



Benthic Invertebrate Community Composition in Streams of the KSM Project, August 2009

FIGURE 5.1-23a

SEABRIDGE GOLD

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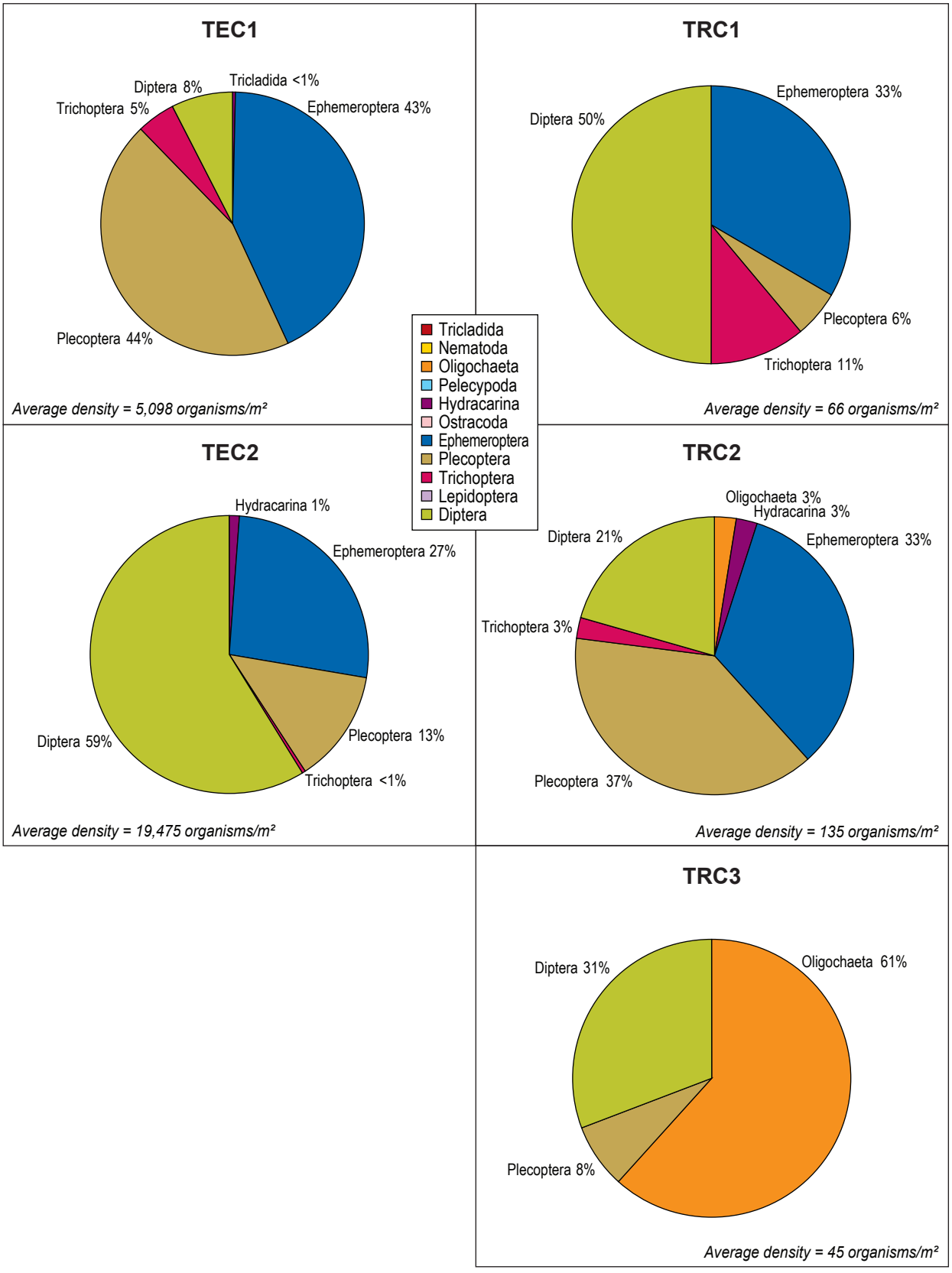

Benthic Invertebrate Community Composition in Streams of the KSM Project, August 2009

FIGURE 5.1-23b

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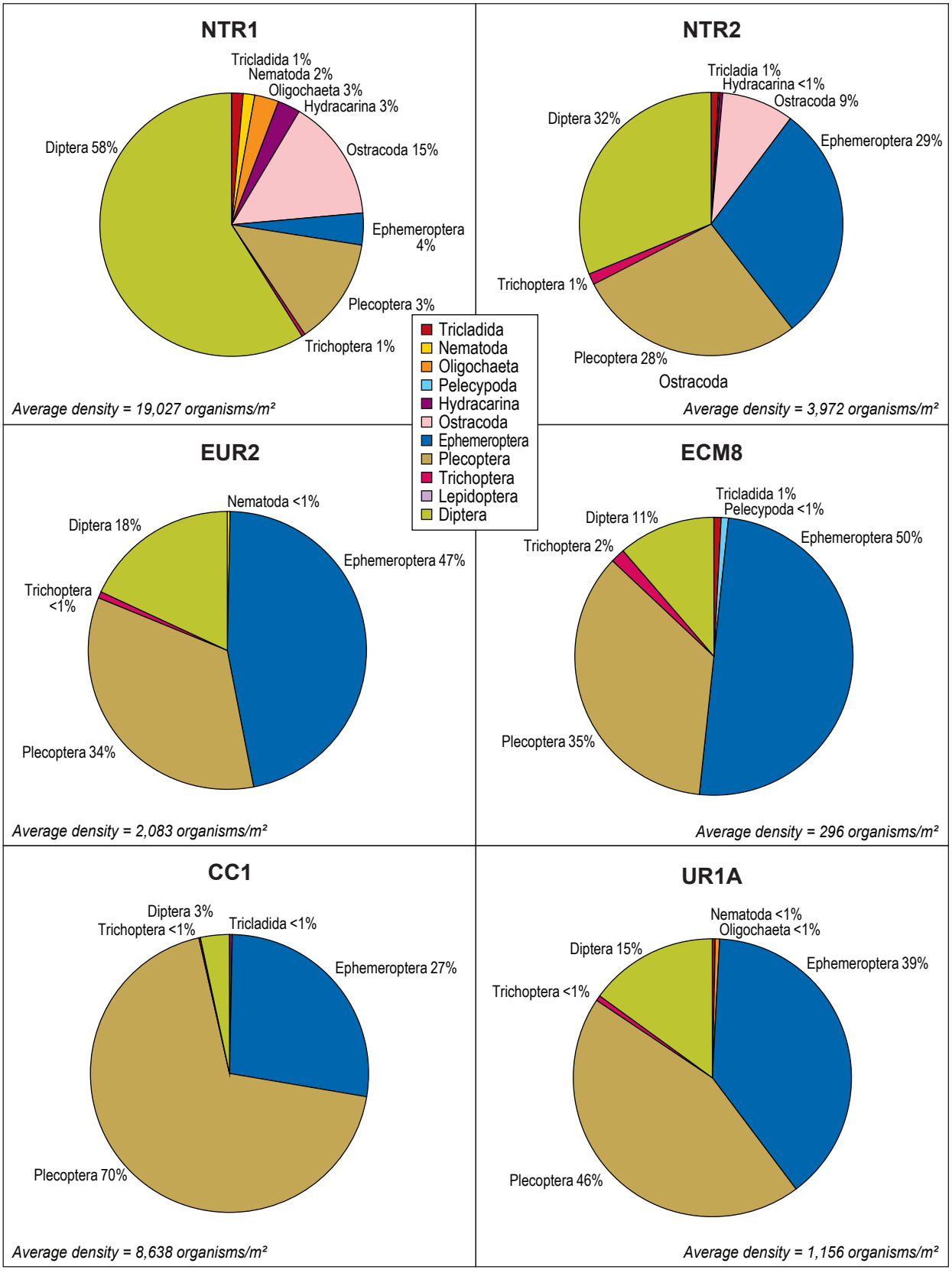
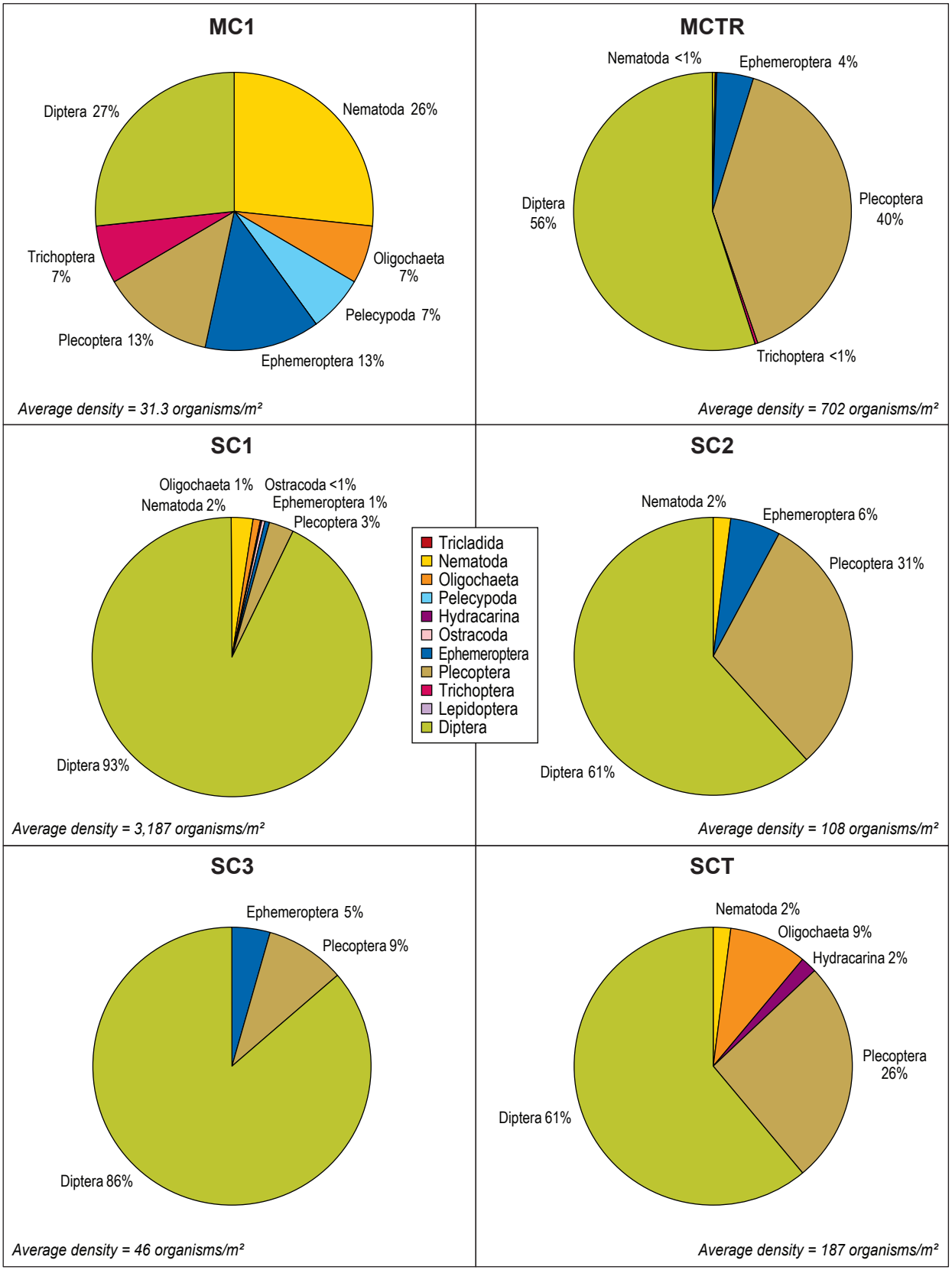


Benthic Invertebrate Community Composition in Streams of the KSM Project, August 2009

FIGURE 5.1-23c

SEABRIDGE GOLD

Rescan™



Benthic Invertebrate Community Composition in Streams of the KSM Project, August 2009

FIGURE 5.1-23d

SEABRIDGE GOLD

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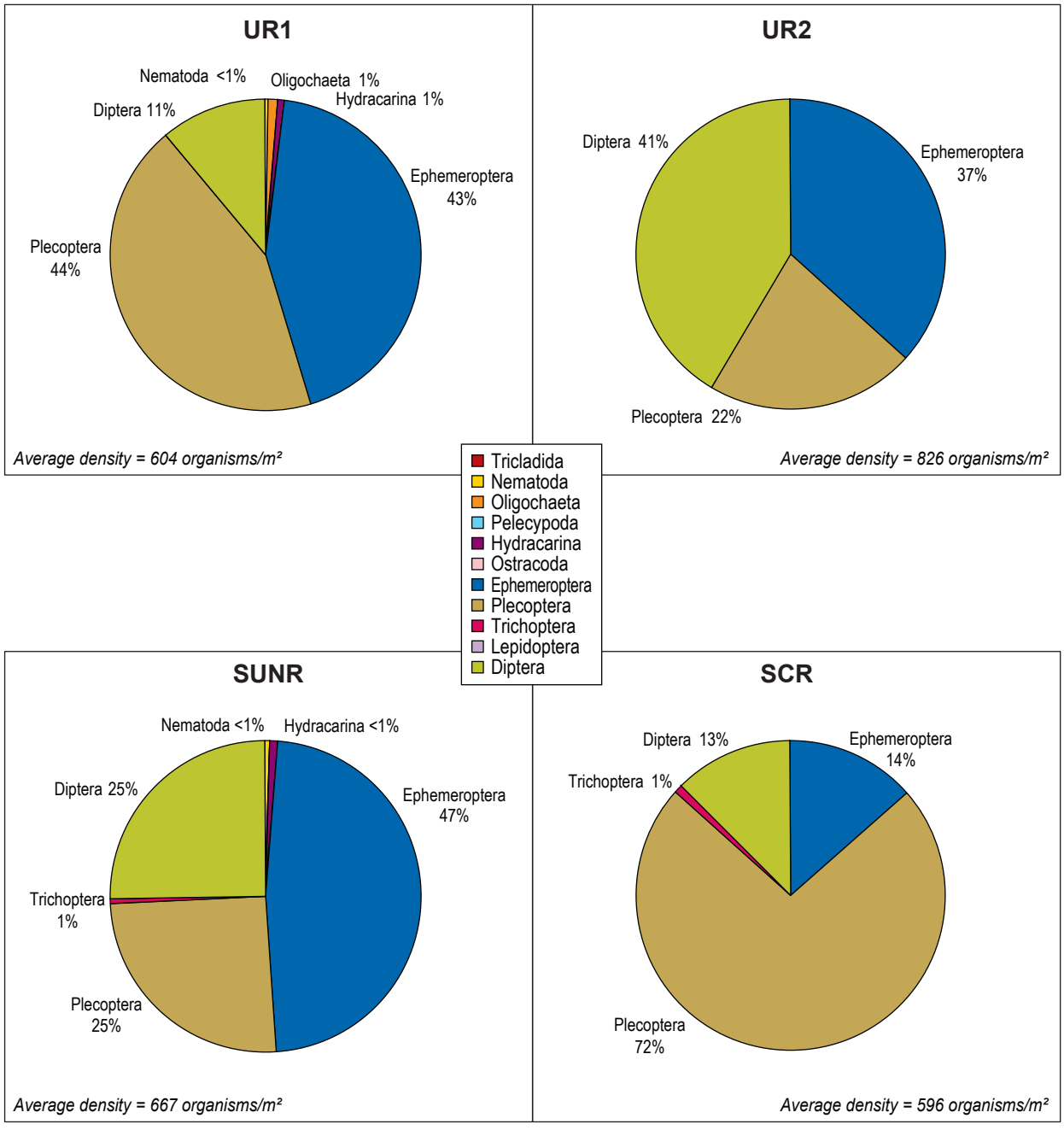

Benthic Invertebrate Community Composition in Streams of the KSM Project, August 2009

FIGURE 5.1-23e

SEABRIDGE GOLD

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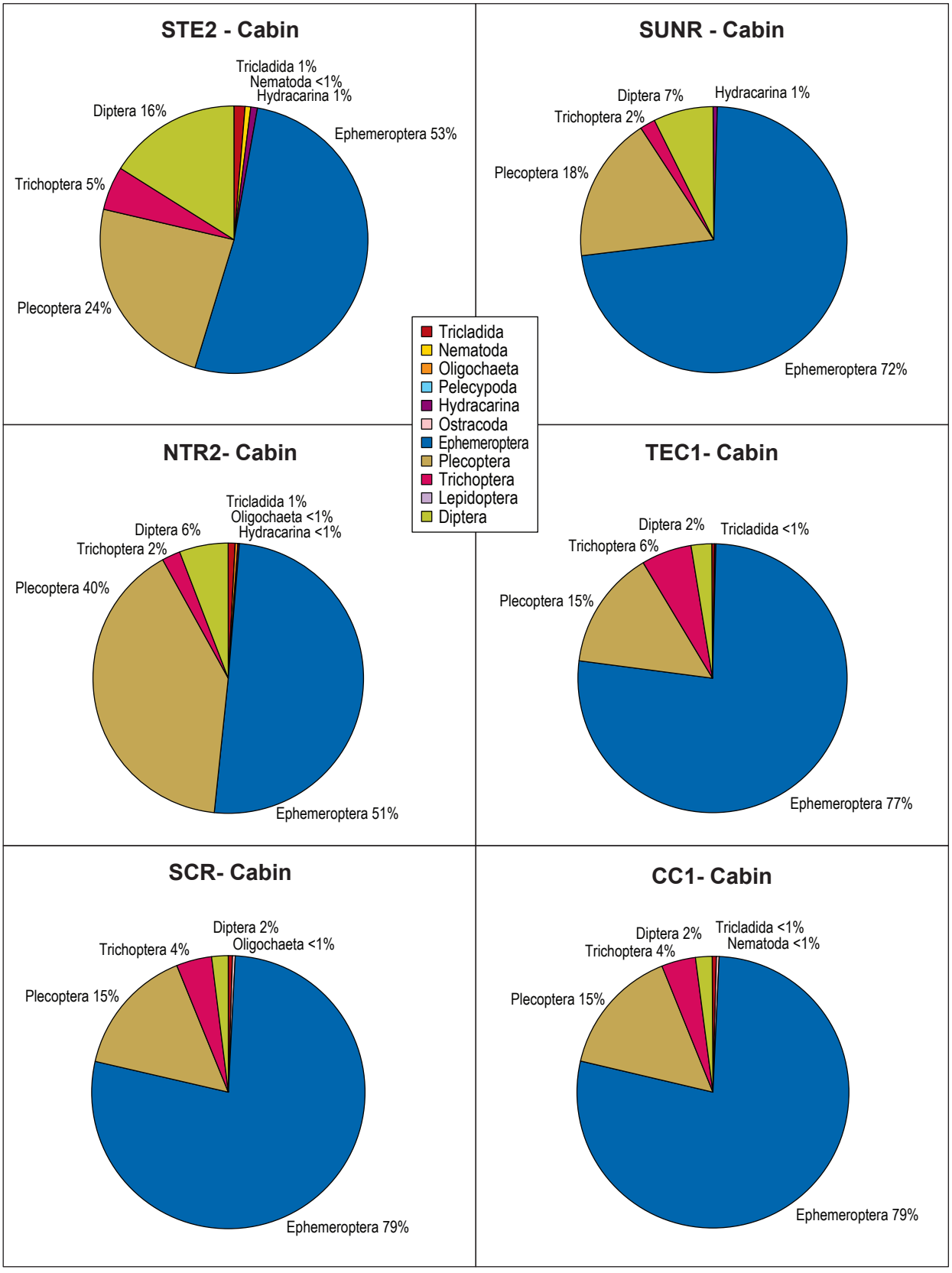

Benthic Invertebrate Community Composition in Streams of the KSM Project, August 2009

FIGURE 5.1-23f

SEABRIDGE GOLD

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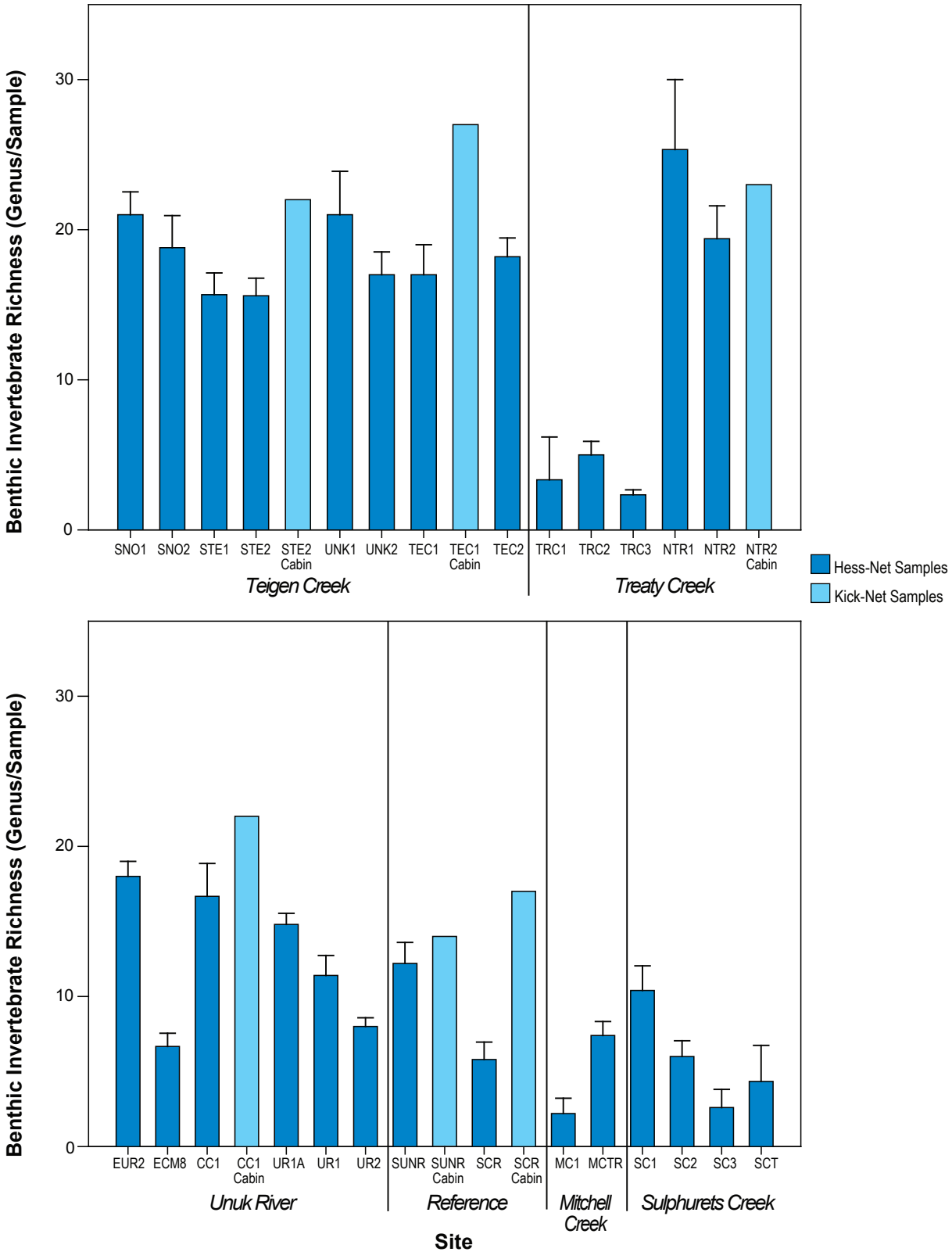

Note: Error bars represent the standard error of the mean

Benthic Invertebrate Richness (Genus) in KSM Project Streams, August 2009

FIGURE 5.1-24

SEABRIDGE GOLD

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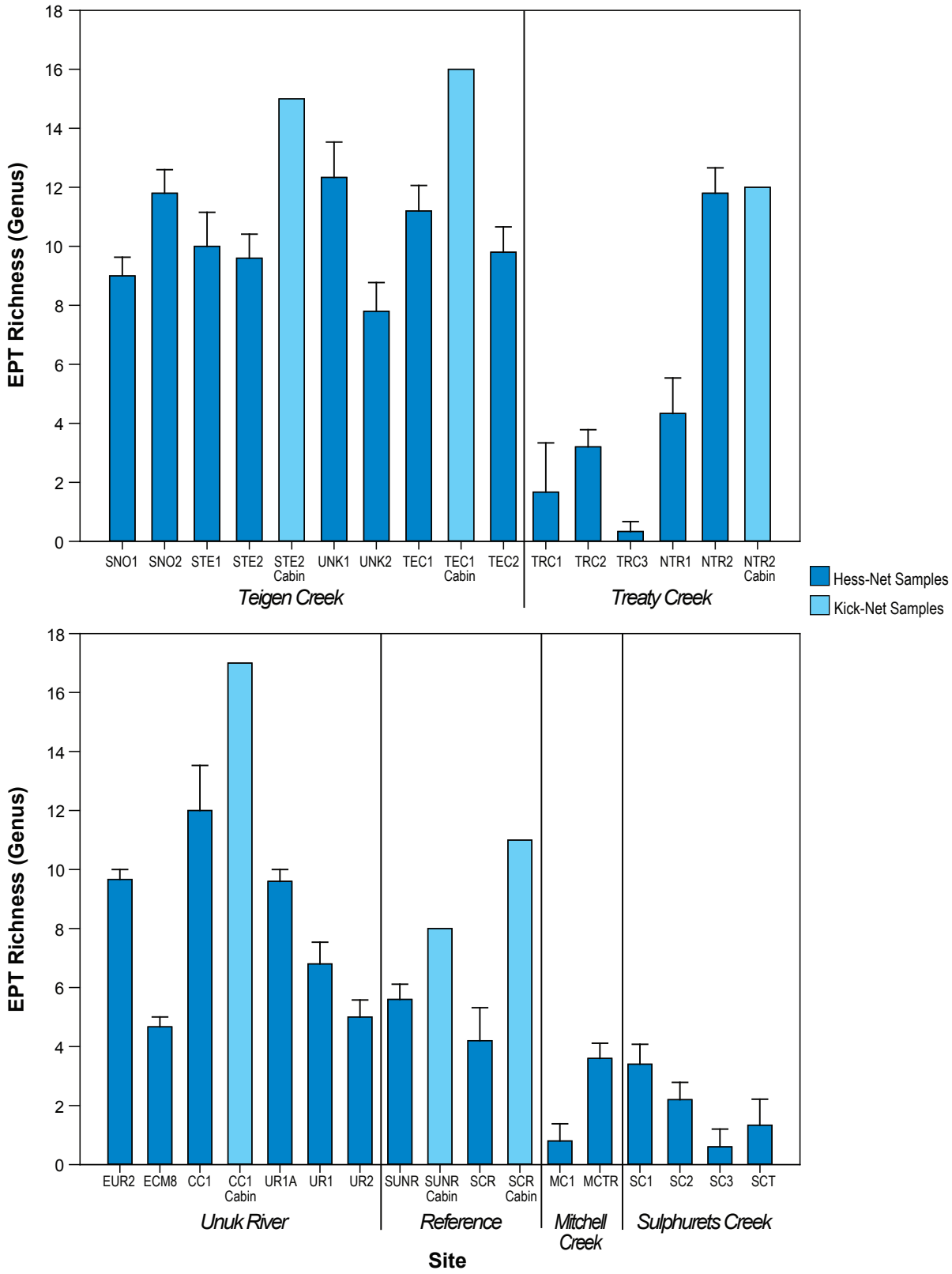


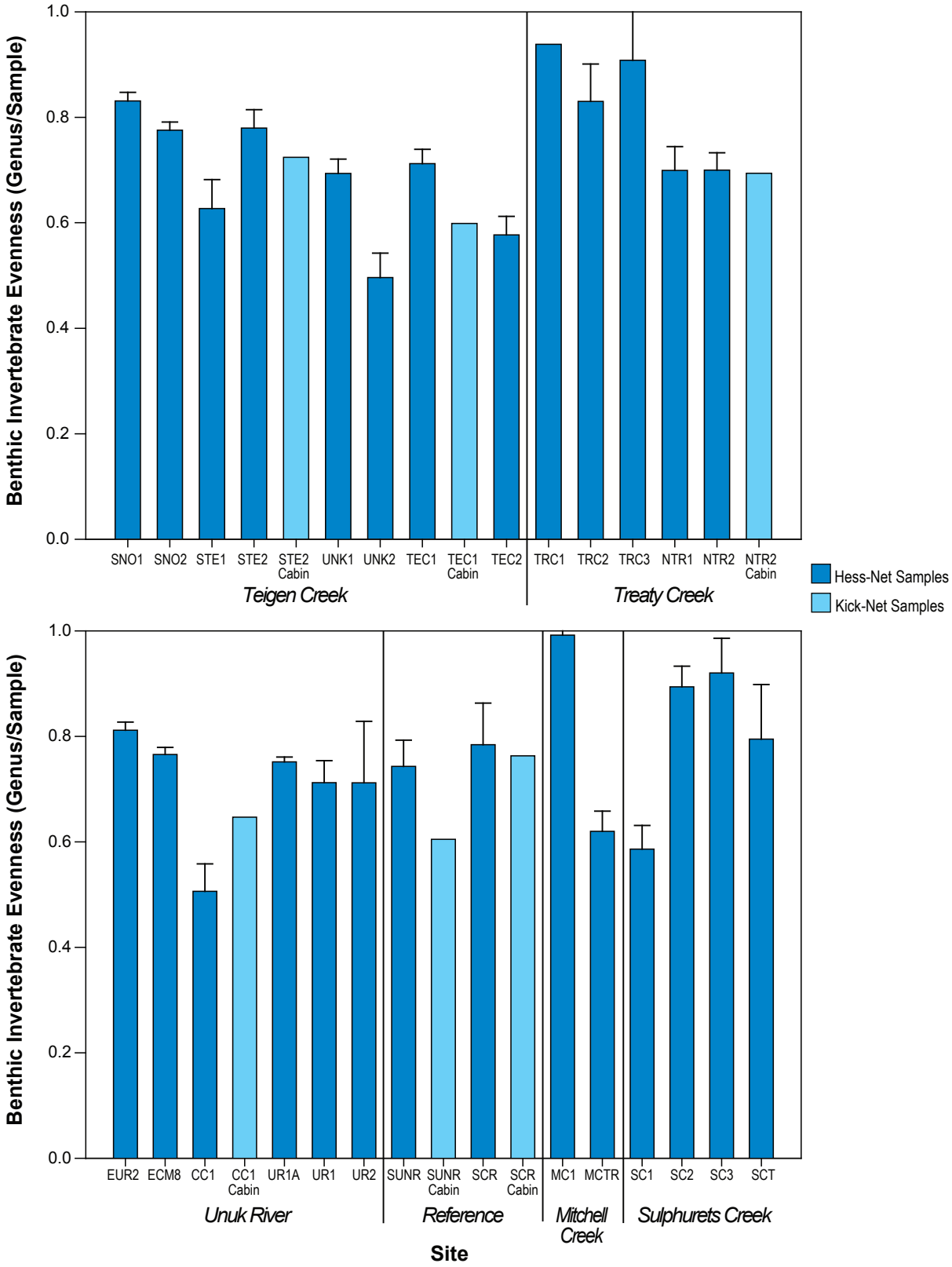
Note: Error bars represent the standard error of the mean

EPT (Ephemeroptera, Plecoptera and Trichoptera) Genus Richness in KSM Project Streams, August 2009

FIGURE 5.1-25

SEABRIDGE GOLD

Rescan™



Note: Error bars represent the standard error of the mean

Benthic Invertebrate Evenness (Genus) in KSM Project Streams, August 2009

FIGURE 5.1-26

SEABRIDGE GOLD

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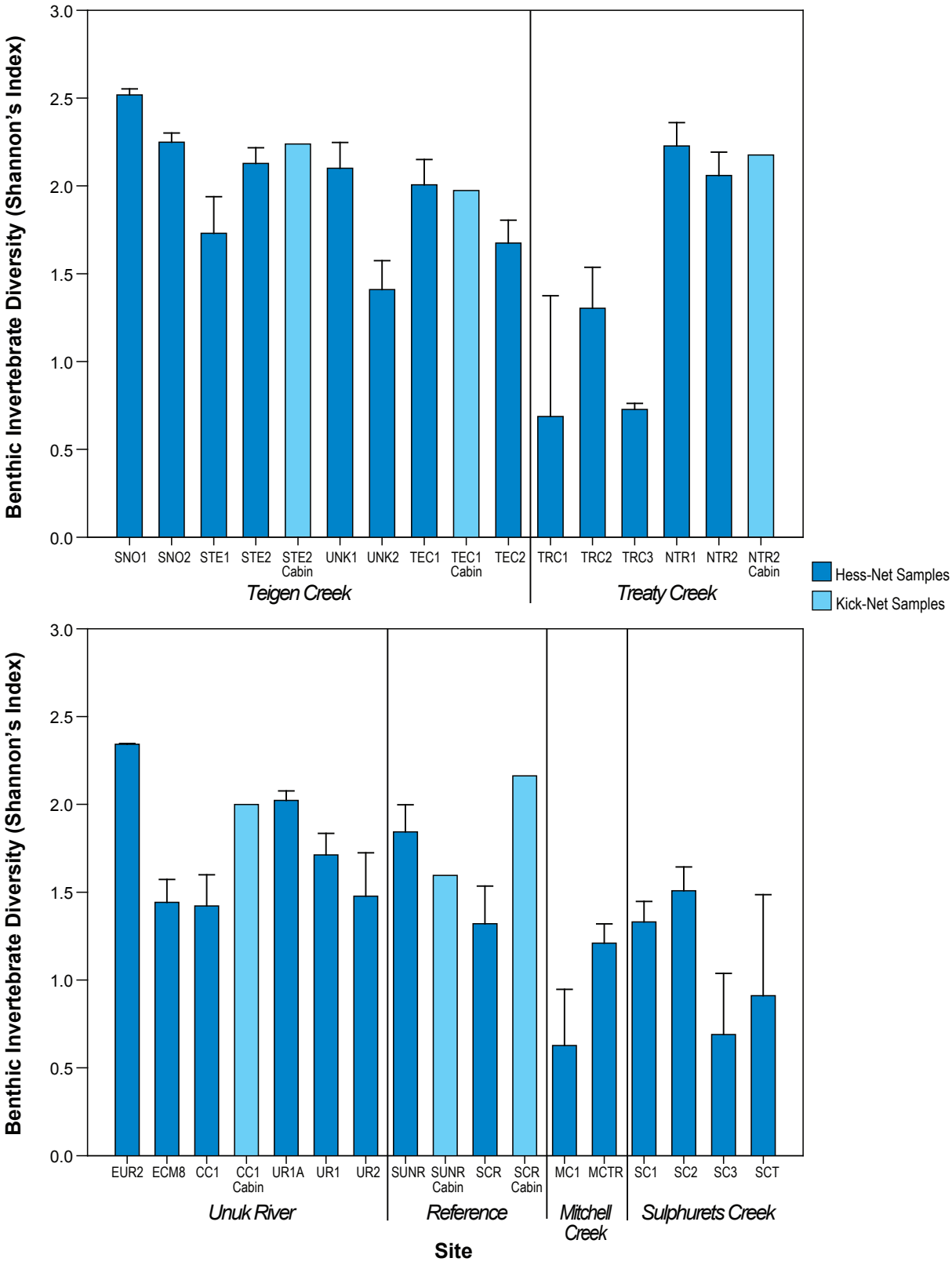

Note: Error bars represent the standard error of the mean

Benthic Invertebrate Diversity (Shannon's Index) in KSM Project Streams, August 2009

FIGURE 5.1-27

SEABRIDGE GOLD

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The Simpson's Diversity Index ranges from 0 (no diversity) to 1 (maximum diversity). Values for KSM streams ranged from 0.58 (CC1) to 0.91 (TRC1), with reference values of 0.77 (SUNR) and 0.69 (SCR) (Figure 5.1-28). Kick-net samples ranged from 0.66 (SUNR) to 0.85 (STE2). As seen with Shannon Diversity, Simpson's diversity scores from kick-net samples matched scores for Hess samples for Teigen and Treaty Creek sites, but were slightly lower at SUNR and higher at CC1 and SCR sites.

5.1.3.4 Bray-Curtis Similarity

The Bray-Curtis similarity coefficient is used to determine similarity in biological community structure between two sites based on the type and relative abundance of organisms present. The coefficient ranges from 0 to 100%, with 0% being completely dissimilar and 100% being identical. A similarity matrix of the stream sites was generated using median benthos density values at two reference sites (SUNR and SCR) to create reference standards for comparison (Appendix 5.1-7).

Data were first transformed (log(x+1)) in order to standardize against non-normality among sample density distributions. Benthic invertebrate samples were then individually compared to each of these artificial reference samples to determine percent similarity (Environment Canada 2003).

As expected, both SCR and SUNR showed highest similarity to their own median reference standard. In non-reference streams, similarity to the median SCR stream ranged from 4 % (NTR1) to 56% (TRC2) with an average similarity of 32% for all sites (Figure 5.1-29). Some sites within the Treaty Creek, Unuk River, Sulphurets Creek, and Mitchell Creek watershed showed above-average similarity to the reference site on Scott Creek. Many sites within the Teigen Creek, Coulter Creek, and North Treaty Creek watersheds showed low similarity (<20%) to SCR.

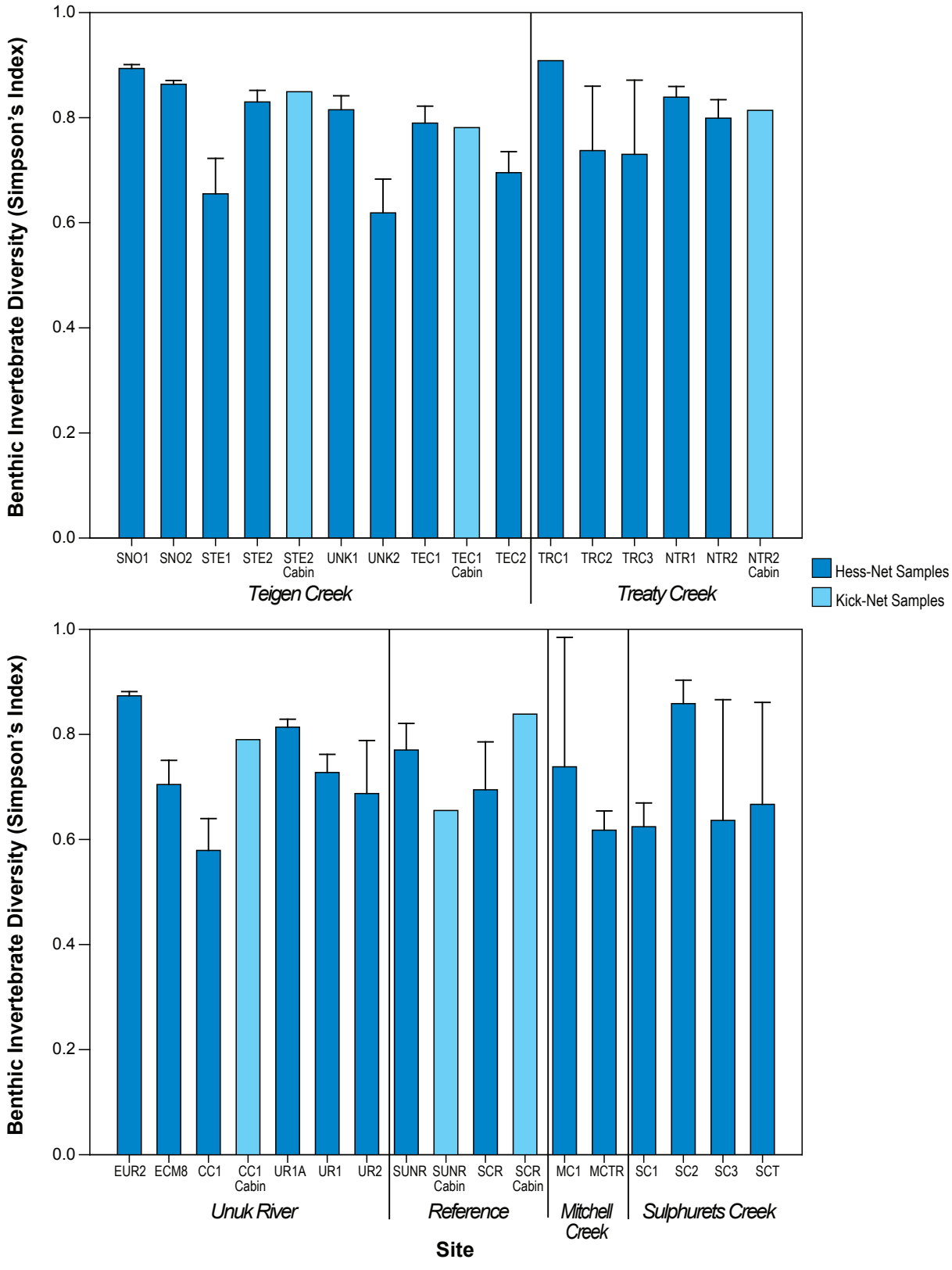
Similarity to the other reference site SUNR (South Unuk River) ranged from 9% (NTR1) to > 60% in the Unuk River (ECM8, UR1). The average similarity among sites was 43% (Figure 5.1-30). Only two sites had similar values below <20% (NTR1 and TRC3). Higher similarity to SUNR was seen in the Unuk River, Snowbank Creek, and Mitchell Creek Tributary. The Bray-Curtis results therefore indicate that the reference SUNR appears to be more similar than reference SCR to benthic invertebrate communities of project streams.

5.1.3.5 Quality Assurance and Quality Control (QA/QC)

Power Analysis

Power analysis for benthic invertebrate data was done for three pairs of sites: SCR (reference) paired with potential exposure site TEC2, SUNR (reference) paired with potential exposure site SC3, and UR1A (upstream reference) paired with its downstream potential exposures site UR1. Species richness, evenness, Shannon diversity, Simpson's diversity and density were selected as variables to examine using the power analysis (Table 5.1-5).

The results indicate that for the majority of the sites a sample size of two to three was sufficient to measure effects on the benthic invertebrate community. The recommended sample size based on the Shannon diversity index was much higher for the SCR and TEC2 comparison, indicating that this metric will need to be interpreted with caution. Overall, UR1A and UR1 had lower recommended sample sizes than SCR and TEC2, and SUNR and SC3, indicating that using the upstream site to detect effects was an appropriate reference site. The recommended sample size for the SUNR and SC3 pairs was not capable of being calculated for all metrics and effect sizes due to the sparse benthic invertebrate community at SC3.



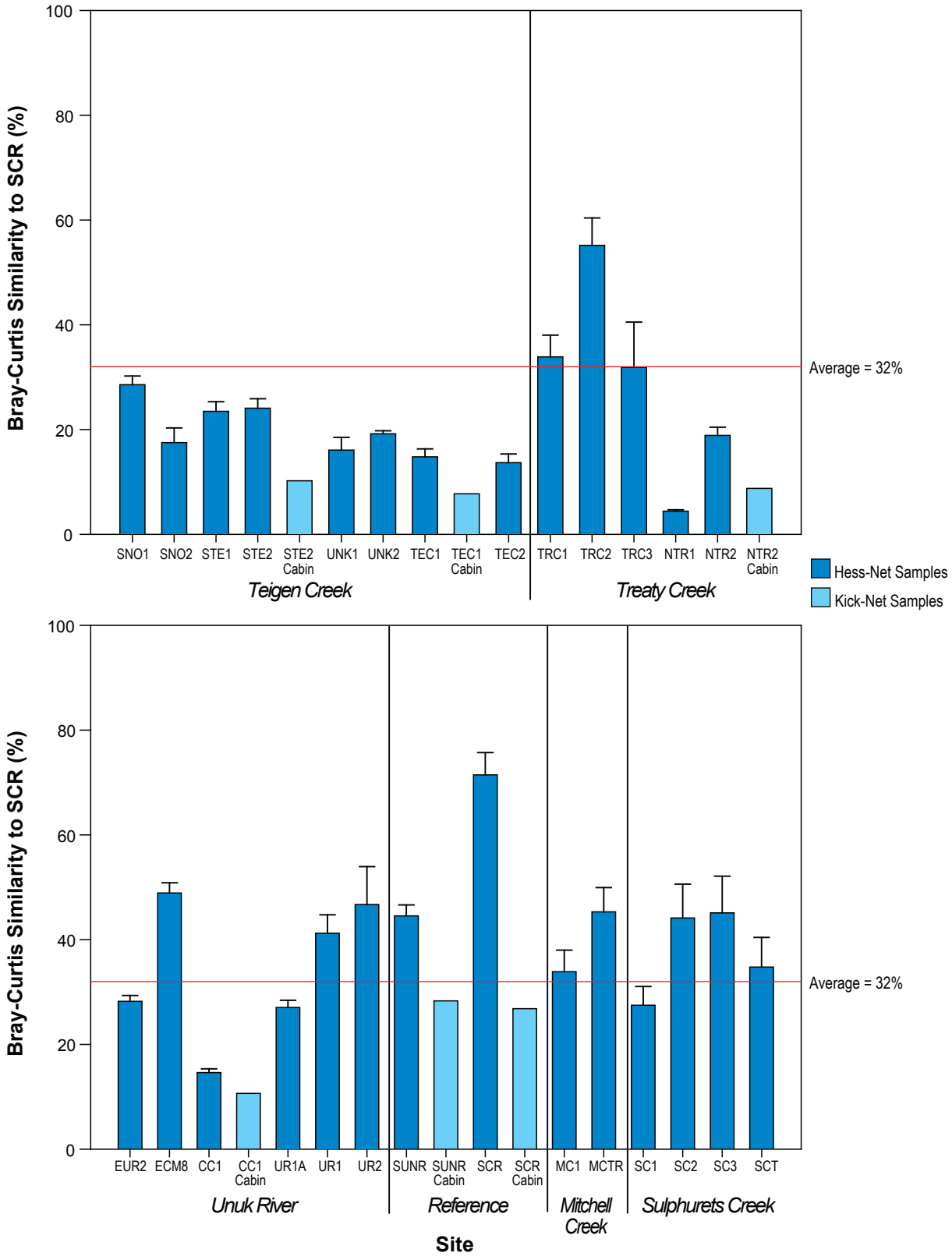
Note: Error bars represent the standard error of the mean

Benthic Invertebrate Diversity (Simpson's Index) in KSM Project Streams, August 2009

FIGURE 5.1-28

SEABRIDGE GOLD

Rescan™



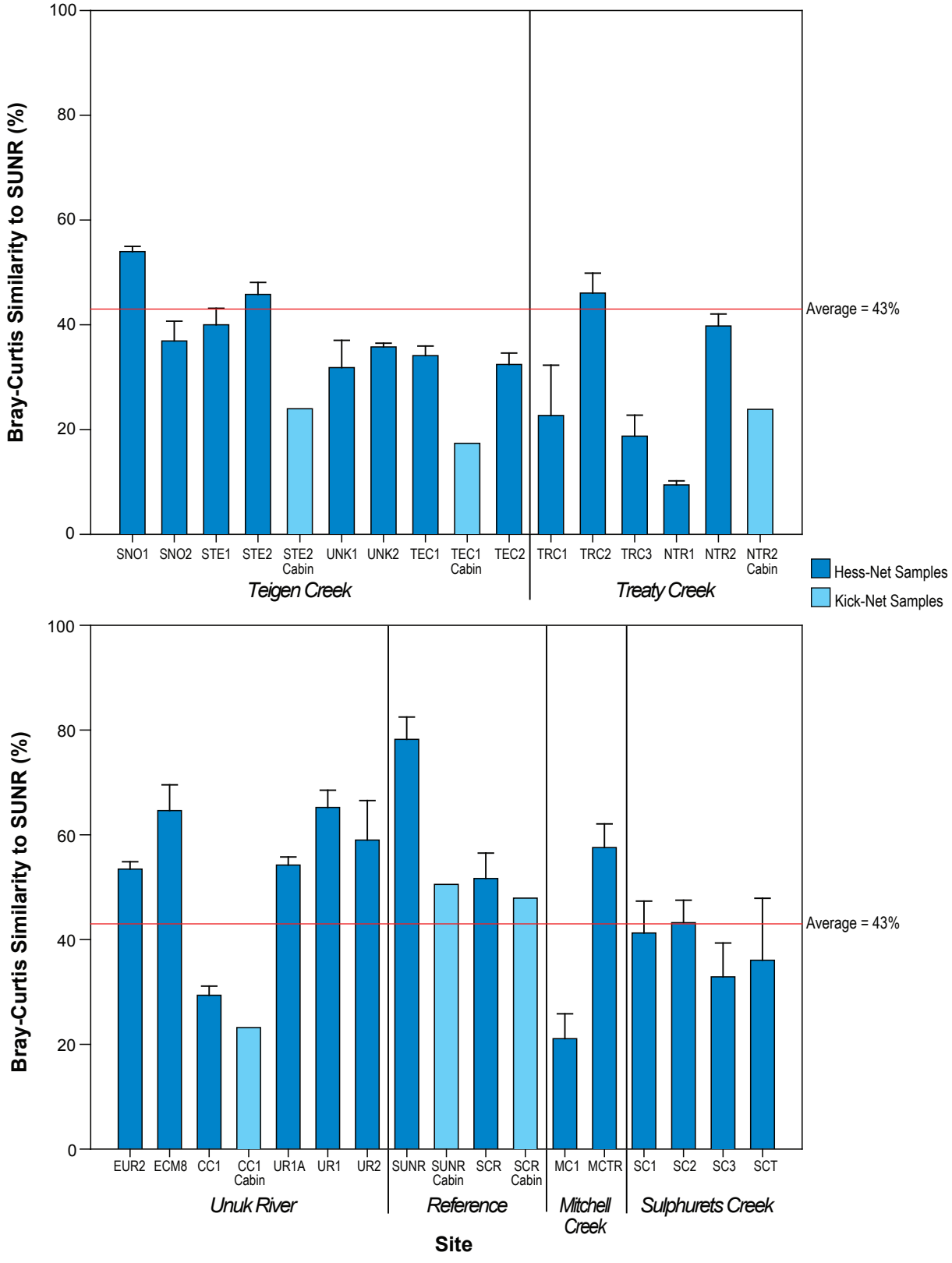
Note: Error bars represent the standard error of the mean.
Red line shows average similarity to median SCR scores.

Bray-Curtis Similarity Index Comparing Benthic Invertebrates in Reference Stream SCR to Each KSM Project Stream, August 2009

FIGURE 5.1-29

SEABRIDGE GOLD

Rescan™



Note: Error bars represent the standard error of the mean.
Red line shows average similarity to median SUNR scores.

Bray-Curtis Similarity Index Comparing Benthic Invertebrates in Reference Stream SUNR to Each KSM Project Stream, August 2009

FIGURE 5.1-30

SEABRIDGE GOLD

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Table 5.1-5. Sample Size Required Based on Power Analyses of KSM 2009 Baseline Benthic Invertebrate Community Data for Three Pairs of Sites

SCR (reference) and TEC2 (exposure)					
Effect	**Richness**	**Evenness**	**Shannon**	**Simpson's**	**Density**
2 x reference standard deviation	3	3	7	4	3
25% of reference mean	3	2	3357	14	3
50% of reference mean	3	2	26	4	3
UR1A (reference) and UR1 (exposure)					
Effect	**Richness**	**Evenness**	**Shannon**	**Simpson's**	**Density**
2 x reference standard deviation	3	9	3	3	2
25% of reference mean	3	3	2	2	2
50% of reference mean	2	2	2	2	2
SUNR (reference) and SC3 (exposure)					
Effect	**Richness**	**Evenness**	**Shannon**	**Simpson's**	**Density**
2 x reference standard deviation	2	73	2	8	nc
25% of reference mean	nc	1670	3	9	nc
50% of reference mean	nc	5	nc	5	nc

Note: for all power analyses, alpha=0.1(p value), beta = 0.1 (power = 90%)
The Effect Size was applied to the exposure group only, not the reference group.
All sites have n=5 composite samples made up of 3 pooled Hess grabs per replicate.
nc = the power calculation was not computable due to the difference between groups being too large.

Coefficient of Variation

Five Hess samples were taken at 17 selected sample sites while three were taken at the 10 other sites (Table 3.1-1). The coefficient of variation was calculated (standard deviation divided by the mean) for richness, evenness, and Shannon and Simpson's index to better compare the variation resulting from the two different number of replicates. A summary of these results is presented in Table 5.1-6. The maximum variation observed was greater for the three replicate Hess samples, as was the average variation. Further, by qualitatively examining the error bars associated with the benthic invertebrate parameters examined, there is evidence of a greater amount of variability associated with some of the three Hess-net sampler sites (i.e., larger error bars). In particular, this was noted at TRC1 and SCT. This indicates that the five replicate Hess samples were more effective in reducing the variation within a sample set and will increase statistical power and the ability to test for effects. However, the results of the power analyses indicate that three replicates will be sufficient to detect changes in the benthic community for the majority of metrics examined.

5.2 LAKES

The four study lakes in the KSM Project area can be divided into two different groups. 1) Glacier-fed lakes located at relatively high elevations (Sulphurets Lake (SUL) and Knipple Glacier Lake (KGL)) (Plate 5.2-1a and b); and 2) two lakes at lower elevations that are primarily stream-fed (West Teigen Lake (LAL) and Todedada Lake (TDL)) (Plate 5.2-1c and d). The biological, physical, and chemical characteristics of these lakes are clearly related to their location in the landscape.

Table 5.1-6. Coefficient of Variation Results for KSM Project Streams Benthic Invertebrate Data, 2009

3 Hess Replicates					5 Hess Replicates				
Site	**Richness**	**Evenness**	**Shannon**	**Simpson**	**Site**	**Richness**	**Evenness**	**Shannon**	**Simpson**
CC1	0.23	0.19	0.21	0.18	MC1	1.04	0.01	1.15	0.67
ECM8	0.23	0.03	0.16	0.11	MCTR	0.28	0.14	0.20	0.13
EUR2	0.10	0.03	0.00	0.02	NTR2	0.25	0.10	0.14	0.10
NTR1	0.32	0.11	0.10	0.04	SC1	0.35	0.17	0.20	0.16
SCT	0.96	0.19	1.09	0.41	SC2	0.39	0.10	0.20	0.12
STE1	0.16	0.15	0.21	0.18	SC3	1.04	0.12	1.13	0.72
TRC1	1.48	NA	1.73	NA	SCR	0.45	0.22	0.37	0.30
TRC3	0.25	0.18	0.09	0.34	SNO1	0.16	0.04	0.03	0.02
UNK1	0.24	0.07	0.12	0.06	SNO2	0.25	0.04	0.05	0.02
UR2	0.13	0.29	0.29	0.25	STE2	0.17	0.10	0.09	0.06
					SUNR	0.26	0.15	0.19	0.15
					TEC1	0.26	0.09	0.16	0.09
					TEC2	0.15	0.14	0.17	0.13
					TRC2	0.40	0.19	0.40	0.37
					UNK2	0.20	0.21	0.26	0.23
					UR1	0.26	0.13	0.16	0.11
					UR1A	0.11	0.03	0.06	0.04
Max	**1.48**	**0.29**	**1.73**	**0.41**	**Max**	**1.04**	**0.22**	**1.15**	**0.72**
Min	**0.10**	**0.03**	**0.00**	**0.02**	**Min**	**0.11**	**0.01**	**0.03**	**0.02**
Mean	**0.41**	**0.14**	**0.40**	**0.18**	**Mean**	**0.35**	**0.12**	**0.29**	**0.20**

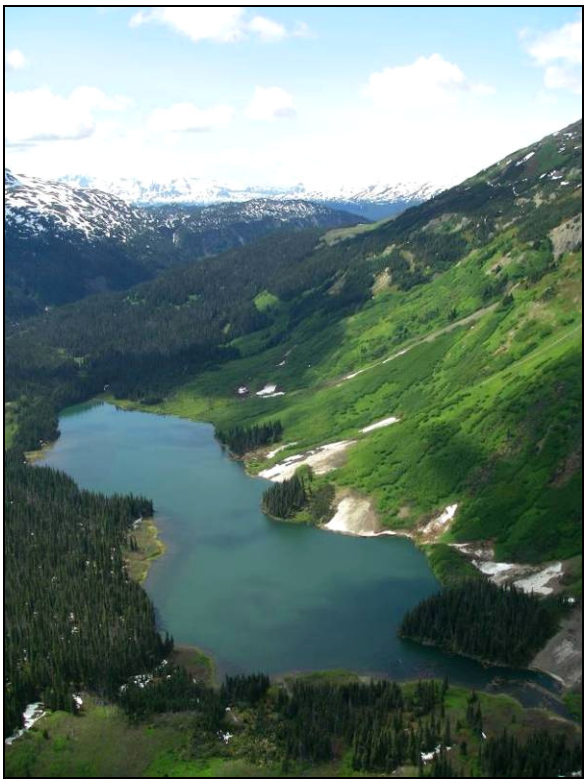
5.2.1 Physical Limnology

Temperature and dissolved oxygen profiles were taken at each of the depth stations in each lake. Appendix 5.2-1 contains the profile data. Figures 5.2-1 to 5.2-4 graphically illustrate the depth profiles for temperature and dissolved oxygen concentrations for each lake. The lake temperature was higher in TDL (max. 16.4°C) and LAL (max. 14.1°C), with lower temperatures being measured at KGL (max. 12.2°C) and SUL (max. 2.9°C). Temperatures decreased with depth, with thermoclines evident at all lakes' deep stations, with the exception of SUL. The water temperature was consistently close to 0°C at SUL, with remnants of ice evident in the water. SUL had the highest dissolved oxygen concentrations, with a maximum concentration of 14.27 mg/L. Dissolved oxygen concentrations were generally stable throughout the majority of the water column at all lakes, though concentrations decreased close to the bottom, in particular at the deep site. This was especially evident at the deep site of TDL. The exception to this generalization was SUL, which showed an increase in concentrations with depth.

