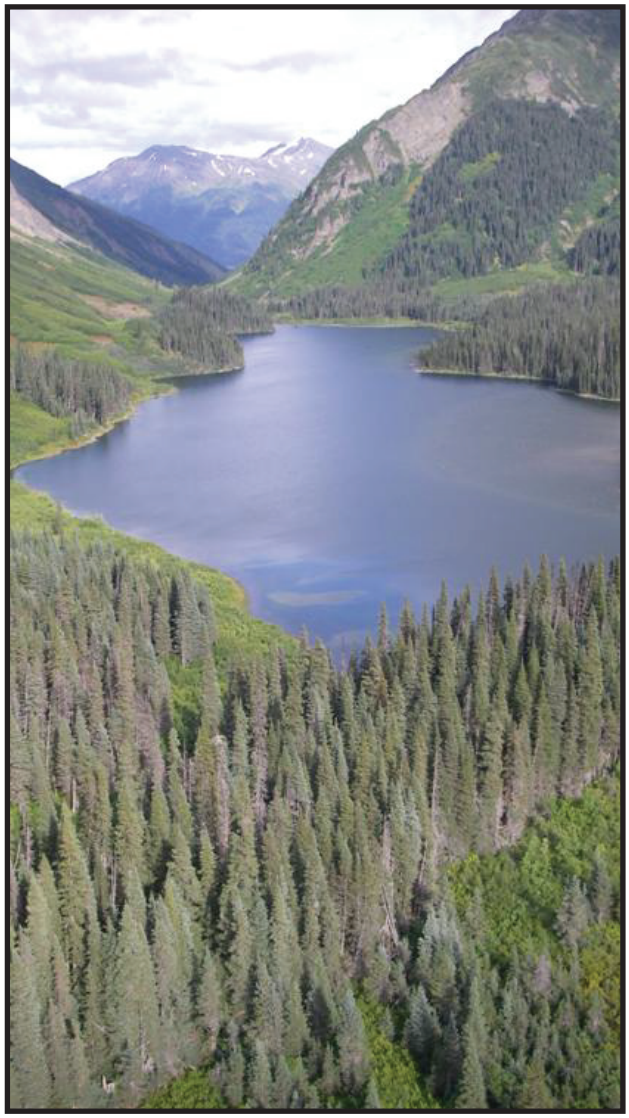
APPENDIX 15-B
2008 BASELINE STUDY REPORT
CHAPTER 9 – AQUATIC ECOLOGY

SEABRIDGE GOLD INC.

Kerr-Sulphurets-Mitchell Project
2008 Baseline Study Report
Chapter 9 - Aquatic Ecology



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This report constitutes Chapters 1, 2 and 9 of the 17 chapter KSM Project 2008 Baseline Studies Report. It has been produced as a separate document to facilitate distribution. For the reader's convenience, the Executive Summary and introductory chapters of the overall KSM Project 2008 Baseline Studies Report have been included to provide background and context to the results reported herein.

EXECUTIVE SUMMARY

Executive Summary

Introduction

Seabridge Gold Inc. (Seabridge) proposes to develop the Kerr-Sulphurets-Mitchell (KSM) Project located in northwest British Columbia, about 65 km northwest of the community of Stewart. Development of this large gold-copper mining project will trigger the British Columbia *Environmental Assessment Act* and the *Canadian Environmental Assessment Act*. Seabridge has initiated environmental and socio-cultural baseline studies to guide the design of the Project and to support preparation of an environmental assessment. The current schedule proposes submission of an Environmental Assessment Certificate Application in the first quarter of 2010. This document presents the results of the first year of baseline studies.

Seabridge is a publicly traded junior gold exploration company with its head office in Toronto, Ontario. Seabridge intends to acquire approvals and permits for the development of the KSM Project concurrently with its efforts to attract a senior mining company to purchase or joint venture the Project and place it in production.

The proposed KSM Project will include open pits, a mineral processing plant, facilities for management of tailings and waste rock, access roads and an ore transport tunnel, a diversion tunnel for Mitchell Creek and related accommodation, administration and maintenance infrastructure. The rugged topography of the region restricts access and provides few alternatives for the siting of facilities. As a result, the proposed Project facilities will be located in the watersheds of both the Unuk and Bell-Irving rivers.

Study areas, appropriate to each specific area of study, were established in the vicinity of the proposed Project components. The study areas included the base case KSM Project used for the December 2008 preliminary economic assessment and provide sufficient latitude to address a number of alternative footprint concepts.

2008 baseline work included the following studies:

Chapter 3	Meteorology
Chapter 4	Air Quality
Chapter 5	Hydrology and Glacier Monitoring
Chapter 6	Hydrogeology
Chapter 7	Geochemistry (Metal leaching/acid rock drainage)
Chapter 8	Water Quality
Chapter 9	Aquatic Ecology
Chapter 10	Fisheries
Chapter 11	Soils and Terrain Mapping
Chapter 12	Ecosystem Mapping and Vegetation
Chapter 13	Wildlife
Chapter 14	Wetlands

Chapter 15	Archaeology
Chapter 16	Land Use
Chapter 17	Country Foods

This document provides details of the work completed in each of these areas of study in 2008 and of the available results of that work.

In addition to these studies, Seabridge initiated consultation with federal and provincial agencies, State of Alaska and US federal agencies and local governments and shared Project information with Aboriginal groups (Tahltan, Skii km Lax Ha, Gitxsan, Gitanyow and the Nisga'a Lisims Government) to facilitate the proposed environmental assessment.

Chapter 3 – Meteorology

Environmental baseline studies for meteorology began in late September 2007 with the installation of an automated meteorological station in the Project area. In early March 2008 a second station was added in the Teigen Creek drainage, and in mid September 2008 a third and fourth station were installed at the proposed plant site and near the Mitchell deposit, respectively.

Average annual precipitation for the KSM Project site is estimated to be around 1,000 mm with approximately 30% of its precipitation falling as snow between November and March. This includes both the vicinity of the mineral deposits and the proposed plant sites and tailings management facilities near the headwaters of Teigen Creek and Unuk River. Maximum precipitation occurs in the fall due to frequent development of Pacific storms.

Based on 12 months of record from the Sulphurets Creek meteorological station (880 m) the extreme maximum temperature was 30°C and the extreme minimum temperature was -30°C. During winter the air is generally unstable and there is a strong temperature gradient in the valley.

Moderate to strong winds occur in all seasons at high elevations. Winds at low elevations are funnelled through the valleys and calm conditions are rarely experienced. Based on 8 months of data from the Teigen Creek meteorological station the frequency of calms (*i.e.*, hourly average wind speed less than one metre per second) was about 1%. The predominant wind direction is consistent with the northwest to southeast orientation of the Teigen Creek valley. The maximum hourly wind speed from all meteorological stations in the KSM Project area was 12.0 m/s, recorded at the Unuk-Teigen meteorological station.

Solar radiation was recorded at the Teigen Creek and Sulphurets Creek meteorological stations. Generally there is a solar energy deficit during the winter months (October through March) and an energy surplus during summer months (April through September).

Three snow courses were established and monitored from February to May 2008. During winter 2007 a maximum snow depth of 237 cm and a maximum snow water equivalent of 900 mm were recorded at the Plant Site snow course. Both snow courses showed an increase in snow density as the snowpack in the KSM Project area consolidated during successive winter months.

Chapter 4 – Air Quality

Five dustfall monitoring stations were established on May 30, 2008. Dustfall was monitored until November 2008 and samples were analyzed at a laboratory in Vancouver for total dustfall, soluble dustfall, insoluble dustfall, sulphate, nitrate and total metals. Total dustfall exceeded BC Pollution Objectives (1979) once during the measurement period (at DF1 in August 2008) but this sample was deemed an outlier as it was unusually high with comparison to other samples taken during the same period. Sulphate and nitrate contributions towards potential acid deposition were found to be below critical load estimates for similar regions in Canada when calculated using average sulphate and nitrate depositions recorded during the period. Metal content in the dustfall were analyzed but were not interpreted at this time because the majority of the values were below the detection limits. Based on these findings, the air quality at the KSM Project can be summarized as good, where all measured parameters fall well within applicable objectives and guidelines.

Chapter 5 – Hydrology and Glacier Monitoring

Four automated hydrometric stations were installed in 2007. An additional seven stations were installed prior to the 2008 freshet and three more were installed during late September. At each station an automated pressure transducer and a datalogger recorded water level readings. In total, 79 manual flow measurements were conducted employing the velocity-area and salt dilution techniques. Stage discharge rating curves were developed at 11 of the 13 monitoring stations.

Annual runoff in the Teigen and Treaty watersheds was observed to range from 1028 mm to 1374 mm whereas in the Unuk and Sulphurets watersheds it ranged from 1512 mm to 1970 mm. The majority of runoff was concentrated in the period from May to August at the Teigen and Treaty watersheds. On the other hand, runoff was concentrated from May to September at the Unuk and Sulphurets watersheds. Further, maximum monthly runoff occurred during June in the Teigen and Treaty catchments whereas it occurred in August for catchments in the Unuk and Sulphurets area. This indicates that early freshet runoff was more important in the lower elevation non-glaciated catchments in the Teigen and Treaty area compared to the majority of the high elevation and glaciated catchments in the Unuk and Sulphurets area. The mainstem of the Unuk River just above the mouth of Sulphurets Creek experienced maximum monthly runoff during July. Annual peak flows occurred in late-August in most of the Unuk and Sulphurets watersheds as a result of snowmelt contribution and rainfall events (between August 18 and August 24, 2008). The exception was the Unuk River just above the mouth of Sulphurets Creek where the resulting peak generated by another rainfall event occurred on September 29, 2008. In most of the Treaty and Teigen watersheds the annual peak flows occurred between May 8 and May 25, 2008 as a result of snowmelt-generated runoff. The exception was a station on the south fork of Teigen Creek within the footprint of the proposed tailings management facility where the peak occurred on July 5, 2008. Low flows during the June to September open water season were recorded at 11 stations. Annual low flows occurred during the winter when the majority of available water was stored in the snowpack. They were recorded at four stations.