Secchi depth was measured at each station in each lake (Table 5.2-1). Secchi depth is a measure of surface water transparency. Secchi depth at SUL and KGL was close to the surface (average of 0.2 and 0.1 m, respectively) due to the high turbidity of the water. Both LAL and TDL had greater transparency, with respective average Secchi depths of 4.3 m and 5.1 m being measured.

(a)

(b)



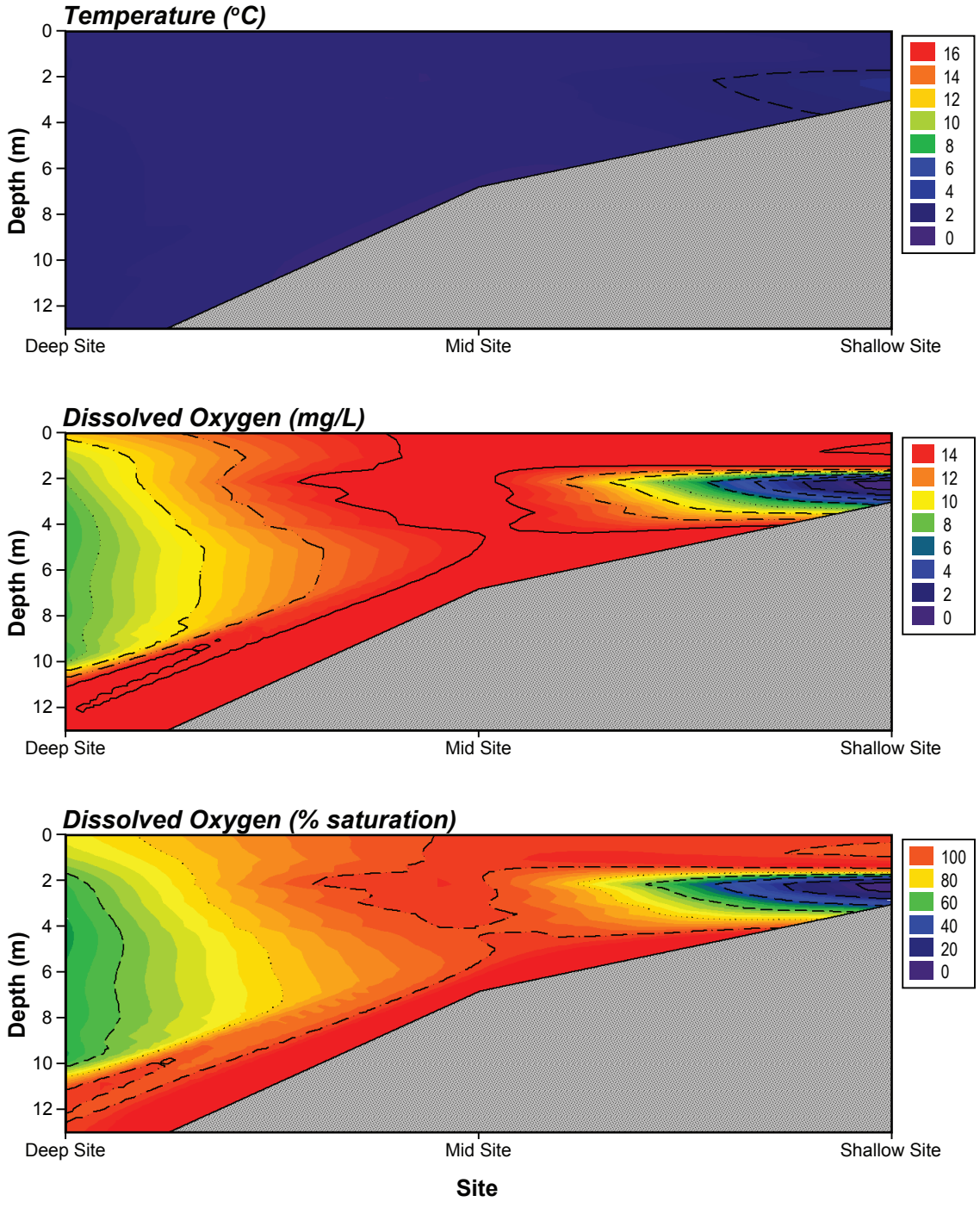
(c)

(d)

Plate 5.2-1. KSM Project Study Lakes, August 2009 (a) Sulphurets Lake (SUL), (b) Knipple Glacier Lake (KGL), (c) West Teigen Lake (LAL) and (d) Todedada Lake (TDL).

Table 5.2-1. Secchi Depth (m) Measured at Lakes in the KSM Project Area, August 2009

	SUL	KGL	LAL	TDL
Shallow	0.2	0.2	4 (bottom)	4.7
Mid	0.2	0.1	4.6	5.3
Deep	0.2	0.1	4.2	5.2
Average	0.2	0.1	4.3	5.1



Note: Contour plots are partially interpreted by Sigmaplot. Three profiles were done at the lake in three depth zones.

Physical Temperature and Dissolved Oxygen Profiles at Sulphurets Lake (SUL), KSM Project, August 2009

FIGURE 5.2-1

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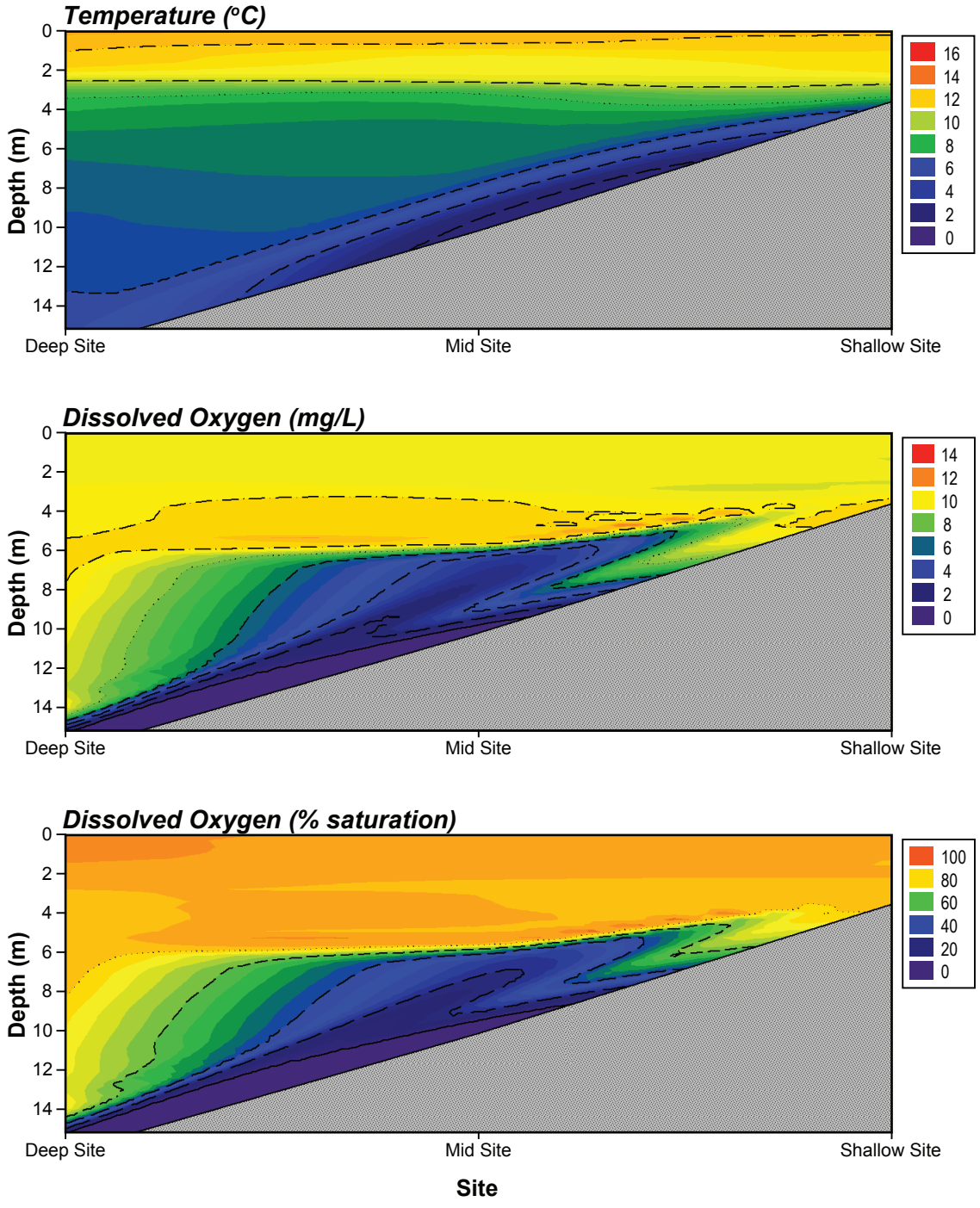


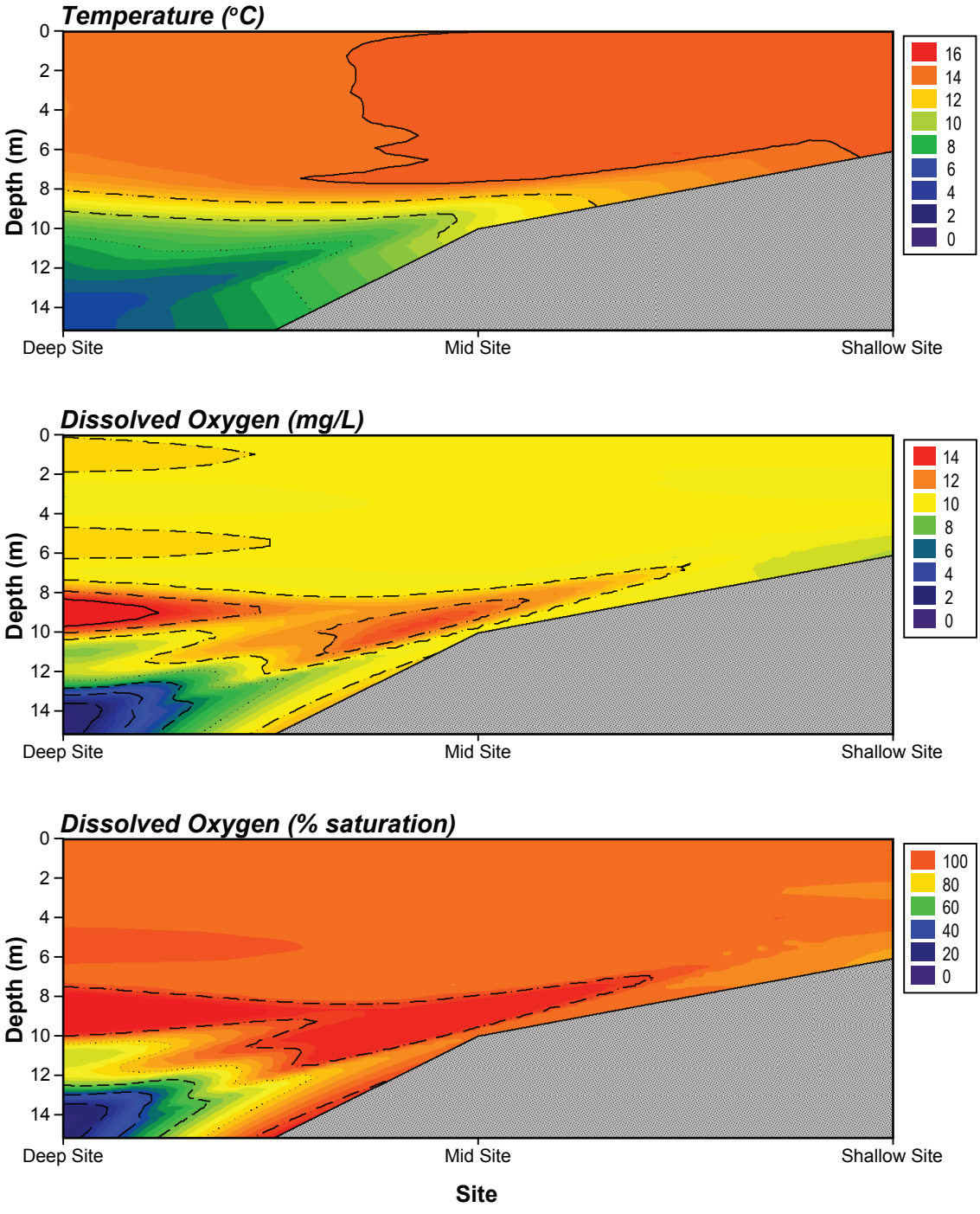
Note: Three profiles were done at the lake in three depth zones.

Physical Temperature and Dissolved Oxygen Profiles at Knipple Glacier Lake (KGL), KSM Project, August 2009

FIGURE 5.2-2

SEABRIDGE GOLD

Rescan™



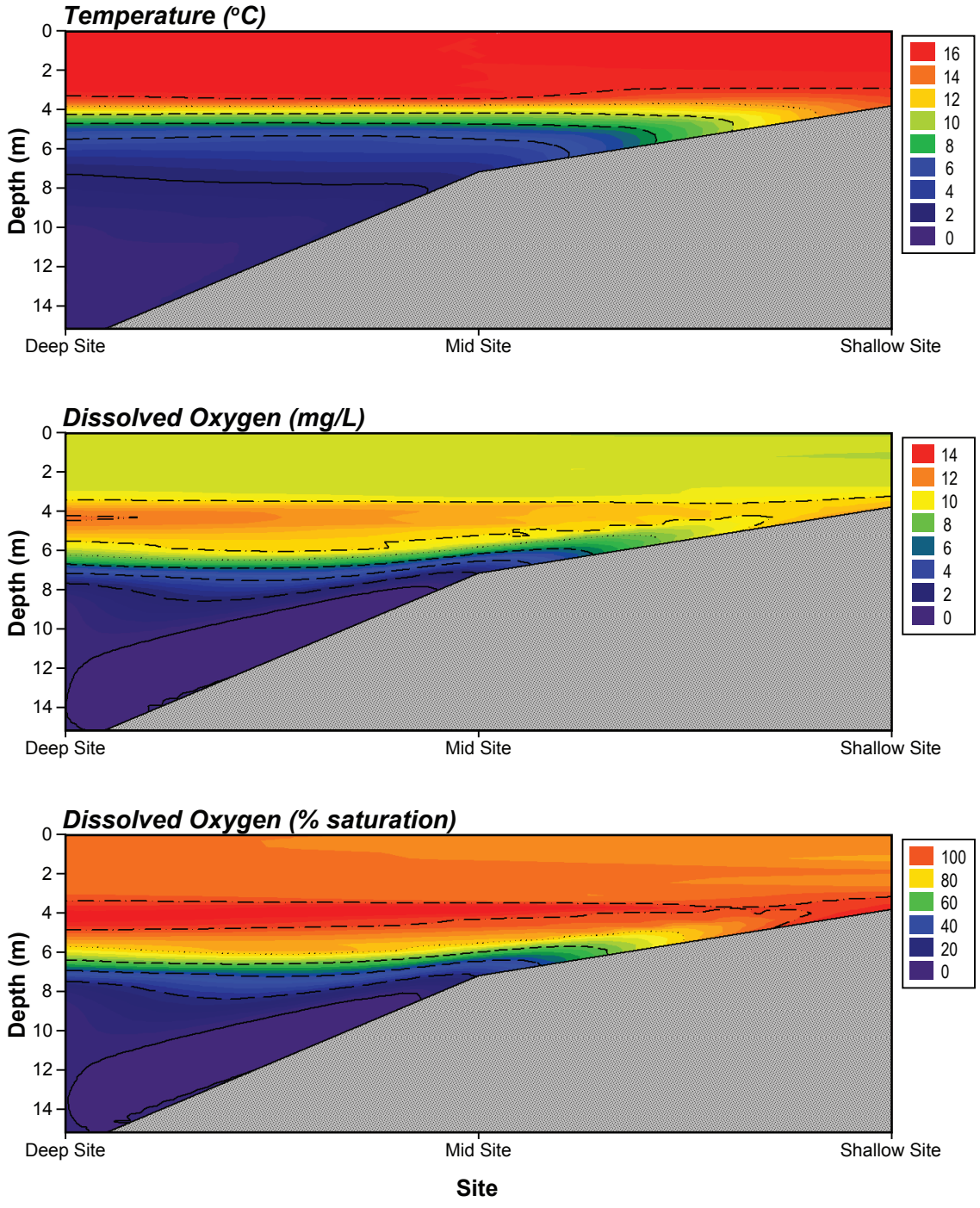
Note: Three profiles were done at the lake in three depth zones.

Physical Temperature and Dissolved Oxygen Profiles at West Teigen Lake (LAL), KSM Project, August 2009

FIGURE 5.2-3

SEABRIDGE GOLD

Rescan™



Note: Three profiles were done at the lake in three depth zones.

Physical Temperature and Dissolved Oxygen Profiles at Todedada Lake (TDL), KSM Project, August 2009

FIGURE 5.2-4

SEABRIDGE GOLD

Rescan™

5.2.2 Sediment Quality

In 2009, sediment sampling was conducted at four lakes. This sampling included the same three lakes sampled in 2008 (KGL, SUL, LAL) with the addition of reference Lake Todedada (TDL). Within each lake, three distinct zones were sampled in duplicate. Results are provided in Appendix 5.2-2, and detection limits are provided in Appendix 5.2-3.

5.2.2.1 Particle Size

Generally, the lake sediments had high proportions of fines (clay, silt), followed by sand. Only the shallow region in TDL had appreciable amounts of gravel. Lake bottom substrate in SUL and LAL was predominantly silt and clay, with higher proportions of sand in the shallow zones (Figure 5.2-5). KGL had mainly clay substrates at all depths, while TDL showed a broader mix of substrates; gravel, sand and silt in shallow zone, sand and silt at mid-depth, and silt and clay in the deepest zone.

5.2.2.2 Total Organic Carbon, Nitrogen, pH, and Cyanides

Total organic carbon (TOC) in lake sediments was highest at TDL (6.2 to 14.8 mg/kg), moderate at LAL (1.1 to 4.5 mg/kg), and low in the two glacial lakes KGL and SUL (≤ 0.5 mg/kg) (Figure 5.2-6). This range relates to differences in organic matter loadings into the colder glacial lakes compared to the more productive lakes in valley basins.

Nitrogen and phosphorus-based nutrients in lake sediments showed a similar pattern to pH and TOC (Figure 5.2-7). The glacial lakes had very low concentrations of total nitrogen (<0.1 %) and total available phosphate (below detection limit of 2 mg/kg). LAL in upper Teigen Creek had intermediate nutrient concentrations, while TDL had the highest levels of nutrients (up to 1.33% total nitrogen and 38.3 mg/kg available phosphate in its deepest zone).

The pH of sediment varied among the four lakes and across depths, with slightly acidic to neutral sediment in LAL and TDL (6.3 to 7.1), and neutral to slightly basic conditions in the two glacial lakes, KGL and SUL (7.1 to 8.5) (Figure 5.2-6). All depths of KGL had basic pH, while LAL and SUL tended to have slightly lower pH in shallow zones compared to deeper depths likely as a result of bacterial respiration.

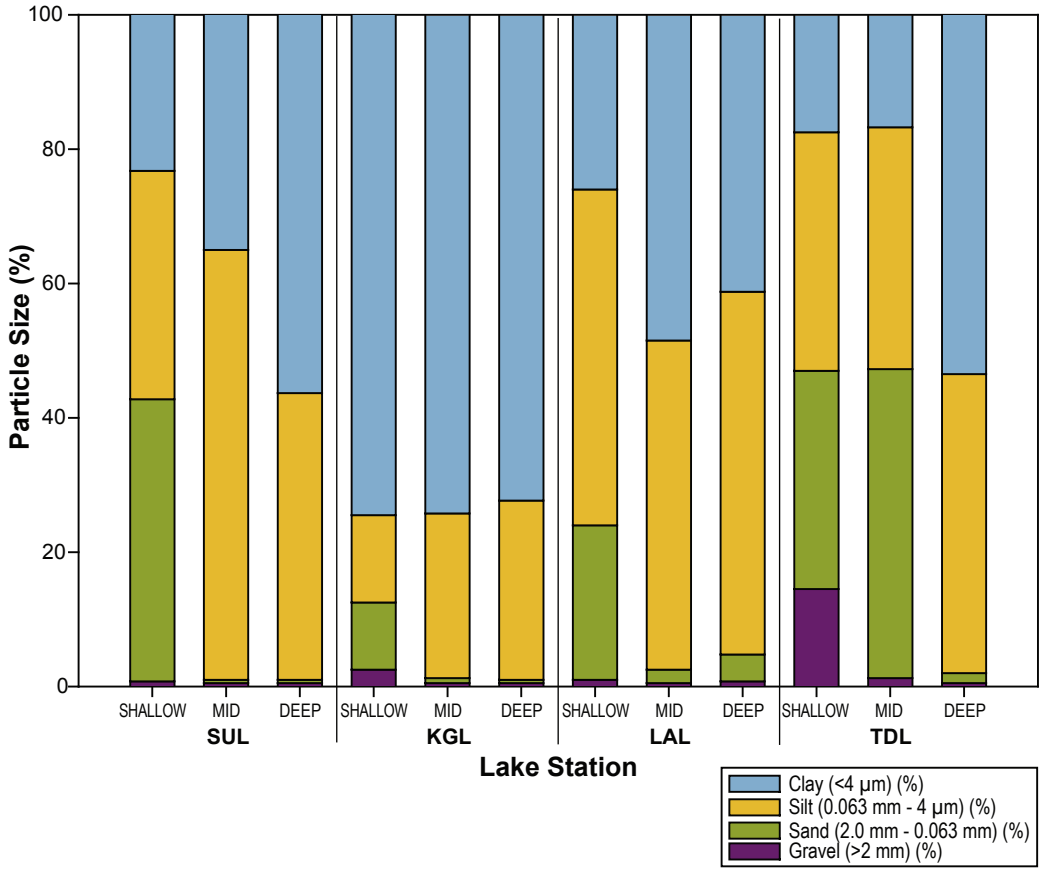
Cyanides can occur naturally in lakes and particularly wetlands, produced through certain bacterial degradation processes. No detectable levels of cyanide were measured at any of the sampled lakes in the Project Study Area.

5.2.2.3 Metals

A suite of 33 metals and metalloids were analyzed in all lake sediment samples. Analyzed metals that do not have provincial or federal sediment quality guidelines (SQG) are only discussed briefly in the following section. Metals with SQG are discussed with accompanying plots.

Of the analyzed metals without a SQG, bismuth, silver, thallium, and tin were not detected in more than 80% of the samples among all lake sites. Therefore these variables are not discussed, although the data are provided in Appendix 5.2-2, and detection limits are shown in Appendix 5.2-3.

Aluminum, beryllium, cobalt, lithium, and manganese showed similar patterns among sediment samples from the lakes, being highest in LAL and lower in other lakes. Aluminum ranged from 13,400 mg/kg (TDL-deep) to 35,200 mg/kg (LAL-mid). Beryllium ranged from below the detection limit (<0.5 mg/kg) to 0.87 mg/kg. Cobalt ranged from 12.4 mg/kg (TDL-shallow) to 54.7 mg/kg (LAL-mid). Lithium ranged from 17.3 mg/kg (SUL-shallow) to 57.05 mg/kg (LAL-mid). Manganese ranged from 3,810 mg/kg (TDL-deep) to 23,200 mg/kg (LAL-mid).



Sediment Particle Size Distribution for Lakes in the KSM Project Area, August 2009

FIGURE 5.2-5

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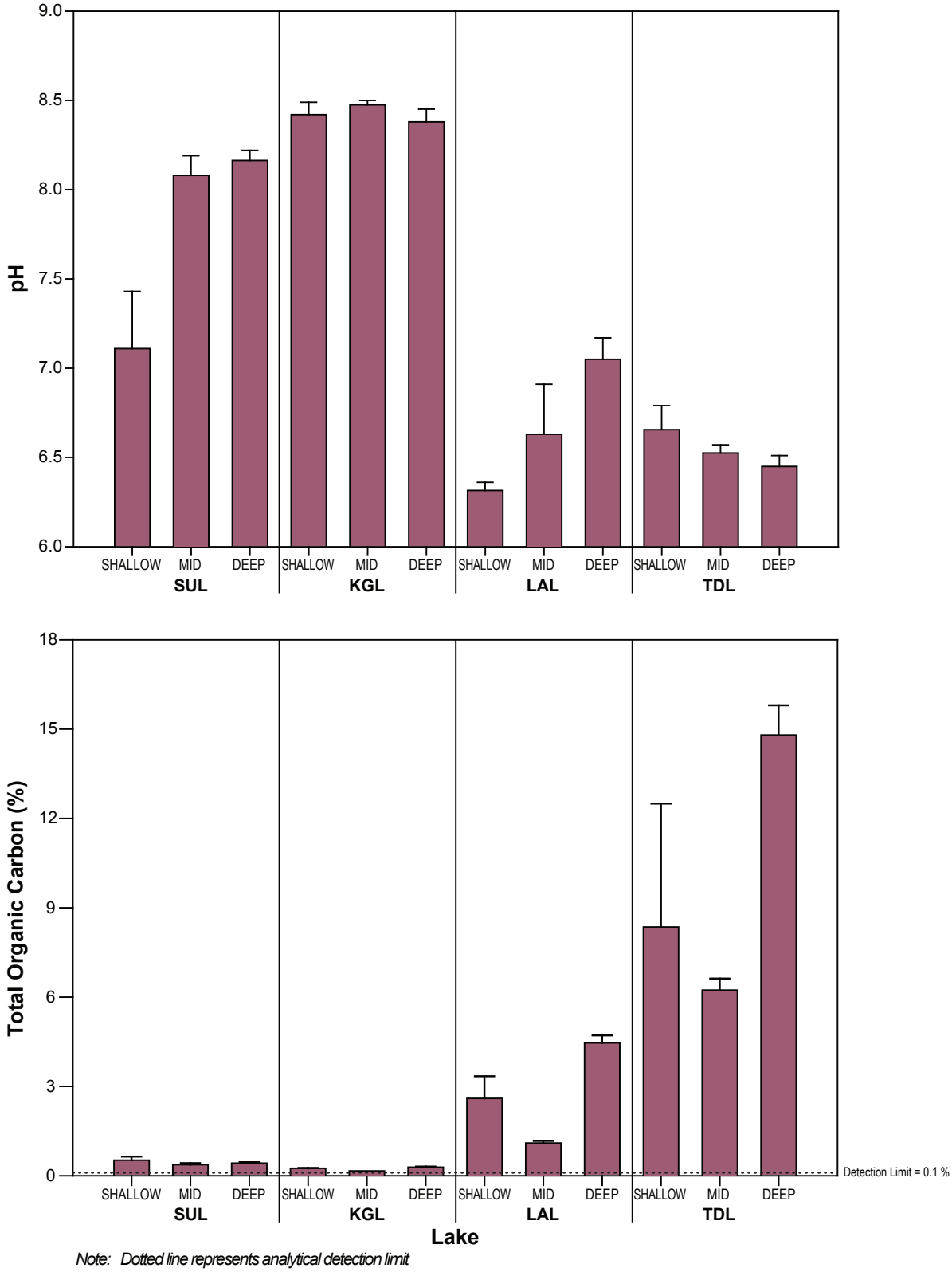

Note: Dotted line represents analytical detection limit

pH and Total Organic Carbon Concentrations in Lake Sediments in the KSM Project Area, August 2009

FIGURE 5.2-6

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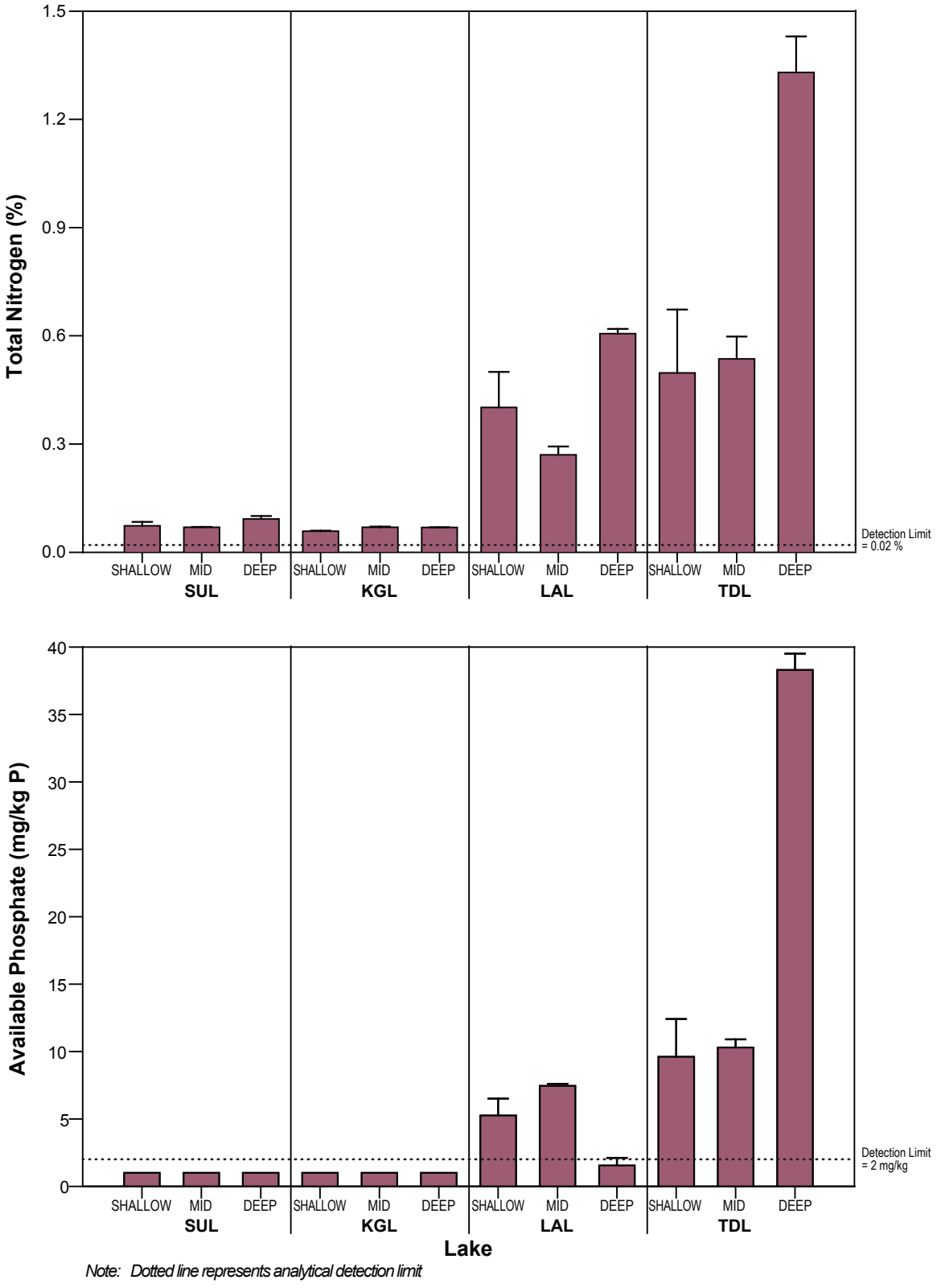

Note: Dotted line represents analytical detection limit

Total Nitrogen and Available Phosphate Concentrations in Lake Sediments in the KSM Project Area, August 2009

FIGURE 5.2-7

SEABRIDGE GOLD

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Antimony in lake sediment samples ranged from below detection limit (10 mg/kg) to 29 mg/kg (SUL-shallow). Calcium ranged from 3,820 mg/kg (LAL-mid) to 28,500 mg/kg (SUL mid). Magnesium was greatest in the deepest part of TDL (3,335 mg/kg), with most values below 2,000 mg/kg. The lowest concentration was measured at LAL-shallow (639 mg/kg). Titanium ranged from 62 mg/kg (TDL-shallow) to 730 mg/kg (SUL-mid).

Barium and potassium concentrations in lake sediment samples were higher at KGL (maximum concentrations of 681 mg/kg and 6,245 mg/kg, respectively) and strontium (up to 140.5 mg/kg) was highest at SUL.

Metals for which guidelines exist are discussed and presented graphically in the following section. Arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium and zinc in lake sediment samples all exceeded SQGs at one or more study lakes (Figures 5.2-8 to 5.2-12). Copper and mercury concentrations in SUL exceeded the PEL by an order of magnitude. Copper, lead, arsenic, and mercury showed similar patterns among lakes, with lower levels in LAL, KGL, and TDL, and highest values at SUL.

Arsenic concentrations in lake sediments exceeded the ISQG guideline (5.9 mg/kg) at all sites (Figure 5.2-8). Except TDL, lakes also exceeded the PEL of 17 mg/kg. Arsenic concentrations were lowest at TDL, with the lowest concentration occurring at the shallow station (9.1 mg/kg). Arsenic concentrations were greatest at SUL, with a maximum concentration of 151 mg/kg at the shallow station.

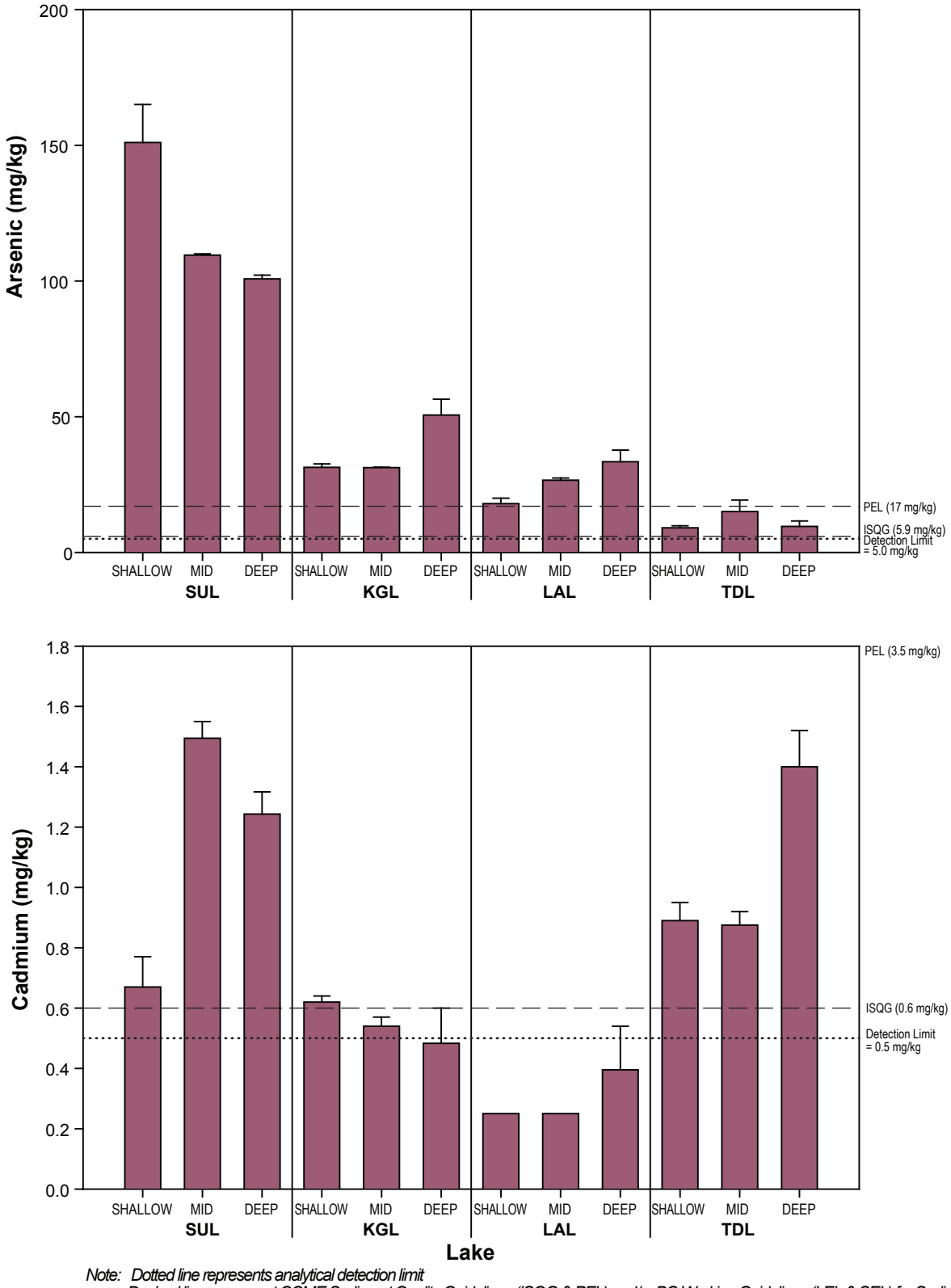
Cadmium concentrations in lake sediment samples were below detection limits (0.5 mg/kg) at all depths of LAL. Concentrations were intermediate at KGL (0.48 to 0.62 mg/kg). Concentrations consistently exceeded the ISQG (0.6 mg/kg), but were more variable in SUL and TDL, with the highest concentration in the mid-depth of SUL (1.50 mg/kg) (Figure 5.2-8).

Chromium in lake sediment samples was highest in stream-fed lakes, particularly LAL where all depth samples exceeded the PEL (90 mg/kg). Chromium concentrations were slightly lower in TDL, but each of the shallower depths had exceeded ISQG. Chromium concentrations at KGL and SUL were relatively low, ranging from 9 mg/kg to 22.8 mg/kg (Figure 5.2-9).

Copper concentrations in lake sediment samples were generally low at all lakes except SUL, which is situated immediately adjacent to the Sulphurets and Kerr mineral deposits naturally enriched in this metal (Figure 5.2-9). Overall concentrations ranged from 23.9 mg/kg (TDL shallow) to 657 mg/kg (SUL-shallow). The ISQG of 35.7 mg/kg was exceeded at all lakes except KGL, while the PEL (197 mg/kg) was exceeded only at SUL.

Iron concentrations in lake sediment samples ranged from 35,300 mg/kg in TDL (shallow) to 65,150 mg/kg in the mid-depth region of LAL (Figure 5.2-10). All sites were well over the LEL of 21,000 mg/kg and most sites were above the SEL guideline of 43, 766 mg/kg.

Lead concentrations in lake sediment samples showed a distinction between the glacial lakes (KGL and SUL) and non-glacial lakes (LAL and TDL). Lead was not detected in the non-glacial lakes (below detection limit of 30 mg/kg), while it ranged from below detection in one depth of KGL to 70 mg/kg in the shallow site of SUL (Figure 5.2-10). The ISQG of 35 mg/kg was exceeded at all depths in SUL.



Note: Dotted line represents analytical detection limit
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Arsenic and Cadmium Concentrations in Lake Sediments in the KSM Project Area, August 2009

FIGURE 5.2-8

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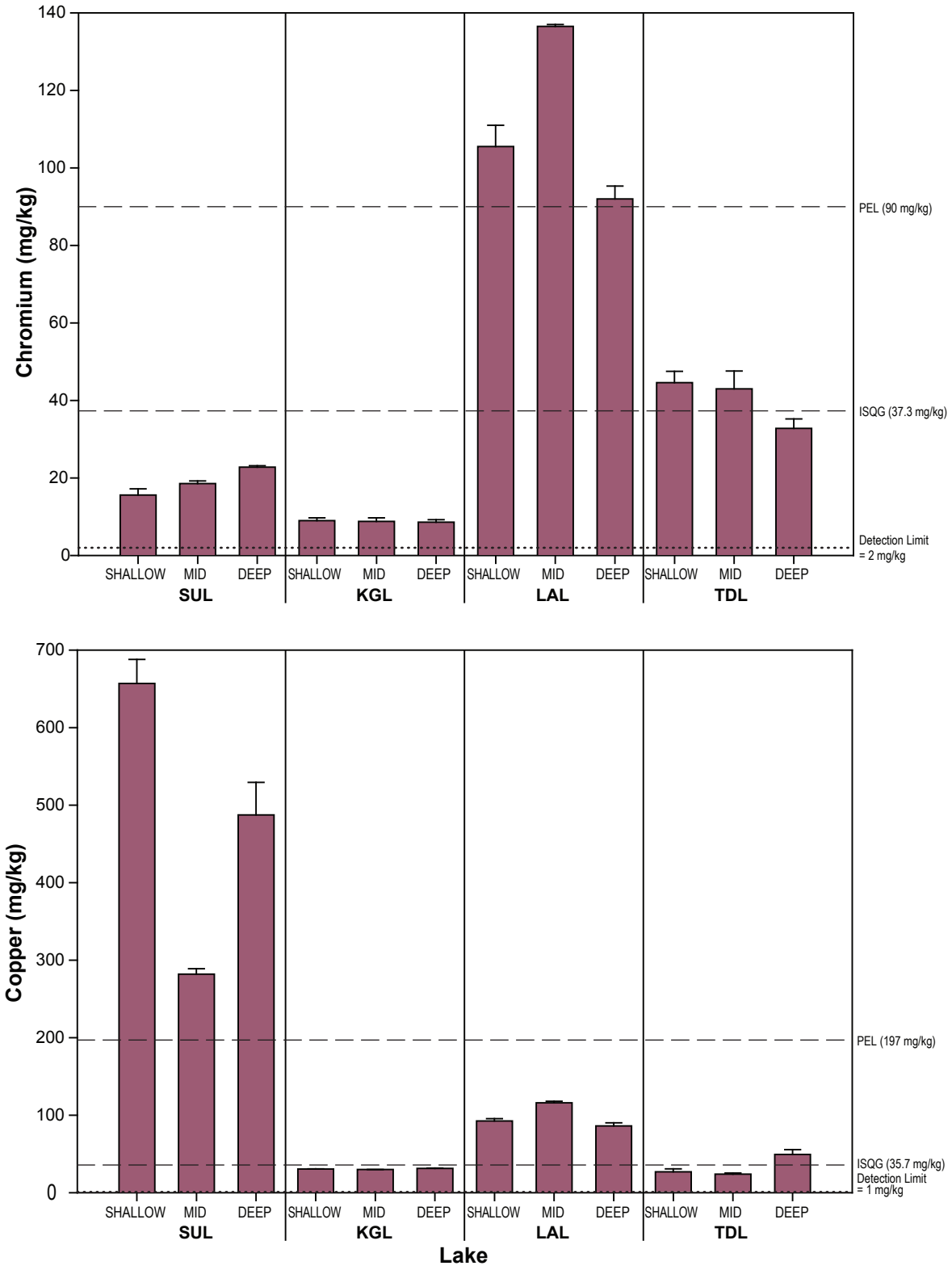

Note: Dotted line represents analytical detection limit
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Chromium and Copper Concentrations in Lake Sediments in the KSM Project Area, August 2009

FIGURE 5.2-9

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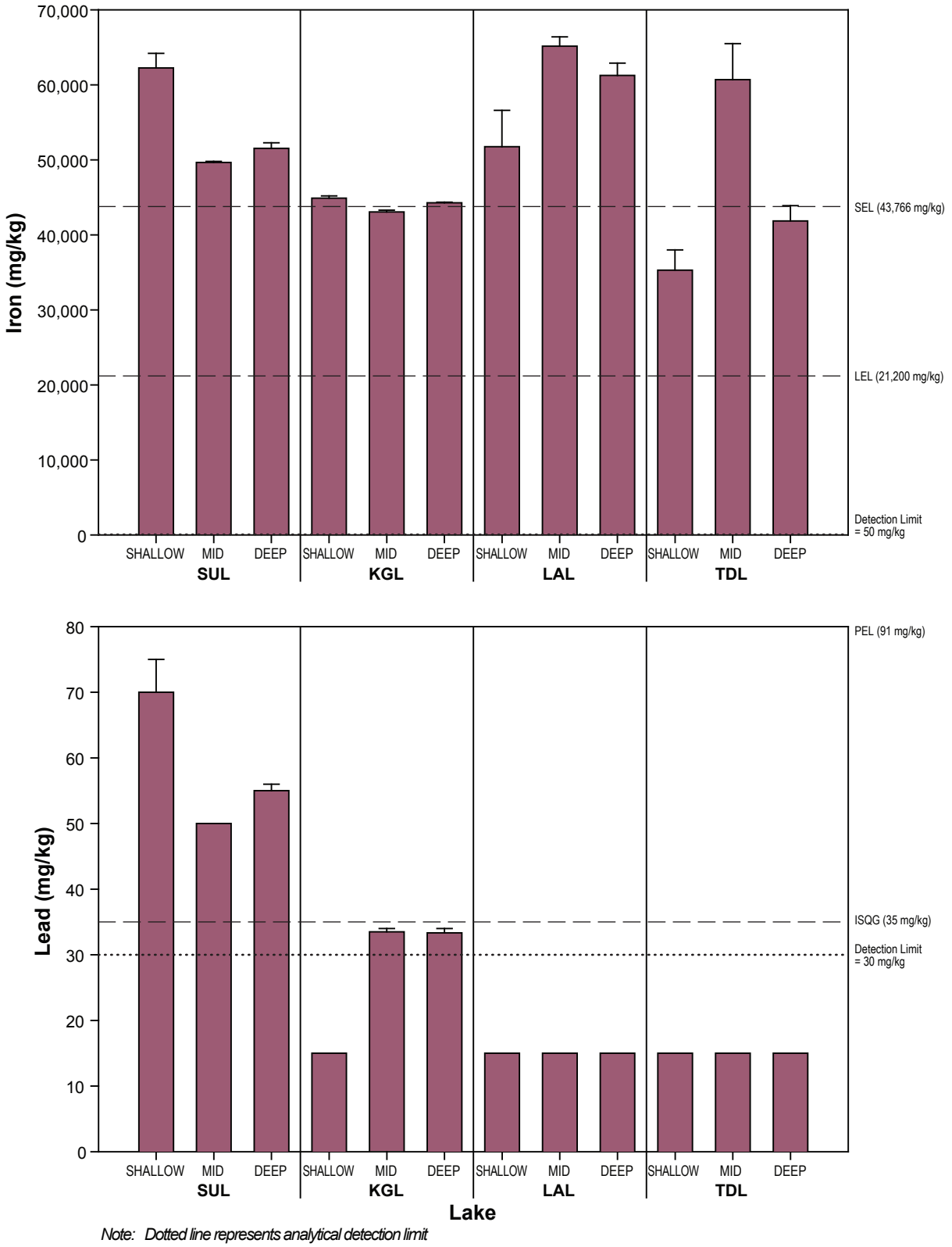

Note: Dotted line represents analytical detection limit
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Iron and Lead Concentrations in Lake Sediments in the KSM Project Area, August 2009

FIGURE 5.2-10

SEABRIDGE GOLD

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Mercury concentrations in lake sediment samples were at or slightly above the ISQG (0.17 mg/kg) in three of the lakes, but were higher in SUL (up to 1.68 mg/kg in shallow site) (Figure 5.2-11). The PEL of 0.486 mg/kg was exceeded only at this shallow SUL site, while mid-depth and deep sites at SUL exceeded the ISQG. The lowest mercury concentrations were in TDL.

Concentrations of nickel in lake sediment samples at KGL and SUL were relatively low, ranging from 10.7 mg/kg (KGL-shallow) to 20.6 mg/kg (SUL-deep) (Figure 5.2-11). The mid-depth and deep station at SUL exceeded the LEL of 16 mg/kg as did all stations at LAL and TDL. TDL showed intermediate nickel concentrations (approximately 80 mg/kg in all), while LAL concentrations were two to three times these levels (165 to 230 mg/kg). Both TDL and LAL naturally exceeded the SEL of 75 mg/kg.

Selenium concentrations in lake sediment samples were generally low at all lakes, and were below detection limits for all shallow and mid-depth sites (Figure 5.2-12). Concentrations were higher in deep zones of each lake, up to 10.7 mg/kg in SUL.

Zinc concentrations in lake sediment samples ranged from 129 mg/kg (KGL-mid) to 227 mg/kg (SUL deep) (Figure 5.2-12). All concentrations exceeded the ISQG of 123 mg/kg, but none exceeded the PEL of 315 mg/kg.

5.2.3 Primary Producers – Phytoplankton

All analytical and taxonomic data for phytoplankton are presented in Appendices 5.2-4 and 5.2-5 respectively.

5.2.3.1 Biomass and Density

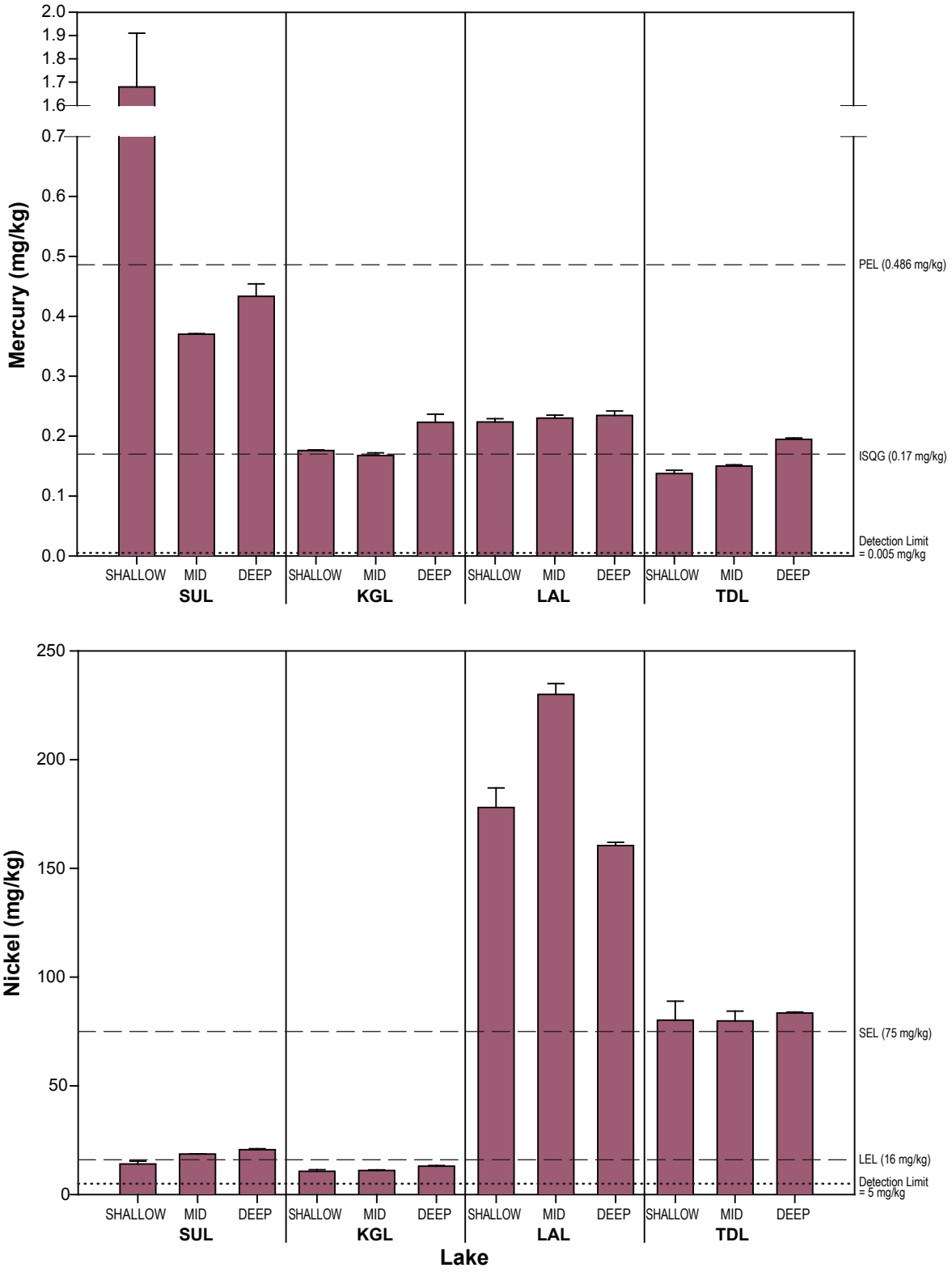
Phytoplankton biomass (chlorophyll *a* concentrations) was measured in the four Project study area lakes. Average biomass was greatest in KGL (0.95 to 1.68 µg chl *a*/L), followed by TDL (0.86 to 1.20 µg chl *a*/L), and LAL (0.38 to 0.64 µg chl *a*/L) (Figure 5.2-13). SUL had extremely low phytoplankton; biomass ranging from 0.02 to 0.04 µg chl *a*/L.

Average phytoplankton density was highest in LAL (464 to 635 cells/mL), followed by KGL and TDL (62 to 263 cells/mL), while almost no algae were detected in SUL (0 to 2 cells/mL). There was no pattern of density associated with depth (Figure 5.2-13).

5.2.3.2 Community Composition

A total of 62 different phytoplankton taxonomic groups were identified among the samples from the four lakes. They included predominantly diatoms (39 species), followed by green algae (Chlorophyta; 10 species), golden algae (Chrysophyta; 4 species), blue-green algae (Cyanophyceae; 3 species), dinoflagellates (3 species), and cryptophytes (2 species).

There were no phytoplankton in shallow or middle depth samples at SUL, and only a few individual diatoms collected in the deepest zone. The phytoplankton community compositions were plotted for the remaining three lakes (Figure 5.2-14a). KGL supported mainly cryptophytes (55 to 76%), with lesser representation by diatoms (17 to 42%) and chlorophytes (2 to 6%) (Figure 5.2-14a). TDL supported a more even mix of cyanophytes (39 to 46%), diatoms (17 to 23%), cryptophytes (17 to 21%) and chlorophytes (16 to 20%). LAL contained a plentiful and rich community of diatoms (85 to 95%), with small proportions of several other groups (Figure 5.2-14b).



Note: Dotted line represents analytical detection limit
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment
Guidelines are for inorganic mercury

Mercury and Nickel Concentrations in Lake Sediments in the KSM Project Area, August 2009

FIGURE 5.2-11

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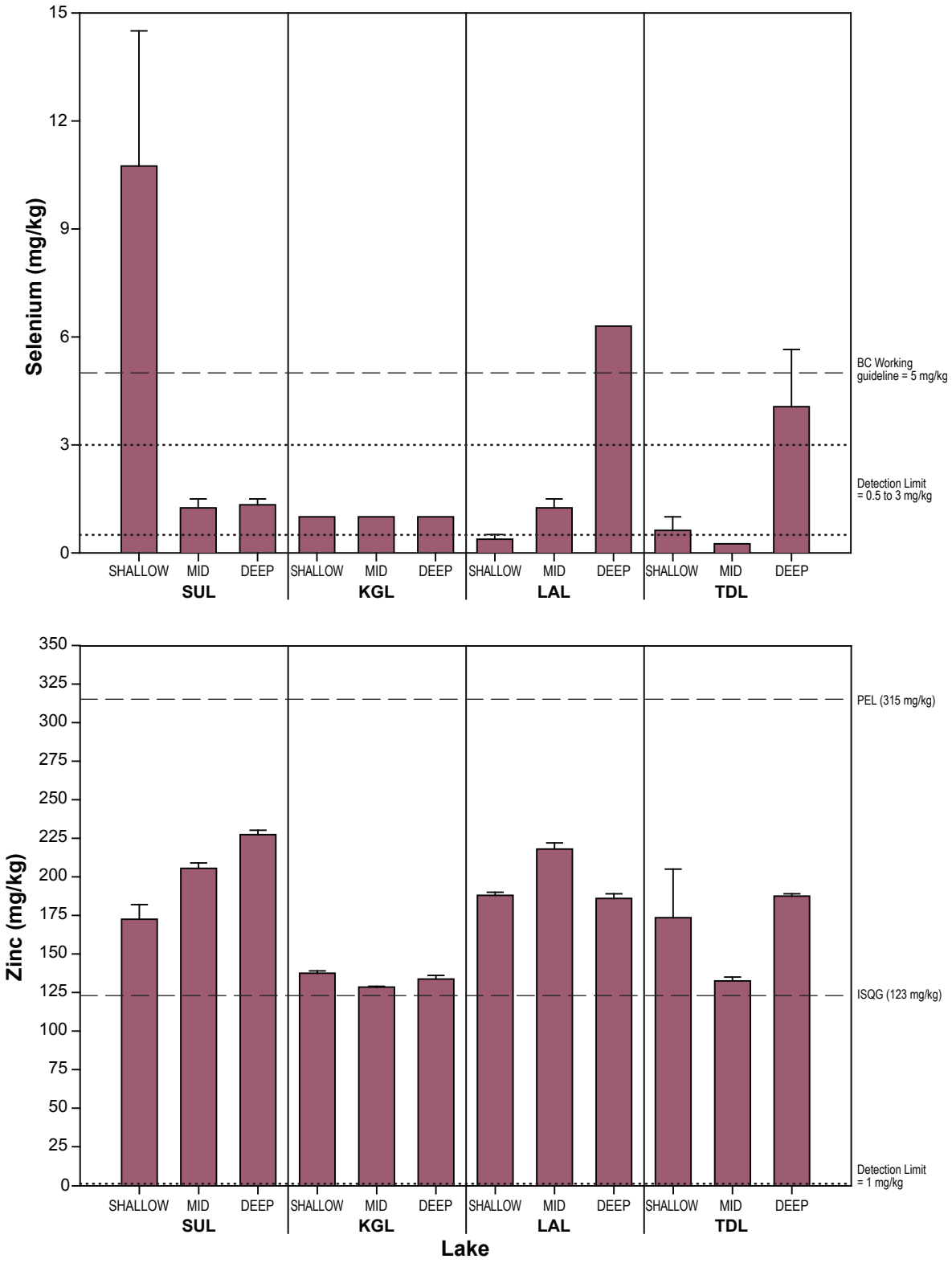

Note: Dotted line represents analytical detection limit
Dashed lines represent CCME Sediment Quality Guidelines (ISQG & PEL) and/or BC Working Guidelines (LEL & SEL) for Sediment

Selenium and Zinc Concentrations in Lake Sediments in the KSM Project Area, August 2009

FIGURE 5.2-12

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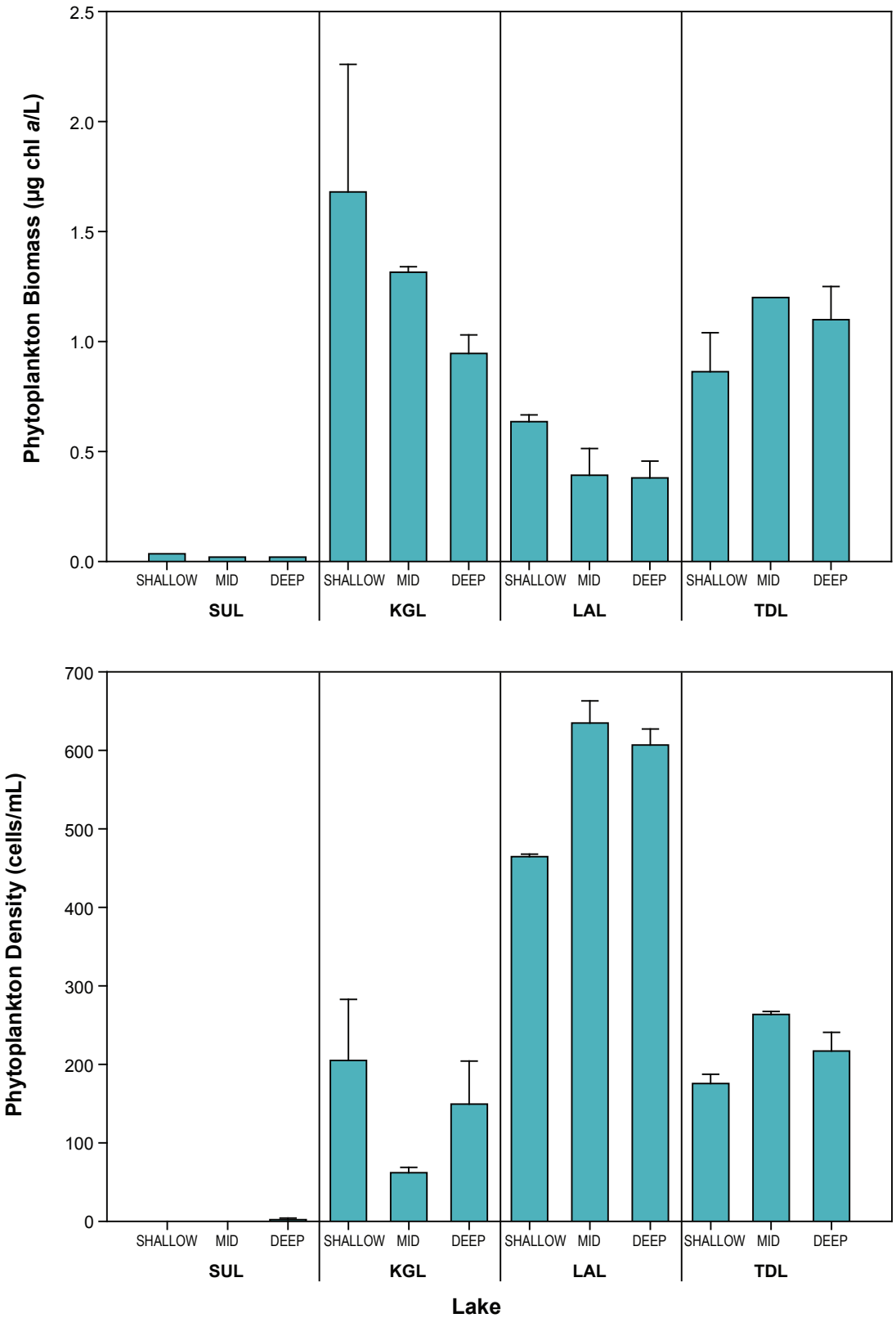

Note: Error bars represent standard error of the mean.

Phytoplankton Biomass and Density in Lakes of the KSM Project Area, August 2009

FIGURE 5.2-13

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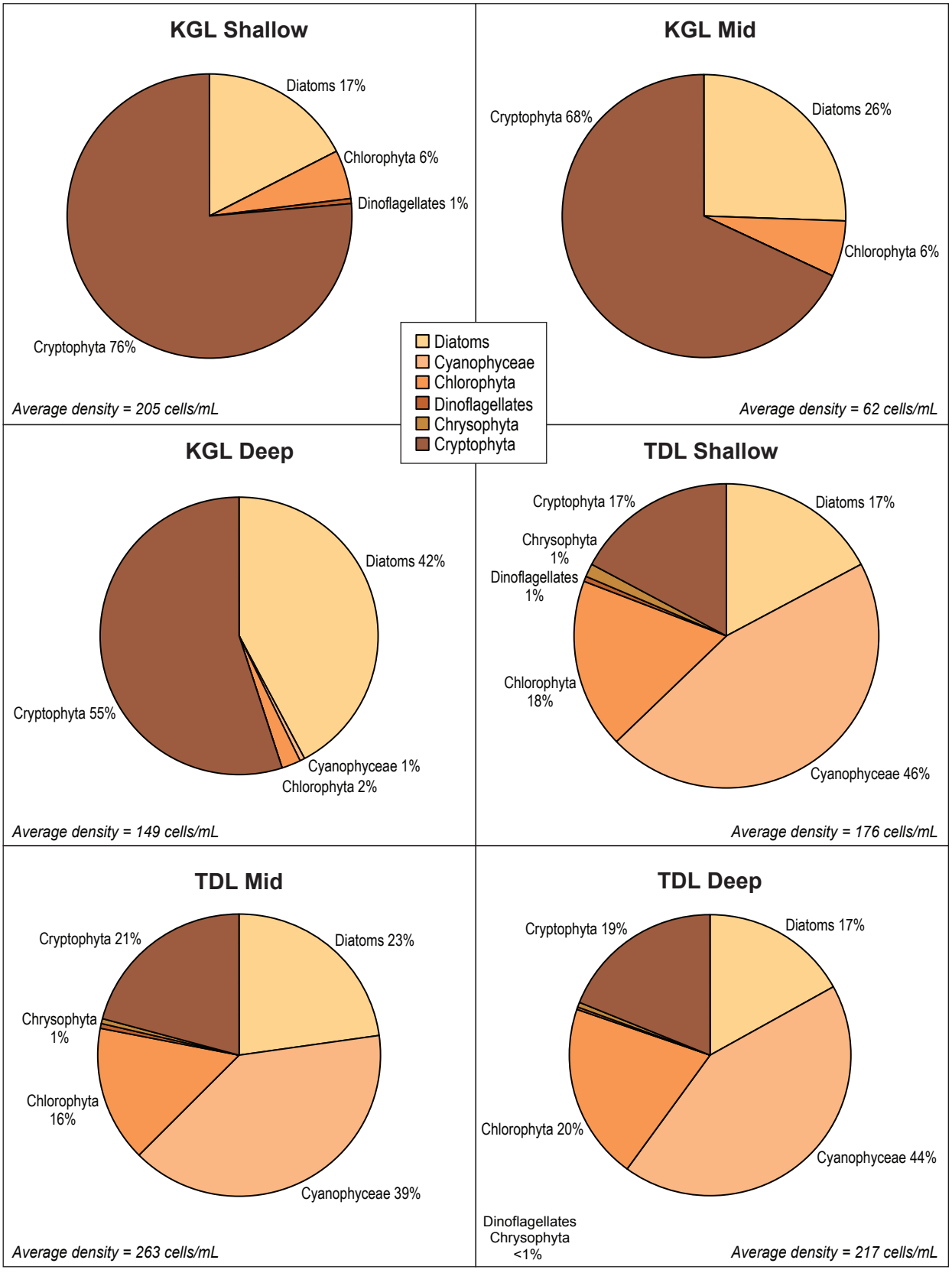

Phytoplankton Community Composition in Lakes of the KSM Project Area, August 2009

FIGURE 5.2-14A

SEABRIDGE GOLD

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5.2.3.3 Richness, Diversity and Evenness

Average phytoplankton species richness was highest in the valley lakes TDL (15 to 18 species) and LAL (14 to 18 species) than in the two glacial lakes KGL (6 to 9 species) and particularly SUL (0 to 2 species) (Figure 5.2-15). As seen with biomass and density, depth played little role in species richness.

Shannon and Simpson's diversity indices patterns for phytoplankton were similar to richness patterns, with lower values in the glacial lakes. Average Shannon diversity was predicatively low in SUL (0 to 0.55) and KGL (0.98 to 1.18), and highest in LAL (1.45 to 1.97) and TDL (1.90 to 1.97) (Figure 5.2-15). Average Simpson's diversity was also very low in SUL (0 to 0.44) and KGL (0.45 to 0.50), and was highest in LAL (0.66 to 0.79) and TDL (0.75 to 0.79) (Figure 5.2-16). Pielou evenness scores (how evenly distributed species densities are relative to each other within a sample) reflect these patterns. Average evenness was lowest in SUL (the deep replicate shows an evenness of 0.5, which is based on only 4 cells counted), and substantially higher in the other three lakes (0.56 to 0.73) (Figure 5.2-16).

5.2.4 Secondary Producers – Zooplankton

All zooplankton taxonomy data and biovolume calculations are presented in Appendices 5.2-6 and 5.2-7.

5.2.4.1 Density

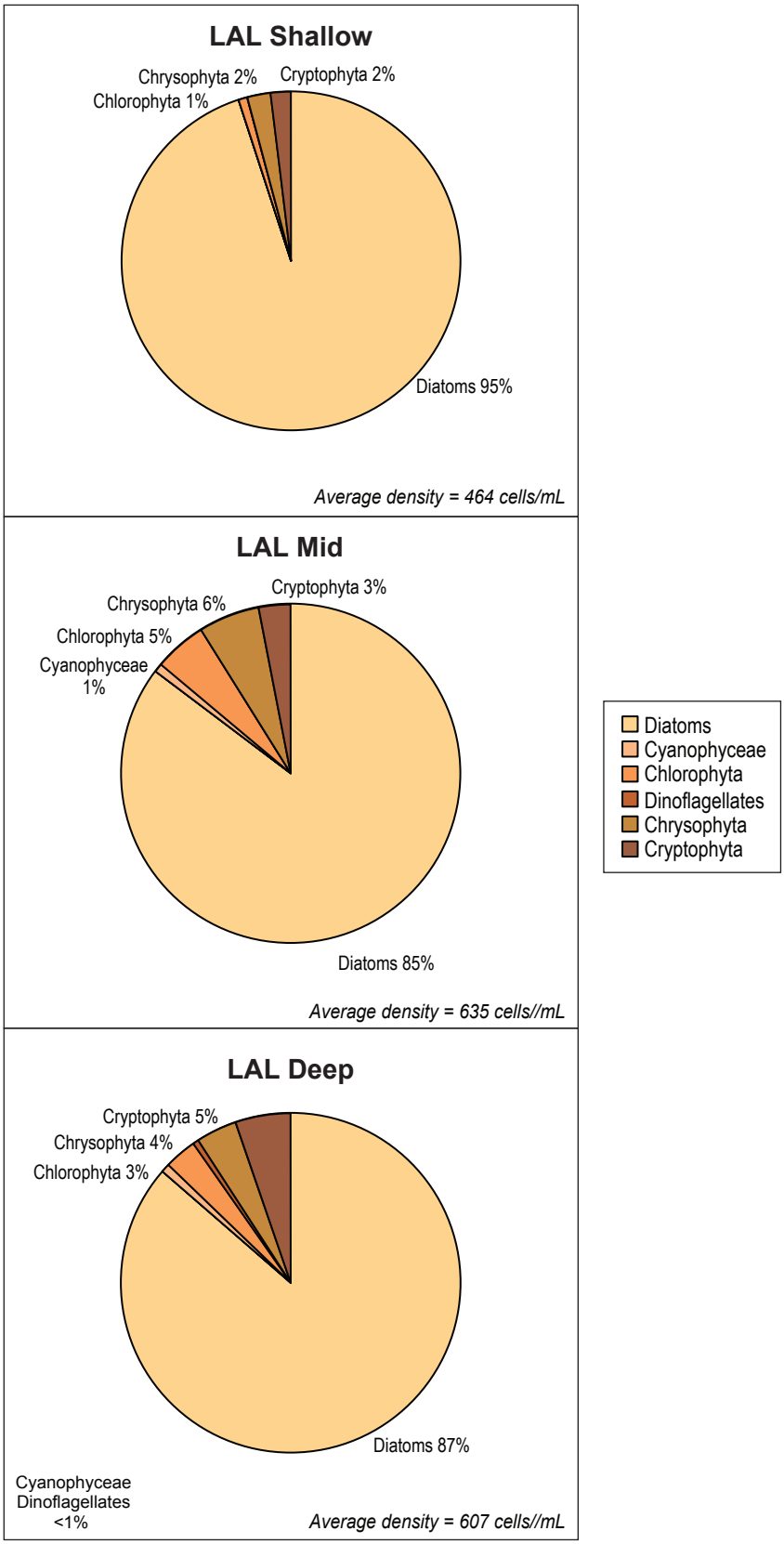
Zooplankton density varied among the four study lakes, ranging from 55 (SUL-deep) to 227,201 organisms/m^3 (LAL-deep) (Figure 5.2-17). Density was highest in deep zones of LAL and TDL compared to shallow zones in these lakes. Average zooplankton density was below 1,000 organisms/m^3 in both of the glacial lakes (KGL and SUL). This indicates naturally low secondary productivity in these lakes, which are characterized by cold waters and low nutrient loadings. Variation was generally low among zones except for the very high value observed at LAL-deep, which suggests some patchy distribution of zooplankton within the lake. Zooplankton biovolume (space taken up by zooplankton relative to the water volume sampled) followed the same pattern shown by density values. TDL had the highest biovolumes (5.9 to 26.7 mL/m^3), followed by LAL (4.1 to 11.5 mL/m^3), while biovolumes of the two glacial lakes were negligible.

5.2.4.2 Community Composition

The sparse zooplankton communities in KGL and SUL were similar in composition, made up primarily of the rotifer *Kellicottia longispina* (58 to 84%), along with lesser numbers of immature copepods (nauplii) in KGL and a mix of copepod nauplii and other rotifers (*Conochilus unicornis*, *Difflugia* sp., *Keratella* sp.) in SUL (Figure 5.2-18a). LAL and TDL showed richer and more diverse community structure with fairly even distributions of rotifers (*K. longispina*) and various copepod groups (Figure 5.2-18b). Calanoid copepods were subdominant in shallow and mid zones of LAL, and shallow zones of TDL. The rotifer *C. unicornis* was well represented in shallow and mid depths of TDL. Deeper zones of LAL and TDL tended to support mainly immature or only partially identified copepods (damaged or partial specimens). Daphnids (*Daphnia* sp. and *Sida* sp.) were found in low proportions in TDL, were very rare in LAL, and were not found in the two glacial lakes.

5.2.4.3 Richness, Evenness and Diversity

Genus richness of zooplankton was highest in TDL (up to 10 genera), and LAL, and lowest in the glacial lakes of KGL and SUL (Figure 5.2-19). Richness ranged from 3 to 10 genera among zones/lakes, and showed a minor pattern of increasing with increased depth. A total of 18 different taxonomic groups were distinguished among the lakes.



Phytoplankton Community Composition in Lakes of the KSM Project Area, August 2009

FIGURE 5.2-14B

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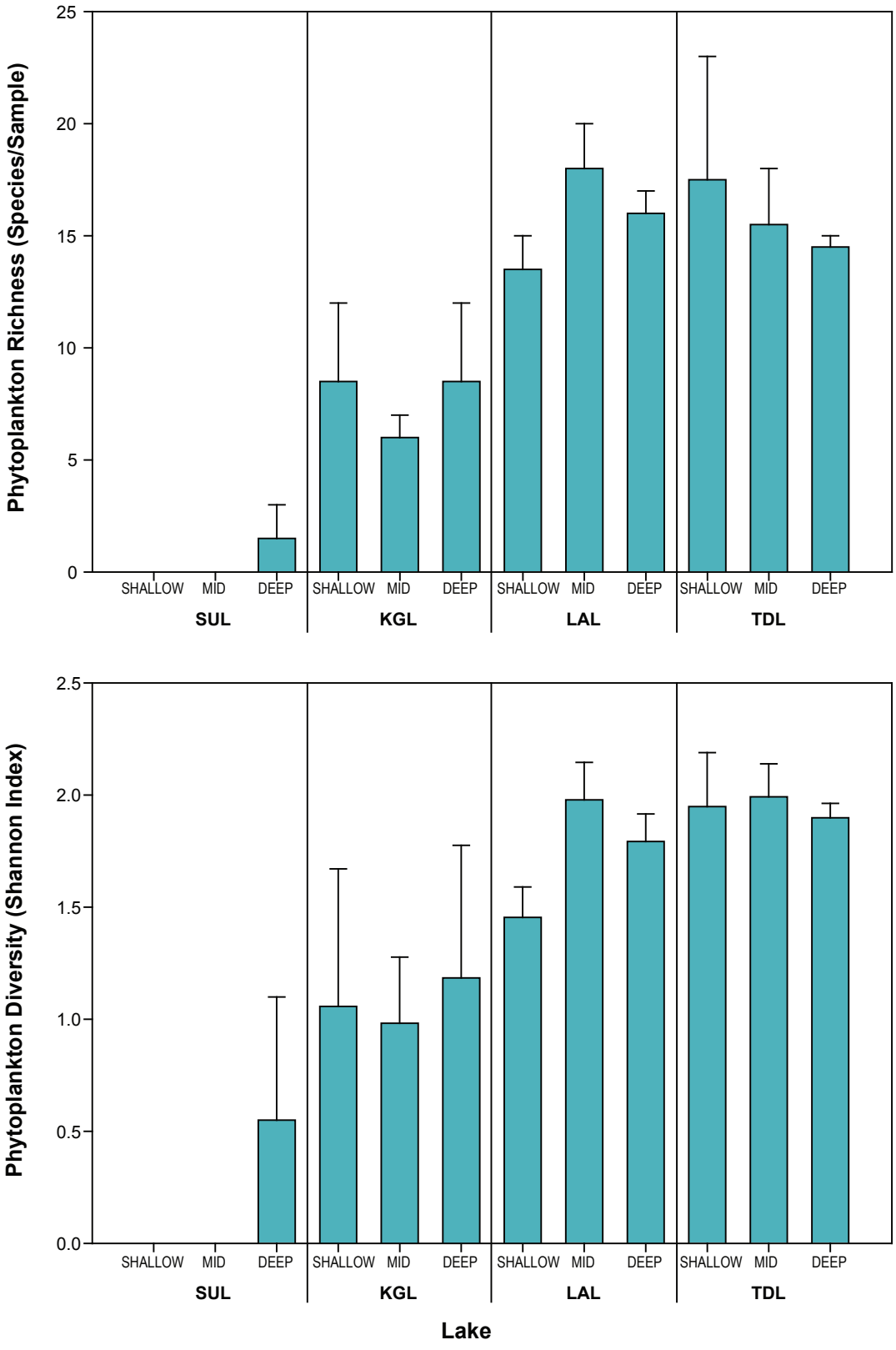

Note: Error bars represent standard error of the mean.

Phytoplankton Richness (Species) and Diversity (Shannon Index) in Lakes of the KSM Project Area, August 2009

FIGURE 5.2-15

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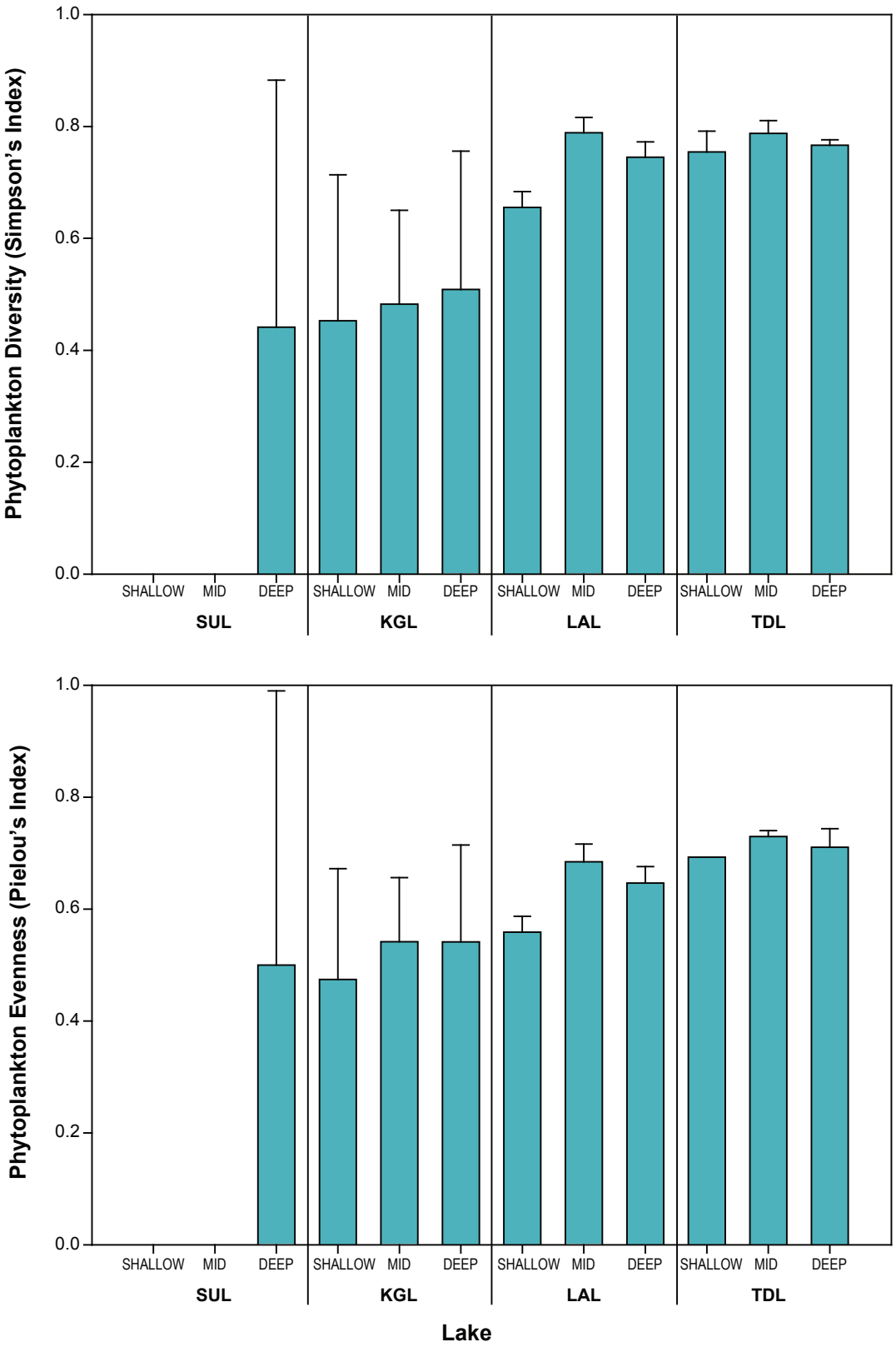

Note: Error bars represent standard error of the mean.

Phytoplankton Diversity (Simpson's) and Evenness in Lakes of the KSM Project Area, August 2009

FIGURE 5.2-16

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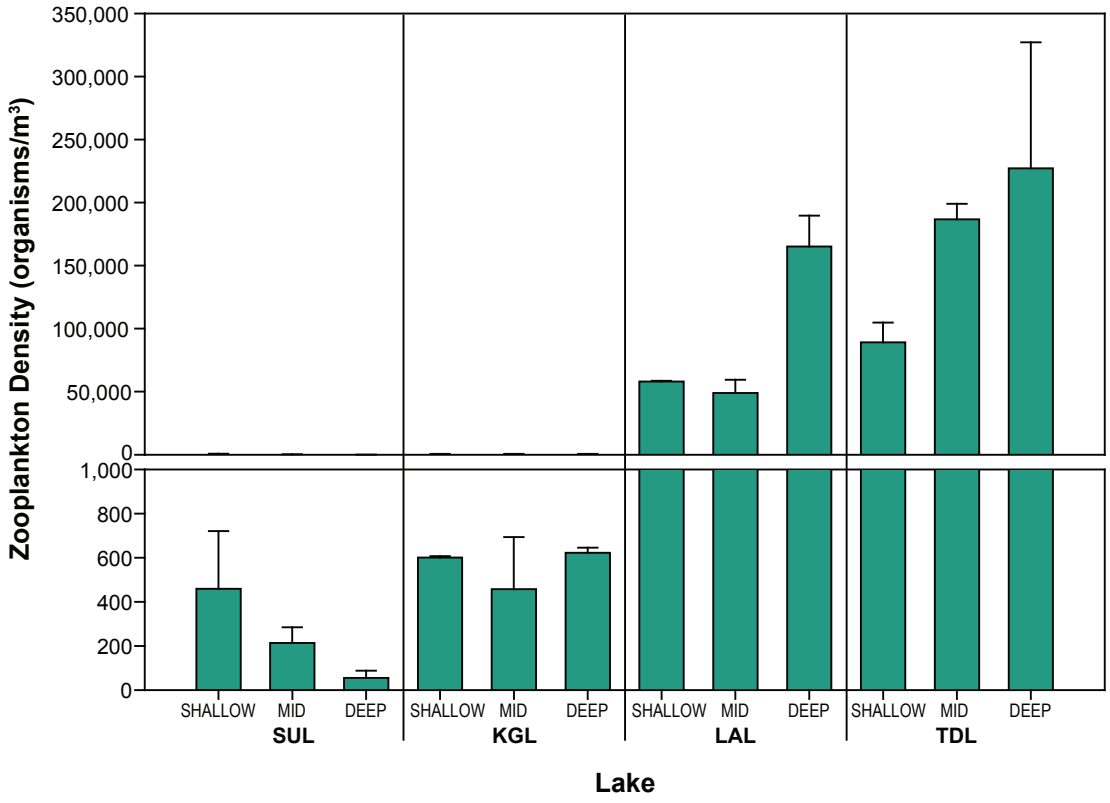

Zooplankton Density in KSM Project Lakes, August 2009

FIGURE 5.2-17

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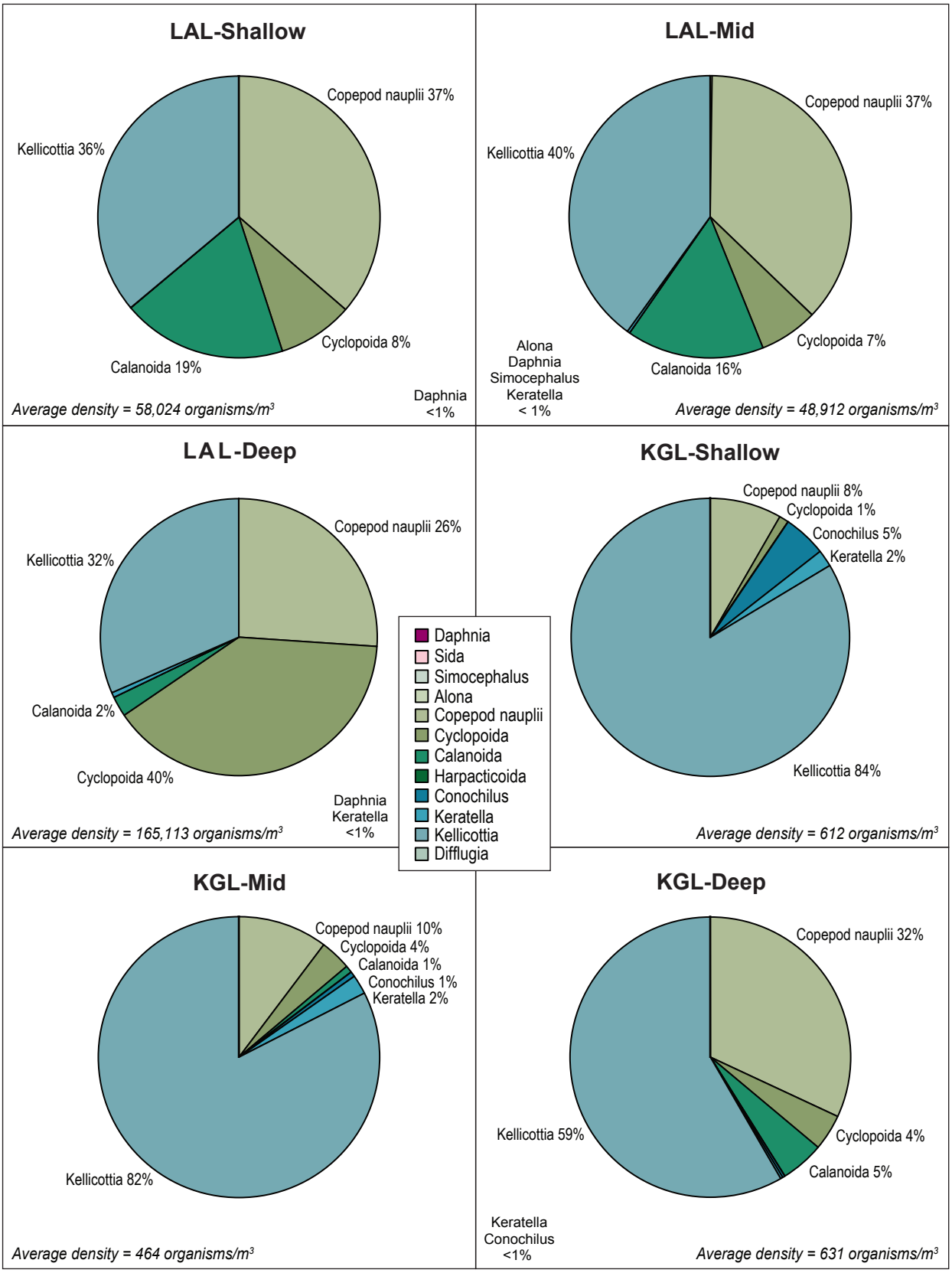

Zooplankton Community Composition in Lakes of the KSM Project Area, August 2009

FIGURE 5.2-18A

SEABRIDGE GOLD

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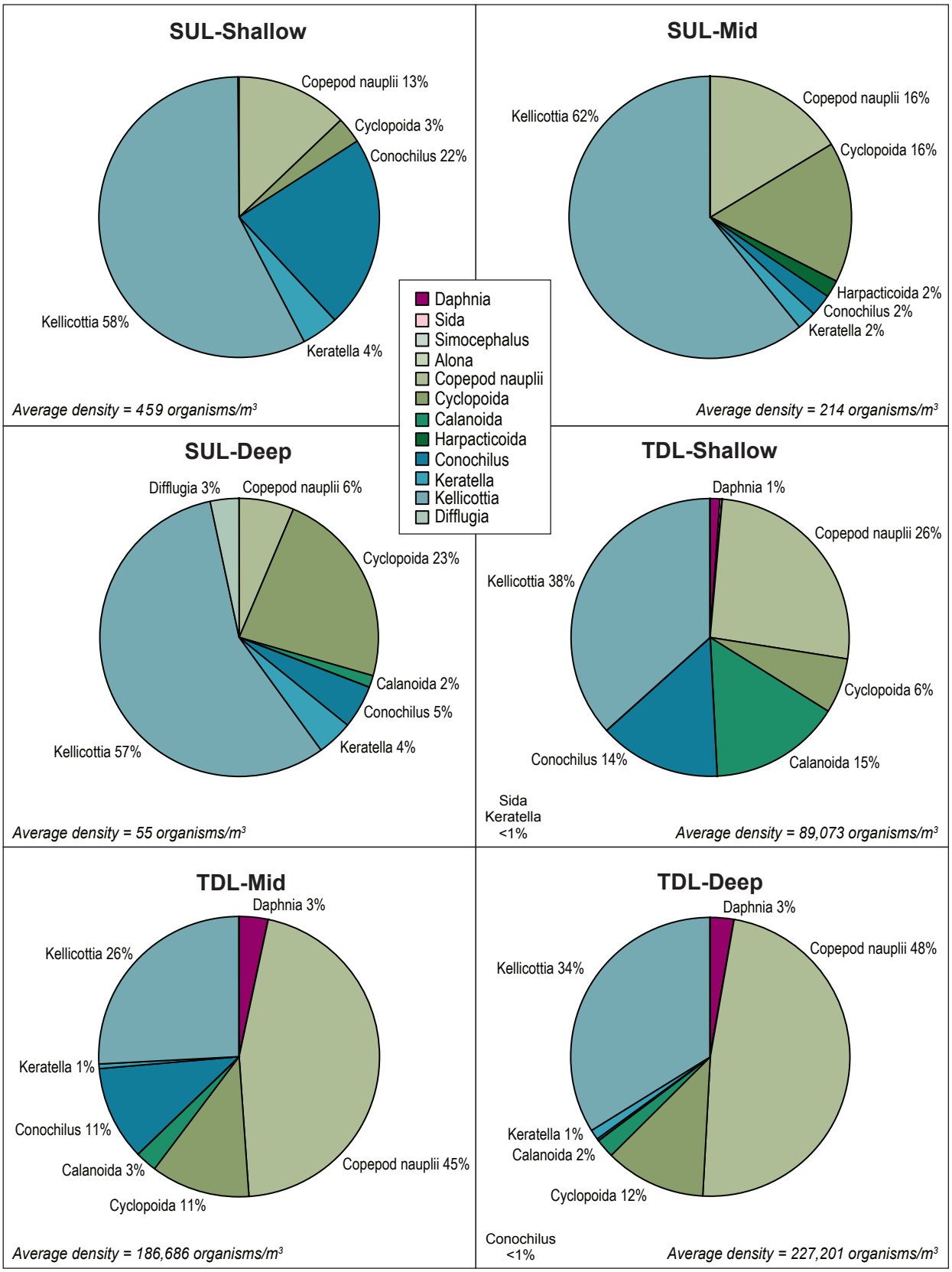

Zooplankton Community Composition in Lakes of the KSM Project Area, August 2009

FIGURE 5.2-18B

SEABRIDGE GOLD

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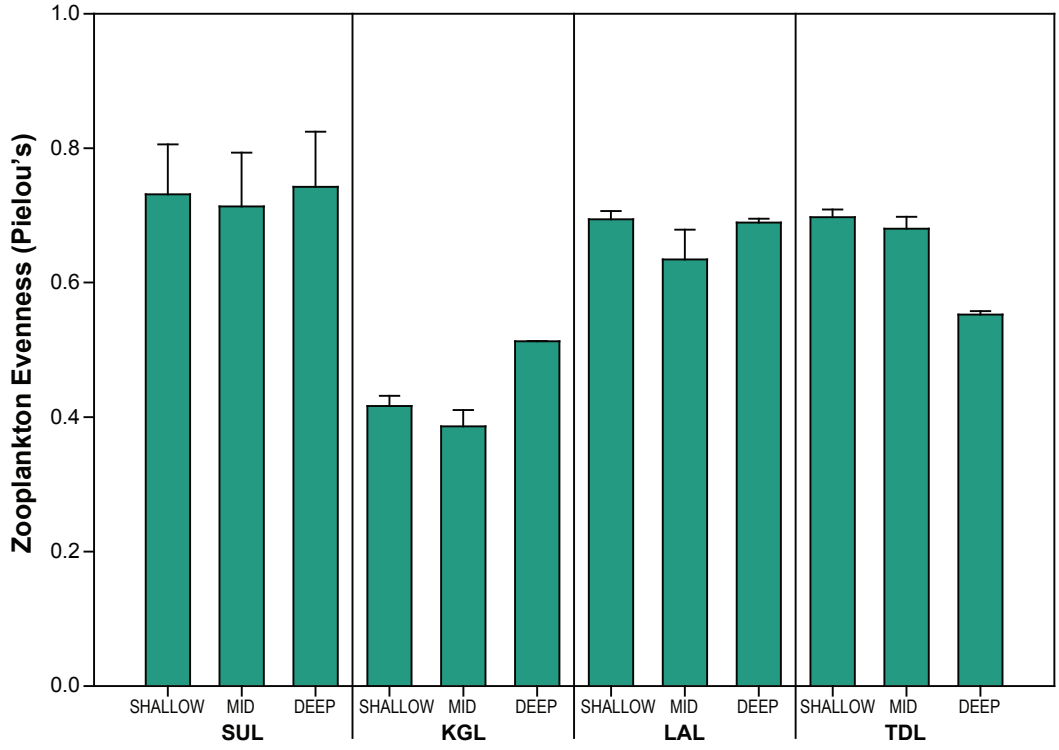

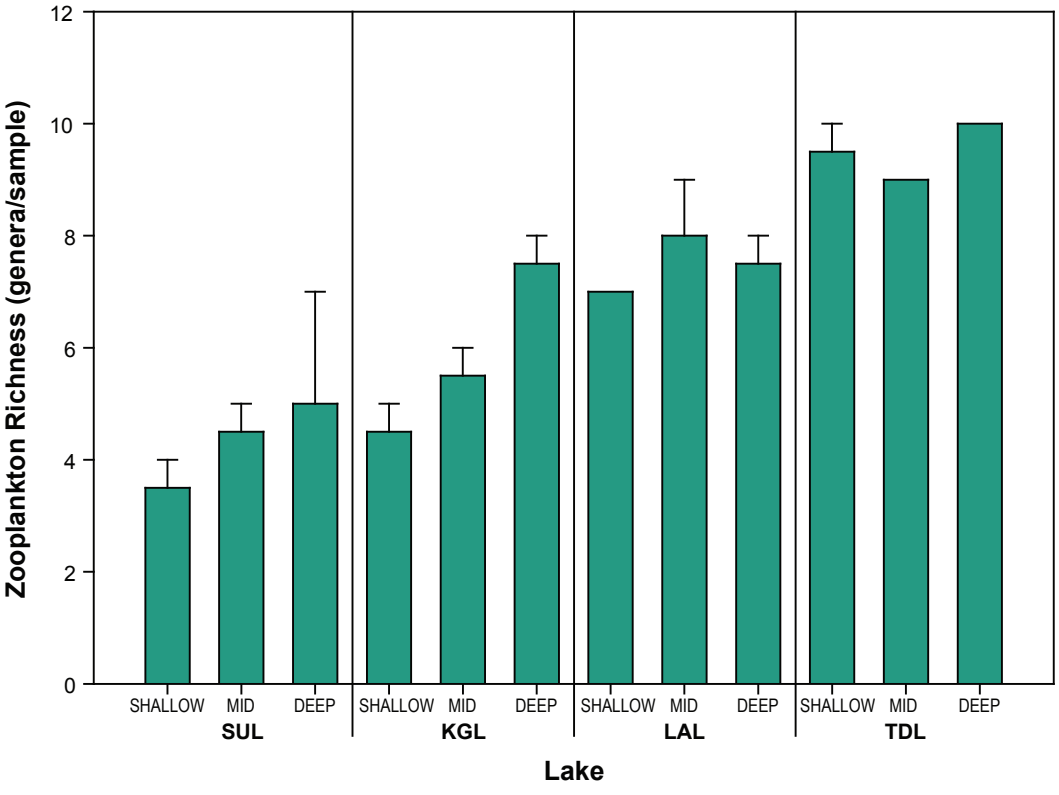

Zooplankton Evenness and Richness in KSM Project Lakes, August 2009

FIGURE 5.2-19

SEABRIDGE GOLD

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Zooplankton evenness was generally highest in SUL (0.71 to 0.74), LAL (0.63 to 0.69) and TDL (0.55 to 0.70), and was lowest in KGL (0.39 to 0.51) (Figure 5.2-19). Shannon diversity was highest in LAL (1.31 to 1.39) and TDL (1.27 to 1.57), and lowest in the glacial lakes SUL (0.92 to 1.16) and KGL (0.63 to 1.03) (Figure 5.2-20). Simpson's diversity showed a similar pattern to Shannon diversity, ranging from 0.29 (KGL-shallow) to 0.75 (TDL-shallow) (Figure 5.2-20).

5.2.4.4 Density

Benthic invertebrate density was highest in the shallow and mid-depth zones of the valley lakes, TDL and LAL, with a maximum density of 22,044 organisms/m^2 occurring at LAL-shallow (Figure 5.2-21). Benthic invertebrate densities were lowest at SUL, with no organisms being found in the mid-depth sample.

5.2.4.5 Community Composition

The benthic communities at SUL and KGL were composed entirely of Diptera (Figure 5.2-22a). The benthic community composition varied between depths and lakes at LAL and TDL. The LAL-shallow and mid-depth sites were primarily composed of Diptera (32% and 59%, respectively) and Pelecypoda (38% and 25%, respectively) (Figure 5.2-22b). The community at LAL-deep was primarily composed of Nematoda, Diptera, and Hydracarina. Pelecypoda were not found at this depth zone. The communities in each depth zone at TDL were also characterized by differences in composition. The community in the shallow site was dominated by Ostracoda (45%), while the mid-depth site contained very few Ostracoda and was dominated by Oligochaeta (39%) and Pelecypoda (31%) (Figure 5.2-22b). The benthic community at the deep site at TDL was composed entirely of Diptera (primarily chironomids).

5.2.5 Secondary Producers – Benthic Invertebrates

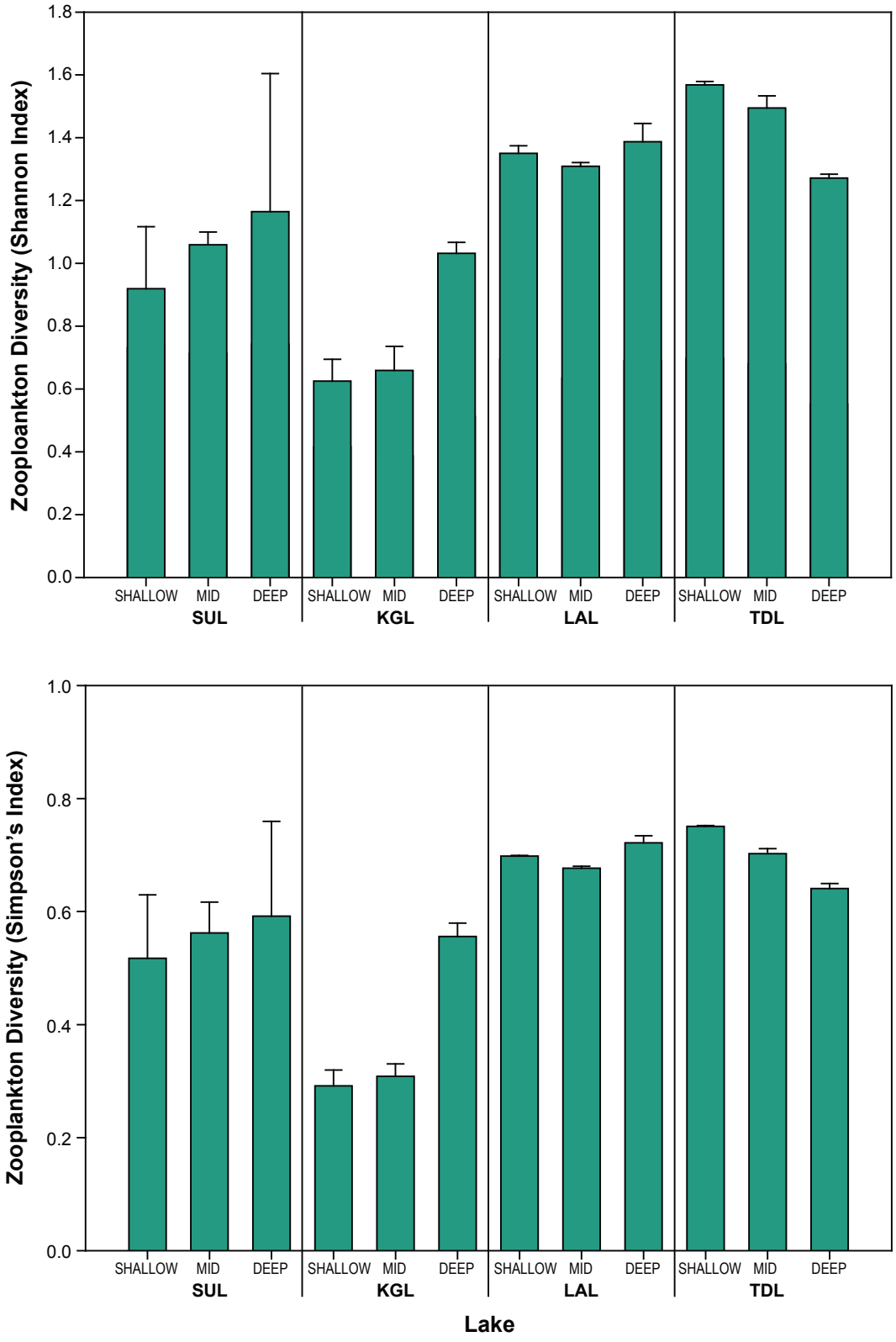
All benthic invertebrate data for the KSM project lakes are presented in Appendix 5.2-8.

5.2.5.1 Richness, Evenness and Diversity

Benthos genus evenness was highest at SUL deep, which was perfectly even (1) (Figure 5.2-23). For those samples where evenness could be calculated (>1 genus/sample) the benthic invertebrate communities for the KSM Project Lakes were generally even.

With the exception of TDL-deep, the benthic communities at TDL and LAL were richer than the communities found in KGL and SUL (Figure 5.2-23). An average of 11 genera were found at TDL-shallow and the lowest number of genera present occurred at SUL-mid where no benthos were found.

Shannon diversity typically ranges from 0 to 3.5, with greater values corresponding to greater diversity. Shannon diversity for benthos was highest in LAL and TDL and ranged from 0.47 (KGL-shallow) to 1.78 (LAL-shallow) (Figure 5.2-24). The Simpson's diversity index ranges from 0 (no diversity) to 1 (maximum diversity) and followed a similar trend as that observed for the Shannon Diversity index. Where diversities could be calculated, the highest diversity was measured at LAL-shallow (0.8) and the lowest was measured at KGL-shallow (0.28) (Figure 5.2-24). The Shannon and Simpson's diversity indices were 0 at KGL-mid and deep stations as only one type of genus was present in the sample. The indices could not be calculated at SUL-mid since there were no organisms in the sample.