Glacier monitoring was initiated on the Mitchell Glacier in September 2008 with the installation of an ablation stake network and a baseline differential GPS (DGPS) survey of the glacier terminus. The full extent of the Mitchell Glacier was mapped using a composite of 2002 and 2004 satellite imagery, and elevation data for the region dating from the mid-1980's was used to create a digital elevation model (DEM) of the Mitchell Glacier. A glacier hypsometry based on the DEM was constructed.

Chapter 6 – Hydrogeology

Groundwater samples were collected from seven groundwater seep sites within the KSM Project footprint and submitted for analysis. The groundwater quality results were compared to three water quality guidelines: the British Columbia Approved and Working Water Quality Guidelines (BCWQG) for Drinking Water (DW), the BCWQG for Freshwater Aquatic Life (FAL) and the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines (WQG) for the Protection of Freshwater Aquatic Life (FAL). The samples were tested for physical properties, anions, nutrients, total metal content and dissolved metal content. There were three additional seep monitoring locations where only field measurements (pH, electrical conductivity and temperature) were collected.

All groundwater samples were collected in the region of the Mitchell and Kerr deposits. With exception of one sampling site, all the results display a calcium sulphate water type reflecting the naturally occurring high sulphide mineral concentrations in the mineralized host rocks. Furthermore, the high concentrations of iron, especially in the Kerr deposit, and copper in the samples analyzed suggest that metal leaching and acid rock drainage (ML/ARD) is naturally occurring and entering into shallow unconfined groundwater. The low pH values, ranging from 0.99 to 3.3 measured in the field and averaging approximately 3.0 measured in the laboratory, are also indicative of naturally occurring ML/ARD.

Chapter 7 – Geochemistry (Metal Leaching/Acid Rock Drainage)

Seabridge has initiated comprehensive metal leaching/acid rock drainage (ML/ARD) research on the potential ore and waste rock from the Kerr, Sulphurets and Mitchell deposits and on tailings from the preliminary metallurgical tests. Historic ML/ARD research on the deposits has been reviewed. Several hundred new samples of core or rejects have been collected and submitted for comprehensive acid base accounting (ABA) analysis. Four on site barrels have been filled with select core and drainage from this core is being sampled on a monthly basis when accessible and available.

Chapter 8 – Water Quality

The 2008 KSM Project water quality program was designed to conduct baseline monitoring on the watersheds which could potentially be affected by mine development and operation (i.e., Mitchell/Sulphurets/Unuk, Teigen/Snowbank/Bell-Irving and Treaty/Bell-Irving). This report presents the results from field studies conducted in 2008. Thirty-seven stream sites and three lakes were selected within the Study Area to meet the program objective. At each site, water quality conditions were assessed to characterize the natural spatial and temporal variation present

in these systems. Water samples were collected on a weekly, monthly, quarterly or annual basis and concentrations were compared to federal and provincial water quality guidelines.

Throughout the KSM Project Study Area many stream water quality variables (particularly total metals and total suspended solids) peaked following freshet in the spring, and again following the heavy rains in the fall. Many metals naturally exceeded the aquatic life guidelines, reflecting the high mineralization of the KSM Project Study Area, in particular at those sites in close proximity to the three deposits. Metals which have the highest concentrations were total and dissolved aluminum and cadmium, and total copper, iron, lead and zinc. Dissolved metals and total dissolved solid concentrations were lower than the associated particulate components throughout the Project Study Area, with the exception of the site located immediately downstream of the Mitchell deposit. This site was heavily influenced by groundwater seepage and naturally occurring acid rock drainage and was characterized by high concentrations of dissolved metals and acidic water.

Of the three lakes monitored in the KSM Project Study Area, Sulphurets Lake (SUL) located in the deposit area was characterized by higher total suspended solid concentrations than either West Teigen Lake (LAL) or Knipple Glacier Lake (KGL). Particulate bound metals compromised the majority of the metals in the lakes, in particular for SUL. CCME and/or BC guidelines were exceeded at all three lakes for total aluminum and silver. Dissolved aluminum, total cadmium, copper, lead and zinc were exceeded at SUL.

Chapter 9 – Aquatic Ecology

The 2008 KSM aquatic ecology baseline assessment was designed to collect baseline sediment quality, and primary and secondary producer community data within the streams, rivers and lakes in the KSM Project Study Area. This program included 28 stream and river sites where sediment quality, and periphyton and benthic invertebrate communities were assessed, and three lakes where physical limnology, sediment, phytoplankton, zooplankton and benthic invertebrate communities were assessed in August 2008.

Streams in the KSM Project Study Area were characterized by sediments consisting primarily of sand, characteristic of fast flowing water. Nutrient concentrations were low in the Unuk River, Reference sites, Mitchell Creek and Sulphurets Creek watersheds and tended to be higher in the Teigen Creek and Treaty Creek Watershed. Sediments in the streams in the KSM Project Study Area were characterized by naturally high concentrations of metals that exceeded BC and CCME sediment quality guidelines for the protection of aquatic life. In particular, arsenic, copper, iron and mercury were highest in the Treaty, Mitchell and Sulphurets Creek watersheds. Sites in the Teigen Creek Watershed contained naturally higher chromium and nickel concentrations. Exceedances are related to the highly mineralized geology of the region, since no development has yet been initiated in the Project area.

Periphyton biomass was typically low, with an average periphyton biomass of 0.38 ug/cm^2. Sites in the Mitchell and Sulphurets Creek watersheds had very low periphyton biomass, density and species richness. Diatoms were the dominant group at the majority of the sites. Chlorophyta, Cryptophyta, Cyanophyta and Euglenoida occurred in low numbers at select sites.

Average diversity across all sites was relatively high, indicating that a most sites the periphyton community was quite diverse.

Benthos density followed a similar pattern to periphyton density and biomass. Density, genus richness and diversity were lowest at sites in the Mitchell and Sulphurets Creek watersheds. Diptera (primarily chironomids), and Ephemeroptera (mayflies) were the dominant taxonomic groups for streams in the KSM Project Study Area.

Sulphurets Lake (SUL) and Knipple Glacier Lake (KGL) were quite similar in their physical, chemical and biological characteristics while West Teigen Lake (LAL) had different attributes. SUL and KGL were characterized by turbid waters, and sediment containing low nutrient concentrations and higher concentrations of arsenic, cadmium, calcium, copper, magnesium, mercury and titanium than what was measured in LAL. LAL had greater concentrations of aluminum, chromium, cobalt, lithium, manganese and nickel. The CCME and BC sediment quality guidelines were exceeded at all three lakes.

KGL and SUL were characterized by very little biological productivity. The phytoplankton, zooplankton and benthic invertebrate communities in these two lakes were very sparse, and had low productivity and diversity. In contrast, LAL was characterized by diverse and abundant phytoplankton, zooplankton and benthic invertebrate communities.

Chapter 10 – Fisheries

The purpose of the 2008 KSM fisheries baseline program was to provide baseline information on fish and fish habitat within the vicinity of the Project that may be impacted by proposed mine and road development.

Overall, 44 potential stream crossing sites of proposed access roads were assessed and 38 (86%) of these sites conformed to the definition of "stream". Of the 38 sites classified as streams, the majority of sites (60%) were considered non-fish bearing due to habitat limiting conditions; such as high channel gradient (>30%), natural barriers, and poor quality fish habitat present to support the different life history stages. Within the proposed Tailings Management Facility and Plant Site 1 Access Road corridors, streams are subject to continuous avalanches and landslides along the Teigen and West Teigen valleys, as a result, channel formation and habitat is continuously disturbed. Within the proposed Mine Site Access Road corridor, the presence of fish passage barriers in Coulter, Sulphurets and Tom Mackay creeks limit fish habitat.

Channel width distributions showed that a wide range of widths were present in the study area, although the majority of streams (21 sites, 55%) possessed widths 3 m or smaller. Only three streams possessed widths greater than 15 metres. The dominant channel morphology was riffle-pool, occurring at 15 sites.

Cover was abundant at 19 sites (53%), moderate at 11 sites (31%), trace at 5 sites (14%), and cover was absent at 1 site (3%). The most prevalent dominant cover at stream sites was overhanging vegetation (17 sites, 46%). Overall habitat was ranked as important at the majority of sites (17 sites, 81%).

Dolly Varden, a provincially blue-listed species, were caught and historically known along all potential access roads. Rainbow trout were caught along both the Plant Site 2 and Mine Site Access Roads. Fish were only caught at one stream along the proposed Mine Site Access Road; however this was the most diverse of all the potential access road route streams.

In total, 21 sites were recorded as fish bearing, 12 were confirmed, and 9 listed as default fish bearing. The proposed Plant Site 2 Access Road had the most numerous fish bearing streams (11 sites), although seven of them were default fish bearing. Along the proposed Tailings Management Facility Access Road only one of the three fish bearing stream was default, while along the proposed Plant Site 1 Access Road only one of the six streams was default. The only stream along the proposed Mine Site Access Road was confirmed fish bearing.

Within the proposed tailings management facility and proposed plant site watersheds, habitat was assessed and end of fish use was determined for fish bearing streams, via ground-truthing. There were a greater number of non fish-bearing streams in the South Teigen drainage compared to North Treaty.