Zooplankton Diversity (Shannon and Simpson's Index) in KSM Project Lakes, August 2009

FIGURE 5.2-20

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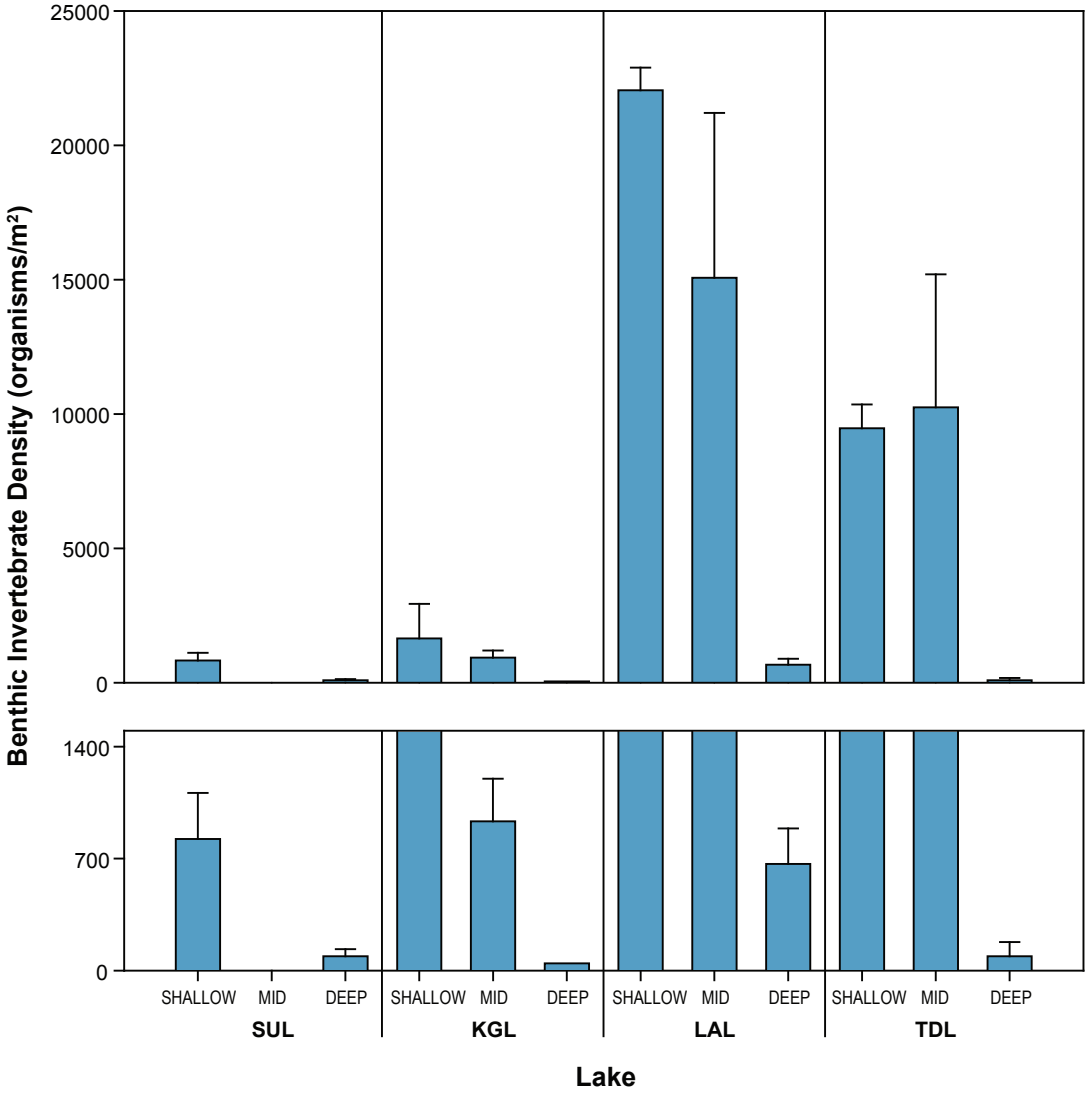

Note: Error bars represent the standard error of the mean

Benthic Invertebrate Density in KSM Project Lakes, August 2009

FIGURE 5.2-21

SEABRIDGE GOLD

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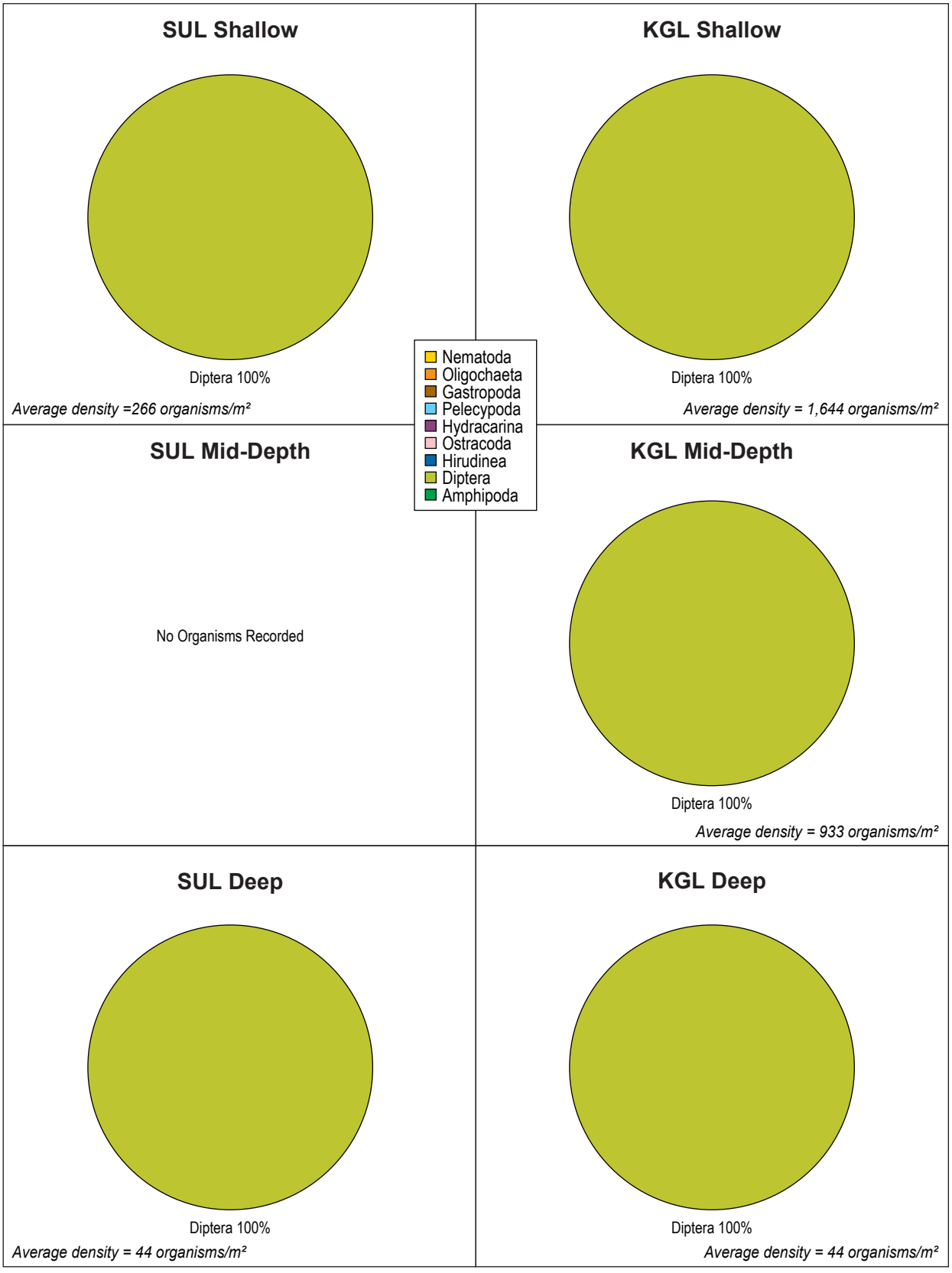
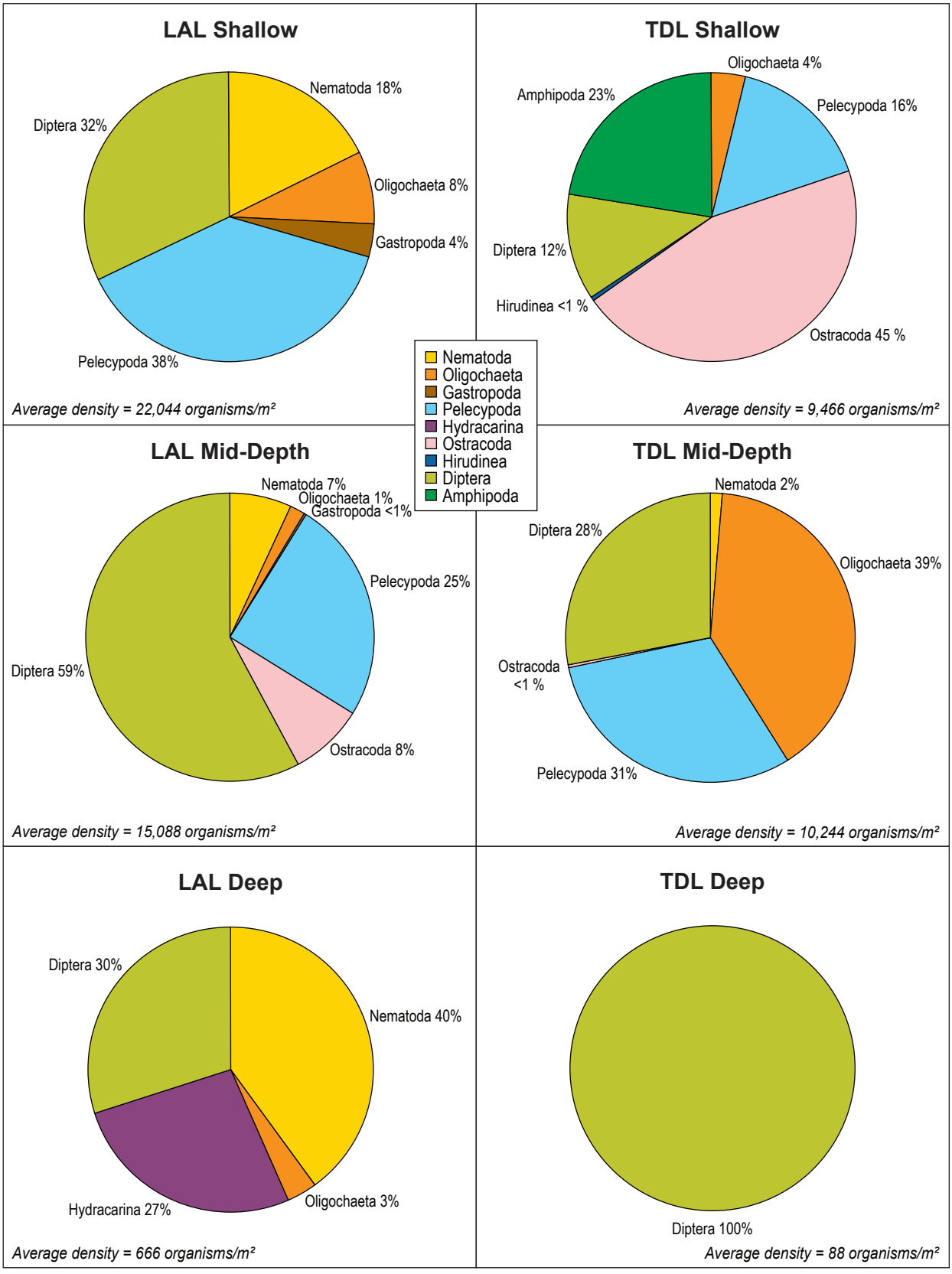


Benthic Invertebrate Community Composition in Lakes of the KSM Project, August 2009

FIGURE 5.2-22a

SEABRIDGE GOLD

Rescan™



Benthic Invertebrate Community Composition in Lakes of the KSM Project, August 2009

FIGURE 5.2-22b

SEABRIDGE GOLD

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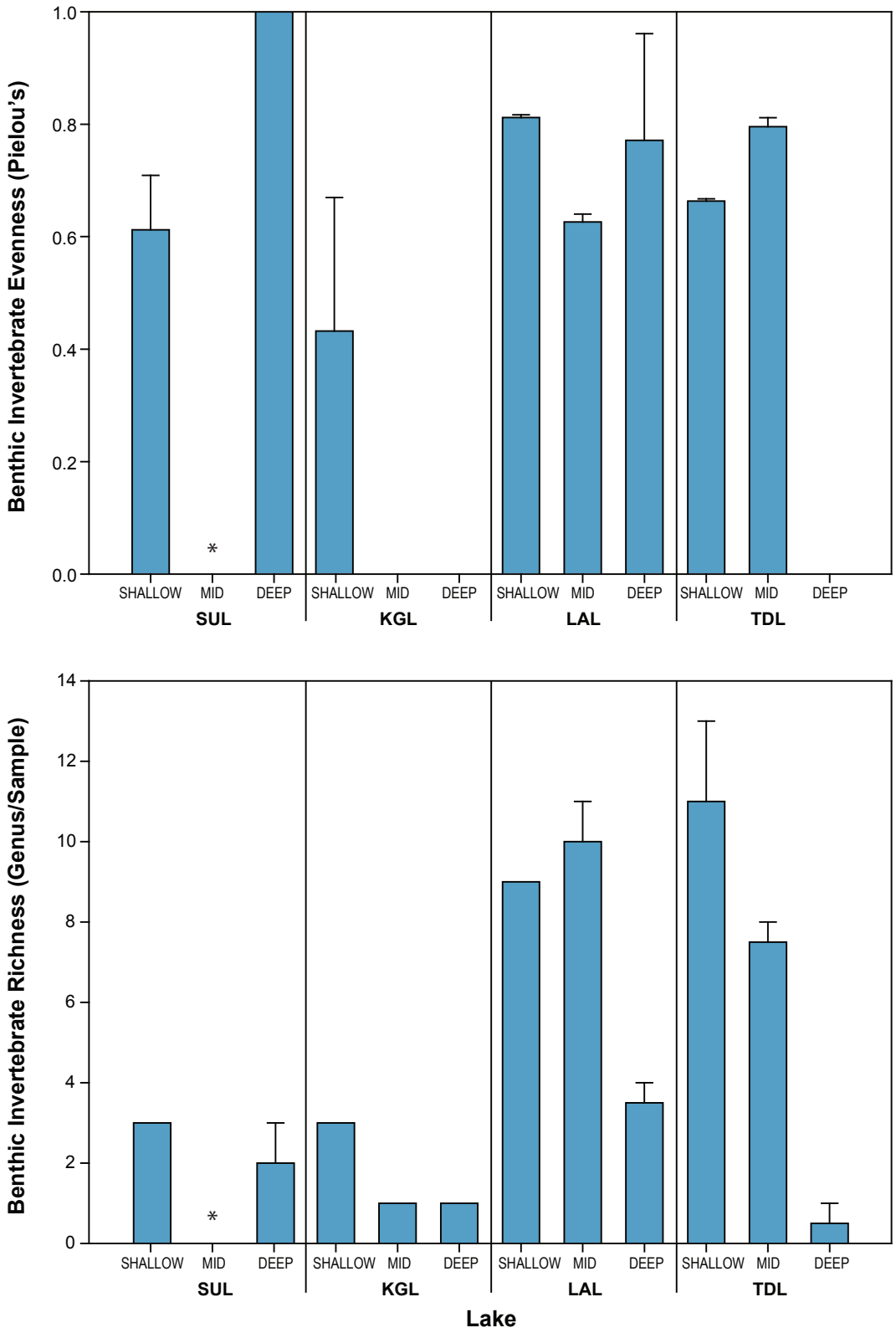

Note: Error bars represent the standard error of the mean
** indicates that no organisms were found*

Benthic Invertebrate Evenness and Richness in KSM Project Lakes, August 2009

FIGURE 5.2-23

SEABRIDGE GOLD

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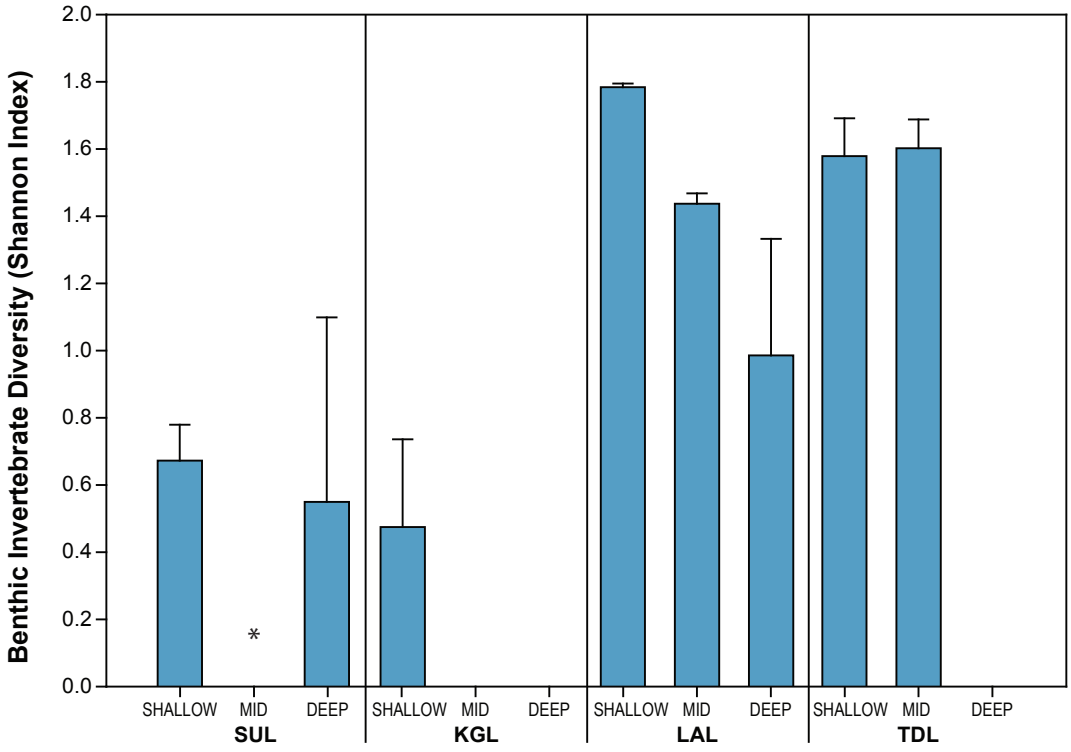

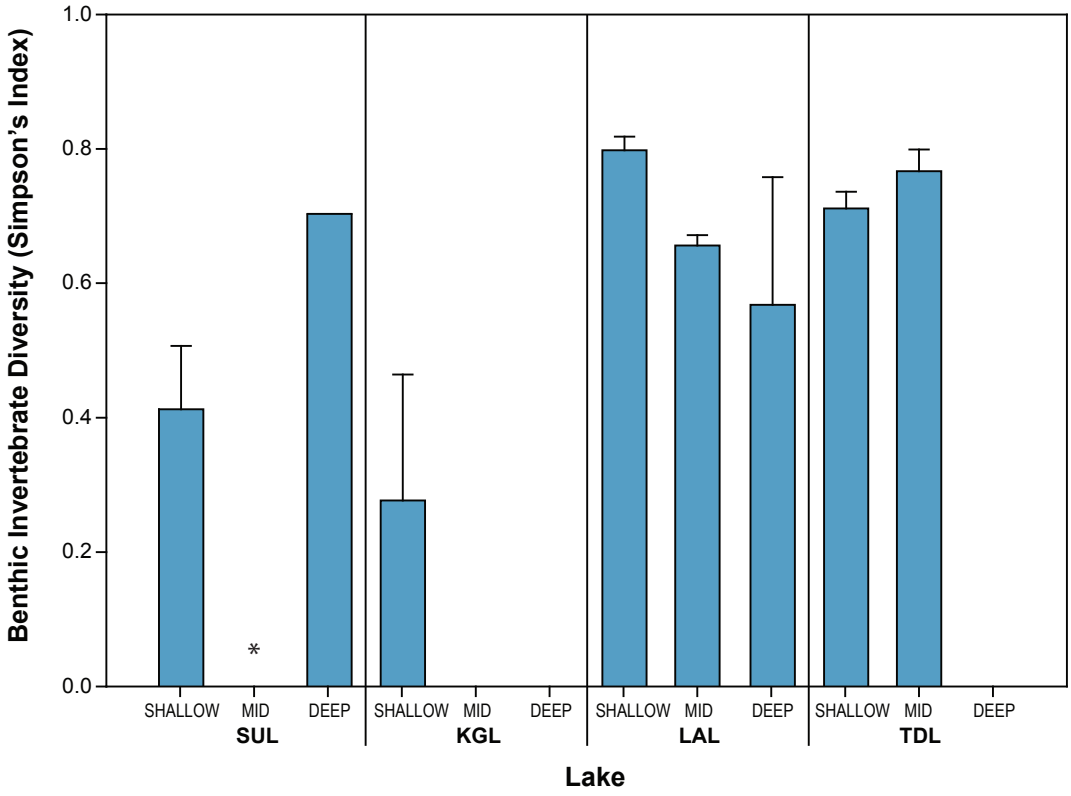

Note: Error bars represent the standard error of the mean
** indicates that no organisms were found*

Benthic Invertebrate Diversity (Shannon and Simpson's Index) in KSM Project Lakes, August 2009

FIGURE 5.2-24

SEABRIDGE GOLD

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6. Conclusions

6.1 STREAMS

The stream and river sites sampled in the KSM Project study area fall into four general categories: wide, large, braided channels; slightly narrower channels that are characterized by high, fast flows, and turbid waters; slightly smaller streams with relatively high and fast moving water; and smaller streams with slow moving water. These qualities, as well as bedrock characteristics, influence the biological, chemical, and physical characteristics of the streams.

Sediment at approximately 90 % of the stream sites was nutrient poor and composed mainly of sand with only small amounts of fine particles. These streams tend to contain high proportions of smaller particle sizes and greater concentrations of nutrients and organic matter. Those streams with higher nutrient levels are the smaller streams close to riparian vegetation. These sites were characterized by a higher energy flow regime. Stream sediments in the KSM Project study area were characterized by naturally high concentrations of metals. Concentrations of metals frequently exceeded BC and CCME guidelines. Arsenic, copper, and mercury tended to be highest in sediments from Treaty, Mitchell, and Sulphurets Creeks. Sites in the Teigen Creek Watershed and in the north Treaty Creek tributary tended to have higher chromium and nickel concentrations. Site CC1 in the Unuk River watershed had high concentrations of cadmium present in the sediments.

Periphyton biomass was typically low, with an average periphyton biomass of 0.61 μg chl *a*/cm^2. Average periphyton density was quite high at several sites within Teigen, South Teigen, North Treaty, and Snowbank creeks. Treaty Creek, Mitchell Creek, Unuk River, and most of Sulphurets Creek had the lowest periphyton density values. Species diversity and richness followed a similar pattern and was typically highest at sites in Teigen Creek and the north Treaty Creek tributary, and very low in Mitchell, Treaty, and Sulphurets creeks. The periphyton community at all stream sites was composed almost entirely of diatoms. The exception was SCR where a mix of diatoms and chlorophytes were found.

The Bray-Curtis Similarity index was calculated to examine the similarities between the periphyton communities at the potentially impacted sites and the reference sites. This comparison showed that some sites within the Unuk River, SC1, and TRC2 had above-average similarity to the reference site on Scott Creek. Many sites along Teigen Creek, Snowbank Creek, Coulter Creek, SC1, and some sites in Treaty Creek were similar to SUNR. The results indicate that SUNR is a better reference site than SCR site for assessing periphyton in Teigen Creek.

Benthos density was generally highest in Teigen Creek and in the North Treaty Creek Tributary. Lower densities were most consistently measured in the Mitchell, Sulphurets, and Treaty Creek watersheds, following a similar pattern as periphyton density and biomass. Richness was lowest in Treaty Creek, Mitchell Creek and Sulphurets Creek watersheds. The kick-net samples were found to have higher richness values than those collected at the same site using the Hess-net. Ephemeroptera, Plecoptera and Trichoptera (EPT) richness followed a similar pattern as overall benthos richness and the kick-net samples also had higher EPT richness values.

The lowest benthos diversities (Shannon's and Simpson's index) were found in some sites in Treaty, Mitchell, and Sulphurets creeks, while the highest values were seen in Snowbank, Teigen, and North Treaty creeks. Kick-net samples had similar diversity values as those calculated for the Hess-net samples. Diptera (primarily chironomids), Plecoptera (stoneflies) and Ephemeroptera (mayflies) were the dominant taxonomic groups present in the streams and rivers of the KSM Project study area. Benthic community structure at study sites was typical of coldwater streams of northwest British Columbia.

The Bray Curtis Similarity index was calculated to examine similarities between the benthic invertebrate communities at potentially impacted sites and the reference sites. This comparison indicated that some sites within the Unuk River, and Treaty, Sulphurets, and Mitchell creeks showed above-average similarity to the reference site on Scott Creek. Higher Bray-Curtis similarity to SUNR was seen in the Unuk River, Snowbank Creek, and McTagg Creek. The Bray-Curtis results therefore indicate that the reference SUNR appears to be more similar than reference SCR to benthic invertebrate communities of Study area streams.

The naturally high metals concentrations of the sediments in Treaty, Mitchell, and Sulphurets creeks may contribute to the low levels of primary and secondary productivity seen in the these creeks. A further contribution to the low levels of productivity at these sites is likely the high flows and turbid waters in these systems. These conditions can scour the rocks and limit the amount of sheltered habitat available to the organisms.

6.2 LAKES

The four study lakes in the KSM Project study area can be divided into two different groups. Sulphurets Lake (SUL) and Knipple Glacier Lake (KGL) are glacier-fed lakes, located at relatively high elevations surrounded by glaciers. These lakes are characterized by turbid water and low nutrient content. In contrast, West Teigen Lake (LAL) and Todedada Lake (TDL) are located at lower elevations in vegetated valleys, and are stream-fed. These latter lakes are characterized by clearer water, with high nutrient and organic carbon levels.

The lake sediment substrates in SUL and LAL were predominantly silt with clay, with the presence of sand in the shallow zones. KGL had mainly clay substrates at all depths, while TDL had a broader mix of substrates. The pH of sediments was slightly acidic to neutral in LAL and TDL and neutral to slightly basic in the two glacial lakes, KGL and SUL.

Due to its proximity to the mineral deposit area, concentrations of arsenic, cadmium, copper, lead and mercury in lake sediments naturally exceeded the BC and CCME sediment quality guidelines at SUL. Iron and zinc exceeded guidelines at all lake sites. Cadmium and chromium were above guidelines at TDL, while nickel also exceeded guidelines at LAL.

The phytoplankton community varied between Project lakes. Biomass and density were low in SUL, with higher values occurring at KGL, TDL, and LAL. There was no phytoplankton in the shallow and mid-depth samples at SUL, and only few diatoms were found in the deepest zone. LAL contained primarily diatoms, KGL supported mainly cryptophytes, and TDL had a more diverse community. Species richness was highest at LAL and TDL, and low in KGL with limited richness in SUL. Phytoplankton diversity (Shannon and Simpson's diversity indices) patterns were similar to richness, with lower values in the glacial lakes.

Zooplankton density was very low in both the glacial lakes KGL and SUL (< 400 organisms/m^3), indicating naturally low secondary productivity in these cold, nutrient-poor lakes. Zooplankton density

was higher in TDL and LAL, but density varied with depth, increasing in the deeper sections of the lakes. This variation is likely a consequence of vertically migrating species inhabiting the deeper water during daylight hours. Genus richness of zooplankton in lakes was higher in TDL (up to 10 genera), intermediate in LAL, and lowest in the glacial lakes, KGL and SUL. Therefore richness was lowest in the glacial lakes, as was the case for density. The sparse zooplankton communities in KGL and SUL were similar in composition, and were mainly made of the rotifer *Kellicottia longispina*. The richer and more diverse zooplankton community in LAL and TDL had relatively even distributions of rotifers (*K. longispina*) and various copepod groups. Zooplankton species evenness and diversity were generally highest in TDL and LAL and lowest in KGL and SUL.

The benthic invertebrate community in the Project lakes followed a trend similar to that observed for phytoplankton and zooplankton. Benthic invertebrate density was greater and the community composition was richer and more diverse in LAL and TDL than in the glacial lakes. The benthic community in SUL and KGL was composed almost entirely of Diptera, providing further evidence of the limited biological activity associated with these high elevation glacier-fed lakes.

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Appendix 3.1-1

Coordinates of KSM Project Area Stream Sampling Sites, 2009

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Appendix 3.1-1. Coordinates of KSM Project Area Stream Sampling Sites, 2009

Watershed	Site Code	Easting	Northing
Unuk River			
1	EUR2	431144	6279172
2	ECM7	413860	6277090
3	ECM8	411452	6273968
4	CC1	407747	6266244
5	UR1	407063	6260637
6	UR2	394076	6245500
7	UR1A	407460	6262151
South Unuk River			
8	SUNR	410012	6247892
Teigen Creek			
9	STE1	441998	6277635
10	STE2	440330	6280371
11	UNK1	438788	6281098
12	UNK2	435759	6281280
13	TEC1	437343	6283293
14	TEC2	440887	6284660
15	SNO1	443408	6290190
16	SNO2	446018	6288330
Treaty Creek			
17	TRC1	435369	6274882
18	TRC2	449039	6269992
19	TRC3	456592	6269436
20	NTR1	445153	6275601
21	NTR2	447192	6271402
Mitchell Creek			
22	MC1	421262	6265372
23	MCTR	418705	6265016
24	MCT1	418425	6269179
25	MCT2	417110	6267993
26	GC1	416295	6262639
Sulphurets Creek			
27	SC1	419493	6261371
28	SC2	415127	6262270
29	SC3	407734	6261590
30	SCT	417355	6260907
Scott Creek			
31	SCR	452654	6258369
Bowser River			
32	BR1	434556	6238978
Bell Irving			
33	BIR1	450592	6289103
34	BIR2	464603	6268033

Appendix 3.1-2

Coordinates of KSM Project Area Lake Sampling Sites, 2009

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Appendix 3.1-2. Coordinates of KSM Project Area Lake Sampling Sites, 2009

Watershed Lake		Site Code	Depth zone	Replicate	Easting	Northing
1	Sulphurets	SUL	Shallow	Rep. 1	420941	6261201
				Rep. 2	420945	6261204
			Mid-depth	Rep. 1	420555	6261211
				Rep. 2	420550	6261209
			Deep	Rep. 1	420885	6261250
				Rep. 2	420874	6261244
2	Knipple Glacier Lake	KGL	Shallow	Rep. 1	440621	6254044
				Rep. 2	440625	625040
			Mid-depth	Rep. 1	440501	6254039
				Rep. 2	440504	6254043
			Deep	Rep. 1	440664	6253879
				Rep. 2	440663	6253881
3	West Teigen Lake	LAL	Shallow	Rep. 1	432387	6279826
				Rep. 2	432394	6279829
			Mid-depth	Rep. 1	432424	6279979
				Rep. 2	432426	6279983
			Deep	Rep. 1	431846	6279765
				Rep. 2	431830	6279780
4	Todedada Lake	TDL	Shallow	Rep. 1	451703	6259501
				Rep. 2	451700	6259497
			Mid-depth	Rep. 1	451869	6259469
				Rep. 2	451862	6259486
			Deep	Rep. 1	451787	6259764
				Rep. 2	451797	6259779

Appendix 5.1-1

Sediment Quality Data for Streams in the KSM Project Area, August 2009

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Appendix 5.1-1. Sediment Quality Data for Streams in the KSM Project Area, August 2009

Sample ID	UR1A-1	UR1A-2	UR1A-3	UR1-1	UR1-2	UR1-3	UR2-1	UR2-2	UR2-3	EUR2-1	EUR2-2	EUR2-3	TRC3-1
Date Sampled	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	16-Aug-09	16-Aug-09	16-Aug-09	18-AUG-09
ALS Sample ID	L806369-1	L806369-2	L806369-3	L806369-4	L806369-5	L806369-6	L806369-7	L806369-8	L806369-9	L807781-13	L807781-14	L807781-15	L809328-6
Physical Tests													
% Moisture	8.69	17.1	18.5	14.0	18.9	18.4	16.0	13.0	18.3	19.0	15.0	18.2	19.8
pH	7.96	8.12	8.16	8.14	8.06	8.52	8.06	8.28	8.44	7.62	7.71	7.48	8.28
Particle Size													
% Gravel (>2mm)	50.0	1.0	2.0	18.0	4.0	1.0	36.0	41.0	10.0	5.0	12.0	10.0	<1.0
% Sand (2.0mm - 0.063mm)	47.0	89.0	91.0	77.0	88.0	92.0	61.0	57.0	86.0	86.0	83.0	76.0	94.0
% Silt (0.063mm - 4um)	3.0	10.0	6.0	4.0	8.0	5.0	3.0	2.0	4.0	8.0	4.0	11.0	5.0
% Clay (<4um)	1.0	1.0	1.0	1.0	1.0	1.0	<1.0	<1.0	<1.0	2.0	1.0	3.0	1.0
Nutrients													
Total Nitrogen by LECO	0.090	0.089	0.090	0.074	0.079	0.081	0.072	0.064	0.075	0.112	0.104	0.105	0.073
Available Phosphate-P	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0
Phosphorus, Total	1130	1240	1290	1090	1010	1020	1060	1020	1140	818	882	1070	948
Cyanides													
Cyanide, Total	<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
Organic / Inorganic Carbon													
$CaCO_3$ Equivalent	8.01	10.2	9.38	7.26	7.21	7.31	5.22	5.15	5.50	<0.70	<0.70	<0.70	1.35
Inorganic Carbon	0.565	0.676	0.664	0.379	0.396	0.409	0.164	0.152	0.156	<0.090	<0.090	<0.090	0.123
Total Carbon by Combustion	1.0	1.0	1.1	0.6	0.6	0.7	0.3	0.3	0.3	0.7	0.7	0.7	0.6
Total Organic Carbon	0.40	0.35	0.40	0.25	0.23	0.25	0.13	0.10	0.16	0.59	0.60	0.58	0.46
Metals													
Aluminum (Al)	16200	15200	15400	14700	14600	15200	12600	14200	13000	17000	17100	17900	15200
Antimony (Sb)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arsenic (As)	54.8	54.9	51.9	85.5	65.8	64.1	57.4	41.1	62.8	23.7	22.8	21.5	60.2
Barium (Ba)	188	149	163	141	153	143	121	305	129	300	589	393	130
Beryllium (Be)	0.56	0.53	0.52	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.74	0.70	0.67	<0.50
Bismuth (Bi)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium (Cd)	0.50	0.50	0.50	1.45	1.46	1.39	0.66	0.62	0.53	1.15	1.01	0.84	1.84
Calcium (Ca)	33400	34800	35100	25100	24600	25300	15900	17500	17900	5640	5200	4910	11500
Chromium (Cr)	43.5	40.3	38.5	24.1	23.5	24.2	41.4	36.3	39.2	54.2	57.2	59.9	29.3
Cobalt (Co)	17.2	17.4	16.9	25.9	21.9	22.0	24.6	20.3	24.4	27.6	26.8	25.9	19.2
Copper (Cu)	90.9	86.4	87.1	214	195	197	144	134	140	65.4	65.4	62.4	64.5
Iron (Fe)	42400	41900	40700	62500	52900	53500	78100	57200	74800	47900	47000	46200	47300
Lead (Pb)	<30	<30	<30	36	<30	<30	<30	<30	31	<30	<30	<30	<30
Lithium (Li)	17.6	16.2	15.9	12.1	12.0	12.6	9.5	10.6	9.5	33.4	37.2	37.6	27.5
Magnesium (Mg)	14300	13900	13900	11200	11000	11500	10100	10700	10200	10800	11000	11000	10900
Manganese (Mn)	871	824	821	801	777	793	629	674	642	1310	1240	1180	858
Mercury (Hg)	0.291	0.365	0.261	0.292	0.170	0.162	0.182	0.113	0.183	0.219	0.185	0.171	0.293
Molybdenum (Mo)	<4.0	<4.0	<4.0	9.4	10.3	9.5	6.2	6.3	6.3	<4.0	<4.0	<4.0	<4.0
Nickel (Ni)	45.1	40.9	39.4	31.7	29.9	28.0	31.2	29.6	29.5	119	123	121	53.0
Phosphorus (P)	2010	2180	2160	2100	2040	2000	2270	2060	2320	1110	1130	1110	1270
Potassium (K)	1240	1040	1100	1650	1630	1690	1120	1440	1220	1380	1750	1780	860
Selenium (Se)	2.83	<3.0	2.93	6.96	5.03	5.37	4.37	3.44	<3.0	<2.0	1.38	<3.0	<3.0
Silver (Ag)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Sodium (Na)	360	330	340	280	280	290	450	500	430	<200	<200	<200	<200
Strontium (Sr)	134	135	136	98.9	96.6	100	64.5	78.3	71.1	60.8	63.6	58.2	58.0
Sulfur (S)-Total	1510	2460	2290	-	7010	5050	2940	2550	2180	1580	1720	1410	3510
Thallium (Tl)	<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
Tin (Sn)	<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
Titanium (Ti)	1060	947	1060	1290	1160	1180	1290	1620	1260	27.6	34.9	21.5	866
Total Sulphur	-	-	-	1.28	-	-	-	-	-	-	-	-	-
Vanadium (V)	101	98.9	100	97.7	88.5	90.9	157	120	153	48.6	49.7	50.6	49.2
Zinc (Zn)	124	116	115	178	170	162	119	112	111	210	190	180	194

Appendix 5.1-1. Sediment Quality Data for Streams in the KSM Project Area, August 2009

Sample ID	TRC3-2	TRC3-3	TEC2-1	TEC2-2	TEC2-3	TRC1-1	TRC1-2	TRC1-3	STE1-1	STE1-2	STE1-3	UNK1-1	UNK1-2
Date Sampled	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09
ALS Sample ID	L809328-7	L809328-8	L809328-9	L809328-10	L809328-11	L809328-12	L809328-13	L809328-14	L809328-15	L809328-16	L809328-17	L809328-18	L809328-19
Physical Tests													
% Moisture	17.9	19.7	12.9	14.6	12.3	15.6	12.7	15.0	16.8	8.41	12.4	25.5	51.3
pH	8.25	8.21	7.80	7.76	7.85	8.32	8.29	8.33	6.74	6.78	6.89	6.90	6.77
Particle Size													
% Gravel (>2mm)	<1.0	1.0	25.0	14.0	35.0	4.0	4.0	<1.0	5.0	41.0	27.0	55.0	1.0
% Sand (2.0mm - 0.063mm)	92.0	92.0	66.0	77.0	61.0	89.0	86.0	88.0	92.0	55.0	67.0	39.0	68.0
% Silt (0.063mm - 4um)	7.0	6.0	8.0	8.0	3.0	6.0	9.0	10.0	2.0	3.0	5.0	5.0	22.0
% Clay (<4um)	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	10.0
Leachable Anions & Nutrients													
Total Nitrogen by LECO	0.068	0.077	0.099	0.095	0.092	0.055	0.055	0.055	0.088	0.089	0.093	0.153	0.234
Available Phosphate-P	<2.0	<2.0	3.1	4.0	3.6	<2.0	<2.0	<2.0	3.7	3.3	3.5	4.8	2.9
Phosphorus, Total	851	975	744	786	738	899	890	901	765	836	726	794	905
Cyanides													
Cyanide, Total	<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
Organic / Inorganic Carbon													
$CaCO_3$ Equivalent	1.28	1.51	<0.70	<0.70	<0.70	3.21	3.51	3.51	<0.70	<0.70	<0.70	<0.70	<0.70
Inorganic Carbon	0.122	0.140	<0.090	<0.090	<0.090	0.352	0.386	0.387	<0.090	<0.090	<0.090	<0.090	<0.090
Total Carbon by Combustion	0.6	0.6	0.6	0.6	0.5	0.9	0.8	0.8	0.5	0.5	0.6	1.5	3.3
Total Organic Carbon	0.47	0.48	0.63	0.56	0.53	0.51	0.38	0.42	0.50	0.53	0.55	1.46	3.26
Metals													
Aluminum (Al)	15400	15300	20000	20500	21200	12600	12100	13500	17700	18600	18100	22000	21800
Antimony (Sb)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arsenic (As)	62.1	67.9	13.0	11.8	11.2	94.0	96.0	69.3	11.3	10.7	9.9	11.5	12.7
Barium (Ba)	132	109	167	164	180	89.2	90.0	121	136	166	165	190	190
Beryllium (Be)	<0.50	<0.50	0.54	0.56	0.55	<0.50	<0.50	<0.50	<0.50	0.52	0.51	0.65	0.64
Bismuth (Bi)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium (Cd)	1.85	1.99	<0.50	<0.50	<0.50	2.03	1.85	1.74	<0.50	<0.50	<0.50	1.50	0.83
Calcium (Ca)	12200	12200	4550	4390	4510	17400	16700	18500	2660	2530	2500	5220	4800
Chromium (Cr)	33.0	31.1	89.1	92.6	96.9	19.5	19.9	20.1	76.0	82.9	75.6	97.1	82.8
Cobalt (Co)	19.3	20.2	22.3	21.3	21.0	20.5	21.9	17.4	20.6	18.1	19.4	37.2	36.9
Copper (Cu)	64.2	69.8	54.1	52.5	50.5	85.5	92.3	81.5	44.9	45.7	48.2	44.0	42.7
Iron (Fe)	48000	50100	34700	35000	34600	51300	52300	43000	32400	30300	30400	36000	36900
Lead (Pb)	<30	<30	<30	<30	<30	40	43	33	<30	<30	<30	<30	<30
Lithium (Li)	27.5	27.7	34.8	35.7	35.3	18.0	17.4	18.8	33.9	33.5	32.1	36.2	35.4
Magnesium (Mg)	11000	11100	15100	15400	15400	9060	8850	9570	13500	13300	13500	12000	11500
Manganese (Mn)	851	865	844	785	792	759	710	807	934	859	841	2180	2300
Mercury (Hg)	0.279	0.291	0.130	0.120	0.113	0.367	0.360	0.285	0.0897	0.0986	0.107	0.160	0.159
Molybdenum (Mo)	<4.0	<4.0	<4.0	<4.0	<4.0	4.1	<4.0	<4.0	<4.0	<4.0	<4.0	4.6	<4.0
Nickel (Ni)	53.3	53.9	116	118	117	39.8	42.1	38.3	96.9	98.2	98.9	130	110
Phosphorus (P)	1350	1340	1150	1140	1100	1260	1290	1300	929	915	948	1390	1290
Potassium (K)	900	840	1630	1750	2000	1080	1030	1170	1360	2020	1890	1670	1740
Selenium (Se)	<3.0	2.98	<2.0	<2.0	<2.0	0.39	0.41	0.29	<2.0	<2.0	<2.0	2.53	<2.0
Silver (Ag)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Sodium (Na)	<200	<200	230	220	240	<200	<200	220	<200	<200	<200	<200	<200
Strontium (Sr)	61.5	60.4	41.8	40.8	41.3	75.5	78.8	81.0	29.0	29.4	28.8	56.8	53.0
Sulfur (S)-Total	3500	3430	510	440	420	-	-	-	580	630	620	320	420
Thallium (Tl)	<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
Tin (Sn)	<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
Titanium (Ti)	951	894	320	334	447	873	894	874	70.3	82.7	56.4	145	150
Total Sulphur	-	-	-	-	-	1.24	1.55	1.17	-	-	-	-	-
Vanadium (V)	51.7	51.1	52.7	54.4	57.2	50.4	48.5	50.3	47.4	50.5	49.9	48.0	47.8
Zinc (Zn)	199	203	116	116	114	205	197	185	105	101	104	161	140

Appendix 5.1-1. Sediment Quality Data for Streams in the KSM Project Area, August 2009

Sample ID	UNK1-3	CC1-1	CC1-2	CC1-3	QAQC 1	ECM8-1	ECM8-2	ECM8-3	SUNR-1	STE2-1	STE2-2	STE2-3	UNK2-1
Date Sampled	18-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09	18-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	22-AUG-09	23-AUG-09	23-AUG-09	23-AUG-09	24-AUG-09
ALS Sample ID	L809328-20	L809328-21	L809328-22	L809328-23	L809328-26	L810729-1	L810729-2	L810729-3	L810729-4	L810729-5	L810729-6	L810729-7	L810729-8
Physical Tests													
% Moisture	17.3	20.8	20.2	28.6	16.5	16.0	16.2	16.7	18.5	12.0	9.43	15.1	19.3
pH	6.77	7.10	7.19	7.10	7.99	8.43	8.27	7.94	8.20	7.80	7.50	7.37	7.77
Particle Size													
% Gravel (>2mm)	44.0	31.0	54.0	7.0	<1.0	<1.0	2.0	1.0	<1.0	40.0	52.0	17.0	4.0
% Sand (2.0mm - 0.063mm)	49.0	63.0	44.0	81.0	90.0	94.0	84.0	89.0	87.0	57.0	44.0	77.0	91.0
% Silt (0.063mm - 4um)	5.0	5.0	1.0	10.0	8.0	5.0	12.0	8.0	12.0	2.0	3.0	4.0	4.0
% Clay (<4um)	1.0	1.0	<1.0	2.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	2.0	1.0
Leachable Anions & Nutrients													
Total Nitrogen by LECO	0.114	0.160	0.147	0.165	0.055	0.045	0.056	0.050	0.026	0.114	0.092	0.090	0.086
Available Phosphate-P	4.0	2.0	2.5	2.1	<2.0								
Phosphorus, Total	844	1020	1230	1060	1040	1320	1310	1330	1150	927	715	716	917
Cyanides													
Cyanide, Total	<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
Organic / Inorganic Carbon													
$CaCO_3$ Equivalent	<0.70	<0.70	<0.70	0.73	1.41	8.46	7.32	7.06	1.57	<0.70	<0.70	<0.70	1.42
Inorganic Carbon	<0.090	<0.090	<0.090	<0.090	0.135	0.988	0.847	0.815	0.159	<0.090	<0.090	<0.090	0.144
Total Carbon by Combustion	1.1	1.5	1.4	1.8	0.6	1.3	1.3	1.2	0.2	0.6	0.6	0.5	0.6
Total Organic Carbon	1.12	1.43	1.39	1.71	0.48	0.30	0.44	0.41	<0.10	0.49	0.54	0.49	0.50
Metals													
Aluminum (Al)	23300	16600	19100	16700	14700	14800	15800	14900	11500	18400	11000	20200	23700
Antimony (Sb)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arsenic (As)	13.0	69.9	76.8	64.6	54.2	117	88.2	82.4	8.8	11.5	6.1	7.8	15.0
Barium (Ba)	323	266	337	242	110	122	190	146	154	200	117	196	349
Beryllium (Be)	0.71	1.04	1.20	1.12	<0.50	0.52	0.56	<0.50	<0.50	<0.50	<0.50	0.54	0.75
Bismuth (Bi)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium (Cd)	2.09	20.7	25.4	21.5	1.74	0.69	0.56	0.69	<0.50	<0.50	<0.50	<0.50	<0.50
Calcium (Ca)	4880	4190	5110	4060	11700	40000	37200	36000	15700	4860	1680	2720	7070
Chromium (Cr)	93.0	44.7	75.7	34.2	30.5	36.6	40.2	36.8	40.4	78.6	46.6	81.7	108
Cobalt (Co)	65.3	27.2	32.0	25.2	17.9	20.3	18.6	17.6	16.7	18.2	11.4	16.3	33.7
Copper (Cu)	50.6	119	134	115	61.4	102	95.5	88.8	67.3	48.1	28.6	45.3	76.5
Iron (Fe)	38800	62600	70600	62400	44800	45900	42400	41100	42700	31000	18200	31700	53000
Lead (Pb)	<30	<30	<30	<30	<30	35	36	34	31	<30	<30	<30	<30
Lithium (Li)	36.4	21.5	22.8	22.9	26.9	14.5	16.2	15.1	6.1	29.8	17.6	32.8	28.5
Magnesium (Mg)	12400	7120	7590	7220	10800	13800	14200	13800	8710	13300	7580	14200	16600
Manganese (Mn)	19600	1300	1520	1200	867	848	846	805	424	879	569	750	1270
Mercury (Hg)	0.179	0.259	0.250	0.245	0.270	0.244	0.496	0.401	<0.0050	0.0973	0.0598	0.0920	0.162
Molybdenum (Mo)	5.3	15.0	20.3	13.3	<4.0	<4.0	<4.0	<4.0	4.9	<4.0	<4.0	<4.0	<4.0
Nickel (Ni)	205	131	157	124	51.6	43.1	45.4	41.7	26.5	97.4	59.6	101	152
Phosphorus (P)	1310	1240	1400	1230	1270	2160	2140	2060	1870	940	521	912	1400
Potassium (K)	1750	1350	1500	1480	730	1180	1290	1070	1260	2350	1470	2370	1430
Selenium (Se)	<2.0	18.2	15.1	19.1	2.57	4.67	3.51	3.17	<2.0	<2.0	<2.0	<3.0	<2.0
Silver (Ag)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Sodium (Na)	<200	<200	<200	<200	<200	330	350	340	360	<200	<200	<200	220
Strontium (Sr)	61.7	50.2	58.9	48.9	57.8	152	145	138	69.3	36.2	18.1	29.2	73.4
Sulfur (S)-Total	250	2330	2840	2230	3200	4300	4330	4190	1120	680	520	480	340
Thallium (Tl)	<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
Tin (Sn)	<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
Titanium (Ti)	160	56.4	58.9	40.1	670	1050	1040	983	1270	160	45.1	57.5	1660
Total Sulphur	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	50.9	48.1	55.2	50.2	45.6	105	102	98.8	103	57.4	32.2	55.4	65.1
Zinc (Zn)	185	1260	1460	1330	184	123	127	120	51.0	98.3	60.3	101	132

Appendix 5.1-1. Sediment Quality Data for Streams in the KSM Project Area, August 2009

Sample ID	UNK2-2	UNK2-3	TEC1-1	TEC1-2	TEC1-3	SNO1-1	SNO1-2	SNO1-3	SNO2-1	SNO2-2	SNO2-3	TRC2-1	TRC2-2
Date Sampled	24-AUG-09	24-AUG-09	23-AUG-09	23-AUG-09	23-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09
ALS Sample ID	L810729-9	L810729-10	L810729-11	L810729-12	L810729-13	L810729-14	L810729-15	L810729-16	L810729-17	L810729-18	L810729-19	L810729-20	L810729-21
Physical Tests													
% Moisture	15.1	10.5	34.3	23.8	14.8	13.8	13.6	16.7	26.5	22.2	19.9	19.4	16.8
pH	7.80	7.93	7.20	7.36	7.32	7.53	7.62	7.75	7.23	7.06	7.32	8.18	8.20
Particle Size													
% Gravel (>2mm)	8.0	19.0	<1.0	10.0	9.0	12.0	6.0	3.0	<1.0	1.0	<1.0	2.0	2.0
% Sand (2.0mm - 0.063mm)	87.0	77.0	81.0	84.0	85.0	79.0	83.0	86.0	81.0	87.0	95.0	90.0	87.0
% Silt (0.063mm - 4um)	4.0	4.0	16.0	5.0	5.0	7.0	9.0	8.0	16.0	10.0	4.0	6.0	10.0
% Clay (<4um)	1.0	1.0	3.0	2.0	1.0	2.0	2.0	2.0	3.0	2.0	1.0	2.0	1.0
Leachable Anions & Nutrients													
Total Nitrogen by LECO	0.085	0.083	0.111	0.078	0.078	0.079	0.089	0.082	0.092	0.091	0.092	0.074	0.112
Available Phosphate-P													
Phosphorus, Total	817	835	712	764	826	773	705	793	782	761	842	999	995
Cyanides													
Cyanide, Total	<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
Organic / Inorganic Carbon													
$CaCO_3$ Equivalent	1.23	1.22	<0.70	<0.70	0.71	0.77	0.99	0.78	<0.70	0.77	<0.70	3.27	2.86
Inorganic Carbon	0.125	0.125	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	0.360	0.318
Total Carbon by Combustion	0.6	0.6	0.9	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.8	0.8
Total Organic Carbon	0.49	0.45	0.89	0.44	0.39	0.33	0.35	0.31	0.48	0.48	0.45	0.47	0.46
Metals													
Aluminum (Al)	25600	24800	23000	23600	23400	16300	16700	17200	19600	19700	20800	15100	14400
Antimony (Sb)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arsenic (As)	17.4	14.9	9.6	8.7	9.2	12.8	13.4	14.0	13.2	12.0	11.2	50.5	55.0
Barium (Ba)	443	392	160	165	164	137	134	140	139	134	142	140	102
Beryllium (Be)	0.85	0.75	0.55	0.56	0.56	<0.50	<0.50	<0.50	<0.50	<0.50	0.52	<0.50	<0.50
Bismuth (Bi)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium (Cd)	0.64	0.58	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.68	1.70
Calcium (Ca)	8110	7790	7530	8030	7730	4360	4480	4810	5100	4900	5080	17700	17800
Chromium (Cr)	116	117	92.2	92.7	93.4	70.2	71.2	73.9	85.6	86.1	91.8	28.0	26.4
Cobalt (Co)	34.3	33.7	17.9	19.3	19.4	22.9	24.7	23.7	18.2	17.2	19.1	16.4	16.9
Copper (Cu)	79.9	75.7	41.2	42.3	42.7	55.1	59.1	56.5	47.8	45.5	50.0	70.4	74.1
Iron (Fe)	60200	54300	33900	35000	34900	38900	40100	39900	35900	35700	37800	44900	46200
Lead (Pb)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Lithium (Li)	26.0	29.1	29.2	29.6	29.8	28.8	29.2	29.5	31.3	31.8	33.4	23.4	22.8
Magnesium (Mg)	16500	18100	15300	15700	15500	12300	12500	13000	14700	14600	14900	11100	10800
Manganese (Mn)	1310	1260	776	847	831	1540	1600	1500	842	786	919	817	801
Mercury (Hg)	0.178	0.150	0.0897	0.0896	0.0854	0.131	0.140	0.145	0.100	0.0966	0.0999	0.213	0.238
Molybdenum (Mo)	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel (Ni)	141	155	105	109	108	117	122	121	110	108	112	47.1	46.8
Phosphorus (P)	1700	1390	994	1030	1010	956	961	979	1120	1090	1080	1230	1310
Potassium (K)	1450	1690	1630	1650	1580	1160	1130	1210	1440	1400	1470	950	820
Selenium (Se)	<2.0	<2.0	<2.0	<2.0	<2.0	<3.0	<2.0	<2.0	<3.0	0.75	<3.0	<3.0	2.33
Silver (Ag)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Sodium (Na)	290	280	280	300	270	<200	<200	<200	330	220	220	210	<200
Strontium (Sr)	93.1	79.8	34.1	36.1	35.2	25.8	26.7	27.6	31.0	28.3	33.5	74.1	73.1
Sulfur (S)-Total	300	310	580	540	550	750	710	920	820	650	550	8420	5450
Thallium (Tl)	<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
Tin (Sn)	<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
Titanium (Ti)	3220	1980	1090	1180	1110	393	385	437	580	573	555	963	857
Total Sulphur	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	71.1	68.4	61.3	64.0	62.5	45.4	45.8	46.8	53.8	53.6	56.1	50.8	49.0
Zinc (Zn)	122	126	99.4	104	102	133	137	131	110	106	113	167	175

Appendix 5.1-1. Sediment Quality Data for Streams in the KSM Project Area, August 2009

Sample ID	TRC2-3	NTR1-1	NTR1-2	NTR1-3	NTR2-1	NTR2-2	NTR2-3	MC1-1	MC1-2	MC1-3	MCTR-1	MCTR-2	MCTR-3
Date Sampled	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	22-AUG-09	22-AUG-09	22-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09
ALS Sample ID	L810729-22	L810729-23	L810729-24	L810729-25	L810729-26	L810729-27	L810729-28	L810729-29	L810729-30	L810729-31	L810729-32	L810729-33	L810729-34
Physical Tests													
% Moisture	16.8	50.4	74.0	14.9	8.57	8.67	11.3	17.3	14.5	18.6	18.4	16.2	15.7
pH	8.40	6.47	6.06	6.69	7.20	7.31	7.29	7.80	8.00	8.10	8.13	8.34	8.34
Particle Size													
% Gravel (>2mm)	3.0	36.0	2.0	58.0	33.0	37.0	21.0	<1.0	6.0	<1.0	6.0	1.0	1.0
% Sand (2.0mm - 0.063mm)	92.0	42.0	50.0	32.0	63.0	58.0	74.0	94.0	78.0	80.0	78.0	89.0	90.0
% Silt (0.063mm - 4um)	4.0	17.0	36.0	10.0	3.0	4.0	4.0	6.0	14.0	18.0	13.0	9.0	8.0
% Clay (<4um)	1.0	5.0	12.0	<1.0	1.0	1.0	1.0	<1.0	1.0	2.0	3.0	1.0	1.0
Leachable Anions & Nutrients													
Total Nitrogen by LECO	0.073	0.151	0.447	0.125	0.109	0.117	0.111	0.033	<0.020	0.024	0.058	0.043	0.041
Available Phosphate-P													
Phosphorus, Total	1040	843	1320	1120	804	791	783	1040	900	1380	1590	1420	1360
Cyanides													
Cyanide, Total	<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
Organic / Inorganic Carbon													
$CaCO_3$ Equivalent	2.83	0.76	0.88	0.97	0.86	<0.70	0.99	1.68	1.72	2.05	5.63	6.08	6.74
Inorganic Carbon	0.308	<0.090	<0.090	<0.090	<0.090	<0.090	0.090	0.172	0.179	0.218	0.649	0.703	0.781
Total Carbon by Combustion	0.8	1.5	6.4	1.0	0.6	0.7	0.7	0.3	0.2	0.2	1.1	1.1	1.1
Total Organic Carbon	0.48	1.46	6.34	0.92	0.55	0.65	0.58	0.13	<0.10	<0.10	0.45	0.39	0.32
Metals													
Aluminum (Al)	15000	22600	17500	22100	22700	22600	21800	9430	13300	12200	16700	16800	17400
Antimony (Sb)	<10	<10	<10	<10	<10	<10	<10	27	13	16	<10	<10	<10
Arsenic (As)	51.0	6.7	12.2	26.1	11.7	12.1	12.3	179	73.1	98.5	27.1	23.3	23.9
Barium (Ba)	126	187	232	254	288	269	274	44.9	142	89.8	151	114	123
Beryllium (Be)	<0.50	0.61	<0.50	0.58	0.63	0.65	0.61	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bismuth (Bi)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium (Cd)	1.68	<0.50	1.62	0.93	<0.50	0.60	0.62	3.59	2.16	2.57	1.89	1.10	1.13
Calcium (Ca)	18000	2950	7130	5430	3090	3200	3290	11600	15100	14900	35200	40200	39600
Chromium (Cr)	27.7	91.7	66.2	77.7	82.4	83.5	80.5	2.9	3.8	3.0	20.2	20.3	20.1
Cobalt (Co)	16.9	18.2	15.4	14.5	19.1	19.4	19.7	36.5	14.9	19.7	18.5	17.9	18.4
Copper (Cu)	71.9	59.7	38.9	40.6	58.3	60.3	60.6	464	350	342	136	122	125
Iron (Fe)	46300	31000	46600	72000	37200	37800	38000	119000	49400	64700	46500	43500	44500
Lead (Pb)	<30	<30	<30	<30	<30	<30	<30	100	44	56	<30	<30	<30
Lithium (Li)	23.7	38.7	24.3	32.9	38.3	38.0	37.2	13.1	17.7	16.3	13.1	12.8	13.3
Magnesium (Mg)	11100	14500	8600	12000	15300	15200	14800	4800	6520	6060	13100	14000	14400
Manganese (Mn)	839	257	739	790	903	925	917	577	783	725	890	838	864
Mercury (Hg)	0.266	0.0995	0.157	0.112	0.101	0.106	0.110	0.673	0.282	0.383	0.159	0.0955	0.0943
Molybdenum (Mo)	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	35.8	33.0	32.7	6.1	4.3	<4.0
Nickel (Ni)	48.1	114	72.9	84.8	112	113	110	7.4	<5.0	<5.0	42.9	30.4	29.8
Phosphorus (P)	1250	951	2100	2390	983	990	1010	2190	2170	2240	2420	2340	2470
Potassium (K)	850	2330	2100	2770	2870	2640	2330	710	1110	1010	1340	1190	1310
Selenium (Se)	<3.0	1.09	9.87	3.81	<3.0	<3.0	<2.0	24.0	4.42	7.7	6.10	<6.0	<6.0
Silver (Ag)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.6	<2.0	<2.0	<2.0	<2.0	<2.0
Sodium (Na)	<200	<200	<200	<200	220	210	<200	<200	<200	<200	300	<200	210
Strontium (Sr)	75.2	34.1	89.1	67.4	35.9	36.6	35.9	35.2	54.1	50.4	139	161	162
Sulfur (S)-Total	5210	950	1790	340	630	500	620	-	-	-	4010	2960	3340
Thallium (Tl)	<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
Tin (Sn)	<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
Titanium (Ti)	928	58.6	64.8	53.7	77.3	62.4	60.1	1100	1200	1260	1320	1540	1610
Total Sulphur	-	-	-	-	-	-	-	4.35	5.85	3.38	-	-	-
Vanadium (V)	50.1	59.2	51.1	64.8	63.5	62.1	60.3	43.9	47.9	48.5	120	124	133
Zinc (Zn)	169	123	103	105	120	124	122	223	191	200	151	95.9	101