A 2.5 metre falls on South Teigen Creek, downstream of the proposed tailings management facility, limits upstream fish movement. Streams located within the proposed Plant Site 1 and 2B footprint were classified as non-fish bearing due to downstream barriers and sampling effort demonstrated no fish present.

Average bankfull widths were small and varied slightly between 1.5 to 2.9 metres. Average channel gradients were high and varied between 7.8 to 13.6%. South Teigen Creek was dominated by riffle-pool morphology. North Treaty Creek was dominated by riffle-pool and step-pool morphologies. All four morphology types were present within the footprint of proposed Plant 2B. All substrate types were observed within each watershed, except at proposed Plant Site 1.

The majority of streams in the South Teigen watershed possessed abundant functional LWD that was even in distribution, compared the other watersheds that possessed few functional LWD and even in distribution. Shrub was the dominant riparian cover type for South Teigen and North Treaty watersheds. Coniferous was the dominant riparian cover type for the proposed Plant Site 1 and 2B watersheds.

Total cover was abundant in watersheds. Overhanging vegetation and SWD were the most dominant cover type in North Treaty, compared to LWD and undercut banks in South Teigen. Boulder was the most dominant cover type in proposed Plant Site 1 and 2B watersheds. Habitat quality for spawning, rearing and over-wintering varied between stream sites.

Receiving environment watersheds were separated into 15 distinct streams. The streams are as follows: Snowbank, Teigen, Treaty, Coulter, Kaypros, Mitchell, Sulphurets, Ted Morris, McTagg, and Scott creeks, South Teigen, West Teigen, and North Treaty tributaries, Unuk and South Unuk rivers.

The majority of receiving environment stream reaches was classified as fish-bearing within the Project study area. The following streams reaches, within the Bell-Irving Watershed, are likely not fish-bearing due to downstream barriers and sampling effort demonstrated no fish present: Treaty – Reach 5 and South Teigen – Reach 5. Within the Unuk Watershed, Sulphurets Creek - Reaches 2 to 5, McTagg, Mitchell and Ted Morris creeks are likely non fish bearing due to the presence of a 200 metre cascade barrier at the end of Reach 1 and sampling effort demonstrated no fish present above the cascade. Within Coulter Creek, Reaches 2 and 3 are likely non fish bearing due to the presence of a 50 metre falls at the end of Reach 1 and the 2008 sampling effort demonstrated no fish present above the falls.

Average bankfull width varied widely between streams. Within the Bell-Irving/Bowser watersheds, channel gradients were considered low gradient and ranged slightly between 0.5% and 3%. Within the Unuk watershed, channel gradients were slightly higher and ranged slightly between 2% and 5.7%. There was a source of sampling bias and error in determining wetted depth and residual pool depth for large non-wadable streams because of high flow and resulting inability to wade in the centre of the stream for proper wetted depth measurement.

Riffle-pool was the dominant channel morphology present in the Bell-Irving/Bowser Watershed. Cascade-pool was the dominant channel morphology present in the Unuk Watershed. Cobble and gravel substrates were dominant in the Bell-Irving/Bowser Watershed. Cobble and boulder substrates were dominant in the Unuk Watershed.

Cascades were the most common habitat unit within all receiving environment streams, except riffle habitat unit was most comment in Hodkin, Treaty, Teigen, Coulter and Kaypros creeks. Total cover was abundant in all Bell-Irving/Bowser Watershed streams; however moderate cover was dominant in Unuk Watershed streams. Deep pools and boulders were the most dominant cover type in all streams. Habitat quality for spawning, rearing and over-wintering varied between stream sites.

Dolly Varden was the most widely distributed species within fish-bearing reaches of the Bell-Irving/Bowser and Unuk watersheds. In the Bell-Irving/Bowser Watershed, Dolly Varden and bull trout coexist in Teigen, Snowbank and Scott creeks. Consequently, hybrids were captured and identified through genetic analysis. A hybrid was captured and identified, through genetic analysis, in South Teigen Creek above the 2.5 metre falls. Steelhead/rainbow trout are present in the larger stream; such as Treaty and Teigen creeks. These creeks support summer run populations of steelhead. Pacific salmon species, such as coho, sockeye and Chinook, are present in the larger creeks. Sockeye salmon are only present in Teigen Creek. Dolly Varden was selected as the keystone species for data analysis and statistics and for reporting differences between receiving and reference environment streams because they are present within all streams and are the most abundant species.

Length, weight, condition, age and growth data for fish species captured in the receiving and reference environment streams varied between streams. For the purposes of the MMER, the receiving environment sites were the following: North Treaty (NTR2), South Teigen (STE2), and Sulphurets (SC3). The reference environment site was Scott (SCR). Energy use by Dolly Varden was assessed and compared using growth models and reproductive investment. Energy

storage was evaluated and compared through analyses of condition (weight at length) at receiving and reference environment sites. Survival was evaluated and compared through analyses of mean age at receiving and reference environment sites. Mean fish tissue metal concentrations for each of the monitoring sites were analyzed. The results of the ANOVA indicated that there was a significant difference between sites for all metals except aluminum, barium, chromium, iron, magnesium, manganese, nickel, strontium, vanadium and zinc. Fish weight had a significant effect on the concentrations of aluminum, arsenic, barium, iron, lead, magnesium, manganese, phosphorus, strontium, titanium and vanadium. Site had a significant effect on fish tissue metal concentrations for arsenic and titanium. Dolly Varden diet varied among sites; however, dominant prey items included adult Diptera (true flies), larval Chironomidae (midges), Ephemeroptera (mayflies) and insect parts. Dolly Varden in South Teigen and North Treaty possessed the highest prey diet diversity.

A total of five receiving and reference environment lakes were assessed and sampled. Two lakes, Sulphurets and Knipple Glacier, were glacial headwater lakes. The other three lakes, West Teigen, Hodkin and Teigen, were not glacial headwater lakes. Shoreline and littoral zone habitat varied between lakes. West Teigen Lake possessed a greater proportion of littoral zone habitat and an abundance of aquatic macrophytes. Dolly Varden was caught in West Teigen and Hodkin lakes. Bull trout and mountain whitefish were caught in Teigen Lake. No fish were caught in Knipple Glacier and Sulphurets lakes. Dolly Varden diet composition was analyzed by number and by weight for West Teigen Lake. Numerically dominant prey items included Cladocera, Copepoda and Molluscs.

A total of two receiving and reference environment wetlands were assessed and sampled. Wetland 1 was dominated by a shrub swamp and an open water marsh dominated by emergent sedges and submergent macrophytes. Wetland 2 was dominated by a sedge marsh and an open water marsh dominated by submergent macrophytes. Dolly Varden was the only species captured in Wetland 2.

Chapter 11 – Soils and Terrain

The 2008 soils field program was carried out between July 19 and July 29 and focused on the potential locations of the various proposed mine site facilities. The soils of the study area are generally poorly developed. Soil formation in the study area is limited by the very cold climate and extreme slope conditions. Morainal (glacial till) and colluvial surficial materials dominate the study area with some fluvial and organic surficial materials found in valley bottoms. The dominant mineral soils in the study area are classified as Orthic Dystric Brunisols, Eutric Dystric Brunisols, and Orthic Humo-Ferric Podzols. Other less common mineral soils are classified as Orthic Regosols, Orthic Gleysols, Gleyed Humo-Feric Podzols, Orthic Humic Regosols, and Orthic Sombric Brunisols. Organic soils that are commonly found in valley bottoms and depressional areas are classified as Typic Fibrisols, Typic Mesisols, and Typic Humisols.

Thirty-six soil samples were collected from 18 representative sites from the surface (0 - 10 cm depth) and subsurface (10 - 20 cm depth) layers. All samples were analysed for pH, organic carbon, and total carbon content following standard procedures. The soil samples were also tested for 28 metals to determine the baseline potentially bio-available levels of the metals in the

soils. Soil analytical results indicate that the soils in the study area are mostly strongly acidic to moderately acidic, have generally low organic carbon content, and are non-calcareous. Metal concentrations of the soils in the study area are variable between sampling locations and sampling depths.

Chapter 12 – Vegetation and Ecosystem Mapping

Ecosystem mapping and vegetation baseline studies conducted in July, 2008 focused on describing the current ecological conditions of the potential development and surrounding area. Baseline vegetation survey results guide ongoing Terrestrial Ecosystem and Predictive Ecosystem Mapping activities for the Project. Field studies inventoried the ecosystems and plant species present in the Project study area and identified the presence of any rare ecological communities, rare plants or invasive plants tracked by federal and provincial conservation agencies. Plant tissue samples were collected to establish baseline metal concentrations.

A total of 74 ground inspection sites and 143 visual inspection sites were established within the six biogeoclimatic (BEC) units. The majority of the field plots were located in mesic forests. Sub-dominant ecosystems included drier shrub, wetland shrub/herb, wetter herb and moist shrub/herb communities. The dominant structural stage observed was mature forests followed by herb, dwarf shrubs and shrub/stunted trees. Sparse/unvegetated and old forests were observed but not commonly.

No rare plants tracked by the BC Conservation Data Centre were identified in the study area during the 2008 field studies. Field studies identified one blue listed moist floodplain ecosystem, (CWHwm 05 Sitka spruce / salmonberry Wet Maritime (Picea sitchensis / Rubus spectabilis Wet Maritime)) and one ecosystem of regional interest (ESSFwv Fm03Populus balsamifera-Abies lasiocarpa-Oplopanax horridus).

One nuisance weed, common horsetail (Equisetum arvense) was identified at 18 sites within the study area. This species is native to B.C. and is not considered a concern within the study area.

Forty-eight plant tissue samples were collected at the KSM Project in July 2008 to establish baseline metal concentrations in local vegetation. Metal concentrations in plant tissue were summarized based on species type and sampling locations. The leaves of red raspberry (Rubus idaeus), blueberry (Vaccinium spp.), black huckleberry (Vaccinium membranaceum) and Sitka valerian (Valeriana sitchensis) were collected.

Chapter 13 – Wildlife

Baseline wildlife information was collected in 2008 to evaluate the existing status of terrestrial wildlife populations in regions within and surrounding the Project footprint. The region encompassing the proposed Project is home to many terrestrial wildlife species including grizzly bears, mountain goats, moose, avian species, amphibian species, and a variety of small and medium-sized mammals. Identification of species, communities, and critical wildlife habitat in the proposed development area is necessary for meeting the obligations of provincial (e.g., BC *Wildlife Act*), federal (e.g., *Species at Risk Act* [SARA]), and international (e.g., *Migratory Bird*

Convention Act) regulations for species protection. Additionally, many wildlife species are important to residents of BC and Aboriginal groups for their biological, economic, and traditional use values.

Literature Review and Evaluation of Species at Risk

During 2008, relevant information on wildlife and wildlife habitats within the KSM Project wildlife study area was collected to supplement baseline field data collection. Examples of collected information are current population estimates, historical distributions, habitat preferences, important legislation designed for wildlife, and information on sensitive wildlife species in an area.

The vertebrate and invertebrate community that could potentially be observed within the study area was also characterized. A total of six amphibians, one reptile, 220 birds, 54 mammals, 11 butterflies, and three mollusc species were identified during this exercise. Of the expected species, one amphibian, 36 birds, and 7 mammals were identified as species of conservation concern. During 2008 baseline studies the number of species of conservation concern that were detected included one amphibian, three birds, and two mammals.

Furbearers

Furbearer species are often secretive in nature and difficult to document with field studies. As such, the provincial Fur Harvest Database provided an opportunity to assess the species of furbearers within the study area. A review of the Fur Harvest Database, which includes records from 1983 to 2005, was conducted during November, 2008 to characterize the furbearer community within the study area.

Seven trapline tenures were identified within the study area. Five of these trapline tenures have registered data within the current Furbearer Harvest Database. Fourteen furbearer species were reported within trapline tenures during the 22 year period, including fisher (*Martes pennanti*) and wolverine (*Gulo gulo*). Both of these species are Blue listed in BC, which means they are of special concern, vulnerable to extirpation or extinction. The harvest records also showed that American marten (*Martes Americana*) is a highly harvested species within the study area, accounting for 70% of all reported harvest.

Grizzly Bear

A study using non-invasive hair collection and DNA analysis was instituted to identify individual grizzly bears and assess the population demographics (e.g., population size, male to female ratio) of grizzly bears within the study area.

The grizzly bear study employed the use of baited hair capture stations set within grizzly bear sample cells in the study area. A 10 x 10 km grid was overlain with the study area to establish sample cells. The hair capture effort was initiated on May 29 to June 1, 2008 with the placement of baited hair capture stations within each 10 x 10 km cell. Capture stations were designed according to RIC (1998d). A total of 45 separate hair capture stations were placed throughout the study area. Three checks of the bait stations were conducted at approximately two week intervals. The effort yielded 974 hair samples: the capture success of all stations was 82.2%. No

detailed analysis of the population of grizzly bears can be attempted at this time as the laboratory analysis of DNA contained from the hair samples collected is currently underway at Wildlife Genetics International (WGI) in Nelson BC.

Mountain Ungulates

An aerial survey was conducted in 2008 to collect baseline information on mountain goat summer population and distribution of this species within the study area, and to identify whether two other mountain ungulates (Stone's sheep and northern caribou) occur at any density in the study area. The study area was divided into 24 discrete survey units (SU). The methods used to inventory mountain ungulates adhered to the aerial survey protocols described in RIC (2002).

From July 17 to 24, 2008, surveys were flown in the 24 SU. Only mountain goats were observed during this survey period: no Stone's sheep or northern caribou were documented. A total 230 individual goats that formed 62 groups were observed within the study area. Most of the mountain goat groups were associated with the predicted habitat and topographic features for mountain goats within the region during this time of the year.

Small Mammals

The goals of the 2008 baseline small mammal inventory program were to establish baseline information on the small mammal species that use the study area and to determine the most abundant species to be used in metals analysis.

Small mammal trapping was conducted from August 16 to 19, 2008 following methods in RIC (1998c). Fifteen animals belonging to two species were caught during the trapping session: northwestern deermouse (*Peromyscus keeni*; also known as Keen's mouse) and meadow vole (*Microtus pennsylvanicus*). The majority of animals caught were Keen's mouse, which suggests that this is an abundant species in the study area.

Terrestrial Breeding Birds

Surveys for terrestrial breeding birds were conducted from June 12 to 18, 2008 using variable radius point counts (VRPC) along 22 one kilometre transects that were distributed across the study area. A total of 54 species of birds were identified. The most abundant species were Townsend's warbler (*Dendroica townsendi*), yellow warbler (*Dendroica petechia*), and hermit thrush (*Catharus guttatus*). Shannon's diversity values were fairly consistent across transects in the study area. The highest diversity values were recorded on in areas associated with the proposed tailings management facility and Plant Site 2. On a landscape level, the highest relative abundance of species and species diversity was observed in the Engelmann Spruce–Subalpine Fir (ESSF) Biogeoclimatic zone (BEC), followed by CWH (Coastal Western Hemlock) and Mountain Hemlock (MH) BECs. Indications of breeding were observed during the survey period and nest sites belonging to dark-eyed junco *(Junco hyemalis*), Swainson's thrush (*Catharus ustulatus*), yellow warbler (*Dendroica petechia*), and three-toed woodpecker (*Picoides dorsalis*) were observed. No species of conservation concern were observed.

Terrestrial and Riparian Raptors

Several survey methodologies were implemented for raptors in 2008 to detect the widest range of species that may be present in the study area. Methods included a call-playback survey (CPS) for northern goshawks, which were performed in conjunction with breeding bird VRPC surveys from June 12 to 18, 2008. Stand watches (SW) were also conducted from June 12 to 18 in portions of the study area that supported suitable cliff or forest nesting raptor habitat. To document riparian tree nesting raptors, aerial reconnaissance surveys (ARS) of riparian areas on the edge of major watersheds was conducted in conjunction with waterfowl surveys in early June, mid July, and late September. Survey methods for raptors followed those outlined in RIC (2001).

Five raptors species were identified from the CPS, SW, and ARS surveys. One northern goshawk was detected along Sulphurets Creek near the proposed Kerr Pit during CPS surveys. Golden eagle (*Aquila chrysaetos*), bald eagle, osprey, and rough-legged hawk (*Buteo lagopus*) were observed during ARS surveys. Two other species of raptors, merlin (*Falco columbarius*) and red-tailed hawk (*Buteo jamaicensis*), were detected incidentally during other fieldwork conducted in 2008.

Water Dependent Birds

Birds that depend on the presence of water as habitat (e.g., for breeding, staging, foraging) are an important component of biodiversity. For the purposes of this report, the term "water dependant bird" is used as an umbrella term to encompass all birds that exclusively use water as habitat for foraging, breeding, or staging during the year. The water dependant bird group encompasses a large number of species including waterfowl (all geese, ducks, and swans), waterbirds (e.g., loons), shorebirds (e.g., sandpipers), and riverine birds (e.g., American dipper [*Cinclus mexicanus*]). Some water dependent bird species are of regional or provincial concern, such as harlequin duck (*Histronicus histronicus*). Harlequin duck is of particular interest to federal regulators as it occupies a unique habitat niche and has received widespread concern following declines in Pacific populations (Robertson and Goudie 1999).

Three aerial surveys of waterbodies and associated riparian habitats were flown in 2008. A local study area (LSA) was created along major watersheds that encompassed a two kilometre wide zone along rivers and waterways (one km out from waterway centreline). Survey timing represented important periods for water dependent birds: spring pair bonding (June 2 and 3), summer brood rearing (July 15 and 16), and fall staging for winter migration (September 27). Survey methodologies adhered to RISC standards (RIC 1998b, 1999b).

During the early June survey, a total of 13 species were positively identified. The distribution of avifauna within the study area suggest that suitable habitat for water dependent birds in early June occurs along the larger reaches of the Unuk and Bell–Irving rivers. Nine species were identified during the brood survey in mid July. The majority of water dependent birds with broods were waterfowl; broods of five dabbling ducks, seven diving ducks, three Canada geese (*Branta canadensis*), and one unknown loon species were observed. The most suitable breeding habitat in the LSA was concentrated around the Teigen Creek – Bell–Irving River confluence. During the fall staging survey conducted in late September, 11 species were documented,

including one species of conservation concern: the provincially Blue listed surf scoter (*Melanitta perspicillata*). Seven surf scoters were observed in a lake adjacent to Treaty Creek south of the proposed tailings management facility.

Only three harlequin ducks were observed in the LSA in 2008. A pair and a single drake were observed on the Bell–Irving River during the spring pair aerial survey in June.

Western Toad

Western toad (*Anaxyrus* [*formerly Bufo*] *boreas*) is a species of concern in Canada and is Yellow listed in British Columbia. This species is of concern due to its inherent low population size, sensitivity to disturbances, and migratory behaviour between terrestrial foraging areas and breeding ponds.