Appendix 5.1-1. Sediment Quality Data for Streams in the KSM Project Area, August 2009

Sample ID	SC1-1	SC1-2	SC1-3	SC2-1	SC2-2	SC2-3	SC3-1	SC3-2	SC3-3	SCT-1	SCT-2	SCT-3	SCR-1
Date Sampled	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	23-AUG-09
ALS Sample ID	L810729-35	L810729-36	L810729-37	L810729-38	L810729-39	L810729-40	L810729-41	L810729-42	L810729-43	L810729-44	L810729-45	L810729-46	L810729-47
Physical Tests													
% Moisture	9.62	23.6	25.2	17.2	9.44	9.46	15.7	16.2	17.1	10.5	11.4	15.3	13.3
pH	8.30	8.09	8.14	8.29	8.07	8.10	8.31	8.24	8.31	8.24	8.22	8.27	8.45
Particle Size													
% Gravel (>2mm)	24.0	32.0	7.0	<1.0	34.0	42.0	<1.0	3.0	1.0	23.0	6.0	6.0	1.0
% Sand (2.0mm - 0.063mm)	72.0	39.0	63.0	96.0	60.0	51.0	85.0	71.0	91.0	69.0	86.0	85.0	57.0
% Silt (0.063mm - 4um)	3.0	23.0	23.0	3.0	4.0	5.0	13.0	23.0	8.0	6.0	6.0	8.0	39.0
% Clay (<4um)	1.0	6.0	7.0	<1.0	1.0	2.0	2.0	3.0	1.0	1.0	1.0	1.0	4.0
Leachable Anions & Nutrients													
Total Nitrogen by LECO	0.036	0.061	0.059	0.030	0.049	0.032	0.029	0.030	0.028	0.029	0.026	0.025	0.040
Available Phosphate-P													
Phosphorus, Total	1330	1750	1630	895	1170	773	1260	1230	980	1080	927	1040	1410
Cyanides													
Cyanide, Total	<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
Organic / Inorganic Carbon													
$CaCO_3$ Equivalent	5.59	1.89	1.76	2.62	2.71	2.00	3.43	3.53	3.10	3.30	2.79	2.43	5.51
Inorganic Carbon	0.641	0.187	0.185	0.285	0.296	0.215	0.386	0.397	0.346	0.367	0.303	0.260	0.631
Total Carbon by Combustion	0.9	0.6	0.6	0.5	0.6	0.4	0.5	0.6	0.5	0.6	0.4	0.4	0.8
Total Organic Carbon	0.29	0.43	0.42	0.20	0.26	0.21	0.16	0.17	0.16	0.18	0.14	0.18	0.21
Metals													
Aluminum (Al)	19300	20100	21900	12100	22600	20000	14400	15400	14000	14800	11400	11900	14600
Antimony (Sb)	18	16	17	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arsenic (As)	237	151	174	236	109	89.3	67.5	56.3	81.2	90.5	151	106	38.6
Barium (Ba)	422	447	473	119	430	378	251	294	176	271	197	208	220
Beryllium (Be)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bismuth (Bi)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium (Cd)	3.73	1.90	2.14	2.19	2.65	2.72	2.04	1.73	2.05	1.91	1.96	1.75	0.78
Calcium (Ca)	20500	11200	11400	16900	16700	14100	23100	22400	22400	20900	18000	17900	36600
Chromium (Cr)	53.9	18.4	18.5	17.8	28.0	25.4	16.7	18.3	16.9	19.6	17.1	15.4	14.5
Cobalt (Co)	40.1	26.8	27.6	44.0	29.0	25.6	21.5	19.5	24.3	24.2	27.0	23.6	14.2
Copper (Cu)	428	271	285	340	321	298	224	209	229	144	156	142	30.0
Iron (Fe)	69700	54900	56400	106000	72900	63300	52400	47900	58800	50600	59100	52600	38400
Lead (Pb)	100	55	64	65	35	31	<30	<30	<30	<30	<30	<30	<30
Lithium (Li)	22.2	21.1	22.1	8.2	13.8	14.5	11.0	11.3	10.6	7.7	5.8	6.1	16.9
Magnesium (Mg)	14500	12600	13200	8370	15800	13500	9810	10500	9800	9780	7350	7650	9240
Manganese (Mn)	4860	2270	2580	692	1270	1100	729	773	721	729	577	588	1280
Mercury (Hg)	0.461	0.335	0.352	0.388	0.186	0.180	0.167	0.170	0.173	0.0547	0.0602	0.0499	0.0878
Molybdenum (Mo)	7.3	<4.0	<4.0	17.0	10.2	9.5	14.9	12.9	13.6	<4.0	<4.0	<4.0	<4.0
Nickel (Ni)	59.2	21.7	22.8	32.7	38.4	29.5	20.1	20.0	21.6	24.3	24.2	22.0	16.0
Phosphorus (P)	1980	2440	2210	2480	2110	2120	2170	2000	2140	1880	1950	1850	1870
Potassium (K)	2740	3000	3880	1840	3370	2630	1840	1970	1760	3100	2500	2690	1570
Selenium (Se)	3.75	<4.0	<3.0	19.1	8.41	<11	<8.0	<6.0	<8.0	<5.0	<8.0	<7.0	<2.0
Silver (Ag)	2.6	<2.0	<2.0	3.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Sodium (Na)	290	370	620	240	490	330	260	280	250	360	310	330	<200
Strontium (Sr)	117	62.7	64.1	71.8	86.9	79.3	103	101	97.8	96.7	79.9	81.4	147
Sulfur (S)-Total	3580	4190	3720	-	5440	-	-	-	-	6310	7670	8280	2200
Thallium (Tl)	<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
Tin (Sn)	<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
Titanium (Ti)	789	855	826	1240	1700	1630	1450	1410	1420	1100	989	1010	271
Total Sulphur	-	-	-	1.92	-	3.66	1.16	2.19	1.87	-	-	-	-
Vanadium (V)	84.1	82.7	84.9	119	125	110	85.2	87.9	87.8	83.5	92.3	86.7	41.3
Zinc (Zn)	334	218	230	201	227	204	159	147	159	159	156	151	90.5

Appendix 5.1-1. Sediment Quality Data for Streams in the KSM Project Area, August 2009

Sample ID	SCR-2	SCR-3	QAQC-4	QAQC-5	QAQC-6	QAQC-7	QAAC-2	QAAC-3	SUNR-2	SUNR-3
Date Sampled	23-AUG-09	23-AUG-09	20-AUG-09	22-AUG-09	22-AUG-09	22-AUG-09	21-AUG-09	18-AUG-09	22-AUG-09	22-AUG-09
ALS Sample ID	L810729-48	L810729-49	L810729-50	L810729-51	L810729-52	L810729-53	L810729-54	L810729-55	L810729-56	L810729-57
Physical Tests										
% Moisture	10.1	12.4	16.5	20.2	18.9	18.0	17.1	18.3	15.4	16.7
pH	8.39	8.21	7.75	8.39	8.21	8.01	8.33	8.10	8.34	8.49
Particle Size										
% Gravel (>2mm)	4.0	3.0	11.0	<1.0	3.0	4.0	<1.0	<1.0	11.0	10.0
% Sand (2.0mm - 0.063mm)	79.0	67.0	80.0	87.0	89.0	91.0	84.0	93.0	84.0	80.0
% Silt (0.063mm - 4um)	15.0	27.0	7.0	12.0	7.0	4.0	15.0	6.0	5.0	9.0
% Clay (<4um)	2.0	3.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0	<1.0
Leachable Anions & Nutrients										
Total Nitrogen by LECO	0.051	0.041	0.075	0.021	0.051	0.076	0.033	0.025	<0.020	<0.020
Available Phosphate-P										
Phosphorus, Total	1200	1160	641	1010	922	803	1180	817	1100	1150
Cyanides										
Cyanide, Total	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Organic / Inorganic Carbon										
$CaCO_3$ Equivalent	5.77	5.16	1.01	1.73	2.72	1.48	3.42	1.73	1.45	1.31
Inorganic Carbon	0.662	0.590	0.094	0.179	0.299	0.145	0.375	0.181	0.150	0.133
Total Carbon by Combustion	1.0	0.9	0.3	0.2	0.7	0.6	0.6	0.2	0.2	0.2
Total Organic Carbon	0.29	0.29	0.25	<0.10	0.43	0.49	0.22	<0.10	<0.10	<0.10
Metals										
Aluminum (Al)	14500	14500	16100	12300	14700	24700	14100	10400	12200	9810
Antimony (Sb)	<10	<10	<10	<10	<10	<10	<10	25	<10	<10
Arsenic (As)	41.4	38.2	14.8	10.0	44.4	15.6	71.6	167	18.4	11.4
Barium (Ba)	211	218	126	163	238	359	217	89.8	164	148
Beryllium (Be)	<0.50	<0.50	<0.50	<0.50	<0.50	0.73	<0.50	<0.50	<0.50	<0.50
Bismuth (Bi)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium (Cd)	0.87	1.00	0.60	0.66	1.65	1.01	1.96	2.81	0.78	0.74
Calcium (Ca)	37200	33200	4120	15900	16700	7260	22900	11800	13600	14200
Chromium (Cr)	13.8	14.4	71.3	45.7	27.3	112	17.7	3.5	53.7	47.8
Cobalt (Co)	14.4	14.3	24.5	17.4	15.5	33.7	22.0	36.1	22.0	19.4
Copper (Cu)	31.3	30.6	58.0	74.6	63.6	78.2	219	462	91.6	68.9
Iron (Fe)	38500	39000	40500	46600	42500	54600	53400	118000	70900	68800
Lead (Pb)	<30	<30	<30	34	<30	<30	<30	86	45	44
Lithium (Li)	16.9	17.5	30.8	6.6	24.0	29.5	10.6	13.7	6.5	5.2
Magnesium (Mg)	9240	9160	12600	8940	11000	16700	9750	5220	8800	7070
Manganese (Mn)	1430	1230	1510	440	755	1250	725	598	485	369
Mercury (Hg)	0.0948	0.0855	0.135	<0.0050	0.205	0.173	0.150	0.679	0.0079	0.0062
Molybdenum (Mo)	<4.0	<4.0	<4.0	5.4	<4.0	<4.0	12.4	37.1	5.3	5.0
Nickel (Ni)	16.3	16.8	118	25.6	43.5	146	20.3	8.3	28.0	23.4
Phosphorus (P)	1810	1860	974	1790	1160	1420	2160	2210	2100	2090
Potassium (K)	1530	1480	1000	1360	910	1620	1750	920	1230	990
Selenium (Se)	<2.0	<2.0	<2.0	<2.0	<3.0	<2.0	<8.0	22.5	<2.0	<2.0
Silver (Ag)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.2	<2.0	<2.0
Sodium (Na)	<200	<200	<200	380	<200	220	250	<200	360	310
Strontium (Sr)	149	135	26.3	73.4	77.6	78.2	99.8	45.2	70.2	65.2
Sulfur (S)-Total	1890	1640	690	960	5770	370	-	-	1980	1450
Thallium (Tl)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tin (Sn)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Titanium (Ti)	256	303	359	1650	1060	1830	1400	1480	1510	1470
Total Sulphur	-	-	-	-	-	-	1.17	4.49	-	-
Vanadium (V)	38.9	41.1	41.6	118	49.9	65.3	85.4	56.1	172	171
Zinc (Zn)	93.3	99.2	132	51.6	151	129	156	226	54.0	43.3

Appendix 5.1-2

Detection Limits of Sediment Quality Data for Streams of the KSM Project Area, August 2009

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Appendix 5.1-2. Detection Limits of Sediment Quality Data for Streams of the KSM Project Area, August 2009

Sample ID	UR1A-1	UR1A-2	UR1A-3	UR1-1	UR1-2	UR1-3	UR2-1	UR2-2	UR2-3	EUR2-1	EUR2-2	EUR2-3	TRC3-1	TRC3-2	TRC3-3
Date Sampled	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	16-Aug-09	16-Aug-09	16-Aug-09	18-AUG-09	18-AUG-09	18-AUG-09
ALS Sample ID	L806369-1	L806369-2	L806369-3	L806369-4	L806369-5	L806369-6	L806369-7	L806369-8	L806369-9	L807781-13	L807781-14	L807781-15	L809328-6	L809328-7	L809328-8
Physical Tests															
% Moisture	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
pH	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
Particle Size															
% Gravel (>2mm)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Leachable Anions & Nutrients															
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Available Phosphate-P	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Phosphorus, Total	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Cyanides															
Cyanide, Total	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Organic / Inorganic Carbon															
$CaCO_3$ Equivalent	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Inorganic Carbon	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Total Carbon by Combustion	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
Total Organic Carbon	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
Metals															
Aluminum (Al)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Arsenic (As)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Barium (Ba)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Beryllium (Be)	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
Bismuth (Bi)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Cadmium (Cd)	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
Calcium (Ca)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Copper (Cu)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Iron (Fe)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Lead (Pb)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Lithium (Li)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mercury (Hg)	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
Molybdenum (Mo)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Potassium (K)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Selenium (Se)	0.5	3	0.5	0.5	0.5	0.5	0.5	0.5	3	2	0.5	3	3	3	0.1
Silver (Ag)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sodium (Na)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Strontium (Sr)	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
Sulfur (S)-Total	100	100	100	-	100	100	100	100	100	100	100	100	100	100	100
Thallium (Tl)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tin (Sn)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Sulphur	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Appendix 5.1-2. Detection Limits of Sediment Quality Data for Streams of the KSM Project Area, August 2009

Sample ID	TEC2-1	TEC2-2	TEC2-3	TRC1-1	TRC1-2	TRC1-3	STE1-1	STE1-2	STE1-3	UNK1-1	UNK1-2	UNK1-3	CC1-1	CC1-2	CC1-3
Date Sampled	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09
ALS Sample ID	L809328-9	L809328-10	L809328-11	L809328-12	L809328-13	L809328-14	L809328-15	L809328-16	L809328-17	L809328-18	L809328-19	L809328-20	L809328-21	L809328-22	L809328-23
Physical Tests															
% Moisture	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
pH	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
Particle Size															
% Gravel (>2mm)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Leachable Anions & Nutrients															
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Available Phosphate-P	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Phosphorus, Total	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Cyanides															
Cyanide, Total	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Organic / Inorganic Carbon															
$CaCO_3$ Equivalent	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Inorganic Carbon	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Total Carbon by Combustion	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
Total Organic Carbon	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
Metals															
Aluminum (Al)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Arsenic (As)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Barium (Ba)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Beryllium (Be)	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
Bismuth (Bi)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Cadmium (Cd)	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
Calcium (Ca)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Copper (Cu)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Iron (Fe)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Lead (Pb)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Lithium (Li)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mercury (Hg)	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
Molybdenum (Mo)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Potassium (K)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Selenium (Se)	2	2	2	0.1	0.1	0.1	2	2	2	0.1	2	2	1	1	1
Silver (Ag)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sodium (Na)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Strontium (Sr)	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
Sulfur (S)-Total	100	100	100	-	-	-	100	100	100	100	100	100	100	100	100
Thallium (Tl)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tin (Sn)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Sulphur	-	-	-	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-
Vanadium (V)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Appendix 5.1-2. Detection Limits of Sediment Quality Data for Streams of the KSM Project Area, 2009

Sample ID	QAQC 1	ECM8-1	ECM8-2	ECM8-3	SUNR-1	STE2-1	STE2-2	STE2-3	UNK2-1	UNK2-2	UNK2-3	TEC1-1	TEC1-2	TEC1-3	SNO1-1
Date Sampled	18-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	22-AUG-09	23-AUG-09	23-AUG-09	23-AUG-09	24-AUG-09	24-AUG-09	24-AUG-09	23-AUG-09	23-AUG-09	23-AUG-09	20-AUG-09
ALS Sample ID	L809328-26	L810729-1	L810729-2	L810729-3	L810729-4	L810729-5	L810729-6	L810729-7	L810729-8	L810729-9	L810729-10	L810729-11	L810729-12	L810729-13	L810729-14
Physical Tests															
% Moisture	0.1	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
pH	0.1	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
Particle Size															
% Gravel (>2mm)	1	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
% Sand (2.0mm - 0.063mm)	1	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
% Silt (0.063mm - 4um)	1	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
% Clay (<4um)	1	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
Leachable Anions & Nutrients															
Total Nitrogen by LECO	0.02	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
Available Phosphate-P	2														
Phosphorus, Total	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Cyanides															
Cyanide, Total	3	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
Organic / Inorganic Carbon															
$CaCO_3$ Equivalent	0.7	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Inorganic Carbon	0.09	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Total Carbon by Combustion	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
Total Organic Carbon	0.1	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
Metals															
Aluminum (Al)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Arsenic (As)	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
Barium (Ba)	1	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
Beryllium (Be)	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
Bismuth (Bi)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Cadmium (Cd)	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
Calcium (Ca)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Chromium (Cr)	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
Cobalt (Co)	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
Copper (Cu)	1	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
Iron (Fe)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Lead (Pb)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Lithium (Li)	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
Magnesium (Mg)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Manganese (Mn)	1	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
Mercury (Hg)	0.005	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Molybdenum (Mo)	4	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Nickel (Ni)	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
Phosphorus (P)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Potassium (K)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Selenium (Se)	0.1	0.10	0.10	0.10	2.0	2.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0
Silver (Ag)	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
Sodium (Na)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Strontium (Sr)	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
Sulfur (S)-Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Thallium (Tl)	1	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
Tin (Sn)	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
Titanium (Ti)	1	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
Total Sulphur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	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
Zinc (Zn)	1	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

Appendix 5.1-2. Detection Limits of Sediment Quality Data for Streams of the KSM Project Area, August 2009

Sample ID	SNO1-2	SNO1-3	SNO2-1	SNO2-2	SNO2-3	TRC2-1	TRC2-2	TRC2-3	NTR1-1	NTR1-2	NTR1-3	NTR2-1	NTR2-2	NTR2-3	MC1-1
Date Sampled	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	22-AUG-09	22-AUG-09	22-AUG-09	20-AUG-09
ALS Sample ID	L810729-15	L810729-16	L810729-17	L810729-18	L810729-19	L810729-20	L810729-21	L810729-22	L810729-23	L810729-24	L810729-25	L810729-26	L810729-27	L810729-28	L810729-29
Physical Tests															
% Moisture	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
pH	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
Particle Size															
% Gravel (>2mm)	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
% Sand (2.0mm - 0.063mm)	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
% Silt (0.063mm - 4um)	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
% Clay (<4um)	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
Leachable Anions & Nutrients															
Total Nitrogen by LECO	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
Available Phosphate-P															
Phosphorus, Total	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Cyanides															
Cyanide, Total	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
Organic / Inorganic Carbon															
$CaCO_3$ Equivalent	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Inorganic Carbon	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Total Carbon by Combustion	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
Total Organic Carbon	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
Metals															
Aluminum (Al)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Arsenic (As)	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
Barium (Ba)	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
Beryllium (Be)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Bismuth (Bi)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Cadmium (Cd)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Calcium (Ca)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Chromium (Cr)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Cobalt (Co)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Copper (Cu)	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
Iron (Fe)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Lead (Pb)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Lithium (Li)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Magnesium (Mg)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Manganese (Mn)	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
Mercury (Hg)	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Molybdenum (Mo)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Nickel (Ni)	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
Phosphorus (P)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Potassium (K)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Selenium (Se)	2.0	2.0	3.0	0.10	3.0	3.0	0.10	3.0	0.10	0.50	0.10	3.0	3.0	2.0	2.0
Silver (Ag)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Sodium (Na)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Strontium (Sr)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Sulfur (S)-Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	-
Thallium (Tl)	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
Tin (Sn)	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
Titanium (Ti)	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
Total Sulphur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10
Vanadium (V)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Zinc (Zn)	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

Appendix 5.1-2. Detection Limits of Sediment Quality Data for Streams of the KSM Project Area, August 2009

Sample ID	MC1-2	MC1-3	MCTR-1	MCTR-2	MCTR-3	SC1-1	SC1-2	SC1-3	SC2-1	SC2-2	SC2-3	SC3-1	SC3-2	SC3-3	SCT-1
Date Sampled	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09
ALS Sample ID	L810729-30	L810729-31	L810729-32	L810729-33	L810729-34	L810729-35	L810729-36	L810729-37	L810729-38	L810729-39	L810729-40	L810729-41	L810729-42	L810729-43	L810729-44
Physical Tests															
% Moisture	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
pH	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
Particle Size															
% Gravel (>2mm)	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
% Sand (2.0mm - 0.063mm)	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
% Silt (0.063mm - 4um)	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
% Clay (<4um)	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
Leachable Anions & Nutrients															
Total Nitrogen by LECO	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
Available Phosphate-P															
Phosphorus, Total	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Cyanides															
Cyanide, Total	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
Organic / Inorganic Carbon															
$CaCO_3$ Equivalent	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Inorganic Carbon	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Total Carbon by Combustion	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
Total Organic Carbon	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
Metals															
Aluminum (Al)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Arsenic (As)	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
Barium (Ba)	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
Beryllium (Be)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Bismuth (Bi)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Cadmium (Cd)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Calcium (Ca)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Chromium (Cr)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Cobalt (Co)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Copper (Cu)	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
Iron (Fe)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Lead (Pb)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Lithium (Li)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Magnesium (Mg)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Manganese (Mn)	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
Mercury (Hg)	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Molybdenum (Mo)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Nickel (Ni)	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
Phosphorus (P)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Potassium (K)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Selenium (Se)	0.10	1.0	0.50	6.0	6.0	0.50	4.0	3.0	2.0	0.50	11	8.0	6.0	8.0	5.0
Silver (Ag)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Sodium (Na)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Strontium (Sr)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Sulfur (S)-Total	-	-	100	100	100	100	100	100	-	100	-	-	-	-	100
Thallium (Tl)	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
Tin (Sn)	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
Titanium (Ti)	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
Total Sulphur	0.10	0.10	-	-	-	-	-	-	0.10	-	0.10	0.10	0.10	0.10	-
Vanadium (V)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Zinc (Zn)	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

Appendix 5.1-2. Detection Limits of Sediment Quality Data for Streams of the KSM Project Area, August 2009

Sample ID	SCT-2	SCT-3	SCR-1	SCR-2	SCR-3	QAQC-4	QAQC-5	QAQC-6	QAQC-7	QAAC-2	QAAC-3	SUNR-2	SUNR-3
Date Sampled	21-AUG-09	21-AUG-09	23-AUG-09	23-AUG-09	23-AUG-09	20-AUG-09	22-AUG-09	22-AUG-09	22-AUG-09	21-AUG-09	18-AUG-09	22-AUG-09	22-AUG-09
ALS Sample ID	L810729-45	L810729-46	L810729-47	L810729-48	L810729-49	L810729-50	L810729-51	L810729-52	L810729-53	L810729-54	L810729-55	L810729-56	L810729-57
Physical Tests													
% Moisture	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
pH	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
Particle Size													
% Gravel (>2mm)	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
% Sand (2.0mm - 0.063mm)	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
% Silt (0.063mm - 4um)	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
% Clay (<4um)	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
Leachable Anions & Nutrients													
Total Nitrogen by LECO	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
Available Phosphate-P													
Phosphorus, Total	90	90	90	90	90	90	90	90	90	90	90	90	90
Cyanides													
Cyanide, Total	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
Organic / Inorganic Carbon													
$CaCO_3$ Equivalent	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Inorganic Carbon	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Total Carbon by Combustion	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
Total Organic Carbon	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
Metals													
Aluminum (Al)	50	50	50	50	50	50	50	50	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10	10	10	10	10	10	10	10	10
Arsenic (As)	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
Barium (Ba)	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
Beryllium (Be)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Bismuth (Bi)	20	20	20	20	20	20	20	20	20	20	20	20	20
Cadmium (Cd)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Calcium (Ca)	50	50	50	50	50	50	50	50	50	50	50	50	50
Chromium (Cr)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Cobalt (Co)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Copper (Cu)	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
Iron (Fe)	50	50	50	50	50	50	50	50	50	50	50	50	50
Lead (Pb)	30	30	30	30	30	30	30	30	30	30	30	30	30
Lithium (Li)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Magnesium (Mg)	50	50	50	50	50	50	50	50	50	50	50	50	50
Manganese (Mn)	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
Mercury (Hg)	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Molybdenum (Mo)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Nickel (Ni)	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
Phosphorus (P)	50	50	50	50	50	50	50	50	50	50	50	50	50
Potassium (K)	200	200	200	200	200	200	200	200	200	200	200	200	200
Selenium (Se)	8.0	7.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	8.0	2.0	2.0	2.0
Silver (Ag)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Sodium (Na)	200	200	200	200	200	200	200	200	200	200	200	200	200
Strontium (Sr)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Sulfur (S)-Total	100	100	100	100	100	100	100	100	100	-	-	100	100
Thallium (Tl)	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
Tin (Sn)	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
Titanium (Ti)	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
Total Sulphur	-	-	-	-	-	-	-	-	-	0.10	0.10	-	-
Vanadium (V)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Zinc (Zn)	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

Appendix 5.1-3

Periphyton Chlorophyll *a* Concentrations from Streams of the KSM Project, August 2009

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Appendix 5.1-3. Periphyton Chlorophyll *a* Concentrations from Streams of the KSM Project, August 2009

RESULTS OF ANALYSIS												
Sample ID	EUR2-1	EUR2-2	EUR2-3	ECM8-1	ECM8-2	ECM8-3	CC1-1	CC1-2	CC1-3	UR1-1	UR1-2	UR1-3
Date Sampled	16-AUG-09	16-AUG-09	16-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09
ALS Sample ID	L810576-1	L810576-2	L810576-3	L810576-4	L810576-5	L810576-6	L810576-7	L810576-8	L810576-9	L810576-10	L810576-11	L810576-12
Plant Pigments												
Chlorophyll *a*	3.70	1.50	3.40	0.042	2.09	3.53	2.12	10.6	3.12	0.020	0.017	0.036

RESULTS OF ANALYSIS												
Sample ID	UR2-1	UR2-2	UR2-3	UR1A-1	UR1A-2	UR1A-3	SUNR-1	SUNR-2	SUNR-3	STE1-1	STE1-2	STE1-3
Date Sampled	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	14-AUG-09	22-AUG-09	22-AUG-09	22-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09
ALS Sample ID	L810576-13	L810576-14	L810576-15	L810576-16	L810576-17	L810576-18	L810576-19	L810576-20	L810576-21	L810576-22	L810576-23	L810576-24
Plant Pigments												
Chlorophyll *a*	0.029	0.014	0.021	0.078	0.211	1.76	0.845	4.11	2.69	0.685	0.265	0.369

RESULTS OF ANALYSIS												
Sample ID	STE2-1	STE2-2	STE2-3	UNK1-1	UNK1-2	UNK1-3	UNK2-1	UNK2-2	UNK2-3	TEC1-1	TEC1-2	TEC1-3
Date Sampled	23-AUG-09	23-AUG-09	23-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	24-AUG-09	24-AUG-09	24-AUG-09	23-AUG-09	23-AUG-09	23-AUG-09
ALS Sample ID	L810576-25	L810576-26	L810576-27	L810576-28	L810576-29	L810576-30	L810576-31	L810576-32	L810576-33	L810576-34	L810576-35	L810576-36
Plant Pigments												
Chlorophyll *a*	27.5	7.10	13.2	1.23	0.545	11.9	8.88	13.8	5.70	0.960	0.987	5.48

RESULTS OF ANALYSIS												
Sample ID	TEC2-1	TEC2-2	TEC2-3	SNO1-1	SNO1-2	SNO1-3	SNO2-1	SNO2-2	SNO2-3	TRC1-1	TRC1-2	TRC1-3
Date Sampled	18-AUG-09	18-AUG-09	18-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09
ALS Sample ID	L810576-37	L810576-38	L810576-39	L810576-40	L810576-41	L810576-42	L810576-43	L810576-44	L810576-45	L810576-46	L810576-47	L810576-48
Plant Pigments												
Chlorophyll *a*	38.5	40.5	20.4	5.05	0.489	0.714	18.1	2.36	16.1	1.15	0.440	0.525

RESULTS OF ANALYSIS												
Sample ID	TRC2-1	TRC2-2	TRC2-3	TRC3-1	TRC3-2	TRC3-3	NTR1-1	NTR1-2	NTR1-3	NTR2-1	NTR2-2	NTR2-3
Date Sampled	24-AUG-09	24-AUG-09	24-AUG-09	18-AUG-09	18-AUG-09	18-AUG-09	24-AUG-09	24-AUG-09	24-AUG-09	22-AUG-09	22-AUG-09	22-AUG-09
ALS Sample ID	L810576-49	L810576-50	L810576-51	L810576-52	L810576-53	L810576-54	L810576-55	L810576-56	L810576-57	L810576-58	L810576-59	L810576-60
Plant Pigments												
Chlorophyll *a*	0.442	0.251	0.569	0.054	0.031	0.062	15.3	8.78	11.6	26.8	6.84	23.0

RESULTS OF ANALYSIS												
Sample ID	MC1-1	MC1-2	MC1-3	MCTR-1	MCTR-2	MCTR-3	SC1-1	SC1-2	SC1-3	SC2-1	SC2-2	SC2-3
Date Sampled	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	20-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09
ALS Sample ID	L810576-61	L810576-62	L810576-63	L810576-64	L810576-65	L810576-66	L810576-67	L810576-68	L810576-69	L810576-70	L810576-71	L810576-72
Plant Pigments												
Chlorophyll *a*	0.865	0.129	0.077	0.241	0.728	1.49	1.12	18.7	3.56	0.077	0.012	0.035

RESULTS OF ANALYSIS									
Sample ID	SC3-1	SC3-2	SC3-3	SCT-1	SCT-2	SCT-3	SCR-1	SCR-2	SCR-3
Date Sampled	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	21-AUG-09	23-AUG-09	23-AUG-09	23-AUG-09
ALS Sample ID	L810576-73	L810576-74	L810576-75	L810576-76	L810576-77	L810576-78	L810576-79	L810576-80	L810576-81
Plant Pigments									
Chlorophyll *a*	<0.010	0.021	0.113	0.148	0.056	0.192	11.6	36.0	14.3

Appendix 5.1-4

Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

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Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	EUR2				EUR2				EUR2			
	Date	16-Aug-09				16-Aug-09				16-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen					486	1.1	301,315	1.8				
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom					1,458	3.4	262,435	1.6	2,672	1.8	480,924	0.8
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	4,517	2.2	225,861	0.4	1,944	4.5	97,198	0.6				
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom	9,034	4.4	4,155,849	7.2					1,336	0.9	614,514	1.0
Cymbella affinis	diatom					972	2.3	1,749,569	10.7				
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom									2,672	1.8	988,566	1.6
Cymbella sinuata	diatom	6,776	3.3	948,618	1.7	972	2.3	136,078	0.8	9,351	6.4	1,701,937	2.7
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom	6,776	3.3	7,046,875	12.3	972	2.3	777,586	4.7	5,344	3.6	5,129,858	8.2
Diatoma vulgare	diatom					486	1.1	952,543	5.8				
Diatomella balfouriana	diatom	2,259	1.1	677,584	1.2								
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom					972	2.3	279,931	1.7	10,687	7.3	4,309,081	6.9
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	121,965	60.0	21,953,726	38.3	21,870	51.1	3,936,530	24.0	65,459	44.5	12,960,906	20.8
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom					486	1.1	97,198	0.6	4,008	2.7	801,540	1.3
Gomphonema subclavatum	diatom	15,810	7.8	10,434,796	18.2					2,672	1.8	1,603,081	2.6
Gomphonema tenellum	diatom	2,259	1.1	474,309	0.8	972	2.3	204,116	1.2	8,015	5.5	1,683,235	2.7
Hannaea arcus	diatom					2,430	5.7	4,252,425	25.9	8,015	5.5	14,026,955	22.5
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom	13,552	6.7	7,826,097	13.6	6,318	14.8	2,918,864	17.8	8,015	5.5	4,011,709	6.4

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		EUR2				EUR2				EUR2			
Date		16-Aug-09				16-Aug-09				16-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom									1,336	0.9	247,142	0.4
Navicula cryptocephala veneta	diatom	2,259	1.1	214,568	0.4	486	1.1	46,169	0.3	6,680	4.5	634,553	1.0
Navicula graciloides	diatom					486	1.1	211,406	1.3				
Navicula gregaria	diatom												
Navicula minima	diatom									2,672	1.8	117,559	0.2
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom									1,336	0.9	11,462,026	18.4
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom	4,517	2.2	542,067	0.9	486	1.1	58,319	0.4	4,008	2.7	480,924	0.8
Nitzschia palea	diatom												
Nitzschia paleacea	diatom	2,259	1.1	221,344	0.4	486	1.1	47,627	0.3				
Nitzschia sp.	diatom	2,259	1.1	271,034	0.5								
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom									1,336	0.9	774,822	1.2
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom	2,259	1.1	316,206	0.6	486	1.1	68,039	0.4	1,336	0.9	187,026	0.3
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom	6,776	3.3	2,032,752	3.5								
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		203,275	100	57,341,687	100	42,281	99	16,096,034	98	146,949	100	62,216,358	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		ECM8				ECM8				ECM8			
Date		21-Aug-09				21-Aug-09				21-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom									243	4.8	11,672	1.1
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom									486	9.5	24,316	2.3
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom									243	4.8	68,086	6.5
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom					900	2.4	332,852	4.5				
Cymbella sinuata	diatom					300	0.8	41,981	0.6	486	9.5	68,086	6.5
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	253	40.0	109,505	54.7					1,459	28.6	462,205	44.3
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	127	20.0	45,627	22.8	32,985	88.7	5,937,367	79.8	1,702	33.3	306,386	29.4
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom					600	1.6	134,940	1.8				
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom					600	1.6	359,840	4.8				
Gomphonema tenellum	diatom					1,199	3.2	251,888	3.4				
Hannaea arcus	diatom												
Hantzschia amphioxys	diatom	127	20.0	25,982	13.0								
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	ECM8				ECM8				ECM8			
	Date	21-Aug-09				21-Aug-09				21-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom	127	20.0	19,011	9.5	300	0.8	44,980	0.6				
Navicula tripunctata	diatom					300	0.8	335,851	4.5				
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom									243	4.8	29,180	2.8
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom									243	4.8	72,949	7.0
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		634	100	200,126	100	37,184	100	7,439,701	100	5,106	100	1,042,879	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		CC1				CC1				CC1			
Date		19-Aug-09				19-Aug-09				19-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen	442	1.9	548,275	4.9	1,854	1.4	1,724,630	1.0				
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom	442	1.9	79,588	0.7								
Achnanthes linearis	diatom	221	1.0	29,182	0.3					421	0.9	55,534	0.3
Achnanthes minutissima	diatom	7,075	30.5	424,471	3.8	15,763	11.8	866,951	0.5	7,993	17.0	439,641	2.2
Achnanthes pinnata	diatom					927	0.7	60,269	0.0				
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom	221	1.0	101,696	0.9								
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	221	1.0	81,799	0.7	1,854	1.4	686,143	0.4				
Cymbella sinuata	diatom	663	2.9	92,853	0.8					421	0.9	117,799	0.6
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom	1,769	7.6	1,556,392	13.9	927	0.7	1,483,553	0.8	2,104	4.5	2,019,403	10.2
Diatoma vulgare	diatom					927	0.7	1,817,352	1.0				
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	663	2.9	191,012	1.7	2,782	2.1	1,041,454	0.6	841	1.8	242,328	1.2
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	6,853	29.5	1,356,979	12.1	9,272	6.9	1,668,997	0.9	24,822	52.7	4,467,929	22.5
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom					927	0.7	556,332	0.3	1,683	3.6	1,009,701	5.1
Gomphonema tenellum	diatom									1,262	2.7	265,047	1.3
Hannaea arcus	diatom	3,537	15.2	6,190,196	55.2	97,358	72.9	170,376,748	94.4	6,311	13.4	11,043,610	55.7
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom	442	1.9	255,346	2.3								

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		CC1				CC1				CC1			
Date		19-Aug-09				19-Aug-09				19-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom									421	0.9	39,967	0.2
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom	221	1.0	247,608	2.2								
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom	442	1.9	61,902	0.6	927	0.7	129,811	0.1	841	1.8	117,799	0.6
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		22,771	98	10,669,024	95	131,665	99	178,687,609	99	47,119	100	19,818,757	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		UR1				UR1				UR1			
Date		14-Aug-09				14-Aug-09				14-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom												
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom									151	50.0	55,712	56.7
Cymbella sinuata	diatom												
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom	58	33.3	3,477	11.4								
Fragilaria vaucheriae	diatom	58	33.3	16,690	54.5								
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	58	33.3	10,431	34.1	42	33.3	7,550	48.6	75	25.0	13,552	13.8
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom												
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom									75	25.0	28,986	29.5

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	UR1				UR1				UR1			
	Date	14-Aug-09				14-Aug-09				14-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom					84	66.7	7,970	51.4				
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		174	100	30,598	100	126	100	15,520	100	301	100	98,250	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		UR2				UR2				UR2			
Date		14-Aug-09				14-Aug-09				14-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom					78	12.5	3,889	3.0				
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	40	25.0	14,681	26.2	156	25.0	57,557	43.8	158	28.6	58,330	42.3
Cymbella sinuata	diatom												
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	79	50.0	34,282	61.1					79	14.3	22,701	16.5
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	40	25.0	7,142	12.7	311	50.0	56,002	42.6	315	57.1	56,753	41.2
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom												
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	UR2				UR2				UR2			
	Date	14-Aug-09				14-Aug-09				14-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom					78	12.5	14,000	10.7				
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		159	100	56,105	100	622	100	131,448	100	552	100	137,785	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		UR1A				UR1A				UR1A			
Date		14-Aug-09				14-Aug-09				14-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen					145	16.7	179,797	33.7				
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom												
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom					145	16.7	260,995	48.9				
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom												
Cymbella sinuata	diatom					290	33.3	40,599	7.6	437	28.6	61,182	3.7
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	102	11.1	29,362	16.2								
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	612	66.7	110,107	60.7	290	33.3	52,199	9.8				
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom									219	14.3	43,702	2.7
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom									874	57.1	1,529,554	93.6
Hantzschia amphioxys	diatom	204	22.2	41,800	23.1								
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	UR1A				UR1A				UR1A			
	Date	14-Aug-09				14-Aug-09				14-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		918	100	181,269	100	725	83	353,794	66	1,530	100	1,634,438	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		SUNR				SUNR				SUNR			
Date		22-Aug-09				22-Aug-09				22-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom	49	4.8	2,333	0.5								
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom					2,481	9.3	327,531	2.2	3,915	4.8	516,771	7.9
Achnanthes minutissima	diatom					2,978	11.1	193,541	1.3	67,113	82.8	3,355,655	51.3
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom	49	4.8	11,907	2.5								
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom					6,451	24.1	2,387,005	15.7	4,474	5.5	1,655,456	25.3
Cymbella sinuata	diatom					744	2.8	156,322	1.0	559	0.7	78,299	1.2
Cymbella sp.	diatom					248	0.9	86,845	0.6				
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom					248	0.9	253,092	1.7				
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom					4,218	15.7	1,214,842	8.0				
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	535	52.4	134,717	28.0	3,722	13.9	736,944	4.9	4,474	5.5	885,893	13.5
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom					496	1.9	297,755	2.0				
Gomphonema tenellum	diatom												
Hannaea arcus	diatom	146	14.3	255,145	53.1	4,714	17.6	9,075,333	59.8				
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	SUNR				SUNR				SUNR			
	Date	22-Aug-09				22-Aug-09				22-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom									559	0.7	53,131	0.8
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom	49	4.8	7,290	1.5								
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom					248	0.9	29,776	0.2				
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom	49	4.8	19,440	4.0								
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom					248	0.9	419,339	2.8				
Synedra radians	diatom	97	9.5	34,991	7.3								
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom	49	4.8	14,580	3.0								
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		1,021	100	480,402	100	26,798	100	15,178,324	100	81,095	100	6,545,205	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	STE1				STE1				STE1			
	Date	18-Aug-09				18-Aug-09				18-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom	852	2.2	153,401	1.0					179	2.3	32,178	0.6
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	426	1.1	21,306	0.1					179	2.3	17,876	0.3
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	852	2.2	630,650	4.3					179	2.3	66,143	1.2
Cymbella sinuata	diatom	2,557	6.6	465,317	3.2	104	7.7	14,616	2.5	1,073	14.0	150,162	2.8
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom	2,131	5.5	4,602,041	31.3					179	2.3	143,011	2.7
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom	426	1.1	25,567	0.2								
Fragilaria vaucheriae	diatom	852	2.2	245,442	1.7	52	3.8	15,033	2.5	358	4.7	102,968	1.9
Frustulia rhomboides	diatom									179	2.3	193,065	3.6
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	21,306	54.9	4,218,537	28.7	887	65.4	159,729	26.9	2,503	32.6	450,485	8.5
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom	426	1.1	85,223	0.6								
Gomphonema subclavatum	diatom	426	1.1	255,669	1.7	52	3.8	31,319	5.3	179	2.3	107,258	2.0
Gomphonema tenellum	diatom	852	2.2	178,968	1.2								
Hannaea arcus	diatom	852	2.2	1,491,402	10.1	209	15.4	365,394	61.6	2,145	27.9	3,754,043	70.5
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom	3,835	9.9	1,476,488	10.0					536	7.0	309,709	5.8

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	STE1				STE1				STE1			
	Date	18-Aug-09				18-Aug-09				18-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom	426	1.1	40,481	0.3								
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom	426	1.1	63,917	0.4								
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom	426	1.1	119,312	0.8								
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom	426	1.1	59,656	0.4	52	3.8	7,308	1.2				
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom	1,278	3.3	575,255	3.9								
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		38,776	100	14,708,634	100	1,357	100	593,399	100	7,687	100	5,326,898	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		STE2				STE2				STE2			
Date		23-Aug-09				23-Aug-09				23-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom	2,264	0.9	407,530	0.1								
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	2,264	0.9	113,203	0.0	4,794	0.9	239,690	0.0	13,899	4.7	694,958	0.3
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	4,528	1.8	1,675,402	0.6	23,969	4.5	8,868,516	1.5	16,679	5.6	6,171,228	3.0
Cymbella sinuata	diatom	2,264	0.9	316,968	0.1					2,780	0.9	389,177	0.2
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom	2,264	0.9	1,811,245	0.6	9,588	1.8	7,670,068	1.3	19,459	6.5	38,917,653	18.9
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom					4,794	0.9	536,905	0.1	2,780	0.9	311,341	0.2
Fragilaria construens venter	diatom									5,560	1.9	266,864	0.1
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	6,792	2.6	1,956,145	0.7	62,319	11.7	23,332,347	3.9	33,358	11.2	10,567,811	5.1
Frustulia rhomboides	diatom									8,339	2.8	9,006,657	4.4
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	63,394	24.6	11,410,843	3.8	71,907	13.5	14,237,564	2.4	52,817	17.8	9,507,027	4.6
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom	6,792	2.6	5,297,892	1.8	19,175	3.6	13,806,122	2.3	16,679	5.6	12,008,876	5.8
Gomphonema tenellum	diatom												
Hannaea arcus	diatom	156,220	60.5	273,384,789	91.1	302,009	56.8	528,515,625	87.5	61,156	20.6	107,023,545	52.1
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom									2,780	0.9	1,389,916	0.7
Melosira varians	diatom												
Meridion circulare	diatom	2,264	0.9	871,662	0.3	9,588	1.8	3,691,220	0.6	2,780	0.9	1,070,235	0.5

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	STE2				STE2				STE2			
	Date	23-Aug-09				23-Aug-09				23-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom	2,264	0.9	418,850	0.1								
Navicula cryptocephala veneta	diatom					14,381	2.7	1,366,231	0.2	22,239	7.5	2,112,673	1.0
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom	2,264	0.9	99,618	0.0								
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom									8,339	2.8	2,243,325	1.1
Nitzschia frustulum	diatom									5,560	1.9	667,160	0.3
Nitzschia palea	diatom									2,780	0.9	500,370	0.2
Nitzschia paleacea	diatom					4,794	0.9	469,792	0.1	13,899	4.7	1,770,753	0.9
Nitzschia sp.	diatom												
Pinnularia sp.	diatom	2,264	0.9	905,622	0.3								
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom									5,560	1.9	778,353	0.4
Synedra socia	diatom												
Synedra sp.	diatom					4,794	0.9	1,342,262	0.2				
Synedra tenera	diatom	2,264	0.9	1,358,434	0.5								
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		258,102	100	300,028,203	100	532,111	100	604,076,341	100	297,442	100	205,397,920	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	UNK1				UNK1				UNK1			
	Date	18-Aug-09				18-Aug-09				18-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen									2,649	3.3	1,721,981	5.9
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom	62	2.9	11,108	1.4	48	1.1	8,594	0.6	7,948	9.8	1,430,569	4.9
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	309	14.7	15,428	2.0					6,181	7.6	309,073	1.1
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom					48	1.1	5,729	0.4				
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom									883	1.1	247,259	0.8
Cocconeis placentula	diatom									883	1.1	406,211	1.4
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom					191	4.2	70,660	4.7	4,415	5.4	1,960,409	6.7
Cymbella sinuata	diatom									883	1.1	123,629	0.4
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom	525	25.0	461,615	59.4	286	6.3	229,167	15.2	5,298	6.5	5,086,466	17.4
Diatoma vulgare	diatom									883	1.1	3,461,623	11.8
Diatomella balfouriana	diatom	31	1.5	9,257	1.2					6,181	7.6	1,854,441	6.3
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom									883	1.1	229,597	0.8
Eunotia incisa	diatom												
Eunotia pectinalis	diatom					430	9.5	525,938	34.8	2,649	3.3	1,907,425	6.5
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom									1,766	2.2	169,549	0.6
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	62	2.9	17,773	2.3					2,649	3.3	1,297,049	4.4
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom									883	1.1	1,536,537	5.3
Gomphonema angustatum	diatom	62	2.9	11,108	1.4	2,339	51.6	463,203	30.7	8,831	10.9	1,589,521	5.4
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom					95	2.1	57,292	3.8	883	1.1	529,840	1.8
Gomphonema tenellum	diatom					48	1.1	10,026	0.7	2,649	3.3	556,332	1.9
Hannaea arcus	diatom	31	1.5	53,999	6.9								
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom	185	8.8	71,279	9.2					3,532	4.3	1,631,908	5.6

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		UNK1				UNK1				UNK1			
Date		18-Aug-09				18-Aug-09				18-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom									883	1.1	163,367	0.6
Navicula cryptocephala veneta	diatom	93	4.4	8,794	1.1	95	2.1	9,071	0.6	5,298	6.5	503,348	1.7
Navicula graciloides	diatom									1,766	2.2	768,268	2.6
Navicula gregaria	diatom												
Navicula minima	diatom	31	1.5	1,358	0.2					3,532	4.3	155,420	0.5
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom	31	1.5	4,628	0.6								
Navicula tripunctata	diatom												
Navicula viridula	diatom									883	1.1	397,380	1.4
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom					48	1.1	5,729	0.4	1,766	2.2	211,936	0.7
Nitzschia palea	diatom												
Nitzschia paleacea	diatom					48	1.1	4,679	0.3	2,649	3.3	259,622	0.9
Nitzschia sp.	diatom												
Pinnularia sp.	diatom	62	2.9	24,685	3.2					883	1.1	353,227	1.2
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom	617	29.4	86,398	11.1	859	18.9	120,313	8.0	2,649	3.3	370,888	1.3
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		2,098	100	777,432	100	4,536	100	1,510,399	100	78,593	97	27,510,894	94

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	UNK2				UNK2				UNK2			
	Date	24-Aug-09				24-Aug-09				24-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen	973	1.1	603,045	1.0								
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom					729	1.0	131,308	0.2				
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	1,945	2.3	97,265	0.2	729	1.0	36,475	0.1	993	2.7	49,626	0.1
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom					2,188	3.1	3,939,247	7.0	331	0.9	595,511	1.7
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	28,207	33.3	10,436,573	16.5	18,237	26.0	6,747,784	12.1	12,241	32.7	4,529,189	12.7
Cymbella sinuata	diatom									993	2.7	138,952	0.4
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom	7,781	9.2	7,469,979	11.8	10,213	14.6	9,804,348	17.5	3,308	8.8	3,176,056	8.9
Diatoma vulgare	diatom	1,945	2.3	5,719,203	9.0	4,377	6.3	10,294,565	18.4	2,978	8.0	9,337,606	26.2
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom					729	1.0	163,406	0.3				
Fragilaria construens venter	diatom	973	1.1	186,749	0.3								
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	973	1.1	280,124	0.4	729	1.0	210,093	0.4	662	1.8	285,845	0.8
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	13,617	16.1	2,941,304	4.6	8,754	12.5	1,890,839	3.4	4,301	11.5	774,164	2.2
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom	1,945	2.3	1,750,776	2.8	2,918	4.2	2,100,932	3.8				
Gomphonema tenellum	diatom												
Hannaea arcus	diatom	15,562	18.4	27,234,300	43.0					3,970	10.6	6,947,623	19.5
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	UNK2				UNK2				UNK2			
	Date	24-Aug-09				24-Aug-09				24-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom	7,781	9.2	739,217	1.2	2,188	3.1	207,905	0.4	1,985	5.3	188,578	0.5
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom									331	0.9	32,422	0.1
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom					13,860	19.8	11,711,965	20.9	331	0.9	279,559	0.8
Synedra radians	diatom												
Synedra rumpens	diatom									331	0.9	46,317	0.1
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom	2,918	3.4	5,806,742	9.2	4,377	6.3	8,710,113	15.6	4,632	12.4	9,217,180	25.9
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		83,648	99	62,662,233	99	70,031	100	55,948,978	100	37,385	100	35,598,629	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		TEC1				TEC1				TEC1			
Date		23-Aug-09				23-Aug-09				23-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom	67	0.8	3,240	0.1								
Achnanthes lanceolata	diatom	67	0.8	12,150	0.4								
Achnanthes linearis	diatom									2,389	1.0	315,318	0.4
Achnanthes minutissima	diatom	1,012	12.5	55,687	1.8	1,197	20.6	71,829	5.7	90,773	36.9	4,992,532	6.1
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom	202	2.5	93,148	3.0	163	2.8	75,094	6.0	4,778	1.9	2,197,669	2.7
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	405	5.0	149,847	4.9	54	0.9	20,134	1.6	45,387	18.4	18,472,368	22.7
Cymbella sinuata	diatom	607	7.5	85,048	2.8	272	4.7	45,709	3.6	2,389	1.0	334,428	0.4
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom	135	1.7	269,995	8.8								
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom									4,778	1.9	687,966	0.8
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	2,362	29.2	680,388	22.2	218	3.7	75,225	6.0	52,553	21.4	15,135,254	18.6
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	1,822	22.5	328,044	10.7	3,537	60.7	700,334	55.9	11,944	4.9	2,149,894	2.6
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom					54	0.9	12,244	1.0				
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom	67	0.8	40,499	1.3								
Gomphonema tenellum	diatom					109	1.9	22,855	1.8	2,389	1.0	501,642	0.6
Hannaea arcus	diatom	540	6.7	944,983	30.8	54	0.9	95,228	7.6	16,721	6.8	32,188,692	39.5
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom	135	1.7	51,974	1.7					2,389	1.0	2,759,031	3.4

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	TEC1				TEC1				TEC1			
	Date	23-Aug-09				23-Aug-09				23-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom	67	0.8	6,615	0.2								
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom	472	5.8	79,379	2.6	54	0.9	7,618	0.6	7,166	2.9	1,003,284	1.2
Synedra socia	diatom					54	0.9	17,957	1.4	2,389	1.0	788,294	1.0
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom	135	1.7	268,645	8.8	54	0.9	108,288	8.6				
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		8,100	100	3,069,643	100	5,823	100	1,252,515	100	246,043	100	81,526,372	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		TEC2				TEC2				TEC2			
Date		18-Aug-09				18-Aug-09				18-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom					17,617	0.9	3,171,094	0.3	3,861	1.0	695,034	0.3
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	18,040	7.2	992,200	0.6	88,086	4.5	4,404,297	0.4	27,029	6.9	1,351,455	0.6
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom					17,617	0.9	22,550,000	2.1				
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom					17,617	0.9	8,103,906	0.8	7,723	2.0	3,552,397	1.7
Cymbella affinis	diatom	6,765	2.7	12,177,000	7.8	17,617	0.9	31,710,938	3.0				
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	115,005	45.9	42,551,850	27.3	1,021,797	52.3	378,064,844	35.7	166,036	42.2	61,433,305	29.5
Cymbella sinuata	diatom	6,765	2.7	947,100	0.6					11,584	2.9	1,621,747	0.8
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom	4,510	1.8	3,608,000	2.3	17,617	0.9	28,187,500	2.7	11,584	2.9	18,534,247	8.9
Diatoma vulgare	diatom	2,255	0.9	4,419,800	2.8	17,617	0.9	34,529,688	3.3	3,861	1.0	7,568,151	3.6
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom	2,255	0.9	4,510,000	2.9	17,617	0.9	35,234,375	3.3	3,861	1.0	7,722,603	3.7
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	31,570	12.6	12,729,024	8.2	105,703	5.4	36,531,000	3.4	34,752	8.8	11,009,342	5.3
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	20,295	8.1	3,653,100	2.3	229,023	11.7	41,224,219	3.9	54,058	13.7	9,730,479	4.7
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom	2,255	0.9	2,706,000	1.7	35,234	1.8	31,710,938	3.0				
Gomphonema tenellum	diatom												
Hannaea arcus	diatom	27,060	10.8	56,826,000	36.5	176,172	9.0	308,300,781	29.1	42,474	10.8	74,330,051	35.7
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom	2,255	0.9	868,175	0.6	17,617	0.9	6,782,617	0.6				

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	TEC2				TEC2				TEC2			
	Date	18-Aug-09				18-Aug-09				18-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom					52,852	2.7	9,777,539	0.9				
Navicula cryptocephala veneta	diatom									11,584	2.9	1,100,471	0.5
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom	2,255	0.9	270,600	0.2								
Nitzschia palea	diatom												
Nitzschia paleacea	diatom	2,255	0.9	220,990	0.1								
Nitzschia sp.	diatom					17,617	0.9	2,114,063	0.2				
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom	2,255	0.9	315,700	0.2	52,852	2.7	7,399,219	0.7	11,584	2.9	2,108,271	1.0
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom	4,510	1.8	8,974,900	5.8	35,234	1.8	70,116,406	6.6	3,861	1.0	7,683,990	3.7
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		250,305	100	155,770,439	100	1,955,508	100	1,059,913,422	100	393,853	100	208,441,543	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	SNO1				SNO1				SNO1			
	Date	20-Aug-09				20-Aug-09				20-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom									79	3.7	14,188	1.7
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	435	2.3	21,750	0.3								
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom	217	1.2	278,395	3.4								
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	1,087	5.8	402,368	4.9	592	2.0	219,105	2.7	315	14.8	116,660	14.3
Cymbella sinuata	diatom					296	1.0	41,452	0.5	79	3.7	11,035	1.4
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom					296	1.0	236,870	2.9				
Diatoma vulgare	diatom					296	1.0	580,331	7.1				
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom	217	1.2	124,408	1.5								
Eunotia pectinalis	diatom	1,740	9.3	1,252,778	15.4								
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom	435	2.3	73,079	0.9								
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	1,305	7.0	1,127,500	13.9	592	2.0	170,546	2.1				
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	5,655	30.2	1,221,458	15.0	25,760	86.1	6,027,743	73.8	1,261	59.3	227,013	27.9
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom					296	1.0	66,620	0.8				
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom									79	3.7	47,294	5.8
Gomphonema tenellum	diatom					296	1.0	62,178	0.8				
Hannaea arcus	diatom	652	3.5	1,141,855	14.0					158	7.4	275,884	33.9
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom	217	1.2	128,105	1.6								
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom					888	3.0	683,961	8.4	158	7.4	121,389	14.9