In 2008, an aerial reconnaissance survey was conducted to identify ponds with high potential as toad breeding sites within areas of proposed Project infrastructure and within one km of all proposed roads. This survey rated 136 ponds for factors such as size, type of surrounding vegetation, flow, and presence of a muddy bank. Twenty-one ponds were subsequently ground surveyed for evidence of toad breeding (tadpoles and toadlets) and for site characteristics. No evidence of toad breeding was found; however, Columbia spotted frog adults were observed at four sites. Toads often breed in alternate years, and surveys found few breeding sites in other areas of northern BC during 2008. Therefore, the toad survey was curtailed in 2008. Western toad presence within the study area has been confirmed through incidental sightings of adults by the Terrestrial Ecosystem Mapping crew in 2008.

Hoary Marmot and Arctic Ground Squirrel

A need was identified to collect information on hoary marmot (*Marmota caligata*) and Arctic ground squirrel (*Spermophilus parryii*) distribution in the study area. These two species are an important prey item for larger carnivore, such as grizzly bear, and are hunted by First Nations. An aerial survey of high elevation habitat within the study area was conducted on August 15 and 16, 2008 in order to assess these species. During this survey, observations of marmot and ground squirrel colony locations within the study area were recorded.

Survey effort in 2008 was directed at establishing an understanding of marmot and ground squirrel habitat use through the observations of colony locations within the study area.

Chapter 14 – Wetlands

An initial survey of wetland ecosystems was conducted in September 2008. Wetlands in the proposed Tailings Management Facility (TMF), the Alternative Tailings Management Facility (ATMF), Plant Site 1, Plant Site 2A, Plant Site 2B, and Plant Site 3 were surveyed.

Twenty sites were surveyed and complete vegetation species and soil descriptors were collected at each site. These data were used to identify wetland classes in the study area and to identify the presence/absence, abundance, and distribution of wetlands including wetland communities at risk. No wetland communities at risk were identified; however the 2008 survey was an initial survey and does not include all proposed development features. The 2008 survey data were also

used to delineate a number of previously unmapped wetland communities in the subalpine areas around the plant site options.

Chapter 15 – Archaeology

The archaeology and heritage resources baseline studies for the KSM Project involved background research and field investigations to determine the location, condition, significance, and potential impacts to archaeological and heritage resources ("sites") within or near the Project study area.

The 2008 baseline studies included an archaeological impact assessment (AIA). The AIA was conducted between July 7 to 11, September 4 to 12 and September 23 to 26, 2008, in accordance with British Columbia *Heritage Conservation Act* (HCA) Heritage Inspection Permit 2008-128, issued by the Archaeology Branch, Ministry of Tourism, Culture and the Arts.

Prior to fieldwork, background research identified 11 previously recorded archaeological and heritage sites within or adjacent to the Project study area. AIA fieldwork during 2008 resulted in the identification of seven new archaeological sites within the Project study area. All of the newly recorded sites are pre-contact, prehistoric sites that are protected by the HCA. Each site consists of lithic (stone) cultural material, including several tools and numerous waste chips (flakes). Some of the stone recovered from the sites is obsidian (volcanic glass).

Chapter 16 – Land Use

Research was undertaken to provide a general description of the land tenures and uses near the Project, including the proposed mining area access route, ore transport tunnel, tailings management facility and mine site. Part of the Project is in the Cassiar Iskut-Stikine Land and Resource Management Plan (LRMP). Several First Nations have asserted traditional territory within the study area. The Nass Area defined in the Nisga'a Final Agreement extends into the study area. Current land tenures that will be potentially affected by the Project include guide outfitting, trapping, commercial, angling, forestry, and mineral tenures.

Chapter 17 – Country Foods

Country foods are animals, plants and fungi used by humans for nutritional or medicinal purposes that are harvested through hunting, fishing and gathering of vegetation. Very preliminary work was completed on the country foods program in 2008, consisting of compilation of a list of relevant animal and plant species that could be harvested as country foods and sampling of surface stream water and soils.

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1. INTRODUCTION

1. Introduction

1.1 Project Overview

The Kerr-Sulphurets-Mitchell (KSM) Project is focused on the potential extraction of gold and copper, with ancillary quantities of silver and molybdenum, from three adjacent porphyry type deposits. Exploration activities to date have identified a resource of 34 million ounces of gold and 8 billion pounds of copper, making it one of the world's largest gold-copper systems, with a potential mine life in excess of 30 years.

The Project is located in rugged terrain about 65 km north of the sea port of Stewart. Road access from Stewart extends to within 30 km of the centre of the deposits.

This report details data collected during the 2008 environmental baseline studies field program. These data will be used to support project design, as the basis for the preparation of an Environmental Assessment Certificate application and to support a comprehensive review under the *Canadian Environmental Assessment Act* and subsequent permit applications for construction and operation of various project facilities.

1.2 Project Proponent

The proponent for the KSM Project is Seabridge Gold Inc. (Seabridge), a publicly traded junior gold exploration company with its head office in Toronto, Ontario. Company shares are traded on the Toronto Stock Exchange in Canada and on the American Stock Exchange in the United States.

In 2000, Seabridge acquired a 100% interest in the KSM Project from Placer Dome Inc. At that time two separate zones were known (Kerr and Sulphurets) containing 3.4 million ounces of gold and 2.7 billion pounds of copper – too small to develop given location, size and metal prices. In 2006 Seabridge began exploring the Mitchell area, identifying a third zone with large tonnage potential. The Project now has a NI43-101 compliant resource of 19.7 million ounces of gold and 5.3 billion pounds of copper in the indicated category plus an additional 14.3 million ounces of gold and 2.9 billion pounds of copper in the inferred category.

Seabridge senior management has extensive international experience with mineral exploration and development, much of it while employed in senior positions by Placer Dome Inc. One of Seabridge's guiding principles is not to operate mines for its own account, but rather to partner its projects with large, established and well-financed companies. Seabridge intends to acquire approvals and permits for the development of the KSM Project concurrently with its efforts to attract a senior mining company to purchase or joint venture the Project and place it in production.

1.3 KSM Project Location

The KSM Project is a gold/copper project located in the mountainous terrain of northwestern British Columbia, approximately 940 km northwest of Vancouver, British Columbia and

approximately 65 km northwest of Stewart, British Columbia (Figure 1.3-1). The proposed project lies approximately 20 km southeast of Barrick Gold's Eskay Creek Mine and 30 km northeast of the Alaska border.

The north and west parts of the Project footprint 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 300 m at the confluence of Sulphurets Creek with the Unuk River, to over 2,300 m at the peak of the Unuk Finger, a mere eight kilometres away.

1.4 KSM Project Description

The following project description is the base case for the Preliminary Economic Assessment (PEA) (Wardrop, 2008) completed for Seabridge in December of 2009. This project description is different from the project description submitted to the Environmental Assessment Office in March of 2008 (Rescan, 2008). At this early stage in the development of the KSM Project the layout and engineering design are continuing to evolve. The environmental and socio-cultural baseline studies presented in this report were designed with consideration of the project description presented below, but were sufficiently broad to address a wide range of alternatives that are being assessed from an engineering and cost perspective concurrently with the environmental baseline studies.

The Project is situated in mountainous terrain that restricts options for the development of the required infrastructure. As a result, Seabridge has identified two distinct and geographically separate areas for the proposed Project; the mining area and the plant and tailings management facility area, to enable economical and environmentally responsible development. These areas are shown in Figure 1.4-1.

The proposed mining activities will be located in the drainage basin of Sulphurets Creek, a tributary of the Unuk River. It will have its own road access and separate camp, administration and maintenance facilities. The proposed processing plant and tailings management facility will be located in the headwaters of tributaries of the Unuk River and Teigen and Treaty creeks. This area will also have separate road access, camp, administration and maintenance facilities. The two areas will be connected by a tunnel that will house a conveyor to transport ore from the mining area to the process plant, an electricity transmission line and a pipeline to supply diesel fuel to the mining area.

1.4.1 Proposed Mining Area

The proposed mining area will be accessed by a 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 River it will follow the north side of the Sulphurets Creek valley and cross Mitchell Creek. Both the Unuk River and Mitchell Creek may be considered navigable waters 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.

Alternative access routes have been considered from Highway 37 to the mouth of Sulphurets Creek by following Teigen Creek and the Unuk River, and over Knipple Glacier from Bowser Lake.

The support facilities for the mining area will be located near the confluence of Sulphurets and Mitchell creeks. They will consist of a camp capable of housing 250 employees, administration, engineering, geology, environment, first aid and laboratory facilities, maintenance shops, warehousing and outside storage and diesel fuel storage.

The ore deposits will be mined using conventional drill and blast methods, with electric shovels loading large diesel haul trucks. The Kerr deposit is located on a ridge south of Sulphurets Lake. The mining of this pit will create a notch through the ridge, daylighting to the north and south.

The Sulphurets deposit is located on the south side of the ridge north of Sulphurets Lake. Mining of this deposit will require two small pits excavated from the steep hillside.

The Mitchell deposit straddles the Mitchell Creek Valley in an area recently exposed by the recession of the Mitchell Glacier. Mining of the deposit will require benching back of both sides of the valley and excavation to a depth of about 600 m below the current valley bottom. Seabridge proposes to construct a diversion tunnel from near the toe of the Mitchell Glacier, southwards towards Sulphurets Lake to divert the flow of Mitchell Creek away from the proposed open pit area. The significant hydraulic head created by this tunnel will be used to drive a small hydro-electric plant to generate a small portion of the electricity requirements of the Project.

Large volumes of low grade or barren rock, typically called waste rock, will have to be removed in order to access the ore (i.e. higher grade zones of mineralization) in each of the deposits. Waste rock from the mining will consist of both potentially acid generating (PAG) and non potentially acid generating (NPAG) rock. The high cost of moving waste rock suggests that this material must be stored as close to the sources as possible with consideration to safety and environmental stability. NPAG waste rock from the Sulphurets and Kerr deposits may be placed at safe locations on valley walls near the deposits. NPAG rock from the Mitchell deposit will be used to construct a foundation for an engineered PAG rock storage area downstream in the Mitchell Valley from the open pit. PAG rock from all three pits will be directed to this single storage area.

The PAG rock storage area will straddle the valley on an impermeable foundation constructed to isolate the PAG from surface and ground water flows. Runoff from the PAG dump will flow back to the pit where it will be collected and treated prior to release.

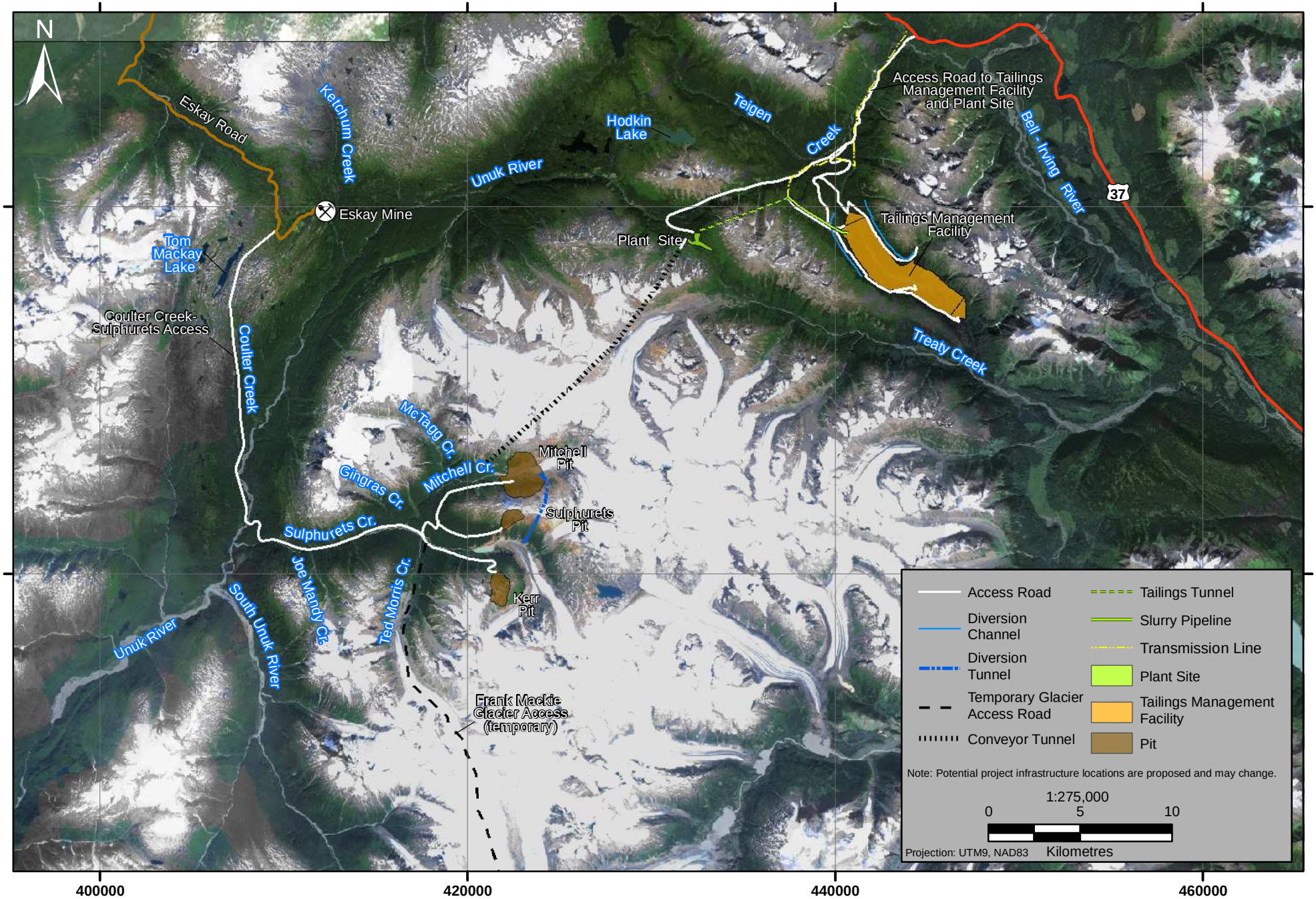
Alternative waste rock storage areas have been considered throughout the drainages of Mitchell, McTagg and Sulphurets creeks.

FIGURE 1.3-1

SEABRIDGE GOLD

KSM Project Location

Rescan™



SEABRIDGE GOLD

KSM Project Layout

FIGURE 1.4-1

Rescan™

Ore from the three deposits will be transported to a crusher located on the north side of the Mitchell Valley west of the Mitchell pit. Crushed ore will be fed to a conveyor that will transport the ore through a 16.5 km long, seven metre diameter tunnel to the process plant, located in the headwaters of Teigen Creek and a tributary of the Unuk River.

Alternative conveyor tunnel alignments have been considered in the immediate vicinity of the currently proposed alignment and between the drainage of McTagg Creek and the Unuk River Valley.

1.4.2 Proposed Processing and Tailings Management Area

The tunnel from the Mitchell Valley will terminate just west of the height of land between Treaty Creek and a northwest flowing tributary (Kaypros Creek) of the Unuk River. The conveyor will travel on surface for about 600 m from the eastern portal to the plant site, crossing the Unuk tributary on an earth fill dam enroute. The dam will provide one source of make-up water for the plant.

Alternative plant sites have been considered in the immediate area of the currently proposed plant site (Plant Site 2A), to the west of Kaypros Creek on a plateau above the Unuk River (Plant Site 3), and west of the proposed tailings management facility in the Teigen Creek drainage (Plant Site 1).

The plant will use a conventional grinding and flotation flowsheet to produce separate concentrates for copper/gold and molybdenum and gold dore, and tailings. 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 hauled to the port of Stewart by truck. An average of 30 round trips per day will be required using 40 tonne payload trucks.

Vehicle access to the plant site will be by an 18 km road along Teigen Creek from Highway 37. This road will require bridges to cross Snowbank and Teigen creeks, both of which may be considered to be navigable waters, and many smaller tributaries.

Alternative access corridors have been considered along Treaty Creek from Highway 37, and from Teigen Creek to Hodkin Lake and then up Kaypros Creek.

The tailings will be pumped in a pipeline in a slurry form through a 5.1 km long, 5.25 m by 4 m tunnel east of the plant site and thence to the tailings management facility located the upper reaches of the Teigen Creek valley, extending southeast over the divide into a tributary of the Treaty Creek drainage. Two dams will initially be constructed; a permanent dam on the west end of the facility, and a saddle dam near the height of land that will form the temporary eastern boundary of the facility during the early years of production. In later years a third dam will be constructed south of the saddle dam to provide storage capacity for the volume of tailings expected over the life of the Project within an area 8 km long and 1.5 km wide. Any seepage from the eastern dam area 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. The excess water in the impoundment will be pumped over the western dam towards the Teigen Creek drainage once it complies with the conditions of a site specific British Columbia waste discharge permit and meets the federal Metal Mining Effluent Regulations.

An alternative tailings management facility site (TMF 2) has been considered in the valley bottom below the plant site. This tailings management facility would require the construction of large earthfill dams across the valleys of Kaypros and Teigen (West Fork) creeks.

It is assumed that electricity to power the plant and mine site will be obtained from the provincial electricity grid via the proposed Northwest Transmission Line (NTL) that will parallel Highway 37. A secondary transmission line will be constructed from a substation on the NTL to be located near the mouth of Teigen Creek. The secondary line will follow the general alignment of the access road, but will divert to the tailings pipeline tunnel to gain access to the plant site. From the plant site it will follow the conveyor tunnel to the mine site.

1.4.3 Evolving Project Design

The PEA identified additional alternatives that have since been evaluated and have been found to be preferable to the base case. These preferred alternatives are shown in Figure 1.4-2. The principal changes are the selection of Plant Site 1 in the Teigen Creek drainage rather than Plant Site 2B, the siting of the primary crushing and grinding circuit in the Mitchell Creek Valley to support the use of a slurry pipeline rather than a conveyor to transport the ore to the process plant, and the delineation of the waste rock storage areas in the Sulphurets, Mitchell and McTagg creek valleys with diversion, seepage collection and water treatment systems. Additional run of river hydroelectric facilities may also be constructed in the vicinity of the cascade in lower Sulphurets Creek and in conjunction with a diversion tunnel from McTagg Creek to lower Mitchell Creek. While these changes are not indicated or discussed elsewhere in this report, the scope of the baseline environmental studies is sufficiently broad to include them.

1.5 KSM Project Schedule

The KSM Project is subject to the British Columbia *Environmental Assessment Act* (BC EAA) process and is expected to trigger the *Canadian Environmental Assessment Act* (CEAA) process. The schedule for these processes, with various associated dates, is shown in Figure 1.5-1. The schedule as outlined assumes that the federal and provincial processes will be harmonized into one process with the BC Environmental Assessment Office (EAO) taking the lead in coordination.

Once the provincial Environmental Assessment Certificate is issued, the federal process will proceed independently. The federal approval will likely extend the approval process by two to three months, as indicated in Figure 1.5-1.

The United States and State of Alaska have expressed an interest in being involved in the process because part of the project is located within the drainage of the Unuk River, which flows into the United States.