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	SNO1				SNO1				SNO1			
	Date	20-Aug-09				20-Aug-09				20-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom	217	1.2	40,237	0.5								
Navicula cryptocephala veneta	diatom	435	2.3	41,324	0.5								
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom	217	1.2	32,624	0.4	296	1.0	44,413	0.5				
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom	870	4.7	39,149	0.5								
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom	1,087	5.8	130,498	1.6	296	1.0	35,530	0.4				
Nitzschia palea	diatom												
Nitzschia paleacea	diatom	217	1.2	21,315	0.3								
Nitzschia sp.	diatom												
Pinnularia sp.	diatom	1,740	9.3	695,988	8.6								
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom	217	1.2	30,449	0.4								
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom	217	1.2	432,817	5.3								
Tabellaria flocculosa	diatom	1,522	8.1	898,259	11.0								
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		18,705	100	8,134,356	100	29,905	100	8,168,749	100	2,128	100	813,465	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	SNO2				SNO2				SNO2			
	Date	20-Aug-09				20-Aug-09				20-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	40,268	7.4	2,214,732	0.9	14,993	3.7	899,601	0.7	455,974	19.0	22,798,713	2.2
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom	20,134	3.7	36,241,071	14.2								
Cymbella cistula	diatom					3,748	0.9	22,490,027	16.4				
Cymbella microcephala	diatom												
Cymbella minuta	diatom	276,842	50.9	102,431,362	40.2	138,688	34.6	51,314,744	37.4	953,401	39.7	352,758,272	33.9
Cymbella sinuata	diatom					11,245	2.8	1,574,302	1.1	41,452	1.7	5,803,309	0.6
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	5,033	0.9	1,449,643	0.6	3,748	0.9	2,159,043	1.6	124,357	5.2	42,977,647	4.1
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	135,904	25.0	26,908,996	10.6	194,914	48.6	42,101,330	30.7	476,700	19.8	85,806,066	8.2
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom					7,497	1.9	1,499,335	1.1				
Gomphonema subclavatum	diatom	20,134	3.7	12,080,357	4.7	11,245	2.8	6,747,008	4.9	20,726	0.9	12,435,662	1.2
Gomphonema tenellum	diatom					3,748	0.9	787,151	0.6				
Hannaea arcus	diatom	30,201	5.6	52,851,563	20.8	3,748	0.9	6,559,591	4.8	269,439	11.2	471,518,842	45.2
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		SNO2				SNO2				SNO2			
Date		20-Aug-09				20-Aug-09				20-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom					3,748	0.9	693,442	0.5	20,726	0.9	3,834,329	0.4
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom	5,033	0.9	493,281	0.2								
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom					3,748	0.9	524,767	0.4	20,726	0.9	2,901,654	0.3
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom	10,067	1.9	20,033,259	7.9					20,726	0.9	41,244,945	4.0
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		543,616	100	254,704,263	100	401,072	100	137,350,341	100	2,404,228	100	1,042,079,439	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	TRC1				TRC1				TRC1			
	Date	18-Aug-09				18-Aug-09				18-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom												
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom									369	100.0	136,653	100.0
Cymbella sinuata	diatom					319	100.0	44,681	100.0				
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom												
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	246	50.0	44,351	54.5								
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom												
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	TRC1				TRC1				TRC1			
	Date	18-Aug-09				18-Aug-09				18-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom	246	50.0	36,959	45.5								
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		493	100	81,310	100	319	100	44,681	100	369	100	136,653	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	TRC2				TRC2				TRC2			
	Date	24-Aug-09				24-Aug-09				24-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte	175	2.2	14,889	1.0								
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	350	4.3	17,516	1.1	66	1.3	3,285	0.3				
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom					66	1.3	18,397	1.5				
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	175	2.2	64,811	4.1	263	5.3	97,244	8.0				
Cymbella sinuata	diatom												
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom					66	1.3	6,308	0.5				
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	88	1.1	25,224	1.6	66	1.3	18,923	1.6				
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	7,182	88.2	1,421,987	90.8	4,205	85.3	832,615	68.2	42	100.0	7,497	100.0
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom					66	1.3	13,798	1.1				
Hannaea arcus	diatom					131	2.7	229,968	18.8				
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	TRC2				TRC2				TRC2			
	Date	24-Aug-09				24-Aug-09				24-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom	88	1.1	13,137	0.8								
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom	88	1.1	8,583	0.5								
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		7,970	98	1,551,258	99	4,928	100	1,220,538	100	42	100	7,497	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	TRC3				TRC3				TRC3			
	Date	18-Aug-09				18-Aug-09				18-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom												
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom												
Cymbella sinuata	diatom												
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	476	66.7	137,128	76.2								
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	238	33.3	42,853	23.8								
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom					161	100.0	281,553	100.0				
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	TRC3				TRC3				TRC3			
	Date	18-Aug-09				18-Aug-09				18-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		714	100	179,981	100	161	100	281,553	100	0	0	0	0

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	NTR1				NTR1				NTR1			
	Date	24-Aug-09				24-Aug-09				24-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom					5,643	1.0	270,871	0.1				
Achnanthes lanceolata	diatom	29,671	2.8	5,340,789	1.9	16,929	2.9	3,047,297	1.5	72,276	4.8	13,009,615	3.8
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	207,697	19.8	10,384,868	3.8	84,647	14.6	4,232,357	2.1	448,109	29.5	22,405,449	6.5
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom					5,643	1.0	1,580,080	0.8				
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom	19,781	1.9	1,048,377	0.4								
Cymbella minuta	diatom	138,465	13.2	51,232,018	18.6	28,216	4.9	10,439,815	5.2	115,641	7.6	42,787,179	12.4
Cymbella sinuata	diatom									14,455	1.0	2,023,718	0.6
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom	69,232	6.6	55,385,965	20.1	50,788	8.7	44,693,694	22.1	72,276	4.8	57,820,513	16.8
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom					5,643	1.0	4,063,063	2.0				
Fragilaria capucina mesolepta	diatom					5,643	1.0	5,756,006	2.9				
Fragilaria construens	diatom	9,890	0.9	2,215,439	0.8	22,573	3.9	5,056,256	2.5	14,455	1.0	3,237,949	0.9
Fragilaria construens venter	diatom	98,904	9.4	17,090,526	6.2	107,220	18.4	12,351,712	6.1	101,186	6.7	8,256,769	2.4
Fragilaria pinnata	diatom	9,890	0.9	1,186,842	0.4	5,643	1.0	338,589	0.2	14,455	1.0	867,308	0.3
Fragilaria vaucheriae	diatom	29,671	2.8	11,108,842	4.0	22,573	3.9	7,801,081	3.9	115,641	7.6	39,965,538	11.6
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	49,452	4.7	8,901,316	3.2	33,859	5.8	6,094,595	3.0	43,365	2.9	7,805,769	2.3
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom					11,286	1.9	19,751,001	9.8	14,455	1.0	25,296,474	7.4
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom					16,929	2.9	19,942,868	9.9				
Melosira sp.	diatom												
Melosira varians	diatom	19,781	1.9	25,714,912	9.3								
Meridion circulare	diatom	59,342	5.7	22,846,711	8.3	90,290	15.5	45,190,290	22.4	101,186	6.7	38,956,571	11.3

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	NTR1				NTR1				NTR1			
	Date	24-Aug-09				24-Aug-09				24-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom	59,342	5.7	10,978,289	4.0	5,643	1.0	1,043,981	0.5				
Navicula cryptocephala veneta	diatom	98,904	9.4	9,395,833	3.4					130,096	8.6	12,359,135	3.6
Navicula graciloides	diatom	9,890	0.9	4,302,303	1.6								
Navicula gregaria	diatom									14,455	1.0	2,529,647	0.7
Navicula minima	diatom	9,890	0.9	435,175	0.2								
Navicula minuscula	diatom					5,643	1.0	253,941	0.1				
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom					5,643	1.0	987,550	0.5				
Navicula sp.	diatom	19,781	1.9	2,967,105	1.1	5,643	1.0	846,471	0.4	43,365	2.9	6,504,808	1.9
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom	19,781	1.9	7,121,053	2.6								
Nitzschia communis	diatom												
Nitzschia dissipata	diatom	9,890	0.9	2,660,504	1.0					28,910	1.9	11,665,288	3.4
Nitzschia frustulum	diatom	9,890	0.9	1,186,842	0.4					14,455	1.0	1,734,615	0.5
Nitzschia palea	diatom					16,929	2.9	3,047,297	1.5	14,455	1.0	2,601,923	0.8
Nitzschia paleacea	diatom	9,890	0.9	969,254	0.4					28,910	1.9	2,833,205	0.8
Nitzschia sp.	diatom	9,890	0.9	1,186,842	0.4								
Pinnularia sp.	diatom												
Stauroneis sp.	diatom					5,643	1.0	1,918,669	1.0				
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom	29,671	2.8	4,153,947	1.5	22,573	3.9	3,160,160	1.6	86,731	5.7	12,142,308	3.5
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom	19,781	1.9	17,802,632	6.5								
Synedra ulna	diatom									14,455	1.0	28,765,705	8.4
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green									14,455	1.0	361,378	0.1
Vaucheria sp.	green												
	TOTAL:	1,048,377	100	275,616,386	100	581,244	100	201,867,645	100	1,517,788	100	343,930,865	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	NRT2				NRT2				NRT2			
	Date	22-Aug-09				22-Aug-09				22-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom	3,051	1.4	549,107	0.3	4,794	0.8	862,883	0.5				
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	15,253	7.2	762,649	0.5	28,763	4.8	2,157,207	1.3	44,043	4.4	2,202,148	0.5
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	27,455	13.0	10,158,482	6.3	62,319	10.5	23,058,142	13.5	697,347	69.9	258,018,392	55.7
Cymbella sinuata	diatom					4,794	0.8	671,131	0.4				
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom	15,253	7.2	19,523,810	12.0	4,794	0.8	3,835,034	2.2				
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	6,101	2.9	2,635,714	1.6	4,794	0.8	1,380,612	0.8	44,043	4.4	12,684,375	2.7
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	67,113	31.9	12,080,357	7.4	412,266	69.4	74,207,908	43.3	66,064	6.6	11,891,602	2.6
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom	3,051	1.4	1,830,357	1.1	14,381	2.4	8,628,827	5.0	14,681	1.5	8,808,594	1.9
Gomphonema tenellum	diatom					19,175	3.2	4,026,786	2.4				
Hannaea arcus	diatom	64,063	30.4	112,109,375	69.1	28,763	4.8	50,334,821	29.4	88,086	8.8	154,150,391	33.3
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom	6,101	2.9	2,348,958	1.4	4,794	0.8	1,845,610	1.1	7,340	0.7	2,826,090	0.6

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	NRT2				NRT2				NRT2			
	Date	22-Aug-09				22-Aug-09				22-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom	3,051	1.4	289,807	0.2								
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom					4,794	0.8	210,927	0.1				
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom									7,340	0.7	330,322	0.1
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom									7,340	0.7	880,859	0.2
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom									7,340	0.7	6,202,718	1.3
Synedra radians	diatom												
Synedra rumpens	diatom									7,340	0.7	1,027,669	0.2
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom									7,340	0.7	4,404,297	1.0
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		210,491	100	162,288,616	100	594,430	100	171,219,887	100	998,307	100	463,427,458	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		MC1				MC1				MC1			
Date		20-Aug-09				20-Aug-09				20-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom												
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom												
Cymbella sinuata	diatom												
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom												
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom									367	100.0	66,064	100.0
Gomphonema gracile	diatom					296	100.0	72,420	100.0				
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom												
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	MC1				MC1				MC1			
	Date	20-Aug-09				20-Aug-09				20-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume um^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom	280	100.0	41,946	100.0								
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		280	100	41,946	100	296	100	72,420	100	367	100	66,064	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	MCTR				MCTR				MCTR			
	Date	20-Aug-09				20-Aug-09				20-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom	217	40.0	39,149	8.0	168	40.0	30,201	30.5	127	100.0	22,814	100.0
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom					84	20.0	4,195	4.2				
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom					84	20.0	31,040	31.4				
Cymbella sinuata	diatom												
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom	217	40.0	426,292	87.5								
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom												
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom												
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom	109	20.0	21,750	4.5								
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom												
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	MCTR				MCTR				MCTR			
	Date	20-Aug-09				20-Aug-09				20-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom					84	20.0	33,557	33.9				
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		544	100	487,191	100	419	100	98,992	100	127	100	22,814	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	SC1				SC1				SC1			
	Date	21-Aug-09				21-Aug-09				21-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom					1,249	1.5	59,973	0.2				
Achnanthes lanceolata	diatom									1,798	6.0	323,581	4.4
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom	719	8.3	71,907	1.9								
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom									599	2.0	167,783	2.3
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom	2,397	27.8	886,852	23.8	49,978	60.6	18,491,800	47.9	4,195	14.0	1,551,990	21.2
Cymbella sinuata	diatom									599	2.0	83,891	1.1
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom									599	2.0	28,763	0.4
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	240	2.8	69,031	1.9	9,996	12.1	3,454,468	8.9	2,397	8.0	690,306	9.4
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	4,075	47.2	880,140	23.6	11,245	13.6	2,428,923	6.3	5,992	20.0	1,294,324	17.7
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom					1,249	1.5	281,125	0.7				
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom	240	2.8	143,814	3.9								
Gomphonema tenellum	diatom												
Hannaea arcus	diatom	959	11.1	1,677,827	45.0	4,998	6.1	8,746,121	22.7	1,198	4.0	2,097,284	28.7
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom									1,198	4.0	461,403	6.3

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		SC1				SC1				SC1			
Date		21-Aug-09				21-Aug-09				21-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom									599	2.0	26,366	0.4
Navicula minuscula	diatom												
Navicula mutica	diatom									10,786	36.0	593,232	8.1
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom					1,249	1.5	174,922	0.5				
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom					2,499	3.0	4,972,795	12.9				
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		8,629	100	3,729,571	100	82,463	100	38,610,128	100	29,961	100	7,318,923	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	SC2				SC2				SC2			
	Date	21-Aug-09				21-Aug-09				21-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom												
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom												
Cymbella sinuata	diatom												
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom												
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	193	100.0	34,771	100.0								
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom												
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	SC2				SC2				SC2			
	Date	21-Aug-09				21-Aug-09				21-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		193	100	34,771	100	0	0	0	0	0	0	0	0

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		SC3				SC3				SC3			
Date		21-Aug-09				21-Aug-09				21-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen					124	33.3	307,680	87.3				
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom												
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom												
Cymbella sinuata	diatom												
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom												
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	200	100.0	35,953	100.0	248	66.7	44,663	12.7				
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom												
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

	Sample ID	SC3				SC3				SC3			
	Date	21-Aug-09				21-Aug-09				21-Aug-09			
	Replicate	1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		200	100	35,953	100	248	67	44,663	13	0	0	0	0

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		SCT				SCT				SCT			
Date		21-Aug-09				21-Aug-09				21-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom												
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom												
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom												
Cymbella sinuata	diatom												
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom												
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom					168	100.0	30,201	100.0	99	100.0	17,740	100.0
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom												
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		SCT				SCT				SCT			
Date		21-Aug-09				21-Aug-09				21-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom												
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green												
TOTAL:		0	0	0	0	168	100	30,201	100	99	100	17,740	100

Shaded sample headings = no algae present.

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		SCR				SCR				SCR			
Date		23-Aug-09				23-Aug-09				23-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent
Nostoc sp.	bluegreen												
Oscillatoria sp.	bluegreen												
Chrysococcus rufescens	chrysophyte												
Achnanthes hauckiana	diatom												
Achnanthes lanceolata	diatom												
Achnanthes linearis	diatom												
Achnanthes minutissima	diatom												
Achnanthes pinnata	diatom												
Achnanthes sp.	diatom												
Amphipleura pellucida	diatom												
Caloneis ventricosa	diatom												
Caloneis ventricosa minuta	diatom												
Cocconeis placentula	diatom					138	2.3	63,411	0.5				
Cymbella affinis	diatom												
Cymbella cistula	diatom												
Cymbella microcephala	diatom												
Cymbella minuta	diatom					414	7.0	153,013	1.2	160	2.2	59,123	0.2
Cymbella sinuata	diatom												
Cymbella sp.	diatom												
Diatoma hiemale mesodon	diatom												
Diatoma vulgare	diatom												
Diatomella balfouriana	diatom												
Didymosphenia geminata	diatom												
Diploneis elliptica	diatom												
Eunotia incisa	diatom												
Eunotia pectinalis	diatom												
Fragilaria capucina mesolepta	diatom												
Fragilaria construens	diatom												
Fragilaria construens venter	diatom												
Fragilaria pinnata	diatom												
Fragilaria vaucheriae	diatom	702	22.2	202,129	2.6	1,654	27.9	524,049	4.2	320	4.4	92,041	0.3
Frustulia rhomboides	diatom												
Gomphonema acuminatum	diatom												
Gomphonema angustatum	diatom	1,228	38.9	221,078	2.8	1,792	30.2	322,568	2.6	2,237	31.1	402,679	1.3
Gomphonema gracile	diatom												
Gomphonema olivaceum	diatom												
Gomphonema sp.	diatom												
Gomphonema subclavatum	diatom												
Gomphonema tenellum	diatom												
Hannaea arcus	diatom												
Hantzschia amphioxys	diatom												
Melosira ambigua	diatom												
Melosira sp.	diatom												
Melosira varians	diatom												
Meridion circulare	diatom												

Appendix 5.1-4. Periphyton Taxonomy Data for Streams of the KSM Project Area, August 2009

Sample ID		SCR				SCR				SCR			
Date		23-Aug-09				23-Aug-09				23-Aug-09			
Replicate		1				2				3			
Taxa	Group	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent	Density #/cm^2	Density Percent	Biovolume µm^3/cm^2	Biovolume Percent
Navicula cryptocephala	diatom												
Navicula cryptocephala veneta	diatom												
Navicula graciloides	diatom												
Navicula gregaria	diatom												
Navicula minima	diatom												
Navicula minuscula	diatom												
Navicula mutica	diatom	175	5.6	9,650	0.1								
Navicula pseudoscutiformis	diatom												
Navicula sp.	diatom												
Navicula tripunctata	diatom												
Navicula viridula	diatom												
Neidium affine	diatom												
Nitzschia capitellata	diatom												
Nitzschia communis	diatom												
Nitzschia dissipata	diatom												
Nitzschia frustulum	diatom												
Nitzschia palea	diatom												
Nitzschia paleacea	diatom												
Nitzschia sp.	diatom												
Pinnularia sp.	diatom												
Stauroneis sp.	diatom												
Surirella linearis	diatom												
Surirella ovata	diatom												
Synedra cyclopum	diatom												
Synedra radians	diatom												
Synedra rumpens	diatom												
Synedra socia	diatom												
Synedra sp.	diatom												
Synedra tenera	diatom												
Synedra ulna	diatom												
Tabellaria flocculosa	diatom												
Ankistrodesmus falcatus	green												
Vaucheria sp.	green	1,053	33.3	7,474,556	94.5	1,930	32.6	11,509,896	91.5	4,474	62.2	30,813,859	98.2
TOTAL:		3,158	100	7,907,414	100	5,928	100	12,572,937	100	7,191	100	31,367,702	100

Shaded sample headings = no algae present.

Appendix 5.1-5

Bray-Curtis Similarity Index Using SUNR and SCR Reference Medians to Compare to KSM Stream Periphyton Communities, 2009

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Appendix 5.1-5. Bray-Curtis Similarity Index Using SUNR and SCR Reference Medians to Compare to KSM Stream Periphyton Communities, 2009

Site	SCR-Median	SUNR -Median	Site	SCR-Median	SUNR -Median
SNO1-1	27.8	33.7	CC1-1	33.2	57.0
SNO1-2	40.6	36.9	CC1-2	34.7	44.6
SNO1-3	40.8	56.8	CC1-3	27.3	53.8
SNO2-1	33.5	44.7	UR1A-1	53.5	23.9
SNO2-2	30.9	50.1	UR1A-2	26.7	36.8
SNO2-3	28.1	46.1	UR1A-3	4.3	37.7
STE1-1	28.8	42.6	UR1-1	44.7	17.5
STE1-2	41.0	46.8	UR1-2	25.8	17.6
STE1-3	41.2	54.7	UR1-3	48.9	34.8
STE2-1	27.3	44.6	UR2-1	63.2	29.2
STE2-2	27.7	37.7	UR2-2	48.9	49.5
STE2-3	20.6	34.8	UR2-3	73.8	38.8
UNK1-1	22.1	28.4	SUNR-1	22.7	30.2
UNK1-2	32.0	27.5	SUNR-2	37.4	71.8
UNK1-3	17.0	25.1	SUNR-3	35.0	84.1
UNK2-1	31.6	41.8	SCR-1	79.4	22.7
UNK2-2	30.3	32.3	SCR-2	89.2	36.7
UNK2-3	30.8	48.6	SCR-3	96.7	37.9
TEC1-1	35.7	50.5	MC1-1	5.8	3.9
TEC1-2	40.3	56.5	MC1-2	5.8	3.9
TEC1-3	27.7	55.0	MC1-3	39.9	26.7
TEC2-1	23.8	39.7	MCTR-1	4.5	3.3
TEC2-2	18.2	25.8	MCTR-2	23.1	30.8
TEC2-3	24.8	41.2	MCTR-3	6.0	4.0
TRC1-1	32.8	22.9	SC1-1	55.1	66.2
TRC1-2	5.8	26.3	SC1-2	42.0	40.1
TRC1-3	35.1	26.8	SC1-3	36.6	45.4
TRC2-1	53.7	48.1	SC2-1	36.9	24.6
TRC2-2	51.9	55.8	SC2-2	7.0	4.4
TRC2-3	29.3	19.2	SC2-3	7.0	4.4
TRC3-1	62.7	22.6	SC3-1	37.1	24.7
TRC3-2	5.9	23.6	SC3-2	33.4	23.2
TRC3-3	7.0	4.4	SC3-3	7.0	4.4
NTR1-1	17.1	20.3	SCT-1	7.0	4.4
NTR1-2	17.4	24.7	SCT-2	36.2	24.1
NTR1-3	16.7	28.6	SCT-3	33.6	22.2
NTR2-1	33.0	44.1			
NTR2-2	28.1	46.0			
NTR2-3	27.0	36.9			
EUR2-1	11.3	28.1			
EUR2-2	20.4	34.1			
EUR2-3	23.5	30.2			
ECM8-1	46.7	17.8			
ECM8-2	35.2	46.1			
ECM8-3	38.6	43.9			

Appendix 5.1-6

Benthic Invertebrate Data for KSM Project Streams, August 2009

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Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				SC1					*SC2*					*SC3*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**
Tricladida	Planariidae		*Polycelis coronata*															
Nematoda						4		33			1							
Oligochaeta	Enchytraeidae						8											
Oligochaeta	Lumbricidae																	
Oligochaeta	Lumbriculidae					5												
Oligochaeta	Naididae																	
Oligochaeta	Tubificidae																	
Hirudinea	Glossiphoniidae		*Helobdella stagnalis*															
Gastropoda	Planorbidae		*Gyraulus*															
Gastropoda	Valvatidae		*Valvata sincera*															
Pelecypoda	Sphaeriidae		*Pisidium*															
Pelecypoda	Sphaeriidae		*Pisidium/Sphaerium*															
Hydracarina						4												
Ostracoda						4												
Cladocera	Daphnidae		*Daphnia*															
Copepoda - Calanoida																		
Copepoda - Cyclopoida																		
Copepoda - Harpacticoida																		
Amphipoda	Gammaridae		*Gammarus lacustris*															
Amphipoda	Talitridae		*Hyallela azteca*															
Collembola											1							
Ephemeroptera	Ameletidae		*Ameletus* sp.					1										
Ephemeroptera	Ameletidae		*Ameletus celer*															
Ephemeroptera	Ameletidae		*Ameletus similior*															
Ephemeroptera	Baetidae (d)																	
Ephemeroptera	Baetidae		*Baetis*			3		2	1	1	1					1		
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*															
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*															
Ephemeroptera	Ephemerellidae		*Drunella doddsi*															
Ephemeroptera	Ephemerellidae		*Ephemerella*															
Ephemeroptera	Ephemerellidae		*Serratella*															
Ephemeroptera	Ephemerellidae (d)																	
Ephemeroptera	Heptageniidae		*Cynigmula*	1														
Ephemeroptera	Heptageniidae		*Epeorus*															
Ephemeroptera	Heptageniidae		*Rhithrogena*	1														
Ephemeroptera	Heptageniidae (d)																	
Ephemeroptera	Leptophlebiidae (d)																	
Ephemeroptera	Leptophlebiidae		*Paraleptophlebia*															
Plecoptera (d)																		
Plecoptera	Capniidae																	
Plecoptera	Chloroperlidae		*Paraperla*															
Plecoptera	Chloroperlidae		*Suwallia*															
Plecoptera	Chloroperlidae		*Sweltsa*													1		
Plecoptera	Chloroperlidae (d)			1														
Plecoptera	Leuctridae		*Despaxia augusta*															
Plecoptera	Leuctridae		*Paraleuctra*															
Plecoptera	Leuctridae (d)																	
Plecoptera	Nemouridae		*Zapada*	1	1	8	1	1	2		1							
Plecoptera	Nemouridae (d)																	

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				SC1					SC2					SC3				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**
Plecoptera	Perlodidae (d)																	
Plecoptera	Perlodidae		*Isoperla*															
Plecoptera	Perlodidae		*Skwala*	1	1	3		2	1	1	2					1		
Plecoptera	Taeniopterygidae		*Taenionema*	9	12	4					6	1	2					
Trichoptera - pupa																		
Trichoptera	Glossosomatidae		*Glossosoma*															
Trichoptera	Hydropsychidae		*Parapsyche*															
Trichoptera	Lepidostomatidae		*Lepidostoma*															
Trichoptera	Limnephilidae (d)																	
Trichoptera	Philopotamidae		*Wormaldia*															
Trichoptera	Rhyacophilidae		*Rhyacophila*															
Trichoptera	Uenoidae		*Neophylax*															
Lepidoptera	Noctuidae																	
Diptera	Empididae		Genus #1						1									
Diptera	Empididae		*Chelifera/Metachela*															
Diptera	Empididae		*Clinocera*					1										
Diptera	Empididae		*Oreogeton*										1					
Diptera	Dixidae		*Dixa*															
Diptera	Blephariceridae		*Agathon*															
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*															
Diptera	Ceratopogonidae	Ceratopogoninae	*Probezzia*															
Diptera	Ephydridae						1											
Diptera	Simulidae		*Helodon clavatus* (pupa)															
Diptera	Simulidae		*Helodon onychodactylus* (pupa)															
Diptera	Simulidae		*Helodon*															
Diptera	Simulidae		*Prosimulium/Helodon*															
Diptera	Simulidae		*Simulium*															
Diptera	Tipulidae		*Dicranota*			4		8										
Diptera	Tipulidae		*Erioptera*															
Diptera	Tipulidae		*Gonomyodes*	1		7	17	9		1								
Diptera	Tipulidae		*Hexatoma*															
Diptera	Tipulidae		*Limnophila*															
Diptera	Tipulidae		*Hexatoma/Limnophila*															
Diptera	Tipulidae		*Rhabdomastix*															
Diptera	Tipulidae		*Tipula*															
Diptera	Tipulidae (d)																	
Diptera	Chironomidae - Pupa			2	6	35	21	106								1		
Diptera	Chironomidae	Chironomini	*Chironomus*															
Diptera	Chironomidae	Chironomini	*Endochironomus*															
Diptera	Chironomidae	Chironomini	*Microtendipes*															
Diptera	Chironomidae	Chironomini	*Phaenopsectra*															
Diptera	Chironomidae	Chironomini	*Polypedilum*															
Diptera	Chironomidae	Chironomini	*Sergentia*															
Diptera	Chironomidae	Chironomini	*Stictochironomus*															
Diptera	Chironomidae	Tanytarsini	*Micropsectra*															
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*															
Diptera	Chironomidae	Tanytarsini	*Stempellinella*															
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*															
Diptera	Chironomidae	Orthocladiinae (d)			1	16		8										

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				SC1					*SC2*					*SC3*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**
Diptera	Chironomidae	Orthocladiinae	*Brillia*	1														
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*															
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*															
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*	1														
Diptera	Chironomidae	Orthocladiinae	*Epoicocladius*															
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*		1							1			1	1	1	
Diptera	Chironomidae	Orthocladiinae	*Gymnometriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Heleniella*															
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*															
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*															
Diptera	Chironomidae	Orthocladiinae	*Metriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Parakiefferiella*	1														
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*					8										
Diptera	Chironomidae	Orthocladiinae	*Paraphaenocladius*							1								
Diptera	Chironomidae	Orthocladiinae	cf. *Platysmittia*	3		32	16	24	1									
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*							1								
Diptera	Chironomidae	Orthocladiinae	*Psilometrocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*	1														
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*															
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*															
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*							1						1		
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*	9	12	145	89	254	2		1	1	1		1	2	1	
Diptera	Chironomidae	Tanypodinae (d)																
Diptera	Chironomidae	Tanypodinae	*Larsia*															
Diptera	Chironomidae	Tanypodinae	*Procladius*															
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.															
Diptera	Chironomidae	Diamesinae (d)																
Diptera	Chironomidae	Diamesinae	*Diamesa*	34	19	147	310	66	7	7	2		1	4	4	2		
Diptera	Chironomidae	Diamesinae	*Pagastia*						2									
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*			1	2											
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*															
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*															
Terrestrial				1			8	1		2	5	1						
			Total	***68***	***53***	***422***	***473***	***524***	***17***	***15***	***20***	***4***	***5***	***4***	***6***	***10***	***2***	***0***

(d) - small or demaged; cannot be ID below this level

Genus #1 - this is an undescribed Epidid larva belonging possibly to a new genus and species

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				TRC1			*TRC2*					*TRC3*		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**
Tricladida	Planariidae		*Polycelis coronata*											
Nematoda														
Oligochaeta	Enchytraeidae							1				2	5	1
Oligochaeta	Lumbricidae													
Oligochaeta	Lumbriculidae													
Oligochaeta	Naididae													
Oligochaeta	Tubificidae													
Hirudinea	Glossiphoniidae		*Helobdella stagnalis*											
Gastropoda	Planorbidae		*Gyraulus*											
Gastropoda	Valvatidae		*Valvata sincera*											
Pelecypoda	Sphaeriidae		*Pisidium*											
Pelecypoda	Sphaeriidae		*Pisidium/Sphaerium*											
Hydracarina								1						
Ostracoda														
Cladocera	Daphnidae		*Daphnia*											
Copepoda - Calanoida														
Copepoda - Cyclopoida														
Copepoda - Harpacticoida														
Amphipoda	Gammaridae		*Gammarus lacustris*											
Amphipoda	Talitridae		*Hyallela azteca*											
Collembola					1								1	
Ephemeroptera	Ameletidae		*Ameletus* sp.											
Ephemeroptera	Ameletidae		*Ameletus celer*											
Ephemeroptera	Ameletidae		*Ameletus similior*											
Ephemeroptera	Baetidae (d)													
Ephemeroptera	Baetidae		*Baetis*	4			1	1		1				
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*											
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*											
Ephemeroptera	Ephemerellidae		*Drunella doddsi*						1					
Ephemeroptera	Ephemerellidae		*Ephemerella*											
Ephemeroptera	Ephemerellidae		*Serratella*											
Ephemeroptera	Ephemerellidae (d)													
Ephemeroptera	Heptageniidae		*Cynigmula*	1										
Ephemeroptera	Heptageniidae		*Epeorus*	1						1				
Ephemeroptera	Heptageniidae		*Rhithrogena*				1	5	3	11	6			
Ephemeroptera	Heptageniidae (d)								1					
Ephemeroptera	Leptophlebiidae (d)													
Ephemeroptera	Leptophlebiidae		*Paraleptophlebia*											
Plecoptera (d)														
Plecoptera	Capniidae													
Plecoptera	Chloroperlidae		*Paraperla*											
Plecoptera	Chloroperlidae		*Suwallia*											
Plecoptera	Chloroperlidae		*Sweltsa*											
Plecoptera	Chloroperlidae (d)						2	2	5	2				
Plecoptera	Leuctridae		*Despaxia augusta*											
Plecoptera	Leuctridae		*Paraleuctra*											
Plecoptera	Leuctridae (d)													
Plecoptera	Nemouridae		*Zapada*	1										
Plecoptera	Nemouridae (d)													

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				TRC1			TRC2					TRC3		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**
Plecoptera	Perlodidae (d)													
Plecoptera	Perlodidae		*Isoperla*											
Plecoptera	Perlodidae		*Skwala*					4		4				
Plecoptera	Taeniopterygidae		*Taenionema*					2		1	1			1
Trichoptera - pupa														
Trichoptera	Glossosomatidae		*Glossosoma*											
Trichoptera	Hydropsychidae		*Parapsyche*											
Trichoptera	Lepidostomatidae		*Lepidostoma*											
Trichoptera	Limnephilidae (d)													
Trichoptera	Philopotamidae		*Wormaldia*											
Trichoptera	Rhyacophilidae		*Rhyacophila*	2					1					
Trichoptera	Uenoidae		*Neophylax*											
Lepidoptera	Noctuidae													
Diptera	Empididae		Genus #1											
Diptera	Empididae		*Chelifera/Metachela*											
Diptera	Empididae		*Clinocera*											
Diptera	Empididae		*Oreogeton*											
Diptera	Dixidae		*Dixa*											
Diptera	Blephariceridae		*Agathon*											
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*											
Diptera	Ceratopogonidae	Ceratopogoninae	*Probezzia*											
Diptera	Ephydridae													
Diptera	Simulidae		*Helodon clavatus* (pupa)											
Diptera	Simulidae		*Helodon onychodactylus* (pupa)											
Diptera	Simulidae		*Helodon*											
Diptera	Simulidae		*Prosimulium/Helodon*											
Diptera	Simulidae		*Simulium*											
Diptera	Tipulidae		*Dicranota*											
Diptera	Tipulidae		*Erioptera*											
Diptera	Tipulidae		*Gonomyodes*											
Diptera	Tipulidae		*Hexatoma*											
Diptera	Tipulidae		*Limnophila*											
Diptera	Tipulidae		*Hexatoma/Limnophila*											
Diptera	Tipulidae		*Rhabdomastix*											
Diptera	Tipulidae		*Tipula*											
Diptera	Tipulidae (d)													
Diptera	Chironomidae - Pupa									1		1		
Diptera	Chironomidae	Chironomini	*Chironomus*											
Diptera	Chironomidae	Chironomini	*Endochironomus*											
Diptera	Chironomidae	Chironomini	*Microtendipes*											
Diptera	Chironomidae	Chironomini	*Phaenopsectra*											
Diptera	Chironomidae	Chironomini	*Polypedilum*											
Diptera	Chironomidae	Chironomini	*Sergentia*											
Diptera	Chironomidae	Chironomini	*Stictochironomus*											
Diptera	Chironomidae	Tanytarsini	*Micropsectra*											
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*											
Diptera	Chironomidae	Tanytarsini	*Stempellinella*											
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*						1					
Diptera	Chironomidae	Orthocladiinae (d)												

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				TRC1			*TRC2*					*TRC3*		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**
Diptera	Chironomidae	Orthocladiinae	*Brillia*											
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*											
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*											
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*											
Diptera	Chironomidae	Orthocladiinae	*Epoicocladius*											
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*	3										
Diptera	Chironomidae	Orthocladiinae	*Gymnometriocnemus*											
Diptera	Chironomidae	Orthocladiinae	*Heleniella*											
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*											
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*											
Diptera	Chironomidae	Orthocladiinae	*Metriocnemus*											
Diptera	Chironomidae	Orthocladiinae	*Parakiefferiella*											
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*											
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*											
Diptera	Chironomidae	Orthocladiinae	*Paraphaenocladius*						1					
Diptera	Chironomidae	Orthocladiinae	cf. *Platysmittia*				1							
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*											
Diptera	Chironomidae	Orthocladiinae	*Psilometrocnemus*											
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*											
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*											
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*											
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*	2									1	
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*	3										
Diptera	Chironomidae	Tanypodinae (d)												
Diptera	Chironomidae	Tanypodinae	*Larsia*											
Diptera	Chironomidae	Tanypodinae	*Procladius*											
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.											
Diptera	Chironomidae	Diamesinae (d)												
Diptera	Chironomidae	Diamesinae	*Diamesa*	1			1	1	3	3		2		
Diptera	Chironomidae	Diamesinae	*Pagastia*											
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*											
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*											
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*											
Terrestrial										1				1
			Total	***18***	***1***	***0***	***6***	***17***	***16***	***25***	***7***	***5***	***7***	***3***

(d) - small or demaged; cannot be ID below this level

Genus #1 - this is an undescribed Epidid larva belonging possibly to a new genus and species

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				UR1					*UR1A*					*UNK1*		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**
Tricladida	Planariidae		*Polycelis coronata*										1			
Nematoda					1							1				8
Oligochaeta	Enchytraeidae				1		1	1	1			1				
Oligochaeta	Lumbricidae															
Oligochaeta	Lumbriculidae															
Oligochaeta	Naididae															
Oligochaeta	Tubificidae															
Hirudinea	Glossiphoniidae		*Helobdella stagnalis*													
Gastropoda	Planorbidae		*Gyraulus*													
Gastropoda	Valvatidae		*Valvata sincera*													
Pelecypoda	Sphaeriidae		*Pisidium*													
Pelecypoda	Sphaeriidae		*Pisidium/Sphaerium*													
Hydracarina							2								4	9
Ostracoda																
Cladocera	Daphnidae		*Daphnia*													
Copepoda - Calanoida																
Copepoda - Cyclopoida																
Copepoda - Harpacticoida																8
Amphipoda	Gammaridae		*Gammarus lacustris*													
Amphipoda	Talitridae		*Hyallela azteca*													
Collembola																4
Ephemeroptera	Ameletidae		*Ameletus* sp.		1				2	4	1	3	3			1
Ephemeroptera	Ameletidae		*Ameletus celer*													
Ephemeroptera	Ameletidae		*Ameletus similior*								1					
Ephemeroptera	Baetidae (d)															
Ephemeroptera	Baetidae		*Baetis*	12	28	29	10	16	7	17	14	21	8	19	21	26
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*													
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*													
Ephemeroptera	Ephemerellidae		*Drunella doddsi*						2	2				78	44	57
Ephemeroptera	Ephemerellidae		*Ephemerella*													
Ephemeroptera	Ephemerellidae		*Serratella*													
Ephemeroptera	Ephemerellidae (d)															4
Ephemeroptera	Heptageniidae		*Cynigmula*			1	1	1		2	3		9	1	4	3
Ephemeroptera	Heptageniidae		*Epeorus*		1	2	2	3	1	2	1	2	7	4		4
Ephemeroptera	Heptageniidae		*Rhithrogena*	1	3	6	6	1	29	26	11	31	6	91	58	25
Ephemeroptera	Heptageniidae (d)												2	20	44	45
Ephemeroptera	Leptophlebiidae (d)						1							4	8	12
Ephemeroptera	Leptophlebiidae		*Paraleptophlebia*												1	20
Plecoptera (d)															4	8
Plecoptera	Capniidae														4	4
Plecoptera	Chloroperlidae		*Paraperla*												2	1
Plecoptera	Chloroperlidae		*Suwallia*		1	2	5	2	10	4		6	1			
Plecoptera	Chloroperlidae		*Sweltsa*								3					1
Plecoptera	Chloroperlidae (d)			3	6	1		2	12	5	2	4	7			
Plecoptera	Leuctridae		*Despaxia augusta*											3	4	
Plecoptera	Leuctridae		*Paraleuctra*												3	
Plecoptera	Leuctridae (d)											2	1			
Plecoptera	Nemouridae		*Zapada*	1	1	3		1	1	10	5	4	3	53	133	64
Plecoptera	Nemouridae (d)															

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				UR1					*UR1A*					*UNK1*		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**
Plecoptera	Perlodidae (d)															
Plecoptera	Perlodidae		*Isoperla*													
Plecoptera	Perlodidae		*Skwala*		7	5	3		3	2	3	3	4	4	1	
Plecoptera	Taeniopterygidae		*Taenionema*	3	11	6	23	41	17	29	37	24	46	8		
Trichoptera - pupa																
Trichoptera	Glossosomatidae		*Glossosoma*													
Trichoptera	Hydropsychidae		*Parapsyche*												1	
Trichoptera	Lepidostomatidae		*Lepidostoma*									1				
Trichoptera	Limnephilidae (d)															
Trichoptera	Philopotamidae		*Wormaldia*													
Trichoptera	Rhyacophilidae		*Rhyacophila*							1				3	4	6
Trichoptera	Uenoidae		*Neophylax*												1	1
Lepidoptera	Noctuidae														1	
Diptera	Empididae		Genus #1													
Diptera	Empididae		*Chelifera/Metachela*													
Diptera	Empididae		*Clinocera*									1			1	
Diptera	Empididae		*Oreogeton*											1	1	1
Diptera	Dixidae		*Dixa*													
Diptera	Blephariceridae		*Agathon*													
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*													
Diptera	Ceratopogonidae	Ceratopogoninae	*Probezzia*													
Diptera	Ephydridae															
Diptera	Simulidae		*Helodon clavatus* (pupa)													
Diptera	Simulidae		*Helodon onychodactylus* (pupa)								1					1
Diptera	Simulidae		*Helodon*													
Diptera	Simulidae		*Prosimulium/Helodon*													1
Diptera	Simulidae		*Simulium*													
Diptera	Tipulidae		*Dicranota*							1						
Diptera	Tipulidae		*Erioptera*													
Diptera	Tipulidae		*Gonomyodes*													
Diptera	Tipulidae		*Hexatoma*													
Diptera	Tipulidae		*Limnophila*													
Diptera	Tipulidae		*Hexatoma/Limnophila*													
Diptera	Tipulidae		*Rhabdomastix*					1				2	4			
Diptera	Tipulidae		*Tipula*													
Diptera	Tipulidae (d)															
Diptera	Chironomidae - Pupa									1		1			5	22
Diptera	Chironomidae	Chironomini	*Chironomus*													
Diptera	Chironomidae	Chironomini	*Endochironomus*													
Diptera	Chironomidae	Chironomini	*Microtendipes*													
Diptera	Chironomidae	Chironomini	*Phaenopsectra*													
Diptera	Chironomidae	Chironomini	*Polypedilum*													
Diptera	Chironomidae	Chironomini	*Sergentia*													
Diptera	Chironomidae	Chironomini	*Stictochironomus*													
Diptera	Chironomidae	Tanytarsini	*Micropsectra*													
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*													
Diptera	Chironomidae	Tanytarsini	*Stempellinella*													
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*						1					4	4	
Diptera	Chironomidae	Orthocladiinae (d)				1		1								16

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				UR1					*UR1A*					*UNK1*		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**
Diptera	Chironomidae	Orthocladiinae	*Brillia*	2		1				1						
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*											4		
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*										1			4
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*										1			
Diptera	Chironomidae	Orthocladiinae	*Epoicocladius*													
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*		2	1		1		2		1				24
Diptera	Chironomidae	Orthocladiinae	*Gymnometriocnemus*													
Diptera	Chironomidae	Orthocladiinae	*Heleniella*								1					
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*													
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*													
Diptera	Chironomidae	Orthocladiinae	*Metriocnemus*													
Diptera	Chironomidae	Orthocladiinae	*Parakiefferiella*													
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*													4
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*													
Diptera	Chironomidae	Orthocladiinae	*Paraphaenocladius*													
Diptera	Chironomidae	Orthocladiinae	cf. *Platysmittia*	2	3		2	1	8	18	4	9	19			
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*													
Diptera	Chironomidae	Orthocladiinae	*Psilometrocnemus*													
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*										1			4
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*													
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*													
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*		2					1		2		8	16	28
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*		2	1			1				2	12	20	112
Diptera	Chironomidae	Tanypodinae (d)														
Diptera	Chironomidae	Tanypodinae	*Larsia*	1												
Diptera	Chironomidae	Tanypodinae	*Procladius*													
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.													
Diptera	Chironomidae	Diamesinae (d)														
Diptera	Chironomidae	Diamesinae	*Diamesa*	1	2	4										
Diptera	Chironomidae	Diamesinae	*Pagastia*		1									5		1
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*													
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*													
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*													
Terrestrial					2				2	1	1			1	9	8
			Total	***26***	***75***	***63***	***56***	***72***	***97***	***129***	***88***	***119***	***126***	***323***	***398***	***537***

(d) - small or demaged; cannot be ID below this level

Genus #1 - this is an undescribed Epidid larva belonging possibly to a new genus and species

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				UNK2					*NTR1*			*NTR2*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#4**	**$5**
Tricladida	Planariidae		*Polycelis coronata*				1		83	1	38	1	2	6	1	5
Nematoda					32		20		81		60					
Oligochaeta	Enchytraeidae								102		41			4		
Oligochaeta	Lumbricidae															
Oligochaeta	Lumbriculidae								1							
Oligochaeta	Naididae										40					
Oligochaeta	Tubificidae								7	42	23					
Hirudinea	Glossiphoniidae		*Helobdella stagnalis*													
Gastropoda	Planorbidae		*Gyraulus*													
Gastropoda	Valvatidae		*Valvata sincera*													
Pelecypoda	Sphaeriidae		*Pisidium*							10						
Pelecypoda	Sphaeriidae		*Pisidium/Sphaerium*						1	6						
Hydracarina						10		10	106		144			4		
Ostracoda				1		10			1181	150	41			100	4	
Cladocera	Daphnidae		*Daphnia*													
Copepoda - Calanoida																
Copepoda - Cyclopoida				8					20		20					
Copepoda - Harpacticoida									100		40					
Amphipoda	Gammaridae		*Gammarus lacustris*													
Amphipoda	Talitridae		*Hyallela azteca*													
Collembola																
Ephemeroptera	Ameletidae		*Ameletus* sp.										1	16		
Ephemeroptera	Ameletidae		*Ameletus celer*											1		
Ephemeroptera	Ameletidae		*Ameletus similior*													
Ephemeroptera	Baetidae (d)					10								4		
Ephemeroptera	Baetidae		*Baetis*	112	206	239	361	228			60	1	4	3	5	2
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*													
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*		1								2			1
Ephemeroptera	Ephemerellidae		*Drunella doddsi*	19	90	115	136	100	20			2		8	6	4
Ephemeroptera	Ephemerellidae		*Ephemerella*													
Ephemeroptera	Ephemerellidae		*Serratella*													
Ephemeroptera	Ephemerellidae (d)			24	48	30	100	60	40				8		1	
Ephemeroptera	Heptageniidae		*Cynigmula*		7							1	2	6	3	
Ephemeroptera	Heptageniidae		*Epeorus*	2	9	5	14	15				29	6	1	7	9
Ephemeroptera	Heptageniidae		*Rhithrogena*		8	2	11	9				42	47	50	49	83
Ephemeroptera	Heptageniidae (d)				8						20	40	20	40	13	7
Ephemeroptera	Leptophlebiidae (d)															
Ephemeroptera	Leptophlebiidae		*Paraleptophlebia*													
Plecoptera (d)						10						8			3	2
Plecoptera	Capniidae			8	9		1		140		443			5	3	9
Plecoptera	Chloroperlidae		*Paraperla*													
Plecoptera	Chloroperlidae		*Suwallia*		1											
Plecoptera	Chloroperlidae		*Sweltsa*												38	
Plecoptera	Chloroperlidae (d)			1	5	2	13					28	21	12		17
Plecoptera	Leuctridae		*Despaxia augusta*											1		
Plecoptera	Leuctridae		*Paraleuctra*											6	1	
Plecoptera	Leuctridae (d)											1	1			
Plecoptera	Nemouridae		*Zapada*		1			10	41	51	241	20	4	11	7	5
Plecoptera	Nemouridae (d)															

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				UNK2					*NTR1*			*NTR2*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#4**	**$5**
Plecoptera	Perlodidae (d)								20							
Plecoptera	Perlodidae		*Isoperla*						3		5					
Plecoptera	Perlodidae		*Skwala*		2	2	1	1				52	60	16	26	13
Plecoptera	Taeniopterygidae		*Taenionema*	1	21	13	34	27	1			36	11	28	58	11
Trichoptera - pupa						2			2							
Trichoptera	Glossosomatidae		*Glossosoma*										4			
Trichoptera	Hydropsychidae		*Parapsyche*									1		1		1
Trichoptera	Lepidostomatidae		*Lepidostoma*													
Trichoptera	Limnephilidae (d)								24	6	1			2		
Trichoptera	Philopotamidae		*Wormaldia*													
Trichoptera	Rhyacophilidae		*Rhyacophila*			3	2	2	1	1	6	3	1	3	1	2
Trichoptera	Uenoidae		*Neophylax*													
Lepidoptera	Noctuidae								1							
Diptera	Empididae		Genus #1													
Diptera	Empididae		*Chelifera/Metachela*						3							
Diptera	Empididae		*Clinocera*							1	4					
Diptera	Empididae		*Oreogeton*					1						3	1	
Diptera	Dixidae		*Dixa*							1						
Diptera	Blephariceridae		*Agathon*													
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*			1										
Diptera	Ceratopogonidae	Ceratopogoninae	*Probezzia*						1							
Diptera	Ephydridae															
Diptera	Simulidae		*Helodon clavatus* (pupa)													
Diptera	Simulidae		*Helodon onychodactylus* (pupa)		1	3	15	1								
Diptera	Simulidae		*Helodon*			2	3									
Diptera	Simulidae		*Prosimulium/Helodon*						20							
Diptera	Simulidae		*Simulium*		9						848					
Diptera	Tipulidae		*Dicranota*	8				10	37	4	63			1	2	
Diptera	Tipulidae		*Erioptera*													
Diptera	Tipulidae		*Gonomyodes*	1	4	13	22	2					4		1	
Diptera	Tipulidae		*Hexatoma*													
Diptera	Tipulidae		*Limnophila*							1						
Diptera	Tipulidae		*Hexatoma/Limnophila*						1							
Diptera	Tipulidae		*Rhabdomastix*													
Diptera	Tipulidae		*Tipula*													
Diptera	Tipulidae (d)															
Diptera	Chironomidae - Pupa				17	29	47	36	1	10	20	1	6	8		
Diptera	Chironomidae	Chironomini	*Chironomus*													
Diptera	Chironomidae	Chironomini	*Endochironomus*													
Diptera	Chironomidae	Chironomini	*Microtendipes*													
Diptera	Chironomidae	Chironomini	*Phaenopsectra*													
Diptera	Chironomidae	Chironomini	*Polypedilum*						20							
Diptera	Chironomidae	Chironomini	*Sergentia*													
Diptera	Chironomidae	Chironomini	*Stictochironomus*													
Diptera	Chironomidae	Tanytarsini	*Micropsectra*													
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*						20							
Diptera	Chironomidae	Tanytarsini	*Stempellinella*						82							1
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*						1081		520					
Diptera	Chironomidae	Orthocladiinae (d)							80		80		4		1	

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				UNK2					*NTR1*			*NTR2*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#4**	**$5**
Diptera	Chironomidae	Orthocladiinae	*Brillia*												1	1
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*													
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*						61	10	40					
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*						61							
Diptera	Chironomidae	Orthocladiinae	*Epoicocladius*								20					
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*							12	340	24	4	7		1
Diptera	Chironomidae	Orthocladiinae	*Gymnometriocnemus*													
Diptera	Chironomidae	Orthocladiinae	*Heleniella*													
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*						8	3						
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*								20					
Diptera	Chironomidae	Orthocladiinae	*Metriocnemus*													
Diptera	Chironomidae	Orthocladiinae	*Parakiefferiella*													
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*													
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*	58	26	70	152	124	40					4	1	
Diptera	Chironomidae	Orthocladiinae	*Paraphaenocladius*													
Diptera	Chironomidae	Orthocladiinae	cf. *Platysmittia*											4	1	1
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*													
Diptera	Chironomidae	Orthocladiinae	*Psilometrocnemus*													
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*				20	20	20						1	
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*													
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*								20					
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*			1	1		2	32	146				1	1
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*	1136	1197	1142	434	880	483	120	160	97	112	33	31	4
Diptera	Chironomidae	Tanypodinae (d)							20							
Diptera	Chironomidae	Tanypodinae	*Larsia*													
Diptera	Chironomidae	Tanypodinae	*Procladius*													
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.												3	
Diptera	Chironomidae	Diamesinae (d)							40							
Diptera	Chironomidae	Diamesinae	*Diamesa*	155	345	349	221	209	20			44				
Diptera	Chironomidae	Diamesinae	*Pagastia*		1	10	4	2	257	54	182					
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*						20				1			
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*													
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*							3						
Terrestrial					1		1	4	4		2	9		9	5	1
			Total	***1534***	***2049***	***2073***	***1614***	***1751***	***4357***	***518***	***3688***	***440***	***325***	***397***	***275***	***181***

(d) - small or demaged; cannot be ID below this level

Genus #1 - this is an undescribed Epidid larva belonging possibly to a new genus and species

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				SNO1					*SNO2*					*SCR*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**
Tricladida	Planariidae		*Polycelis coronata*															
Nematoda					1	2		2	16									
Oligochaeta	Enchytraeidae			2			1	1										
Oligochaeta	Lumbricidae																	
Oligochaeta	Lumbriculidae																	
Oligochaeta	Naididae											10						
Oligochaeta	Tubificidae											1						
Hirudinea	Glossiphoniidae		*Helobdella stagnalis*															
Gastropoda	Planorbidae		*Gyraulus*															
Gastropoda	Valvatidae		*Valvata sincera*															
Pelecypoda	Sphaeriidae		*Pisidium*															
Pelecypoda	Sphaeriidae		*Pisidium/Sphaerium*															
Hydracarina						1			8									
Ostracoda																		
Cladocera	Daphnidae		*Daphnia*															
Copepoda - Calanoida																		
Copepoda - Cyclopoida																		
Copepoda - Harpacticoida																		
Amphipoda	Gammaridae		*Gammarus lacustris*															
Amphipoda	Talitridae		*Hyallela azteca*															
Collembola								2										
Ephemeroptera	Ameletidae		*Ameletus* sp.	1			1	1	8			3						
Ephemeroptera	Ameletidae		*Ameletus celer*															
Ephemeroptera	Ameletidae		*Ameletus similior*															
Ephemeroptera	Baetidae (d)																	
Ephemeroptera	Baetidae		*Baetis*	29	10	41	13	22	91	63	92	41	73	4	2	2	11	8
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*						2									
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*							5	2	1						
Ephemeroptera	Ephemerellidae		*Drunella doddsi*		1	1	7	9	212	85	172	3	25					
Ephemeroptera	Ephemerellidae		*Ephemerella*															
Ephemeroptera	Ephemerellidae		*Serratella*						10									
Ephemeroptera	Ephemerellidae (d)								80	24	21	10	40					
Ephemeroptera	Heptageniidae		*Cynigmula*						40	27	29	24	7					
Ephemeroptera	Heptageniidae		*Epeorus*	8	7	3	4	5	35	39	31	8	7	3			2	
Ephemeroptera	Heptageniidae		*Rhithrogena*	15	4	11	19	7	75	138	203	70	33	1			5	1
Ephemeroptera	Heptageniidae (d)				1			1	241	224	100	111	25					
Ephemeroptera	Leptophlebiidae (d)																	
Ephemeroptera	Leptophlebiidae		*Paraleptophlebia*															
Plecoptera (d)						4	1	13	32	24								
Plecoptera	Capniidae			6	3	2	7	6	51	57	1	81	26	1				
Plecoptera	Chloroperlidae		*Paraperla*															
Plecoptera	Chloroperlidae		*Suwallia*			1			7	31	13		4					
Plecoptera	Chloroperlidae		*Sweltsa*			1						5						1
Plecoptera	Chloroperlidae (d)			4	5				19	131	10	7	59		69	115	5	4
Plecoptera	Leuctridae		*Despaxia augusta*															
Plecoptera	Leuctridae		*Paraleuctra*															
Plecoptera	Leuctridae (d)																	4
Plecoptera	Nemouridae		*Zapada*			1		1	28	3	2							1
Plecoptera	Nemouridae (d)																	