1.6 Cassiar Iskut-Stikine Land and Resource Management Plan

The Cassiar Iskut-Stikine Land and Resource Management Plan (CI-S LRMP) encompasses 5.2 million hectares in northwestern British Columbia. Portions of the KSM Project area that drain to the Unuk River are included in the CI-S LRMP (Figure 1.6-1). The plan represents the consensus reached in 2000 as a result of a three-year interest-based negotiation process that involved approximately 25 public, First Nations, and provincial government representatives.

The plan creates three categories of management direction for the LRMP area: General Management Direction, Area-Specific Management, and Protected Areas. No part of the KSM Project area is included in Protected Areas. Ten thousand hectares of the lower elevations of the Unuk River Valley downstream of the confluence of Sulphurets Creek are classified as General Management with Area Specific Direction. All of the proposed project facilities that lie within the bounds of the CI-S LRMP will be subject to General Management Direction.

The General Management Direction represents a baseline for resource activities on all Crown land outside of Protected Areas. Area-Specific Management refers to geographic resource management zones with distinct biophysical characteristics and resource issues. The General Management Direction applies in these geographic zones, except where different objectives and strategies were developed for certain resource values or activities.

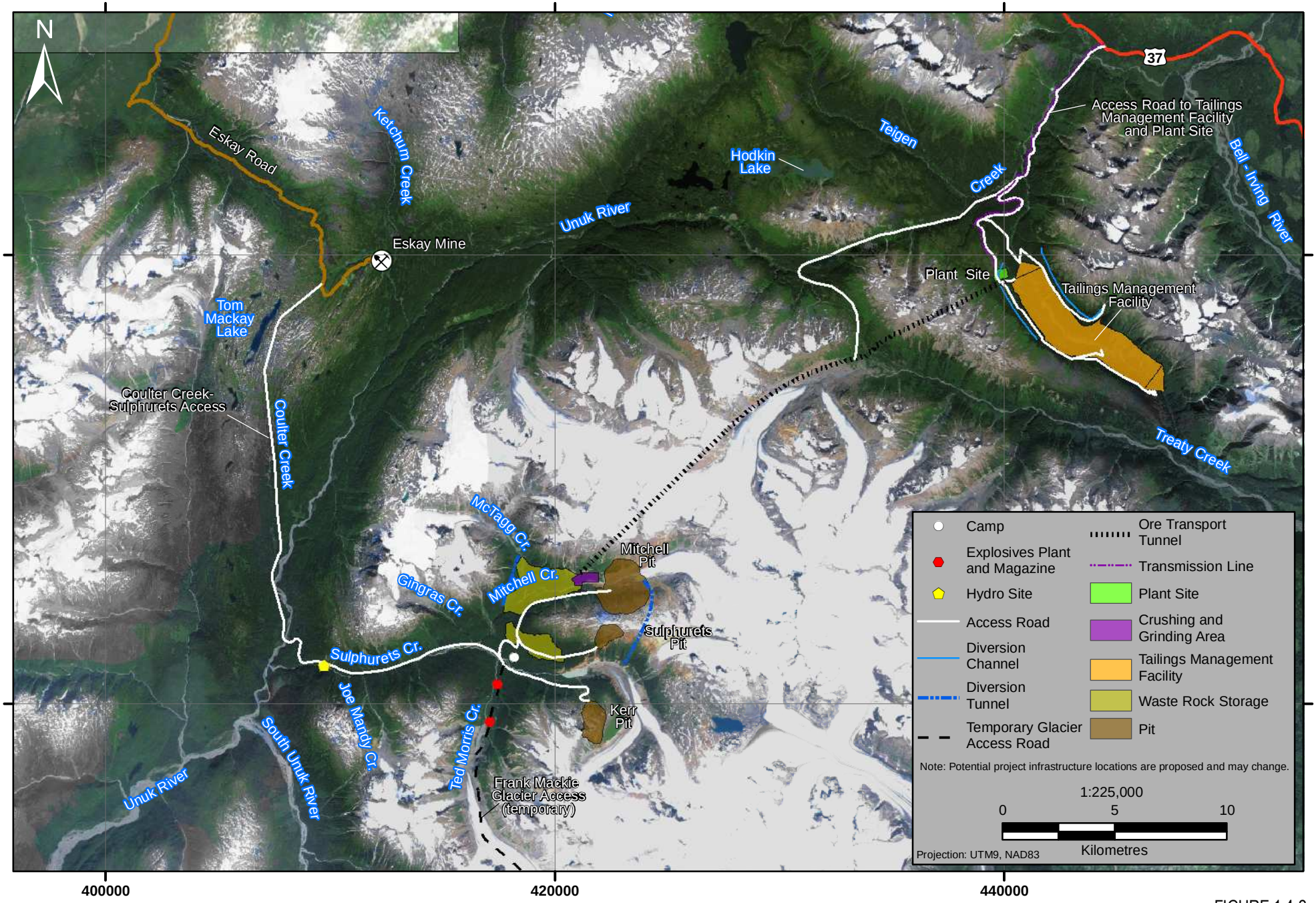
The General Management Direction encourages protection of wildlife, fisheries and aquatic resources and cultural and heritage resources, while specifically permitting roaded access and the exploration and development of mineral and energy resources.

There is no land use plan for portions of the Project that lie outside the boundaries of the CI-S LRMP.

1.7 Consultation

Consultation activities under the environmental assessment process in British Columbia are the responsibility of the provincial and federal governments. The British Columbia Environmental Assessment Office leads the process through the harmonization agreement between the Province and the Government of Canada. The Environmental Assessment Office has delegated information sharing responsibilities to Seabridge as the proponent of the KSM Project. Seabridge and their agents have met several times with the each of the Gitanyow, Gitxsan, Skii km Lax Ha and Tahltan First Nations and the Nisga'a Lisims Government to provide information on the Project. Seabridge has provided regular information updates (press releases) and copies of the December 2008 Preliminary Economic Assessment to each of the Aboriginal groups.

Seabridge has also held individual discussions on aspects of the Project with government agencies and has participated in meetings with the Technical Working Group and its subcommittees. Site visits were arranged in 2008 for representatives of interested agencies and Aboriginal groups.



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2009 KSM Project Preferred Layout

FIGURE 1.4-2

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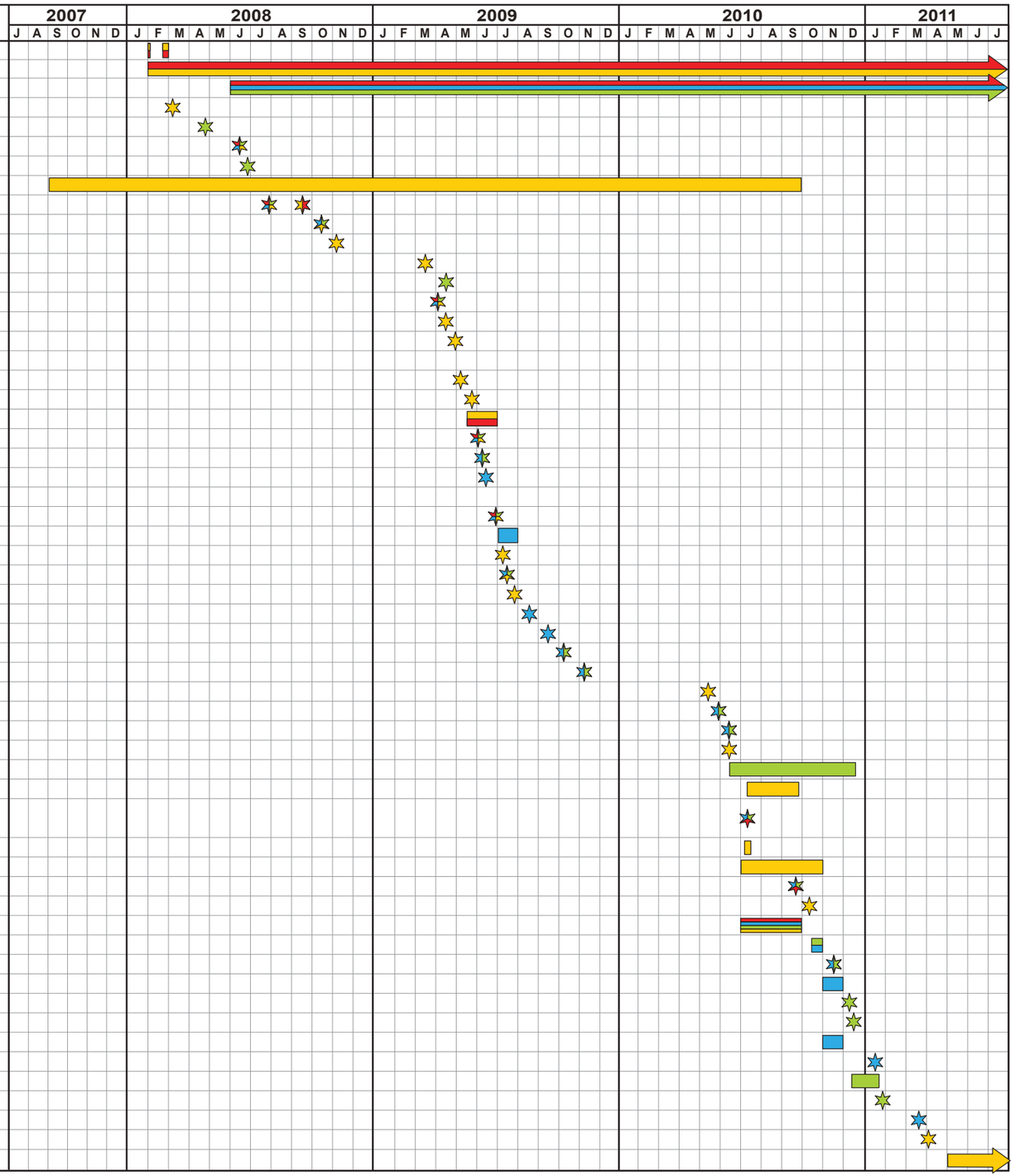
Task / Task Responsibility: Seabridge EAO CEAA First Nations and Nisga'a Lisims Gov't.