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				SNO1					*SNO2*					*SCR*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**
Plecoptera	Perlodidae (d)							1			10							
Plecoptera	Perlodidae		*Isoperla*						28		33	5						
Plecoptera	Perlodidae		*Skwala*	3	2	5	6	8	2	4	3		1		1	1	1	3
Plecoptera	Taeniopterygidae		*Taenionema*	11	13	20	7	31	270	62	194	50	10				2	1
Trichoptera - pupa									1									
Trichoptera	Glossosomatidae		*Glossosoma*					1										
Trichoptera	Hydropsychidae		*Parapsyche*							1								1
Trichoptera	Lepidostomatidae		*Lepidostoma*															
Trichoptera	Limnephilidae (d)				2			1										
Trichoptera	Philopotamidae		*Wormaldia*															
Trichoptera	Rhyacophilidae		*Rhyacophila*	1	1	5						2						1
Trichoptera	Uenoidae		*Neophylax*															
Lepidoptera	Noctuidae																	
Diptera	Empididae		Genus #1			1												
Diptera	Empididae		*Chelifera/Metachela*															
Diptera	Empididae		*Clinocera*				1											
Diptera	Empididae		*Oreogeton*															
Diptera	Dixidae		*Dixa*															
Diptera	Blephariceridae		*Agathon*															
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*									1						
Diptera	Ceratopogonidae	Ceratopogoninae	*Probezzia*															
Diptera	Ephydridae																	
Diptera	Simulidae		*Helodon clavatus* (pupa)															
Diptera	Simulidae		*Helodon onychodactylus* (pupa)						3									
Diptera	Simulidae		*Helodon*		1	6												
Diptera	Simulidae		*Prosimulium/Helodon*															
Diptera	Simulidae		*Simulium*															
Diptera	Tipulidae		*Dicranota*	1	1	5	6	7	11			1	10					
Diptera	Tipulidae		*Erioptera*															
Diptera	Tipulidae		*Gonomyodes*	10	13	7	8	9									1	
Diptera	Tipulidae		*Hexatoma*						1	1								
Diptera	Tipulidae		*Limnophila*															
Diptera	Tipulidae		*Hexatoma/Limnophila*															
Diptera	Tipulidae		*Rhabdomastix*					1	1		1							
Diptera	Tipulidae		*Tipula*															
Diptera	Tipulidae (d)							1			10							
Diptera	Chironomidae - Pupa			2	1	3	1	5	2	8	10							
Diptera	Chironomidae	Chironomini	*Chironomus*															
Diptera	Chironomidae	Chironomini	*Endochironomus*															
Diptera	Chironomidae	Chironomini	*Microtendipes*															
Diptera	Chironomidae	Chironomini	*Phaenopsectra*															
Diptera	Chironomidae	Chironomini	*Polypedilum*															
Diptera	Chironomidae	Chironomini	*Sergentia*															
Diptera	Chironomidae	Chironomini	*Stictochironomus*															
Diptera	Chironomidae	Tanytarsini	*Micropsectra*															
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*															
Diptera	Chironomidae	Tanytarsini	*Stempellinella*															
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*						1									
Diptera	Chironomidae	Orthocladiinae (d)		1			1				20	10						

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				SNO1					*SNO2*					*SCR*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**
Diptera	Chironomidae	Orthocladiinae	*Brillia*		1													
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*															
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*															
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*									10						
Diptera	Chironomidae	Orthocladiinae	*Epoicocladius*															
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*	2		11	1	2	180	16	164	11						
Diptera	Chironomidae	Orthocladiinae	*Gymnometriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Heleniella*															
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*									10						
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*					1										
Diptera	Chironomidae	Orthocladiinae	*Metriocnemus*		1													
Diptera	Chironomidae	Orthocladiinae	*Parakiefferiella*		1					8		3	5					
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*			1												
Diptera	Chironomidae	Orthocladiinae	*Paraphaenocladius*	1	1		1	1										
Diptera	Chironomidae	Orthocladiinae	cf. *Platysmittia*			2											1	
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*															
Diptera	Chironomidae	Orthocladiinae	*Psilometrocnemus*					1										
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*		1	1	1		16	2								
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*															
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*															
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*	7	3	1	3	1	16		20							
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*	5	3	2	3	3	196	51	146		22		1			
Diptera	Chironomidae	Tanypodinae (d)																
Diptera	Chironomidae	Tanypodinae	*Larsia*															
Diptera	Chironomidae	Tanypodinae	*Procladius*															
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.															
Diptera	Chironomidae	Diamesinae (d)																
Diptera	Chironomidae	Diamesinae	*Diamesa*	7	6	6	2	2	1	1	10		5	1	18	3	9	2
Diptera	Chironomidae	Diamesinae	*Pagastia*	2		3	11	1										
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*															
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*															
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*															
Terrestrial				4	1	1	1	1	1					1			1	3
			Total	***122***	***84***	***148***	***106***	***148***	***1685***	***1005***	***1297***	***478***	***352***	***11***	***91***	***121***	***38***	***30***

(d) - small or demaged; cannot be ID below this level

Genus #1 - this is an undescribed Epidid larva belonging possibly to a new genus and species

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				TEC1					*TEC2*					*MC1*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**
Tricladida	Planariidae		*Polycelis coronata*			1	2											
Nematoda												1		4				
Oligochaeta	Enchytraeidae																	
Oligochaeta	Lumbricidae																	
Oligochaeta	Lumbriculidae																	
Oligochaeta	Naididae															1		
Oligochaeta	Tubificidae																	
Hirudinea	Glossiphoniidae		*Helobdella stagnalis*															
Gastropoda	Planorbidae		*Gyraulus*															
Gastropoda	Valvatidae		*Valvata sincera*															
Pelecypoda	Sphaeriidae		*Pisidium*															
Pelecypoda	Sphaeriidae		*Pisidium/Sphaerium*															1
Hydracarina							4		21	40		40						
Ostracoda																		
Cladocera	Daphnidae		*Daphnia*															
Copepoda - Calanoida																		
Copepoda - Cyclopoida																		
Copepoda - Harpacticoida																		
Amphipoda	Gammaridae		*Gammarus lacustris*															
Amphipoda	Talitridae		*Hyallela azteca*															
Collembola																	2	
Ephemeroptera	Ameletidae		*Ameletus* sp.				4		60			60	20					
Ephemeroptera	Ameletidae		*Ameletus celer*															
Ephemeroptera	Ameletidae		*Ameletus similior*															
Ephemeroptera	Baetidae (d)																	
Ephemeroptera	Baetidae		*Baetis*	33	48	52	24	40	223	151	337	356	182				1	
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*															
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*	1	3		1		1	1	1		1					
Ephemeroptera	Ephemerellidae		*Drunella doddsi*	10	22	3	6	18	279	43	130	97	94					
Ephemeroptera	Ephemerellidae		*Ephemerella*															
Ephemeroptera	Ephemerellidae		*Serratella*															
Ephemeroptera	Ephemerellidae (d)					8	32	40	40		20	100	20					
Ephemeroptera	Heptageniidae		*Cynigmula*				3	12	3		3							
Ephemeroptera	Heptageniidae		*Epeorus*	42	48	29	30	17	1	1	7	10	5					
Ephemeroptera	Heptageniidae		*Rhithrogena*	127	121	49	36	49	41		20	40				1		
Ephemeroptera	Heptageniidae (d)			16	56	16	28	24	40		40	80						
Ephemeroptera	Leptophlebiidae (d)																	
Ephemeroptera	Leptophlebiidae		*Paraleptophlebia*															
Plecoptera (d)									160	220	40	40	70				1	
Plecoptera	Capniidae			9		1												
Plecoptera	Chloroperlidae		*Paraperla*	3														
Plecoptera	Chloroperlidae		*Suwallia*		2		3	2	3			2						
Plecoptera	Chloroperlidae		*Sweltsa*															
Plecoptera	Chloroperlidae (d)			20	16	8	1	1										
Plecoptera	Leuctridae		*Despaxia augusta*															
Plecoptera	Leuctridae		*Paraleuctra*	1														
Plecoptera	Leuctridae (d)																	
Plecoptera	Nemouridae		*Zapada*	38	63	20	45	73	145	22	34	128	10					
Plecoptera	Nemouridae (d)																	

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				TEC1					*TEC2*					*MC1*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**
Plecoptera	Perlodidae (d)									1		100	10					
Plecoptera	Perlodidae		*Isoperla*				8											
Plecoptera	Perlodidae		*Skwala*		2				1		4	1	3					
Plecoptera	Taeniopterygidae		*Taenionema*	117	140	190	132	197	101	20	20	20	50				1	
Trichoptera - pupa																		
Trichoptera	Glossosomatidae		*Glossosoma*															
Trichoptera	Hydropsychidae		*Parapsyche*	14	18	4	2	1				21						
Trichoptera	Lepidostomatidae		*Lepidostoma*															
Trichoptera	Limnephilidae (d)																	
Trichoptera	Philopotamidae		*Wormaldia*															
Trichoptera	Rhyacophilidae		*Rhyacophila*	13	24	3	8	25	1	5	4	3	3				1	
Trichoptera	Uenoidae		*Neophylax*				4											
Lepidoptera	Noctuidae																	
Diptera	Empididae		Genus #1															
Diptera	Empididae		*Chelifera/Metachela*	8	1			1										
Diptera	Empididae		*Clinocera*						1	21	1							
Diptera	Empididae		*Oreogeton*															
Diptera	Dixidae		*Dixa*															
Diptera	Blephariceridae		*Agathon*															
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*															
Diptera	Ceratopogonidae	Ceratopogoninae	*Probezzia*															
Diptera	Ephydridae																	
Diptera	Simulidae		*Helodon clavatus* (pupa)							1								
Diptera	Simulidae		*Helodon onychodactylus* (pupa)															
Diptera	Simulidae		*Helodon*															
Diptera	Simulidae		*Prosimulium/Helodon*							1	6							
Diptera	Simulidae		*Simulium*															
Diptera	Tipulidae		*Dicranota*	8	2		4											
Diptera	Tipulidae		*Erioptera*					8										
Diptera	Tipulidae		*Gonomyodes*															
Diptera	Tipulidae		*Hexatoma*	1														
Diptera	Tipulidae		*Limnophila*															
Diptera	Tipulidae		*Hexatoma/Limnophila*															
Diptera	Tipulidae		*Rhabdomastix*															
Diptera	Tipulidae		*Tipula*															
Diptera	Tipulidae (d)																	
Diptera	Chironomidae - Pupa								45	3	1	86	5					
Diptera	Chironomidae	Chironomini	*Chironomus*															
Diptera	Chironomidae	Chironomini	*Endochironomus*															
Diptera	Chironomidae	Chironomini	*Microtendipes*															
Diptera	Chironomidae	Chironomini	*Phaenopsectra*															
Diptera	Chironomidae	Chironomini	*Polypedilum*															
Diptera	Chironomidae	Chironomini	*Sergentia*															
Diptera	Chironomidae	Chironomini	*Stictochironomus*															
Diptera	Chironomidae	Tanytarsini	*Micropsectra*															
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*															
Diptera	Chironomidae	Tanytarsini	*Stempellinella*															
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*	8				8	20			20						
Diptera	Chironomidae	Orthocladiinae (d)					4									1		

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				TEC1					*TEC2*					*MC1*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**
Diptera	Chironomidae	Orthocladiinae	*Brillia*	8	16		8	1	20									
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*															
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*			4	4		100		20		11					
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*															
Diptera	Chironomidae	Orthocladiinae	*Epoicocladius*															
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*				4	8	144	329	100	172	64				1	
Diptera	Chironomidae	Orthocladiinae	*Gymnometriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Heleniella*															
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*															
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*															
Diptera	Chironomidae	Orthocladiinae	*Metriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Parakiefferiella*															
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*						20	22	20		10					
Diptera	Chironomidae	Orthocladiinae	*Paraphaenocladius*															
Diptera	Chironomidae	Orthocladiinae	cf. *Platysmittia*	24														
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*															
Diptera	Chironomidae	Orthocladiinae	*Psilometrocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*	8			8	9	20	1	20	2						
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*															
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*					8										
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*		8		8		82	20			11					
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*				5		906	1051	287	1334	490					1
Diptera	Chironomidae	Tanypodinae (d)																
Diptera	Chironomidae	Tanypodinae	*Larsia*															
Diptera	Chironomidae	Tanypodinae	*Procladius*															
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.															
Diptera	Chironomidae	Diamesinae (d)																
Diptera	Chironomidae	Diamesinae	*Diamesa*								5	22					1	
Diptera	Chironomidae	Diamesinae	*Pagastia*								1	1	1					
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*															
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*															
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*															
Terrestrial				8			2						12		1		1	
			Total	***517***	***590***	***388***	***420***	***542***	***2478***	***1953***	***1121***	***2736***	***1072***	***4***	***1***	***3***	***9***	***2***

(d) - small or demaged; cannot be ID below this level

Genus #1 - this is an undescribed Epidid larva belonging possibly to a new genus and species

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				MCTR					*SUNR*					*STE1*			*STE2*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#4**	**#5**
Tricladida	Planariidae		*Polycelis coronata*											1	2	9		1	1		
Nematoda							1		1			1								1	
Oligochaeta	Enchytraeidae													4		4			4	2	
Oligochaeta	Lumbricidae																				
Oligochaeta	Lumbriculidae																				
Oligochaeta	Naididae																				
Oligochaeta	Tubificidae														7						
Hirudinea	Glossiphoniidae		*Helobdella stagnalis*																		
Gastropoda	Planorbidae		*Gyraulus*																		
Gastropoda	Valvatidae		*Valvata sincera*																		
Pelecypoda	Sphaeriidae		*Pisidium*																		
Pelecypoda	Sphaeriidae		*Pisidium/Sphaerium*																		
Hydracarina							1					2								1	1
Ostracoda																					
Cladocera	Daphnidae		*Daphnia*																		
Copepoda - Calanoida																4					
Copepoda - Cyclopoida																					
Copepoda - Harpacticoida																					
Amphipoda	Gammaridae		*Gammarus lacustris*																		
Amphipoda	Talitridae		*Hyallela azteca*																		
Collembola										1	1										
Ephemeroptera	Ameletidae		*Ameletus* sp.														4	8			
Ephemeroptera	Ameletidae		*Ameletus celer*																		
Ephemeroptera	Ameletidae		*Ameletus similior*																		
Ephemeroptera	Baetidae (d)																				
Ephemeroptera	Baetidae		*Baetis*	3	4		2	1	49	24	25	19	6	14	12	16	38	7	52	68	25
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*																		
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*																		
Ephemeroptera	Ephemerellidae		*Drunella doddsi*								1	1	1		17	1	5	1	4		4
Ephemeroptera	Ephemerellidae		*Ephemerella*																		
Ephemeroptera	Ephemerellidae		*Serratella*																		
Ephemeroptera	Ephemerellidae (d)																				
Ephemeroptera	Heptageniidae		*Cynigmula*									1		8	7	6		2	5		
Ephemeroptera	Heptageniidae		*Epeorus*							3					2	4	10	6	11	20	28
Ephemeroptera	Heptageniidae		*Rhithrogena*	3			1		1	2	8	8	3		1	2	6	14	9	1	6
Ephemeroptera	Heptageniidae (d)													24	16	40	12	24	8	5	10
Ephemeroptera	Leptophlebiidae (d)																				
Ephemeroptera	Leptophlebiidae		*Paraleptophlebia*																		
Plecoptera (d)						2		1						8	8	32		4			
Plecoptera	Capniidae													120	82	113		28	8	3	6
Plecoptera	Chloroperlidae		*Paraperla*										1								
Plecoptera	Chloroperlidae		*Suwallia*												1						
Plecoptera	Chloroperlidae		*Sweltsa*																	4	
Plecoptera	Chloroperlidae (d)										3	4	1	31	21	21	7	12	12	1	6
Plecoptera	Leuctridae		*Despaxia augusta*					1													
Plecoptera	Leuctridae		*Paraleuctra*				1											1			
Plecoptera	Leuctridae (d)																				
Plecoptera	Nemouridae		*Zapada*			1	1					1		6	4	4	4	4	4	4	4
Plecoptera	Nemouridae (d)				1																

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				MCTR					*SUNR*					*STE1*			*STE2*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#4**	**#5**
Plecoptera	Perlodidae (d)																				
Plecoptera	Perlodidae		*Isoperla*																		
Plecoptera	Perlodidae		*Skwala*	2		3			1	4	2	6	2	5	5	7	8	14	27		14
Plecoptera	Taeniopterygidae		*Taenionema*	11	18	64	15	14	5	14	9	19	9	1	16	4		4	9	2	2
Trichoptera - pupa																					
Trichoptera	Glossosomatidae		*Glossosoma*											4	4						
Trichoptera	Hydropsychidae		*Parapsyche*																2		
Trichoptera	Lepidostomatidae		*Lepidostoma*																		
Trichoptera	Limnephilidae (d)								1					1							
Trichoptera	Philopotamidae		*Wormaldia*																		
Trichoptera	Rhyacophilidae		*Rhyacophila*			1					1			2	5	5	4	6	8	1	2
Trichoptera	Uenoidae		*Neophylax*																		
Lepidoptera	Noctuidae																				
Diptera	Empididae		Genus #1																		
Diptera	Empididae		*Chelifera/Metachela*																		
Diptera	Empididae		*Clinocera*																		
Diptera	Empididae		*Oreogeton*														1	1	1		
Diptera	Dixidae		*Dixa*																		
Diptera	Blephariceridae		*Agathon*																		
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*																		
Diptera	Ceratopogonidae	Ceratopogoninae	*Probezzia*																		
Diptera	Ephydridae																				
Diptera	Simulidae		*Helodon clavatus* (pupa)																		
Diptera	Simulidae		*Helodon onychodactylus* (pupa)												2						
Diptera	Simulidae		*Helodon*																		
Diptera	Simulidae		*Prosimulium/Helodon*														33	2	96	14	1
Diptera	Simulidae		*Simulium*																		
Diptera	Tipulidae		*Dicranota*						1			1		4	5	13					
Diptera	Tipulidae		*Erioptera*																		
Diptera	Tipulidae		*Gonomyodes*		2	1			1			1								1	
Diptera	Tipulidae		*Hexatoma*																		
Diptera	Tipulidae		*Limnophila*																		
Diptera	Tipulidae		*Hexatoma/Limnophila*																		
Diptera	Tipulidae		*Rhabdomastix*									1									
Diptera	Tipulidae		*Tipula*								1										
Diptera	Tipulidae (d)																				
Diptera	Chironomidae - Pupa			1		2				1	2	2				4	1		4	1	2
Diptera	Chironomidae	Chironomini	*Chironomus*																		
Diptera	Chironomidae	Chironomini	*Endochironomus*																		
Diptera	Chironomidae	Chironomini	*Microtendipes*																		
Diptera	Chironomidae	Chironomini	*Phaenopsectra*																		
Diptera	Chironomidae	Chironomini	*Polypedilum*																		
Diptera	Chironomidae	Chironomini	*Sergentia*																		
Diptera	Chironomidae	Chironomini	*Stictochironomus*																		
Diptera	Chironomidae	Tanytarsini	*Micropsectra*																		
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*																		
Diptera	Chironomidae	Tanytarsini	*Stempellinella*																		
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*																		
Diptera	Chironomidae	Orthocladiinae (d)			1			1	1	1		1		28				4		3	2

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				MCTR					*SUNR*					*STE1*			*STE2*				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#4**	**#5**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#4**	**#5**
Diptera	Chironomidae	Orthocladiinae	*Brillia*																		
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*																		
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*							1											
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*																		
Diptera	Chironomidae	Orthocladiinae	*Epoicocladius*																		
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*	1		2		1	4	6	1		1				4		5	26	21
Diptera	Chironomidae	Orthocladiinae	*Gymnometriocnemus*																		
Diptera	Chironomidae	Orthocladiinae	*Heleniella*																		
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*																		
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*																		
Diptera	Chironomidae	Orthocladiinae	*Metriocnemus*																		
Diptera	Chironomidae	Orthocladiinae	*Parakiefferiella*																		
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*																		
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*			1				1		2									
Diptera	Chironomidae	Orthocladiinae	*Paraphaenocladius*													4					
Diptera	Chironomidae	Orthocladiinae	cf. *Platysmittia*						13	2	2	7	2	8	4	5			4		
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*																		
Diptera	Chironomidae	Orthocladiinae	*Psilometrocnemus*																		
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*											1		2					
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*																		
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*																		
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*	1								1					5				
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*	1		1	1	1		1	2	3	2				5	9	8	9	14
Diptera	Chironomidae	Tanypodinae (d)																			
Diptera	Chironomidae	Tanypodinae	*Larsia*																		
Diptera	Chironomidae	Tanypodinae	*Procladius*																		
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.																		
Diptera	Chironomidae	Diamesinae (d)																			
Diptera	Chironomidae	Diamesinae	*Diamesa*	25	48	66	17	10	2	5	5	3			4			5	1		
Diptera	Chironomidae	Diamesinae	*Pagastia*					1		1										1	
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*																		
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*																		
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*																		
Terrestrial				1	1		1										4		5	1	1
			Total	***49***	***75***	***144***	***41***	***31***	***80***	***67***	***63***	***84***	***28***	***270***	***225***	***300***	***151***	***157***	***288***	***169***	***149***

(d) - small or demaged; cannot be ID below this level

Genus #1 - this is an undescribed Epidid larva belonging possibly to a new genus and species

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				SCT			*ECM8*			*CC1*			*EUR2*			*UR2*		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**
Tricladida	Planariidae		*Polycelis coronata*				1					1						
Nematoda				1											1			
Oligochaeta	Enchytraeidae			5														
Oligochaeta	Lumbricidae																	
Oligochaeta	Lumbriculidae																	
Oligochaeta	Naididae																	
Oligochaeta	Tubificidae																	
Hirudinea	Glossiphoniidae		*Helobdella stagnalis*															
Gastropoda	Planorbidae		*Gyraulus*															
Gastropoda	Valvatidae		*Valvata sincera*															
Pelecypoda	Sphaeriidae		*Pisidium*															
Pelecypoda	Sphaeriidae		*Pisidium/Sphaerium*				1											
Hydracarina						1				8				1				
Ostracoda																		
Cladocera	Daphnidae		*Daphnia*															
Copepoda - Calanoida																		
Copepoda - Cyclopoida																		
Copepoda - Harpacticoida																		
Amphipoda	Gammaridae		*Gammarus lacustris*															
Amphipoda	Talitridae		*Hyallela azteca*															
Collembola																		
Ephemeroptera	Ameletidae		*Ameletus* sp.							56	72				1			
Ephemeroptera	Ameletidae		*Ameletus celer*															
Ephemeroptera	Ameletidae		*Ameletus similior*															
Ephemeroptera	Baetidae (d)									8								
Ephemeroptera	Baetidae		*Baetis*				3	5	22	17	1	14	21	12	17	15	3	5
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*															
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*							3	1							
Ephemeroptera	Ephemerellidae		*Drunella doddsi*							8			34	13	21			
Ephemeroptera	Ephemerellidae		*Ephemerella*								16	8						
Ephemeroptera	Ephemerellidae		*Serratella*															
Ephemeroptera	Ephemerellidae (d)																	
Ephemeroptera	Heptageniidae		*Cynigmula*							2	4	8	1	1			1	
Ephemeroptera	Heptageniidae		*Epeorus*				1	2	3	110	57	60	5	6	14			
Ephemeroptera	Heptageniidae		*Rhithrogena*				9	6	6	72	56	58	41	37	14	32	27	4
Ephemeroptera	Heptageniidae (d)									24	16	8	33	5	4			
Ephemeroptera	Leptophlebiidae (d)																	
Ephemeroptera	Leptophlebiidae		*Paraleptophlebia*															
Plecoptera (d)											8			1	1			
Plecoptera	Capniidae									24		16	8	3	1			
Plecoptera	Chloroperlidae		*Paraperla*							1				1				
Plecoptera	Chloroperlidae		*Suwallia*							6		2				1	2	
Plecoptera	Chloroperlidae		*Sweltsa*															
Plecoptera	Chloroperlidae (d)						1			10		8	56	36	2	13	17	1
Plecoptera	Leuctridae		*Despaxia augusta*							13								
Plecoptera	Leuctridae		*Paraleuctra*									5						
Plecoptera	Leuctridae (d)																	
Plecoptera	Nemouridae		*Zapada*	5						61	5	36		1	3	1		
Plecoptera	Nemouridae (d)																	

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				SCT			*ECM8*			*CC1*			*EUR2*			*UR2*		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**
Plecoptera	Perlodidae (d)																	
Plecoptera	Perlodidae		*Isoperla*															
Plecoptera	Perlodidae		*Skwala*	2				2		6	1		4	7	2	5	1	2
Plecoptera	Taeniopterygidae		*Taenionema*	5	2		9	22	6	593	612	306	30	21	27	5		4
Trichoptera - pupa																		
Trichoptera	Glossosomatidae		*Glossosoma*															
Trichoptera	Hydropsychidae		*Parapsyche*							1								
Trichoptera	Lepidostomatidae		*Lepidostoma*															
Trichoptera	Limnephilidae (d)								1					1				
Trichoptera	Philopotamidae		*Wormaldia*															
Trichoptera	Rhyacophilidae		*Rhyacophila*						1			4	2		2			
Trichoptera	Uenoidae		*Neophylax*															
Lepidoptera	Noctuidae																	
Diptera	Empididae		Genus #1											3				
Diptera	Empididae		*Chelifera/Metachela*															
Diptera	Empididae		*Clinocera*										1	2				
Diptera	Empididae		*Oreogeton*										6	4	4			
Diptera	Dixidae		*Dixa*															
Diptera	Blephariceridae		*Agathon*															
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*															
Diptera	Ceratopogonidae	Ceratopogoninae	*Probezzia*															
Diptera	Ephydridae																	
Diptera	Simulidae		*Helodon clavatus* (pupa)															
Diptera	Simulidae		*Helodon onychodactylus* (pupa)															
Diptera	Simulidae		*Helodon*															
Diptera	Simulidae		*Prosimulium/Helodon*										4		1			
Diptera	Simulidae		*Simulium*															
Diptera	Tipulidae		*Dicranota*							1				1				
Diptera	Tipulidae		*Erioptera*															
Diptera	Tipulidae		*Gonomyodes*										10	2	4			
Diptera	Tipulidae		*Hexatoma*															
Diptera	Tipulidae		*Limnophila*															
Diptera	Tipulidae		*Hexatoma/Limnophila*															
Diptera	Tipulidae		*Rhabdomastix*														1	
Diptera	Tipulidae		*Tipula*															
Diptera	Tipulidae (d)																	
Diptera	Chironomidae - Pupa									9			8	1	7	2	1	
Diptera	Chironomidae	Chironomini	*Chironomus*															
Diptera	Chironomidae	Chironomini	*Endochironomus*															
Diptera	Chironomidae	Chironomini	*Microtendipes*															
Diptera	Chironomidae	Chironomini	*Phaenopsectra*															
Diptera	Chironomidae	Chironomini	*Polypedilum*															
Diptera	Chironomidae	Chironomini	*Sergentia*															
Diptera	Chironomidae	Chironomini	*Stictochironomus*															
Diptera	Chironomidae	Tanytarsini	*Micropsectra*															
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*															
Diptera	Chironomidae	Tanytarsini	*Stempellinella*															
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*							16								
Diptera	Chironomidae	Orthocladiinae (d)					1								1	2		

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				SCT			*ECM8*			*CC1*			*EUR2*			*UR2*		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**	**#1**	**#2**	**#3**
Diptera	Chironomidae	Orthocladiinae	*Brillia*															
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*															
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*							8								
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*															
Diptera	Chironomidae	Orthocladiinae	*Epoicocladius*															
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*								8		4	2	3			
Diptera	Chironomidae	Orthocladiinae	*Gymnometriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Heleniella*															
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*															
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*															
Diptera	Chironomidae	Orthocladiinae	*Metriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Parakiefferiella*															2
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*															1
Diptera	Chironomidae	Orthocladiinae	*Paraphaenocladius*															
Diptera	Chironomidae	Orthocladiinae	cf. *Platysmittia*	4					8							75	6	5
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*	1														
Diptera	Chironomidae	Orthocladiinae	*Psilometrocnemus*															
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*							3		1						
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*									8						
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*								1							
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*							9	1	8				1		
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*	8	1				1		9		5	2	14	1		
Diptera	Chironomidae	Tanypodinae (d)																
Diptera	Chironomidae	Tanypodinae	*Larsia*															
Diptera	Chironomidae	Tanypodinae	*Procladius*															
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.															
Diptera	Chironomidae	Diamesinae (d)																
Diptera	Chironomidae	Diamesinae	*Diamesa*	11	8		1		2				5	3	4			2
Diptera	Chironomidae	Diamesinae	*Pagastia*										6	2				
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*															
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*															
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*															
Terrestrial				2							1		7	2	8	2		
			Total	***44***	***11***	***1***	***27***	***37***	***50***	***1069***	***869***	***551***	***291***	***170***	***156***	***155***	***59***	***26***

(d) - small or demaged; cannot be ID below this level

Genus #1 - this is an undescribed Epidid larva belonging possibly to a new genus and species

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				CABIN					
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**SUNR**	**STE2**	**TEC1**	**NTR2**	**CC1**	**SCR**
Tricladida	Planariidae		*Polycelis coronata*		24	8	20	8	
Nematoda					8				
Oligochaeta	Enchytraeidae						10		
Oligochaeta	Lumbricidae					8			
Oligochaeta	Lumbriculidae								
Oligochaeta	Naididae								
Oligochaeta	Tubificidae								2
Hirudinea	Glossiphoniidae		*Helobdella stagnalis*						
Gastropoda	Planorbidae		*Gyraulus*						
Gastropoda	Valvatidae		*Valvata sincera*						
Pelecypoda	Sphaeriidae		*Pisidium*						
Pelecypoda	Sphaeriidae		*Pisidium/Sphaerium*						
Hydracarina				2	16	16	10		
Ostracoda								8	
Cladocera	Daphnidae		*Daphnia*						
Copepoda - Calanoida									
Copepoda - Cyclopoida									
Copepoda - Harpacticoida									
Amphipoda	Gammaridae		*Gammarus lacustris*						
Amphipoda	Talitridae		*Hyallela azteca*						
Collembola									
Ephemeroptera	Ameletidae		*Ameletus* sp.		8			48	
Ephemeroptera	Ameletidae		*Ameletus celer*						
Ephemeroptera	Ameletidae		*Ameletus similior*						
Ephemeroptera	Baetidae (d)								
Ephemeroptera	Baetidae		*Baetis*	180	474	823	84	169	59
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*						
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*			7	23	7	
Ephemeroptera	Ephemerellidae		*Drunella doddsi*	14	86	126	17	9	7
Ephemeroptera	Ephemerellidae		*Ephemerella*						
Ephemeroptera	Ephemerellidae		*Serratella*						
Ephemeroptera	Ephemerellidae (d)					8			
Ephemeroptera	Heptageniidae		*Cynigmula*		14	20	83	88	
Ephemeroptera	Heptageniidae		*Epeorus*	9	144	821	305	439	26
Ephemeroptera	Heptageniidae		*Rhithrogena*	31	156	1718	847	562	5
Ephemeroptera	Heptageniidae (d)							16	
Ephemeroptera	Leptophlebiidae (d)								
Ephemeroptera	Leptophlebiidae		*Paraleptophlebia*						
Plecoptera (d)							10		
Plecoptera	Capniidae				8	8	20		16
Plecoptera	Chloroperlidae		*Paraperla*		2	24	76	12	
Plecoptera	Chloroperlidae		*Suwallia*			58		11	
Plecoptera	Chloroperlidae		*Sweltsa*		2	10			
Plecoptera	Chloroperlidae (d)			1	64	114	292	66	12
Plecoptera	Leuctridae		*Despaxia augusta*		8				
Plecoptera	Leuctridae		*Paraleuctra*			16		1	
Plecoptera	Leuctridae (d)								1
Plecoptera	Nemouridae		*Zapada*	5	74	229	199	74	12
Plecoptera	Nemouridae (d)								

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				CABIN					
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**SUNR**	**STE2**	**TEC1**	**NTR2**	**CC1**	**SCR**
Plecoptera	Perlodidae (d)								
Plecoptera	Perlodidae		*Isoperla*						2
Plecoptera	Perlodidae		*Skwala*	42	230	60	414	35	9
Plecoptera	Taeniopterygidae		*Taenionema*	9	16	152	80	64	2
Trichoptera - pupa					2				
Trichoptera	Glossosomatidae		*Glossosoma*					8	
Trichoptera	Hydropsychidae		*Parapsyche*		8	98		2	1
Trichoptera	Lepidostomatidae		*Lepidostoma*						
Trichoptera	Limnephilidae (d)			1			10		
Trichoptera	Philopotamidae		*Wormaldia*					8	
Trichoptera	Rhyacophilidae		*Rhyacophila*	6	78	189	50	57	7
Trichoptera	Uenoidae		*Neophylax*						
Lepidoptera	Noctuidae								
Diptera	Empididae		Genus #1						
Diptera	Empididae		*Chelifera/Metachela*						
Diptera	Empididae		*Clinocera*	1					
Diptera	Empididae		*Oreogeton*		2	10	4	8	
Diptera	Dixidae		*Dixa*						
Diptera	Blephariceridae		*Agathon*						4
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*			24			
Diptera	Ceratopogonidae	Ceratopogoninae	*Probezzia*						
Diptera	Ephydridae								
Diptera	Simulidae		*Helodon clavatus* (pupa)						
Diptera	Simulidae		*Helodon onychodactylus* (pupa)						
Diptera	Simulidae		*Helodon*						
Diptera	Simulidae		*Prosimulium/Helodon*		232	32	20		
Diptera	Simulidae		*Simulium*						
Diptera	Tipulidae		*Dicranota*				22		
Diptera	Tipulidae		*Erioptera*			8			
Diptera	Tipulidae		*Gonomyodes*	2					2
Diptera	Tipulidae		*Hexatoma*			1			
Diptera	Tipulidae		*Limnophila*						
Diptera	Tipulidae		*Hexatoma/Limnophila*			8			
Diptera	Tipulidae		*Rhabdomastix*						
Diptera	Tipulidae		*Tipula*						
Diptera	Tipulidae (d)								
Diptera	Chironomidae - Pupa				8		20	8	
Diptera	Chironomidae	Chironomini	*Chironomus*						
Diptera	Chironomidae	Chironomini	*Endochironomus*						
Diptera	Chironomidae	Chironomini	*Microtendipes*						
Diptera	Chironomidae	Chironomini	*Phaenopsectra*						
Diptera	Chironomidae	Chironomini	*Polypedilum*						
Diptera	Chironomidae	Chironomini	*Sergentia*						
Diptera	Chironomidae	Chironomini	*Stictochironomus*						
Diptera	Chironomidae	Tanytarsini	*Micropsectra*						
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*						
Diptera	Chironomidae	Tanytarsini	*Stempellinella*						
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*						
Diptera	Chironomidae	Orthocladiinae (d)							

Appendix 5.1-6. Benthic Invertebrate Data for KSM Project Steams, August 2009

				CABIN					
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**SUNR**	**STE2**	**TEC1**	**NTR2**	**CC1**	**SCR**
Diptera	Chironomidae	Orthocladiinae	*Brillia*			24	24		
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*				20		
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*						
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*						
Diptera	Chironomidae	Orthocladiinae	*Epoicocladius*						
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*	13	16				2
Diptera	Chironomidae	Orthocladiinae	*Gymnometriocnemus*						
Diptera	Chironomidae	Orthocladiinae	*Heleniella*						
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*						
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*						
Diptera	Chironomidae	Orthocladiinae	*Metriocnemus*						
Diptera	Chironomidae	Orthocladiinae	*Parakiefferiella*						
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*					8	
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*						
Diptera	Chironomidae	Orthocladiinae	*Paraphaenocladius*						
Diptera	Chironomidae	Orthocladiinae	cf. *Platysmittia*				10		
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*						
Diptera	Chironomidae	Orthocladiinae	*Psilometrocnemus*						
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*					8	
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*						
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*						
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*		16	8	21		
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*				20		2
Diptera	Chironomidae	Tanypodinae (d)							
Diptera	Chironomidae	Tanypodinae	*Larsia*						
Diptera	Chironomidae	Tanypodinae	*Procladius*						
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.						
Diptera	Chironomidae	Diamesinae (d)							
Diptera	Chironomidae	Diamesinae	*Diamesa*	6					45
Diptera	Chironomidae	Diamesinae	*Pagastia*	1					
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*						
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*						
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*						
Terrestrial				2		4	20		2
			Total	***325***	***1696***	***4632***	***2731***	***1724***	***218***

(d) - small or demaged; cannot be ID below this level

Genus #1 - this is an undescribed Epidid larva belonging possibly to a new genus and species

Appendix 5.1-7

Bray-Curtis Similarity Index Using SUNR and SCR Reference Medians to Compare to KSM Stream Benthic Invertebrate Communities, 2009

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Appendix 5.1-7. Bray-Curtis Similarity Index Using SUNR and SCR Reference Medians to Compare to KSM Stream Benthic Invertebrate Communities, 2009

	SCR	SUNR
SNO1-1	30.8	55.9
SNO1-2	33.8	56.1
SNO1-3	25.1	54.3
SNO1-4	27.9	52.3
SNO1-5	25.2	51.1
SNO2-1	11.6	27.2
SNO2-2	16.9	38.0
SNO2-3	17.9	37.4
SNO2-4	13.4	32.0
SNO2-5	27.8	49.8
STE1-1	22.0	34.2
STE1-2	27.1	44.8
STE1-3	21.3	41.0
STE2-1	24.5	44.6
STE2-2	30.2	46.8
STE2-3	20.8	49.4
STE2-4	20.1	37.6
STE2-5	24.8	50.4
STE2-Cabin	10.2	24.0
UNK1-1	19.2	41.7
UNK1-2	17.7	29.6
UNK1-3	11.3	24.1
UNK2-1	21.1	34.8
UNK2-2	19.1	37.5
UNK2-3	19.4	37.1
UNK2-4	17.6	33.7
UNK2-5	18.8	35.7
TEC1-1	12.1	30.7
TEC1-2	16.7	34.4
TEC1-3	19.8	41.0
TEC1-4	11.9	32.5
TEC1-5	13.3	32.0
TEC1-Cabin	7.7	17.3
TEC2-1	10.3	25.8
TEC2-2	10.0	29.5
TEC2-3	18.4	38.3
TEC2-4	16.3	33.5
TEC2-5	13.4	35.0
TRC1-1	42.0	41.9
TRC1-2	28.3	12.8
TRC1-3	31.3	13.4
TRC2-1	67.3	42.5
TRC2-2	55.3	53.7
TRC2-3	51.6	43.5
TRC2-4	64.1	55.5
TRC2-5	37.5	35.0
TRC3-1	48.9	24.4
TRC3-2	20.9	11.0
TRC3-3	25.7	20.7
NTR1-1	4.2	8.0
NTR1-2	4.1	9.8
NTR1-3	4.9	10.5
NTR2-1	21.8	41.7
NTR2-2	21.6	40.4
NTR2-3	13.5	33.3
NTR2-4	17.2	36.5
NTR2-5	20.3	46.8
NTR2-Cabin	8.8	23.8
EUR2-1	26.0	51.0
EUR2-2	29.0	53.5
EUR2-3	29.6	55.8
ECM8-1	49.8	57.0
ECM8-2	51.7	63.0
ECM8-3	45.2	73.8
CC1-1	13.3	27.2
CC1-2	15.6	32.8
CC1-3	15.0	28.1
CC1-Cabin	10.6	23.2
UR1A-1	30.3	59.2
UR1A-2	24.4	53.9
UR1A-3	30.5	55.1
UR1A-4	25.3	53.2
UR1A-5	24.7	49.8
UR1-1	52.2	62.2
UR1-2	38.7	74.4
UR1-3	45.9	71.3
UR1-4	36.7	61.2
UR1-5	32.6	56.9
UR2-1	34.2	61.6
UR2-2	46.5	44.8
UR2-3	59.3	70.5
SUNR-1	48.8	69.8
SUNR-2	43.6	75.6
SUNR-3	47.4	89.3
SUNR-4	37.0	69.3
SUNR-5	45.9	87.1
SUNR-Cabin	28.3	50.5
SCR-1	69.8	39.9
SCR-2	70.7	47.7
SCR-3	87.4	46.0
SCR-4	62.4	67.7
SCR-5	66.9	56.9
SCR-Cabin	26.8	47.9
MC1-1	25.0	12.1
MC1-2	31.3	13.4
MC1-3	43.6	20.7
MC1-4	43.6	38.6
MC1-5	25.7	20.7
MCTR-1	57.1	74.6
MCTR-2	50.2	51.4
MCTR-3	29.7	49.0
MCTR-4	48.3	55.4
MCTR-5	41.2	57.5
SC1-1	34.0	53.8
SC1-2	37.1	57.0
SC1-3	23.9	37.7
SC1-4	17.7	25.7
SC1-5	24.7	32.0
SC2-1	51.9	48.1
SC2-2	59.8	35.6
SC2-3	49.8	57.8
SC2-4	23.6	36.1
SC2-5	35.4	38.4
SC3-1	59.7	28.8
SC3-2	50.9	42.0
SC3-3	57.9	51.1
SC3-4	25.7	29.2
SC3-5	31.3	13.4
SCT-1	30.0	51.3
SCT-2	46.0	44.1
SCT-3	28.3	12.8
SCR median		55.6
SUNR median	55.6	

Appendix 5.2-1

Temperature and Dissolved Oxygen Profiles taken at the KSM Project Lakes, August 2009

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Appendix 5.2-1. Temperature and Dissolved Oxygen Profiles taken at the KSM Project Lakes, August 2009

Site	Site Depth	Depth	Temperature	DO (mg/L)	DO (% sat)	Site	Site Depth	Depth	Temperature	DO (mg/L)	DO (% sat)	Site	Site Depth	Depth	Temperature	DO (mg/L)	DO (% sat)
SUL-shallow	3 m	0	1.4	14.22	101.2	**SUL-mid**	6.8 m	0	1	14.44	101.3	**SUL-deep**	15 m	0	1.1	10.48	73.9
		0.5	1.3	13.93	98.7			0.5	0.9	14.5	101.9			1	1.2	8.8	67.6
		1	1.3	14.12	100.2			1	0.9	14.6	102.5			2	1.2	8.09	56.8
		1.5	1.5	14.12	100.3			1.5	0.9	14.35	100.7			3	1.2	7.52	53.5
		2	2.8	0.26	2			2	0.9	14.35	100.7			4	1.3	7.22	51
		2.5	2.9	0.22	1.6			2.5	0.9	14.46	101.6			5	1.3	7.3	51.3
								3	0.9	14.37	100.6			6	1.3	7.49	52.9
								3.5	0.9	14.4	101.3			7	1.3	7.54	53.5
								4	0.9	14.15	99.9			8	1.3	7.5	53.1
								4.5	0.9	13.97	100.1			9	1.3	7.66	54.1
								5	0.9	14	99			10	1.4	7.92	56.4
														11	1.3	13.76	97.6
														12	1.3	14.1	100.4
														13	1.3	14.27	101.5
KGL-shallow	3.5 m	0	12.2	9.43	87.8	**KGL-Mid**	10 m	0	12.2	9.46	88.2	**KGL-Deep**	16 m	0	12.5	9.48	89.1
		0.5	11.7	9.32	87.6			0.5	12.1	9.25	85.7			1	12	9.37	89.3
		1	11.6	9.22	85			1	11.4	9.51	86.3			2	11.3	9.4	85.9
		1.5	11.5	9.21	83.8			1.5	11	9.55	86.1			3	8.5	9.79	83.7
		2	11.3	9.33	84.9			2	10.9	9.46	85.3			4	7.6	9.86	83
		2.5	10.4	9.16	82.2			2.5	10.2	9.44	83.2			5	7.2	9.9	81.9
		3	8.8	9.68	82.2			3	8.2	98.8	83.9			6	6.9	10.35	84
								3.5	7.7	10.08	84.1			7	6.7	10.08	82.9
								4	7.4	10.12	84.5			8	6.6	9.9	80.5
								4.5	7.2	10.18	84.4			9	6.4	9.54	77.4
								5	7.1	10.21	84.8			10	6.3	9.33	75.5
								5.5	7.1	10.25	84.7			11	6.2	9.16	73.6
								6	7	4.86	40.2			12	6.1	9.01	73
								6.5	6.9	3.16	25.6			13	6	8.94	71.9
														14	5.9	8.82	70.6
														15	5.7	0.34	2.5
LAL-shallow	4.0 m	0	14	9.79	95	**LAL-mid**	6.6 m	0	14	9.76	95.1	**LAL-Deep**	13.5 m	0	13.6	9.96	94.6
		0.5	14.1	9.83	96			0.5	14.1	9.73	94.3			1	13.6	10.21	94.9
		1	14.1	9.63	93.7			1	14.1	9.7	94.2			2	13.6	9.2	95.6
		1.5	14.1	9.42	91.8			1.5	14.1	9.72	93.9			3	13.6	9.93	96.1
		2	14.1	9.39	91.7			2	14.1	9.69	93.7			4	13.6	10.14	97.8
		2.5	14.1	9.85	95.4			2.5	14.1	9.72	95.8			5	12.7	10.68	101.3
		3	14.1	9.53	92.8			3	14.1	9.83	95.6			6	10	16.25	140.3
		3.5	14	9.73	94.7			3.5	14.1	9.73	94.4			7	7.7	8.8	72.4
								4	14.1	9.73	94.3			8	7	8.79	71.2
								4.5	14.1	9.64	93.7			9	6.2	1.72	12.1
								5	14.1	9.62	93.5			10	6.1	0.9	9.8
								5.5	12.1	11.73	110.3						
TDL-shallow	4.5 m	0	16.4	8.72	88.2	**TDL-Mid**	8.5 m	0	16.4	8.8	91.4	**TDL-Deep**	19 m	0	16.5	9.21	94
		0.5	16.5	8.88	89.3			0.5	16.4	8.88	90.3			1	16.5	9.06	93.8
		1	16.5	8.85	89.7			1	16.4	8.94	91.3			2	16.5	9.11	94
		1.5	16.5	8.75	86.4			1.5	16.4	8.92	91.6			3	16.5	9.01	93.5
		2	16.5	8.96	91.6			2	16.4	9.2	94			4	15.9	9.82	99.7
		2.5	16.4	8.96	91.8			2.5	16.4	9.21	93.3			5	12.1	12.08	110.6
		3	16.2	8.94	90.1			3	16.4	9.08	92.7			6	8.9	11.01	95
		3.5	16	9.5	97			3.5	16.4	9	91.7			7	7.4	9.07	74.8
		4	15.6	10.2	102.5			4	16.2	9.25	95			8	6.4	5.83	46.9
								4.5	13.8	11.1	113			9	5.8	2.2	15.9
								5	11.8	10.82	101			10	5.4	0.47	3.7
								5.5	10.3	11.01	98.1			11	5	0.14	1.2
								6	8.9	10.02	88.5			12	4.7	0.13	1.2
								6.5	8	9.81	82			13	4.6	0.09	0.7
								7	7.5	7.61	63.8			14	4.5	0.08	0.6
														15	4.4	0.08	0.7
														16	4.4	0.04	0.4
														17	4.4	0.03	0.8
														18	4.4	0.1	0.9

Appendix 5.2-2

Sediment Quality Data for Lakes in the KSM Project Area, August 2009

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Appendix 5.2-2. Sediment Quality Data for Lakes in the KSM Project Area, August 2009

Sample ID	LAL DEEP REP1	LAL DEEP REP2	LAL MID REP1	LAL MID REP2	LAL SHALLOW REP1	LAL SHALLOW REP2	TDL DEEP REP1	TDL DEEP REP2	TDL MID REP1	TDL MID REP2	TDL SHALLOW REP 1	TDL SHALLOW REP 2	SUL DEEP REP 1
Date Sampled	15-AUG-09	15-AUG-09	15-AUG-09	15-AUG-09	15-AUG-09	15-AUG-09	17-Aug-09	17-Aug-09	17-Aug-09	17-Aug-09	17-Aug-09	17-Aug-09	16-Aug-09
ALS Sample ID	L806369-10	L806369-11	L806369-12	L806369-13	L806369-14	L806369-15	L807781-1	<1.0	<1.0	<1.0	<1.0	<1.0	L807781-7
Physical Tests													
% Moisture	80.1	77.4	57.5	59.5	57.7	71.8	90.0	88.2	72.9	79.5	86.2	76.0	60.8
pH (pH units)	7.17	6.93	6.91	6.35	6.27	6.36	6.39	6.51	6.48	6.57	6.79	6.52	8.14
Particle Size													
% Gravel (>2mm)	<1.0	1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	2.0	<1.0	25.0	4.0	<1.0
% Sand (2.0mm - 0.063mm)	4.0	4.0	2.0	2.0	43.0	3.0	2.0	1.0	47.0	45.0	30.0	35.0	<1.0
% Silt (0.063mm - 4um)	58.0	50.0	48.0	50.0	39.0	60.0	44.0	45.0	36.0	36.0	29.0	42.0	53.0
% Clay (<4um)	38.0	45.0	50.0	48.0	17.0	35.0	54.0	53.0	16.0	18.0	16.0	19.0	47.0
Leachable Anions & Nutrients													
Total Nitrogen by LECO (%)	0.619	0.593	0.293	0.247	0.303	0.500	1.43	1.23	0.474	0.598	0.673	0.321	0.100
Available Phosphate-P	2.1	<2.0	7.3	7.6	6.5	4.0	37.1	39.5	9.7	10.9	12.4	6.8	<2.0
Phosphorus, Total	1380	757	1620	1600	871	1330	765	701	622	783	607	613	1320
Cyanides													
Cyanide, Total	<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
Organic / Inorganic Carbon (%)													
$CaCO_3$ Equivalent	5.77	5.75	5.77	5.42	5.13	5.64	2.11	2.58	<0.70	<0.70	<0.70	<0.70	3.98
Inorganic Carbon	<0.090	<0.090	<0.090	0.113	<0.090	<0.090	0.193	0.262	<0.090	<0.090	<0.090	<0.090	0.432
Total Carbon by Combustion	4.8	4.3	1.2	1.1	1.9	3.4	15.9	14.0	5.9	6.7	12.6	4.3	1.0
Total Organic Carbon	4.71	4.21	1.17	1.02	1.86	3.34	15.8	13.8	5.85	6.62	12.5	4.21	0.49
Plant Available Nutrients													
Metals													
Aluminum (Al)	26400	28100	35100	35300	29200	30200	11700	15100	13800	13900	14000	18500	28200
Antimony (Sb)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	15
Arsenic (As)	29.1	37.7	27.4	25.8	15.9	20.0	7.5	11.6	19.3	10.8	8.3	9.8	101
Barium (Ba)	226	218	183	196	173	181	256	71.1	242	216	240	199	555
Beryllium (Be)	0.77	0.85	0.88	0.85	0.83	0.80	<0.50	0.51	<0.50	<0.50	<0.50	0.54	0.67
Bismuth (Bi)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium (Cd)	0.54	<0.50	<0.50	<0.50	<0.50	<0.50	1.52	1.28	0.83	0.92	0.95	0.83	1.18
Calcium (Ca)	6020	5890	3790	3850	4430	4520	8910	8280	9100	9950	12200	8060	16400
Chromium (Cr)	88.7	95.3	137	136	100	111	30.4	35.2	47.6	38.4	41.7	47.5	23.4
Cobalt (Co)	35.2	35.9	56.4	53.0	30.6	39.0	17.4	16.6	16.2	13.1	10.9	13.9	20.6
Copper (Cu)	82.2	90.0	118	114	89.6	95.6	43.0	55.5	25.3	22.4	23.3	30.7	537
Iron (Fe)	59600	62900	66400	63900	46900	56600	43900	39800	65500	55900	38000	32600	52500
Lead (Pb)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	56
Lithium (Li)	47.9	50.6	57.3	56.8	57.7	53.5	13.3	21.4	25.4	25.8	30.8	48.4	26.6
Magnesium (Mg)	14700	15400	23600	22800	17300	18900	3030	4590	5990	5960	4970	7040	15400
Manganese (Mn)	1130	670	1270	1240	468	811	3620	3050	700	599	831	973	1520
Mercury (Hg)	0.227	0.242	0.235	0.225	0.229	0.218	0.197	0.192	0.152	0.148	0.132	0.143	0.451
Molybdenum (Mo)	<4.0	5.1	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	<4.0	<4.0	<4.0	<4.0	5.1
Nickel (Ni)	159	162	235	225	169	187	83.9	83.0	84.3	75.4	71.5	88.9	21.1
Phosphorus (P)	1430	1020	1830	1790	1180	1850	958	960	974	990	780	1120	1420
Potassium (K)	2040	2060	1530	1900	1630	1640	1000	1140	1440	1400	1130	1230	4270
Selenium (Se)	6.3	6.3	<3.0	<2.0	0.51	<0.50	5.65	2.47	<0.50	<0.50	<0.50	<2.0	<3.0
Silver (Ag)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Sodium (Na)	<200	<200	<200	<200	<200	<200	270	220	270	300	<200	<200	410
Strontium (Sr)	74.1	77.9	64.9	65.2	60.6	65.8	143	126	133	139	164	117	93.7
Sulfur (S)-Total	-	-	1020	970	2340	2530	-	-	-	-	-	-	3320
Thallium (Tl)	<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
Tin (Sn)	<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
Titanium (Ti)	93.6	103	177	198	68.5	131	149	100	196	209	91.7	31.8	604
Total Sulphur	0.91	2.33	-	-	-	-	3.62	3.37	1.79	1.64	1.68	0.20	-
Vanadium (V)	65.9	66.9	73.7	75.0	64.0	65.8	21.6	28.2	31.1	28.5	28.0	34.8	96.2
Zinc (Zn)	183	189	222	214	186	190	189	186	135	130	142	205	233

All units in mg/kg dry weight unless otherwise noted

Appendix 5.2-2. Sediment Quality Data for Lakes in the KSM Project Area, August 2009

Sample ID	QAQC-LAKE 1	SUL DEEP REP 2	SUL MID REP 1	SUL MID REP 2	SUL SHALLOW REP 1	SUL SHALLOW REP 2	KGL DEEP REP 1	KGL DEEP REP 2	QAQC LAKE 2	KGL MID REP 1	KGL MID REP 2	KGL SHALLOW REP 1	KGL SHALLOW REP 2
Date Sampled	16-Aug-09	16-Aug-09	16-Aug-09	16-Aug-09	16-Aug-09	16-Aug-09	19-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09	18-AUG-09	18-AUG-09
ALS Sample ID	L807781-16	L807781-8	L807781-9	L807781-10	L807781-11	L807781-12	L809328-1	L809328-2	L809328-5	L809328-3	L809328-4	L809328-24	L809328-25
Physical Tests													
% Moisture	57.7	57.0	44.9	41.0	37.7	47.3	52.1	58.5	55.5	48.5	47.7	49.0	54.3
pH (pH units)	8.27	8.08	8.19	7.97	6.79	7.43	8.24	8.47	8.43	8.45	8.50	8.49	8.35
Particle Size													
% Gravel (>2mm)	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.0	1.0
% Sand (2.0mm - 0.063mm)	<1.0	<1.0	<1.0	<1.0	50.0	34.0	<1.0	<1.0	<1.0	1.0	<1.0	10.0	10.0
% Silt (0.063mm - 4um)	41.0	34.0	64.0	64.0	32.0	36.0	26.0	27.0	27.0	24.0	25.0	13.0	13.0
% Clay (<4um)	58.0	66.0	36.0	36.0	17.0	30.0	74.0	73.0	73.0	75.0	75.0	74.0	75.0
Leachable Anions & Nutrients													
Total Nitrogen by LECO (%)	0.101	0.076	0.070	0.069	0.063	0.084	0.070	0.068	0.068	0.068	0.071	0.057	0.060
Available Phosphate-P	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Phosphorus, Total	1450	1510	1620	1610	1690	1740	1240	1270	1290	1160	1220	1200	1160
Cyanides													
Cyanide, Total	<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
Organic / Inorganic Carbon (%)													
$CaCO_3$ Equivalent	4.57	4.06	4.81	5.16	0.78	0.91	3.22	2.55	2.51	2.45	2.70	1.98	1.96
Inorganic Carbon	0.516	0.453	0.542	0.586	<0.090	<0.090	0.316	0.252	0.243	0.233	0.247	0.166	0.177
Total Carbon by Combustion	0.9	0.9	1.0	1.0	0.5	0.7	0.6	0.5	0.6	0.4	0.4	0.4	0.4
Total Organic Carbon	0.38	0.39	0.42	0.32	0.40	0.64	0.29	0.25	0.32	0.16	0.16	0.24	0.26
Plant Available Nutrients													
Metals													
Aluminum (Al)	26000	25200	22400	22900	15900	19800	27500	28200	26700	27800	27400	29700	29000
Antimony (Sb)	16	15	14	15	33	25	<10	<10	<10	<10	<10	<10	<10
Arsenic (As)	103	98.4	110	109	165	137	50.7	40.5	60.6	31.1	31.4	32.6	30.1
Barium (Ba)	506	510	466	464	358	458	678	667	680	680	682	642	635
Beryllium (Be)	0.62	0.62	0.57	0.55	<0.50	<0.50	0.72	0.71	0.72	0.71	0.70	0.76	0.70
Bismuth (Bi)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Cadmium (Cd)	1.16	1.39	1.55	1.44	0.57	0.77	0.61	0.59	<0.50	0.57	0.51	0.64	0.60
Calcium (Ca)	20900	21000	26700	30300	5130	7880	14200	11800	15100	14100	14300	10500	12700
Chromium (Cr)	22.8	22.2	17.9	19.2	14.0	17.2	8.9	9.5	7.4	9.7	7.9	9.7	8.3
Cobalt (Co)	20.6	20.8	20.7	20.6	12.9	15.1	19.6	19.3	19.8	18.6	18.7	19.1	18.9
Copper (Cu)	521	404	275	289	688	626	31.3	31.0	31.9	29.9	29.8	30.8	30.3
Iron (Fe)	52000	50100	49800	49500	64200	60300	44300	44400	44100	42800	43300	45200	44600
Lead (Pb)	56	53	50	50	75	65	34	32	34	34	33	<30	<30
Lithium (Li)	26.0	25.7	23.3	23.6	15.9	18.7	24.3	25.3	24.1	23.3	23.0	25.2	25.0
Magnesium (Mg)	15400	14900	14200	14400	8980	11200	11500	12100	10800	11700	12000	12800	13000
Manganese (Mn)	1540	1680	1770	1700	700	995	1820	1730	1910	1670	1680	1780	1670
Mercury (Hg)	0.457	0.392	0.369	0.371	1.91	1.45	0.213	0.206	0.250	0.172	0.163	0.175	0.177
Molybdenum (Mo)	5.1	<4.0	<4.0	<4.0	14.1	10.8	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel (Ni)	20.9	19.8	18.7	18.5	12.8	15.3	12.6	13.5	13.0	11.3	10.8	11.4	9.9
Phosphorus (P)	1440	1560	1780	1850	2260	1990	1260	1250	1260	1270	1280	1180	1210
Potassium (K)	3450	3390	2750	2880	2570	2680	5940	5960	5680	6290	6010	6320	6170
Selenium (Se)	<3.0	<2.0	<2.0	<3.0	14.5	6.99	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver (Ag)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Sodium (Na)	240	230	210	220	<200	<200	500	500	430	600	460	380	360
Strontium (Sr)	105	103	114	130	104	89.0	51.0	46.4	53.6	49.4	48.2	42.0	46.0
Sulfur (S)-Total	2820	3890	4110	4570	6000	6220	1050	780	1020	310	440	370	550
Thallium (Tl)	<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
Tin (Sn)	<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
Titanium (Ti)	600	618	689	770	374	436	489	517	443	581	555	402	451
Total Sulphur	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	94.0	86.0	80.6	85.2	63.0	71.9	62.6	66.0	59.3	65.2	66.1	67.0	67.7
Zinc (Zn)	224	225	209	202	163	182	133	138	130	128	129	139	136

All units in mg/kg dry weight uni

Appendix 5.2-3

Detection Limits of Sediment Quality Data for Lakes of the KSM Project Area, August 2009

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Appendix 5.2-3. Detection Limits of Sediment Quality Data for Lakes of the KSM Project Area, August 2009

Sample ID	TDL DEEP REP1	TDL DEEP REP2	TDL MID REP1	TDL MID REP2	TDL SHALLOW REP 1	TDL SHALLOW REP 2	SUL DEEP REP 1	SUL DEEP REP 2	SUL MID REP 1	SUL MID REP 2	SUL SHALLOW REP 1	SUL SHALLOW REP 2	QAQC-LAKE 1
Date Sampled	17-Aug-09	17-Aug-09	17-Aug-09	17-Aug-09	17-Aug-09	17-Aug-09	16-Aug-09	16-Aug-09	16-Aug-09	16-Aug-09	16-Aug-09	16-Aug-09	16-Aug-09
ALS Sample ID	L807781-1	L807781-2	L807781-3	L807781-4	L807781-5	L807781-6	L807781-7	L807781-8	L807781-9	L807781-10	L807781-11	L807781-12	L807781-16
Physical Tests													
% Moisture	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
pH	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
Particle Size													
% Gravel (>2mm)	1	1	1	1	1	1	1	1	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1	1	1	1	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1	1	1	1	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1	1	1	1	1	1	1	1	1
Nutrients													
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Available Phosphate-P	2	2	2	2	2	2	2	2	2	2	2	2	2
Phosphorus, Total	90	90	90	90	90	90	90	90	90	90	90	90	90
Cyanides													
Cyanide, Total	3	3	3	3	3	3	3	3	3	3	3	3	3
Organic / Inorganic Carbon													
$CaCO_3$ Equivalent	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Inorganic Carbon	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Total Carbon by Combustion	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
Total Organic Carbon	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
Metals													
Aluminum (Al)	50	50	50	50	50	50	50	50	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10	10	10	10	10	10	10	10	10
Arsenic (As)	5	5	5	5	5	5	5	5	5	5	5	5	5
Barium (Ba)	1	1	1	1	1	1	1	1	1	1	1	1	1
Beryllium (Be)	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
Bismuth (Bi)	20	20	20	20	20	20	20	20	20	20	20	20	20
Cadmium (Cd)	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
Calcium (Ca)	50	50	50	50	50	50	50	50	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2	2	2	2	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2	2	2	2	2	2	2	2	2
Copper (Cu)	1	1	1	1	1	1	1	1	1	1	1	1	1
Iron (Fe)	50	50	50	50	50	50	50	50	50	50	50	50	50
Lead (Pb)	30	30	30	30	30	30	30	30	30	30	30	30	30
Lithium (Li)	2	2	2	2	2	2	2	2	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50	50	50	50	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1	1	1	1	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4	4	4	4	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5	5	5	5	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50	50	50	50	50	50	50	50	50
Potassium (K)	200	200	200	200	200	200	200	200	200	200	200	200	200
Selenium (Se)	0.5	0.5	0.5	0.5	0.5	2	3	2	2	3	2	0.5	3
Silver (Ag)	2	2	2	2	2	2	2	2	2	2	2	2	2
Sodium (Na)	200	200	200	200	200	200	200	200	200	200	200	200	200
Strontium (Sr)	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
Sulfur (S)-Total	-	-	-	-	-	-	100	100	100	100	100	100	100
Thallium (Tl)	1	1	1	1	1	1	1	1	1	1	1	1	1
Tin (Sn)	5	5	5	5	5	5	5	5	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Sulphur	0.1	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-
Vanadium (V)	2	2	2	2	2	2	2	2	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1	1	1	1	1	1	1	1	1

Appendix 5.2-3. Detection Limits of Sediment Quality Data for Lakes of the KSM Project Area, August 2009

Sample ID	LAL DEEP REP1	LAL DEEP REP2	LAL MID REP1	LAL MID REP2	LAL SHALLOW REP1	LAL SHALLOW REP2	KGL DEEP REP 1	KGL DEEP REP 2	KGL MID REP 1	KGL MID REP 2	QAQC LAKE 2	KGL SHALLOW REP 1	KGL SHALLOW REP 2
Date Sampled	15-AUG-09	15-AUG-09	15-AUG-09	15-AUG-09	15-AUG-09	15-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09	18-AUG-09	18-AUG-09
ALS Sample ID	L806369-10	L806369-11	L806369-12	L806369-13	L806369-14	L806369-15	L809328-1	L809328-2	L809328-3	L809328-4	L809328-5	L809328-24	L809328-25
Physical Tests													
% Moisture	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
pH	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
Particle Size													
% Gravel (>2mm)	1	1	1	1	1	1	1	1	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1	1	1	1	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1	1	1	1	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1	1	1	1	1	1	1	1	1
Nutrients													
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Available Phosphate-P	2	2	2	2	2	2	2	2	2	2	2	2	2
Phosphorus, Total	90	90	90	90	90	90	90	90	90	90	90	90	90
Cyanides													
Cyanide, Total	3	3	3	3	3	3	3	3	3	3	3	3	3
Organic / Inorganic Carbon													
$CaCO_3$ Equivalent	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Inorganic Carbon	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Total Carbon by Combustion	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
Total Organic Carbon	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
Metals													
Aluminum (Al)	50	50	50	50	50	50	50	50	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10	10	10	10	10	10	10	10	10
Arsenic (As)	5	5	5	5	5	5	5	5	5	5	5	5	5
Barium (Ba)	1	1	1	1	1	1	1	1	1	1	1	1	1
Beryllium (Be)	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
Bismuth (Bi)	20	20	20	20	20	20	20	20	20	20	20	20	20
Cadmium (Cd)	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
Calcium (Ca)	50	50	50	50	50	50	50	50	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2	2	2	2	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2	2	2	2	2	2	2	2	2
Copper (Cu)	1	1	1	1	1	1	1	1	1	1	1	1	1
Iron (Fe)	50	50	50	50	50	50	50	50	50	50	50	50	50
Lead (Pb)	30	30	30	30	30	30	30	30	30	30	30	30	30
Lithium (Li)	2	2	2	2	2	2	2	2	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50	50	50	50	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1	1	1	1	1	1	1	1	1
Mercury (Hg)	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
Molybdenum (Mo)	4	4	4	4	4	4	4	4	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5	5	5	5	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50	50	50	50	50	50	50	50	50
Potassium (K)	200	200	200	200	200	200	200	200	200	200	200	200	200
Selenium (Se)	5	5	3	2	0.5	0.5	2	2	2	2	2	2	2
Silver (Ag)	2	2	2	2	2	2	2	2	2	2	2	2	2
Sodium (Na)	200	200	200	200	200	200	200	200	200	200	200	200	200
Strontium (Sr)	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
Sulfur (S)-Total	-	-	100	100	100	100	100	100	100	100	100	100	100
Thallium (Tl)	1	1	1	1	1	1	1	1	1	1	1	1	1
Tin (Sn)	5	5	5	5	5	5	5	5	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Sulphur	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	2	2	2	2	2	2	2	2	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1	1	1	1	1	1	1	1	1

Appendix 5.2-4

Phytoplankton Chlorophyll *a* Concentrations from Lakes of the KSM Project, August 2009

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Appendix 5.2-4. Phytoplankton Chlorophyll *a* Concentrations from Lakes of the KSM Project, August 2009

RESULTS OF ANALYSIS									
Sample ID	KGL DEEP REP 1	KGL DEEP REP 2	KGL MID REP 1	KGL MID REP 2	KGL SHALLOW REP 1	KGL SHALLOW REP 2	TDL DEEP REP 1	TDL DEEP REP 2	TDL MID REP 1
Date Sampled	19-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09	19-AUG-09	17-AUG-09	17-AUG-09	17-AUG-09
ALS Sample ID	L810572-1	L810572-2	L810572-3	L810572-4	L810572-5	L810572-6	L810572-7	L810572-8	L810572-9
Plant Pigments									
Chlorophyll *a*	0.861	1.03	1.34	1.29	1.10	2.26	1.25	0.948	1.20

RESULTS OF ANALYSIS									
Sample ID	TDL MID REP 2	TDL SHALLOW REP 1	TDL SHALLOW REP 2	SUL DEEP REP 1	SUL DEEP REP 2	SUL MID REP 1	SUL MID REP 2	SUL SHALLOW REP 1	SUL SHALLOW REP 2
Date Sampled	17-AUG-09	17-AUG-09	17-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09	16-AUG-09
ALS Sample ID	L810572-10	L810572-11	L810572-12	L810572-13	L810572-14	L810572-15	L810572-16	L810572-17	L810572-18
Plant Pigments									
Chlorophyll *a*	1.20	0.685	1.04	<0.040	<0.040	<0.040	0.486	<0.070	<0.070

RESULTS OF ANALYSIS						
Sample ID	LAL DEEP REP 1	LAL DEEP REP 2	LAL MID REP 1	LAL MID REP 2	LAL SHALLOW REP 1	LAL SHALLOW REP 2
Date Sampled	15-AUG-09	15-AUG-09	15-AUG-09	15-AUG-09	15-AUG-09	15-AUG-09
ALS Sample ID	L810572-19	L810572-20	L810572-21	L810572-22	L810572-23	L810572-24
Plant Pigments						
Chlorophyll *a*	0.304	0.456	0.513	0.270	0.605	0.666

Possible field or lab error; results interpreted with caution.

Appendix 5.2-5

Phytoplankton Taxonomic Data for Lakes of the KSM Project Area, August 2009

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Appendix 5.2-5. Phytoplankton Tqaxonomic Data for Lakes of the KSM Project Area, August 2009

	Sample ID	SUL Shallow								SUL Mid							
	Date	16-Aug-09				16-Aug-09				16-Aug-09				16-Aug-09			
	Replicate	1				2				1				2			
Taxa	Group	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent
Anabaena flos-aquae	bluegreen																
Anabaena sp.	bluegreen																
Chroococcus minimus	bluegreen																
Rhodomonas minuta	cryptophyte																
Cryptomonas erosa	cryptophyte																
Chrysococcus rufescens	chrysophyte																
Dinobryon sertularia	chrysophyte																
Kephyrion littorale	chrysophyte																
Kephyrion spirale	chrysophyte																
Achnanthes clevei	diatom																
Achnanthes hauckiana	diatom																
Achnanthes linearis	diatom																
Achnanthes minutissima	diatom																
Amphora perpusilla	diatom																
Asterionella formosa	diatom																
Caloneis ventricosa	diatom																
Cocconeis placentula	diatom																
Cyclotella comta	diatom																
Cyclotella ocellata	diatom																
Cyclotella stelligera	diatom																
Cymbella microcephala	diatom																
Cymbella minuta	diatom																
Fragilaria construens venter	diatom																
Fragilaria pinnata	diatom																
Fragilaria vaucheriae	diatom																
Frustulia rhomboides	diatom																
Gomphonema acuminatum	diatom																
Gomphonema angustatum	diatom																
Gomphonema sp.	diatom																
Navicula anglica	diatom																
Navicula cryptocephala veneta	diatom																
Navicula pupula	diatom																
Navicula minima																	
Navicula sp.	diatom																
Nitzschia acicularis	diatom																
Nitzschia dissipata	diatom																
Nitzschia frustulum	diatom																
Nitzschia linearis	diatom																
Nitzschia sp.	diatom																
Stephanodiscus astraea	diatom																
Stephanodiscus astraea minutula	diatom																
Stephanodiscus hantzschii	diatom																
Surirella ovata	diatom																
Synedra cyclopum	diatom																
Synedra radians	diatom																
Synedra rumpens	diatom																
Synedra tenera	diatom																
Synedra ulna	diatom																
Ceratium hirundinella	dinoflagellate																
Glenodinium sp.	dinoflagellate																
Hemidinium sp.	dinoflagellate																
Ankistrodesmus falcatus	green																
Botryococcus braunii	green																
Chlamydomonas sp.	green																
Cosmarium sp.	green																
Crucigenia quadrata	green																
Gloeocystis ampla	green																
Oocystis pusilla	green																
Quadrigula closterioides	green																
Sphaerocystis schroeteri	green																
Tetraedron minimum	green																
Unidentified flagellate																	
Total:		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

yellow Indicates no phytoplankton found

Appendix 5.2-5. Phytoplankton Tqaxonomic Data for Lakes of the KSM Project Area, August 2009

	Sample ID	SUL Deep								KGL Shallow							
	Date	16-Aug-09				16-Aug-09				19-Aug-09				19-Aug-09			
	Replicate	1				2				1				2			
Taxa	Group	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent
Anabaena flos-aquae	bluegreen																
Anabaena sp.	bluegreen																
Chroococcus minimus	bluegreen																
Rhodomonas minuta	cryptophyte									253.4689922	88.7755102	5069.379845	28.41280209	59.61494253	46.93877551	1192.298851	4.338394794
Cryptomonas erosa	cryptophyte																
Chrysococcus rufescens	chrysophyte																
Dinobryon sertularia	chrysophyte																
Kephyrion littorale	chrysophyte																
Kephyrion spirale	chrysophyte																
Achnanthes clevei	diatom																
Achnanthes hauckiana	diatom																
Achnanthes linearis	diatom																
Achnanthes minutissima	diatom									3	1.0	146	0.8				
Amphora perpusilla	diatom																
Asterionella formosa	diatom													3	2.0	570	2.1
Caloneis ventricosa	diatom																
Cocconeis placentula	diatom																
Cyclotella comta	diatom													3	2.0	5,884	21.4
Cyclotella ocellata	diatom													3	2.0	324	1.2
Cyclotella stelligera	diatom																
Cymbella microcephala	diatom																
Cymbella minuta	diatom					1	33.3	504	48.9	6	2.0	2,156	12.1				
Fragilaria construens venter	diatom					1	33.3	131	12.7					3	2.0	124	0.5
Fragilaria pinnata	diatom																
Fragilaria vaucheriae	diatom																
Frustulia rhomboides	diatom																
Gomphonema acuminatum	diatom																
Gomphonema angustatum	diatom																
Gomphonema sp.	diatom																
Navicula anglica	diatom																
Navicula cryptocephala veneta	diatom																
Navicula pupula	diatom																
Navicula minima																	
Navicula sp.	diatom													3	2.0	389	1.4
Nitzschia acicularis	diatom																
Nitzschia dissipata	diatom																
Nitzschia frustulum	diatom													3	2.0	311	1.1
Nitzschia linearis	diatom									3	1.0	4,440	24.9				
Nitzschia sp.	diatom									3	1.0	350	2.0				
Stephanodiscus astraea	diatom																
Stephanodiscus astraea minutula	diatom													10	8.2	3,629	13.2
Stephanodiscus hantzschii	diatom																
Surirella ovata	diatom					1	33.3	395	38.4								
Synedra cyclopum	diatom																
Synedra radians	diatom													31	24.5	11,197	40.7
Synedra rumpens	diatom													3	2.0	363	1.3
Synedra tenera	diatom																
Synedra ulna	diatom																
Ceratium hirundinella	dinoflagellate																
Glenodinium sp.	dinoflagellate													3	2.0	1,814	6.6
Hemidinium sp.	dinoflagellate																
Ankistrodesmus falcatus	green																
Botryococcus braunii	green																
Chlamydomonas sp.	green									17	6.1	5,681	31.8	5	4.1	1,685	6.1
Cosmarium sp.	green																
Crucigenia quadrata	green																
Gloeocystis ampla	green																
Oocystis pusilla	green																
Quadrigula closterioides	green																
Sphaerocystis schroeteri	green																
Tetraedron minimum	green																
Unidentified flagellate																	
Total:		0	0	0	0	4	100	1,029	100	286	100	17,842	100	127	100	27,482	100

yellow Indicates no phytoplankton found

Appendix 5.2-5. Phytoplankton Tqaxonomic Data for Lakes of the KSM Project Area, August 2009

	Sample ID	KGL Mid								KGL Deep							
	Date	19-Aug-09				19-Aug-09				19-Aug-09				19-Aug-09			
	Replicate	1				2				1				2			
Taxa	Group	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent
Anabaena flos-aquae	bluegreen													2	2.0	1,033	18.7
Anabaena sp.	bluegreen																
Chroococcus minimus	bluegreen																
Rhodomonas minuta	cryptophyte	56.63242009	82.5	1132.648402	20.06079027	27.52685547	50	550.5371094	6.501105188	83.2202381	40.78947368	1664.404762	2.560290717	80.94871795	85.71428571	1618.974359	29.30914166
Cryptomonas erosa	cryptophyte																
Chrysococcus rufescens	chrysophyte																
Dinobryon sertularia	chrysophyte																
Kephyrion littorale	chrysophyte																
Kephyrion spirale	chrysophyte																
Achnanthes clevei	diatom																
Achnanthes hauckiana	diatom																
Achnanthes linearis	diatom																
Achnanthes minutissima	diatom																
Amphora perpusilla	diatom					1	2.0	183	2.2								
Asterionella formosa	diatom									51	25.0	11,221	17.3	6	6.1	1,272	23.0
Caloneis ventricosa	diatom					1	2.0	270	3.2								
Cocconeis placentula	diatom	5	7.5	2,368	41.9	1	2.0	506	6.0								
Cyclotella comta	diatom																
Cyclotella ocellata	diatom																
Cyclotella stelligera	diatom																
Cymbella microcephala	diatom																
Cymbella minuta	diatom																
Fragilaria construens venter	diatom	2	2.5	824	14.6					5	2.6	2,319	3.6				
Fragilaria pinnata	diatom																
Fragilaria vaucheriae	diatom																
Frustulia rhomboides	diatom																
Gomphonema acuminatum	diatom																
Gomphonema angustatum	diatom									5	2.6	966	1.5	2	2.0	347	6.3
Gomphonema sp.	diatom																
Navicula anglica	diatom									3	1.3	966	1.5				
Navicula cryptocephala veneta	diatom																
Navicula pupula	diatom					18	32.0	4,757	56.2	3	1.3	725	1.1				
Navicula minima																	
Navicula sp.	diatom																
Nitzschia acicularis	diatom																
Nitzschia dissipata	diatom																
Nitzschia frustulum	diatom																
Nitzschia linearis	diatom																
Nitzschia sp.	diatom																
Stephanodiscus astraea	diatom									3	1.3	21,589	33.2				
Stephanodiscus astraea minutula	diatom					2	4.0	771	9.1	5	2.6	1,879	2.9				
Stephanodiscus hantzschii	diatom	2	2.5	206	3.6												
Surirella ovata	diatom																
Synedra cyclopum	diatom									19	9.2	15,879	24.4				
Synedra radians	diatom									16	7.9	5,799	8.9				
Synedra rumpens	diatom									8	3.9	1,128	1.7				
Synedra tenera	diatom																
Synedra ulna	diatom																
Ceratium hirundinella	dinoflagellate																
Glenodinium sp.	dinoflagellate																
Hemidinium sp.	dinoflagellate																
Ankistrodesmus falcatus	green																
Botryococcus braunii	green																
Chlamydomonas sp.	green	3	5.0	1,115	19.8	4	8.0	1,431	16.9	3	1.3	872	1.3	4	4.1	1,253	22.7
Cosmarium sp.	green																
Crucigenia quadrata	green																
Gloeocystis ampla	green																
Oocystis pusilla	green																
Quadrigula closterioides	green																
Sphaerocystis schroeteri	green																
Tetraedron minimum	green																
Unidentified flagellate																	
Total:		69	100	5,646	100	55	100	8,468	100	204	100	65,008	100	93	98	4,491	81

yellow Indicates no phytoplankton found

Appendix 5.2-5. Phytoplankton Tqaxonomic Data for Lakes of the KSM Project Area, August 2009

	Sample ID	TDL Shallow								TDL Mid							
	Date	17-Aug-09				17-Aug-09				17-Aug-09				17-Aug-09			
	Replicate	1				2				1				2			
Taxa	Group	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent
Anabaena flos-aquae	bluegreen																
Anabaena sp.	bluegreen																
Chroococcus minimus	bluegreen	78	41.7	4,379	4.8	81	49.5	4,542	7.0	103	38.0	5,747	5.2	107	40.7	5,975	3.8
Rhodomonas minuta	cryptophyte	**23.64112903**	**12.62135922**	**472.8225806**	**0.515306588**	**17.84532374**	**10.89108911**	**356.9064748**	**0.55225042**	35	13.0	702	0.6	**46.06989247**	**17.59259259**	**921.3978495**	**0.580569263**
Cryptomonas erosa	cryptophyte	11	5.8	5,674	6.2	8	5.0	4,218	6.5	22	8.0	11,234	10.1	7	2.8	3,783	2.4
Chrysococcus rufescens	chrysophyte																
Dinobryon sertularia	chrysophyte	2	1.0	218	0.2	2	1.0	195	0.3	3	1.0	324	0.3				
Kephyrion littorale	chrysophyte	2	1.0	173	0.2												
Kephyrion spirale	chrysophyte																
Achnanthes clevei	diatom									3	1.0	405	0.4				
Achnanthes hauckiana	diatom																
Achnanthes linearis	diatom																
Achnanthes minutissima	diatom									3	1.0	135	0.1				
Amphora perpusilla	diatom																
Asterionella formosa	diatom	2	1.0	800	0.9					5	2.0	14,259	12.9				
Caloneis ventricosa	diatom																
Cocconeis placentula	diatom																
Cyclotella comta	diatom	22	11.7	49,537	54.0	21	12.9	47,874	74.1	27	10.0	61,304	55.3	46	17.6	104,579	65.9
Cyclotella ocellata	diatom																
Cyclotella stelligera	diatom	4	1.9	200	0.2					11	4.0	594	0.5	7	2.8	400	0.3
Cymbella microcephala	diatom																
Cymbella minuta	diatom																
Fragilaria construens venter	diatom	2	1.0	524	0.6					3	1.0	389	0.4	5	1.9	349	0.2
Fragilaria pinnata	diatom																
Fragilaria vaucheriae	diatom																
Frustulia rhomboides	diatom									3	1.0	2,917	2.6				
Gomphonema acuminatum	diatom	2	1.0	3,164	3.4												
Gomphonema angustatum	diatom																
Gomphonema sp.	diatom																
Navicula anglica	diatom																
Navicula cryptocephala veneta	diatom																
Navicula pupula	diatom																
Navicula minima		2	1.0	80	0.1									5	1.9	213	0.1
Navicula sp.	diatom																
Nitzschia acicularis	diatom																
Nitzschia dissipata	diatom	2	1.0	489	0.5												
Nitzschia frustulum	diatom																
Nitzschia linearis	diatom																
Nitzschia sp.	diatom																
Stephanodiscus astraea	diatom																
Stephanodiscus astraea minutula	diatom																
Stephanodiscus hantzschii	diatom																
Surirella ovata	diatom																
Synedra cyclopum	diatom																
Synedra radians	diatom	2	1.0	655	0.7					3	1.0	972	0.9				
Synedra rumpens	diatom	2	1.0	255	0.3	2	1.0	227	0.4								
Synedra tenera	diatom																
Synedra ulna	diatom																
Ceratium hirundinella	dinoflagellate	2	1.0	17,822	19.4									2	0.9	23,762	15.0
Glenodinium sp.	dinoflagellate																
Hemidinium sp.	dinoflagellate																
Ankistrodesmus falcatus	green	4	1.9	136	0.1	2	1.0	41	0.1								
Botryococcus braunii	green	2	1.0	2,619	2.9									5	1.9	8,729	5.5
Chlamydomonas sp.	green	2	1.0	591	0.6												
Cosmarium sp.	green	5	2.9	1,146	1.2	2	1.0	341	0.5	3	1.0	567	0.5				
Crucigenia quadrata	green	7	3.9	618	0.7	13	7.9	1,765	2.7	19	7.0	1,607	1.5	10	3.7	989	0.6
Gloeocystis ampla	green																
Oocystis pusilla	green	5	2.9	501	0.5	8	5.0	1,577	2.4	3	1.0	146	0.1	7	2.8	4,321	2.7
Quadrigula closterioides	green	2	1.0	175	0.2	2	1.0	311	0.5	8	3.0	2,333	2.1	7	2.8	1,920	1.2
Sphaerocystis schroeteri	green	4	1.9	1,528	1.7	6	4.0	3,180	4.9	14	5.0	6,616	6.0	5	1.9	2,716	1.7
Tetraedron minimum	green									3	1.0	486	0.4				
Unidentified flagellate										3	1.0	54	0.0	2	0.9	48	0.0
Total:		109	58	87,377	95	83	50	60,085	93	167	62	105,045	95	155	59	152,731	96

yellow Indicates no phytoplankton found

Appendix 5.2-5. Phytoplankton Tqaxonomic Data for Lakes of the KSM Project Area, August 2009

	Sample ID	TDL Deep								LAL Shallow							
	Date	17-Aug-09				17-Aug-09				15-Aug-09				15-Aug-09			
	Replicate	1				2				1				2			
Taxa	Group	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent
Anabaena flos-aquae	bluegreen																
Anabaena sp.	bluegreen																
Chroococcus minimus	bluegreen	83	41.7	4,639	4.6	104	42.5	5,828	5.4								
Rhodomonas minuta	cryptophyte	**29.45306122**	**14.81481481**	**589.0612245**	**0.58090985**	**26.01923077**	**10.61946903**	**520.3846154**	**0.484152088**	**13.11046512**	**2.803738318**	**262.2093023**	**0.22070995**	4	0.9	85	0.1
Cryptomonas erosa	cryptophyte	9	4.6	4,786	4.7	17	7.1	9,020	8.4								
Chrysococcus rufescens	chrysophyte									4	0.9	371	0.3				
Dinobryon sertularia	chrysophyte									4	0.9	524	0.4	4	0.9	513	0.4
Kephyrion littorale	chrysophyte	2	0.9	175	0.2					4	0.9	415	0.3				
Kephyrion spirale	chrysophyte									4	0.9	275	0.2				
Achnanthes clevei	diatom																
Achnanthes hauckiana	diatom																
Achnanthes linearis	diatom													4	0.9	564	0.4
Achnanthes minutissima	diatom									17	3.7	874	0.7	4	0.9	214	0.2
Amphora perpusilla	diatom																
Asterionella formosa	diatom																
Caloneis ventricosa	diatom																
Cocconeis placentula	diatom																
Cyclotella comta	diatom	35	17.6	79,394	78.3	24	9.7	54,142	50.4								
Cyclotella ocellata	diatom																
Cyclotella stelligera	diatom									26	5.6	1,442	1.2	34	7.4	1,879	1.4
Cymbella microcephala	diatom					4	1.8	230	0.2								
Cymbella minuta	diatom									4	0.9	1,617	1.4				
Fragilaria construens venter	diatom									4	0.9	210	0.2				
Fragilaria pinnata	diatom																
Fragilaria vaucheriae	diatom																
Frustulia rhomboides	diatom																
Gomphonema acuminatum	diatom																
Gomphonema angustatum	diatom	2	0.9	331	0.3					4	0.9	787	0.7				
Gomphonema sp.	diatom																
Navicula anglica	diatom																
Navicula cryptocephala veneta	diatom	2	0.9	175	0.2												
Navicula pupula	diatom																
Navicula minima						2	0.9	95	0.1	4	0.9	192	0.2				
Navicula sp.	diatom																
Nitzschia acicularis	diatom													4	0.9	1,196	0.9
Nitzschia dissipata	diatom																
Nitzschia frustulum	diatom																
Nitzschia linearis	diatom																
Nitzschia sp.	diatom																
Stephanodiscus astraea	diatom																
Stephanodiscus astraea minutula	diatom																
Stephanodiscus hantzschii	diatom																
Surirella ovata	diatom																
Synedra cyclopum	diatom																
Synedra radians	diatom					2	0.9	781	0.7	223	47.7	80,236	67.5	239	51.9	86,100	65.8
Synedra rumpens	diatom	2	0.9	258	0.3					135	29.0	18,966	16.0	145	31.5	20,329	15.5
Synedra tenera	diatom									13	2.8	3,933	3.3	4	0.9	1,281	1.0
Synedra ulna	diatom									4	0.9	8,697	7.3	9	1.9	16,998	13.0
Ceratium hirundinella	dinoflagellate					2	0.9	21,249	19.8								
Glenodinium sp.	dinoflagellate																
Hemidinium sp.	dinoflagellate																
Ankistrodesmus falcatus	green	2	0.9	368	0.4	9	3.5	260	0.2								
Botryococcus braunii	green	4	1.9	5,302	5.2												
Chlamydomonas sp.	green	2	0.9	598	0.6	2	0.9	705	0.7					4	0.9	1,388	1.1
Cosmarium sp.	green	4	1.9	773	0.8												
Crucigenia quadrata	green	9	4.6	782	0.8	13	5.3	1,659	1.5					4	0.9	363	0.3
Gloeocystis ampla	green																
Oocystis pusilla	green					20	8.0	8,219	7.6								
Quadrigula closterioides	green	7	3.7	1,060	1.0	7	2.7	1,046	1.0								
Sphaerocystis schroeteri	green	2	0.9	2,062	2.0	9	3.5	3,643	3.4								
Tetraedron minimum	green																
Unidentified flagellate		6	2.8	110	0.1	4	1.8	87	0.1								
Total:		116	58	96,764	95	141	58	101,655	95	468	100	118,803	100	461	100	130,910	100

yellow Indicates no phytoplankton found

Appendix 5.2-5. Phytoplankton Tqaxonomic Data for Lakes of the KSM Project Area, August 2009

	Sample ID	LAL Mid								LAL Deep							
	Date	15-Aug-09				15-Aug-09				15-Aug-09				15-Aug-09			
	Replicate	1				2				1				2			
Taxa	Group	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent	Density #/ml	Density Percent	Biovolume µm³/ml	Biovolume Percent
Anabaena flos-aquae	bluegreen																
Anabaena sp.	bluegreen	11	1.8	8,032	5.4									12	1.8	10,953	6.3
Chroococcus minimus	bluegreen																
Rhodomonas minuta	cryptophyte	**26.8452381**	**4.424778761**	**536.9047619**	**0.364126279**	**6.195054945**	**0.934579439**	**123.9010989**	**0.090106325**	36	6.2	727	0.5	**17.25765306**	**2.727272727**	**345.1530612**	**0.198813745**
Cryptomonas erosa	cryptophyte	5	0.9	2,792	1.9					5	0.8	2,364	1.6	6	0.9	2,991	1.7
Chrysococcus rufescens	chrysophyte	5	0.9	456	0.3	12	1.9	1,053	0.8								
Dinobryon sertularia	chrysophyte	21	3.5	3,093	2.1					32	5.4	3,819	2.6				
Kephyrion littorale	chrysophyte	11	1.8	1,020	0.7	19	2.8	1,766	1.3	9	1.6	864	0.6				
Kephyrion spirale	chrysophyte					6	0.9	390	0.3					6	0.9	362	0.2
Achnanthes clevei	diatom																
Achnanthes hauckiana	diatom					6	0.9	297	0.2								
Achnanthes linearis	diatom									5	0.8	600	0.4				
Achnanthes minutissima	diatom	5	0.9	268	0.2	12	1.9	620	0.5	5	0.8	227	0.2	12	1.8	575	0.3
Amphora perpusilla	diatom																
Asterionella formosa	diatom																
Caloneis ventricosa	diatom																
Cocconeis placentula	diatom	5	0.9	2,470	1.7												
Cyclotella comta	diatom																
Cyclotella ocellata	diatom																
Cyclotella stelligera	diatom	97	15.9	5,315	3.6	136	20.6	7,496	5.5	23	3.9	1,250	0.8	58	9.1	3,164	1.8
Cymbella microcephala	diatom																
Cymbella minuta	diatom	5	0.9	1,987	1.3	6	0.9	2,292	1.7								
Fragilaria construens venter	diatom	5	0.9	515	0.3					5	0.8	218	0.1	6	0.9	1,104	0.6
Fragilaria pinnata	diatom	5	0.9	322	0.2					5	0.8	273	0.2				
Fragilaria vaucheriae	diatom					12	1.9	3,568	2.6								
Frustulia rhomboides	diatom																
Gomphonema acuminatum	diatom																
Gomphonema angustatum	diatom													6	0.9	1,035	0.6
Gomphonema sp.	diatom													6	0.9	1,151	0.7
Navicula anglica	diatom																
Navicula cryptocephala veneta	diatom					6	0.9	1,146	0.8								
Navicula pupula	diatom																
Navicula minima																	
Navicula sp.	diatom									5	0.8	682	0.5				
Nitzschia acicularis	diatom																
Nitzschia dissipata	diatom					6	0.9	1,666	1.2								
Nitzschia frustulum	diatom																
Nitzschia linearis	diatom																
Nitzschia sp.	diatom																
Stephanodiscus astraea	diatom																
Stephanodiscus astraea minutula	diatom																
Stephanodiscus hantzschii	diatom																
Surirella ovata	diatom																
Synedra cyclopum	diatom	11	1.8	9,074	6.2												
Synedra radians	diatom	199	32.7	71,516	48.5	248	37.4	89,209	64.9	209	35.7	75,288	50.6	253	40.0	91,120	52.5
Synedra rumpens	diatom	129	21.2	18,040	12.2	155	23.4	21,683	15.8	173	29.5	24,187	16.3	207	32.7	28,993	16.7
Synedra tenera	diatom	21	3.5	6,443	4.4	6	0.9	1,859	1.4	41	7.0	12,275	8.2	17	2.7	5,177	3.0
Synedra ulna	diatom	5	0.9	10,684	7.2					9	1.6	18,095	12.2	12	1.8	22,895	13.2
Ceratium hirundinella	dinoflagellate																
Glenodinium sp.	dinoflagellate																
Hemidinium sp.	dinoflagellate													6	0.9	1,726	1.0
Ankistrodesmus falcatus	green	16	2.7	403	0.3	12	1.9	310	0.2	14	2.3	341	0.2	6	0.9	144	0.1
Botryococcus braunii	green																
Chlamydomonas sp.	green	5	0.9	1,745	1.2	12	1.9	4,027	2.9	9	1.6	2,955	2.0	6	0.9	1,870	1.1
Cosmarium sp.	green																
Crucigenia quadrata	green	16	2.7	2,738	1.9												
Gloeocystis ampla	green									5	0.8	4,655	3.1				
Oocystis pusilla	green																
Quadrigula closterioides	green																
Sphaerocystis schroeteri	green																
Tetraedron minimum	green																
Unidentified flagellate																	
Total:		596	98	139,418	95	663	100	137,505	100	586	100	148,821	100	621	98	162,653	94

yellow Indicates no phytoplankton found

Appendix 5.2-6

Taxonomic Data for Zooplankton in Lakes of the KSM Project Area, August 2009

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Appendix 5.2-6. Taxonomic Data for Zooplankton in Lakes of the KSM Project Area, August 2009

Lake/Sample ID	SUL shallow	SUL shallow	SUL mid	SUL mid	SUL deep	SUL deep	KGL shallow	KGL shallow	KGL mid	KGL mid	KGL deep	KGL deep
Date	**16-Aug-09**	**16-Aug-09**	**16-Aug-09**	**16-Aug-09**	**16-Aug-09**	**16-Aug-09**	**19-Aug-09**	**19-Aug-09**	**19-Aug-09**	**19-Aug-09**	**19-Aug-09**	**19-Aug-09**
Volume sampled (m^3)	**0.060754539**	**0.072146015**	**0.182263617**	**0.140494872**	**0.531602218**	**0.353135759**	**0.074044595**	**0.112016182**	**0.330352807**	**0.191756514**	**0.522109321**	**0.3493386**
Replicate	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
CLADOCERA												
Daphnia pulex												
Daphnia sp.	0	0	0	0	0	0	0	0	0	0	3.8	2.9
Sida crystallina												
Simocephalus vetulus												
Alona sp.												
Subtotal cladocerans	0	0	0	0	0	0	0	0	0	0	3.8	2.9
COPEPODA												
Acanthodiaptomus denticornis												
calanoid copepodite	0	0	0	0	0	2.8	0	0	0	0	0	0
copepod nauplii	32.9	69.3	21.9	49.8	0	11.3	54	44.6	27.2	57.4	222.2	174.6
cyclopoid copepodites	0	41.6	38.4	14.2	3.8	22.7	13.5	0	3	36.5	24.9	17.2
Cyclops scutifer	0	0	0	0	0	2.8	0	0	0	5.2	1.9	8.6
diaptomid copepodites	0	0	0	0	0	0	0	0	0	10.4	36.4	22.9
harpacticoid copepods	0	0	5.5	0	0	0	0	0	0	0	0	0
Heterocope septentrionalis												
Leptodiaptomus tyrrelli												
Subtotal copepods	32.9	110.9	65.8	64.1	3.8	39.6	67.5	44.6	30.3	109.5	285.4	223.3
MISCELLANEOUS ZOOPLANKTERS												
chironomid larvae	0	0	0	0	0	0	13.5	8.9	3	10.4	9.6	8.6
ROTIFERA & PROTISTA												
Keratella cochlearis												
Keratella irregularis	0	0	0	0	0	0	13.5	0	3	0	0	0
Keratella quadrata	16.5	0	0	14.2	1.9	0	0	8.9	0	20.9	1.9	0
Kellicottia longispina	148.1	291.1	76.8	192.2	16.9	34	486.2	517.8	184.7	563.2	352.4	369.3
Conochilus unicornis	0	318.8	0	14.2	0	8.5	27	35.7	3	0	1.9	2.9
Difflugia sp.	0	0	0	0	0	5.7	0	0	0	0	0	0
Subtotal rotifers and protists	164.6	609.9	76.8	220.6	18.8	48.1	526.7	562.4	190.7	584.1	356.2	372.1
TOTAL DENSITY	**197.5**	**720.8**	**142.7**	**284.7**	**22.6**	**87.8**	**607.7**	**616**	**224**	**704**	**655**	**606.9**

Lake/Sample ID	TDL shallow	TDL shallow	TDL mid	TDL mid	TDL deep	TDL deep	LAL shallow	LAL shallow	LAL mid	LAL mid	LAL deep	LAL deep
Date	**17-Aug-09**	**17-Aug-09**	**17-Aug-09**	**17-Aug-09**	**17-Aug-09**	**17-Aug-09**	**15-Aug-09**	**15-Aug-09**	**15-Aug-09**	**15-Aug-09**	**15-Aug-09**	**15-Aug-09**
Volume sampled (m^3)	**0.170872141**	**0.155683507**	**0.252511053**	**0.26200395**	**0.666401351**	**0.411991719**	**0.123407658**	**0.172770721**	**0.193655094**	**0.193655094**	**0.546790852**	**0.43667325**
Replicate	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
CLADOCERA												
Daphnia pulex	374.5	1952.7	6589.8	5618.2	4801.9	5903	64.8	92.6	0	41.3	0	293.1
Daphnia sp.												
Sida crystallina	93.6	0	0	0	0	0	0	0	0	0	0	0
Simocephalus vetulus	0	0	0	0	0	0	0	0	0	41.3	0	0
Alona sp.	0	0	0	0	0	0	0	0	82.6	0	0	0
Subtotal cladocerans	468.1	1952.7	6589.8	5618.2	4801.9	5903	64.8	92.6	82.6	82.6	0	293.1
COPEPODA												
Acanthodiaptomus denticornis	655.5	205.5	506.9	488.5	192.1	1242.7	0	0	0	0	0	0
calanoid copepodite												
copepod nauplii	19195.6	27543.1	91750.4	78899.6	58199.2	165284.9	19447.7	22689	21977.2	14334.8	38976.5	46020.7
cyclopoid copepodites	4401	4624.8	19516	12213.6	12869.1	32000.6	1620.6	3241.3	2809.1	1074.1	43073.1	63315.1
Cyclops scutifer	1310.9	822.2	5576	4885.4	1920.8	6213.7	2139.3	2778.2	2313.4	702.3	8193.3	17294.4
diaptomid copepodites	12079.2	13154.9	3548.4	5129.7	1536.6	8077.8	12705.9	8520	7849	6114	1872.7	5276.3
harpacticoid copepods												
Heterocope septentrionalis	0	0	0	0	96	310.7	0	0	0	0	0	0
Leptodiaptomus tyrrelli	0	0	0	0	0	0	389	463	495.7	578.3	234.1	293.1
Subtotal copepods	37642.2	46350.4	120897.7	101616.8	74813.8	213130.5	36302.4	37691.6	35444.5	22803.4	92349.8	132199.5
MISCELLANEOUS ZOOPLANKTERS												
chironomid larvae												
ROTIFERA & PROTISTA												
Keratella cochlearis	93.6	102.8	253.5	488.5	192.1	621.4	0	0	0	0	0	0
Keratella irregularis												
Keratella quadrata	0	0	0	1221.4	1344.5	2485.5	0	0	0	123.9	234.1	1465.6
Kellicottia longispina	27435.7	37512	54492.7	42258.9	45714.2	104390.4	22170.4	19725.6	23960.1	15326.2	47989.1	55693.8
Conochilus unicornis	7678.3	18910.2	16728	23205.8	384.2	621.4	0	0	0	0	0	0
Difflugia sp.												
Subtotal rotifers and protists	35207.6	56524.9	71474.1	67174.6	47635	108118.7	22170.4	19725.6	23960.1	15450.1	48223.2	57159.4
TOTAL DENSITY	**73318**	**104828.1**	**198961.6**	**174409.6**	**127250.6**	**327152.2**	**58537.7**	**57509.7**	**59487.2**	**38336.2**	**140572.9**	**189652.1**

Note: Data represent numbers of zooplankton/m^3

Appendix 5.2-7

Biovolume Calculations for Zooplankton in Lakes of the KSM Project Area, August 2009

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Appendix 5.2-7. Biovolume Calculations for Zooplankton in Lakes of the KSM Project Area, August 2009

Sample ID - Replicate No.	TDL-Sh (Rep 1)	TDL-Sh (Rep 2)	TDL-Mid (Rep 1)	TDL-Mid (Rep 2)	TDL-Deep (Rep 1)	TDL-Deep (Rep 2)
Date Sampled	17 Aug 2009	17 Aug 2009	17 Aug 2009	17 Aug 2009	17 Aug 2009	17 Aug 2009
Volume (m^3)	0.1709	0.1557	0.2525	0.2620	0.6664	0.4120
Biovolume (in ml)	1	1	5	5	11	11
Biovolume/Sample Volume	5.9	6.4	19.8	19.1	16.5	26.7

Sample ID - Replicate No.	LAL-Sh (Rep 1)	LAL-Sh (Rep 2)	LAL-Mid (Rep 1)	LAL-Mid (Rep 2)	LAL-Deep (Rep 1)	LAL-Deep (Rep 2)
Date Sampled	15 Aug 2009	15 Aug 2009	15 Aug 2009	15 Aug 2009	15 Aug 2009	15 Aug 2009
Volume (m^3)	0.1234	0.1728	0.1937	0.1937	0.5468	0.4367
Biovolume (in ml)	0.5	0.75	1	1	4	5
Biovolume/Sample Volume	4.1	4.3	5.2	5.2	7.3	11.5

**Biovolume was negligible or KGL and SUL and was consequently not calculated.*

Appendix 5.2-8

Benthic Invertebrate Data for KSM Project Lakes, August 2009

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Appendix 5.2-8. Benthic Invertebrate Data for KSM Project Lakes, August 2009

				KGL						*TDL*						*SUL*						*LAL*					
				Deep		Mid		Shallow		Deep		Mid		Shallow		Deep		Mid		Shallow		Deep		Mid		Shallow	
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**
Tricladida	Planariidae		*Polycelis coronata*																								
Nematoda												2	5									4	8	32	16	128	48
Oligochaeta	Enchytraeidae																										
Oligochaeta	Lumbricidae																										
Oligochaeta	Lumbriculidae													3											1	7	7
Oligochaeta	Naididae																										
Oligochaeta	Tubificidae											37	145	11	2								1	8	1	65	
Hirudinea	Glossiphoniidae		*Helobdella stagnalis*											2													
Gastropoda	Planorbidae		*Gyraulus*											1													
Gastropoda	Valvatidae		*Valvata sincera*																						3	1	35
Pelecypoda	Sphaeriidae		*Pisidium*									23	38	16	7									7	44	118	192
Pelecypoda	Sphaeriidae		*Pisidium/Sphaerium*									14	67	45										25	94		72
Hydracarina																						8					
Ostracoda												1		104	88									8	48		
Cladocera	Daphnidae		*Daphnia*							1	1																
Copepoda - Calanoida																						4				24	
Copepoda - Cyclopoida										5063	5572	7	5	24								56	148	704	1872	8	24
Copepoda - Harpacticoida												5															
Amphipoda	Gammaridae		*Gammarus lacustris*											34	61												
Amphipoda	Talitridae		*Hyallela azteca*											1													
Collembola																1	1			10	16						
Ephemeroptera	Ameletidae		*Ameletus* sp.																								
Ephemeroptera	Ameletidae		*Ameletus celer*																								
Ephemeroptera	Ameletidae		*Ameletus similior*																								
Ephemeroptera	Baetidae (d)																										
Ephemeroptera	Baetidae		*Baetis*																								
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*																								
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*																								
Ephemeroptera	Ephemerellidae		*Drunella doddsi*																								
Ephemeroptera	Ephemerellidae		*Ephemerella*																								
Ephemeroptera	Ephemerellidae		*Serratella*																								
Ephemeroptera	Ephemerellidae (d)																										
Ephemeroptera	Heptageniidae		*Cynigmula*																								
Ephemeroptera	Heptageniidae		*Epeorus*																								
Ephemeroptera	Heptageniidae		*Rhithrogena*																								
Ephemeroptera	Heptageniidae (d)																										
Ephemeroptera	Leptophlebiidae (d)																										
Ephemeroptera	Leptophlebiidae		*Paraleptophlebia*																								
Plecoptera (d)																											
Plecoptera	Capniidae																										
Plecoptera	Chloroperlidae		*Paraperla*																								
Plecoptera	Chloroperlidae		*Suwallia*																								
Plecoptera	Chloroperlidae		*Sweltsa*																								
Plecoptera	Chloroperlidae (d)																										
Plecoptera	Leuctridae		*Despaxia augusta*																								
Plecoptera	Leuctridae		*Paraleuctra*																								
Plecoptera	Leuctridae (d)																										
Plecoptera	Nemouridae		*Zapada*																								
Plecoptera	Nemouridae (d)																										
Plecoptera	Perlodidae (d)																										
Plecoptera	Perlodidae		*Isoperla*																								
Plecoptera	Perlodidae		*Skwala*																								
Plecoptera	Taeniopterygidae		*Taenionema*																								
Trichoptera - pupa																											
Trichoptera	Glossosomatidae		*Glossosoma*																								
Trichoptera	Hydropsychidae		*Parapsyche*																								
Trichoptera	Lepidostomatidae		*Lepidostoma*																								
Trichoptera	Limnephilidae (d)																										
Trichoptera	Philopotamidae		*Wormaldia*																								
Trichoptera	Rhyacophilidae		*Rhyacophila*																								
Trichoptera	Uenoidae		*Neophylax*																								
Lepidoptera	Noctuidae																										
Diptera	Empididae		Genus #1																								
Diptera	Empididae		*Chelifera/Metachela*																								
Diptera	Empididae		*Clinocera*																								
Diptera	Empididae		*Oreogeton*																	1							
Diptera	Dixidae		*Dixa*																								
Diptera	Blephariceridae		*Agathon*																								
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*																								

(d) - small or demaged; cannot be ID below this level
Genus #1 - this is an undescribed Epidid larva belonging possibly to a new genus and species

Appendix 5.2-8. Benthic Invertebrate Data for KSM Project Lakes, August 2009

				KGL						*TDL*						*SUL*						*LAL*					
				Deep		Mid		Shallow		Deep		Mid		Shallow		Deep		Mid		Shallow		Deep		Mid		Shallow	
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**	**#1**	**#2**
Diptera	Ceratopogonidae	Ceratopogoninae	*Probezzia*																								
Diptera	Ephydridae																										
Diptera	Simulidae		*Helodon clavatus* (pupa)																								
Diptera	Simulidae		*Helodon onychodactylus* (pupa)																								
Diptera	Simulidae		*Helodon*																								
Diptera	Simulidae		*Prosimulium/Helodon*																								
Diptera	Simulidae		*Simulium*																								
Diptera	Tipulidae		*Dicranota*					2	1																		
Diptera	Tipulidae		*Erioptera*																								
Diptera	Tipulidae		*Gonomyodes*																								
Diptera	Tipulidae		*Hexatoma*																								
Diptera	Tipulidae		*Limnophila*																								
Diptera	Tipulidae		*Hexatoma/Limnophila*																								
Diptera	Tipulidae		*Rhabdomastix*																								
Diptera	Tipulidae		*Tipula*																								
Diptera	Tipulidae (d)																			1							
Diptera	Chironomidae - Pupa																										
Diptera	Chironomidae	Chironomini	*Chironomus*									20	22											1	2	2	2
Diptera	Chironomidae	Chironomini	*Endochironomus*											9	8												
Diptera	Chironomidae	Chironomini	*Microtendipes*												1									1			
Diptera	Chironomidae	Chironomini	*Phaenopsectra*					1																			
Diptera	Chironomidae	Chironomini	*Polypedilum*																								
Diptera	Chironomidae	Chironomini	*Sergentia*									21	62		8												
Diptera	Chironomidae	Chironomini	*Stictochironomus*																			4			9	91	54
Diptera	Chironomidae	Tanytarsini	*Micropsectra*												10												
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*																								
Diptera	Chironomidae	Tanytarsini	*Stempellinella*																								
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*																					113	248	67	43
Diptera	Chironomidae	Orthocladiinae (d)																						1			
Diptera	Chironomidae	Orthocladiinae	*Brillia*																	1							
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*																								
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*																								
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*																								
Diptera	Chironomidae	Orthocladiinae	*Epoicocladius*																								
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*														1										
Diptera	Chironomidae	Orthocladiinae	*Gymnometriocnemus*																	8							
Diptera	Chironomidae	Orthocladiinae	*Heleniella*																								
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*		1	27	15	63	6	4				3													
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*																								
Diptera	Chironomidae	Orthocladiinae	*Metriocnemus*																								
Diptera	Chironomidae	Orthocladiinae	*Parakiefferiella*														1										
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*																								
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*																								
Diptera	Chironomidae	Orthocladiinae	*Paraphaenocladius*																								
Diptera	Chironomidae	Orthocladiinae	cf. *Platysmittia*																								
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*																								
Diptera	Chironomidae	Orthocladiinae	*Psilometrocnemus*																								
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*																								
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*																								
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*																								
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*																								
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*																								
Diptera	Chironomidae	Tanypodinae (d)																									
Diptera	Chironomidae	Tanypodinae	*Larsia*																								
Diptera	Chironomidae	Tanypodinae	*Procladius*									1	3	3						1		4	1	6	11	36	24
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.																								
Diptera	Chironomidae	Diamesinae (d)																									
Diptera	Chironomidae	Diamesinae	*Diamesa*																								
Diptera	Chironomidae	Diamesinae	*Pagastia*																								
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*	1					1																		
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*											1	8												
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*																								
Terrestrial																				10							
			Total	***1***	***1***	***27***	***15***	***66***	***8***	***5068***	***5573***	***131***	***347***	***257***	***193***	***1***	***3***	***0***	***0***	***22***	***26***	***80***	***158***	***906***	***2349***	***547***	***501***

(d) - small or damaged; cannot be ID below this level
Genus #1 - this is an undescribed Epiidid larva belonging possibly to a new genus and species