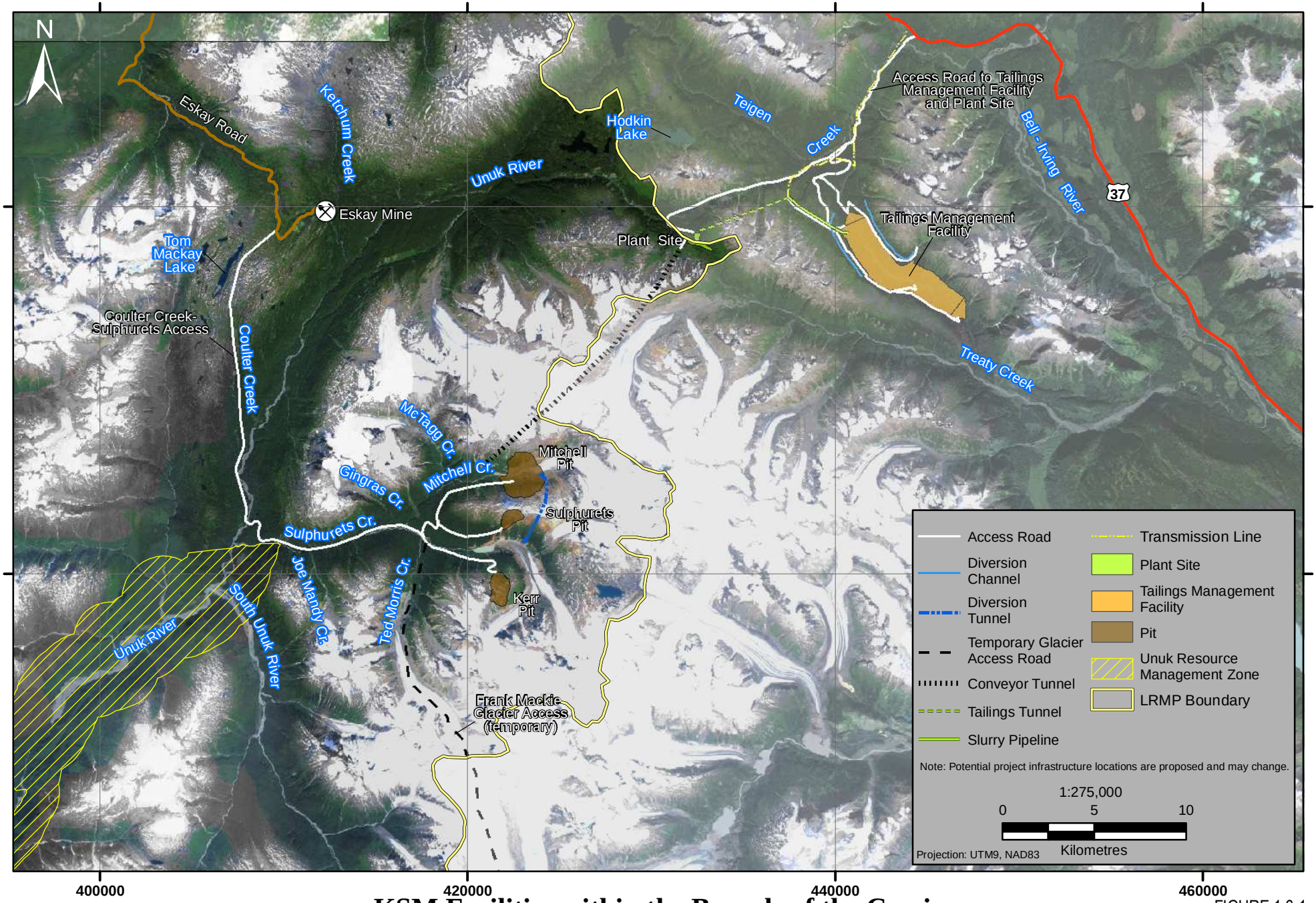
	Task
1.	Initial consultation meetings with Nisga'a, Skii km Lax Ha, Gitxsan and Gitanyow – *February 25 to 29*, and Tahltan – *February 1, 2008*
2.	Ongoing engagement and information sharing with First Nations and Nisga'a Lisims Government - *February 1, 2008*
3.	Ongoing federal and provincial agencies' consultation with Nisga'a Lisims Government and First Nations - *June 2008*
4.	Submit KSM Project Description - *March 7, 2008*
5.	Section 10 Order issued under Environmental Assessment (EA) Act - *April 25, 2008*
6.	Initial project meeting with provincial and federal agencies, First Nations and Seabridge Gold to present proposed baseline studies in Smithers - *June 17, 2008*
7.	EAO set up and finalize working groups for baseline study work - *June 27, 2008*
8.	Baseline studies and preparation of EA application - *September 2007 to October 2010*
9.	Site visits to KSM Project Site - *July 29 and September 17, 2008*
10.	Project meeting with U.S. Agencies in Juneau, EA, CEAA and Seabridge in Alaska to comment on work plan - *October 16, 2008*
11.	Final version of 2008 Baseline Studies Program made available to EAO Working Group – *November 4, 2008*
12.	Submit 2008 Baseline Studies Report to EAO – *March 2009*
13.	EAO Section 11 Order and CEAA Section 21 - *April 15, 2009*
14.	Agencies meetings in Smithers to provide general update for results of 2008 baseline study program - *April 2009*
15.	Submit 2009 Baseline Studies Program to EAO - *April 2009*
16.	Prepare and submit initial draft Terms of Reference (TOR) for EA application - *April 30, 2009*
17.	Follow-up meeting with technical working groups as required to discuss details of 2009 baseline study program - *as required*
18.	Submit CEAA Project Description identifying KSM Project federal triggers (DFO, DOT, NRCan, Environment Canada) - *May 2009*
19.	Distribution of Alternative Screening Report - *May 2009*
20.	Community Open Houses - *May and June 2009*
21.	Meeting with agencies to finalize preferred alternatives for KSM Project - *May/June 2009*
22.	EAO/CEAA announces KSM Project will be a harmonized joint Review with EAO taking the lead - *June 2009*
23.	NRCan, DOT, DFO and Environment Canada trigger CEAA Review - *June 2009*
24.	Provincial, Federal, First Nations, Nisga'a Lisims Government and U.S. Agencies comments on Draft TOR provided to Seabridge Gold - *June 2009*
25.	ML/ARD Working Group meetings in Vancouver - *June 2009*
26.	CEAA Scoping Document Public Review (Section 21) - *July 2 to July 31, 2009*
27.	Distribution of second Draft TOR for comment by various agencies, Nisga'a Lisims Government and First Nations - *July 2009*
28.	Meeting with Health Canada and Northern Health Unit to review health impact assessment - *July 2009*
29.	Revised CEAA Project Description with Preferred Alternatives for KSM Project - *July 2009*
30.	Federal RAs recommendation to Environment Minister on level of review (Comprehensive Study or Panel) - *August 17, 2009*
31.	Federal Minister of Environment's decision on level of Review (Comprehensive Study or Panel) - *September 15, 2009*
32.	CEAA/EAO agree on Terms of Reference - *October 6, 2009*
33.	Final EAO Section 11 Order and CEAA Section 21 issued with Approved TOR - *November 9, 2009*
34.	Submit Application/Comprehensive Study EIA - *May 7, 2010*
35.	Provide comments to Seabridge Gold on adequacy of public consultation program as outlined in EA Application (to be completed during 30 day screening of EA Application) - *May 28, 2010*
36.	Screening of Application (to be completed within 30 days of receiving the EA Application) - *June 8, 2010*
37.	Submit concurrent provincial permit applications - *June 16, 2010*
38.	Accept EA application and initiate review - *June 16 to December 13, 2010*
39.	Public Comment Period (60 to 75 days) - *July 5 to September 24, 2010*
40.	Agencies, First Nations meeting with Seabridge Gold to review EA Application and provide preliminary comments on EA (meeting to be held within 21 days of initiating the EA review) EAO/CEAA initiates draft of summary outlining initial issues raised by agencies and First Nations - *July 6, 2010*
41.	Public meetings presenting EA application by Seabridge Gold: Dease Lake, Iskut, Telegraph Creek, Stewart, Hazelton, Terrace, Smithers, and Ketchikan - *July 2010*
42.	Submit non-concurrent permit application during EA review period - *July to November, 2010*
43.	Agencies and FN submit written comments on EA Application/Comprehensive Study to EAO and CEAA (deadline coincides with last day of public comment period) - *Sept. 24, 2010*
44.	Summarize agency and public comments, identify responses (within 14 days of receiving written comments) and distribute to agencies and First Nations - *October 8, 2010*
45.	Meetings and Teleconferences as required to resolve issues raised by agencies and First Nations during the review of the EA application - *July to October 2010*
46.	Distribute first draft of EAO/CEAA Assessment Report on EA to agencies and First Nations for comment (14 day comment period) - *October 2010*
47.	Distribute second draft of EAO/CEAA Assessment Report on EA to agencies and First Nations for comment - *November 2010*
48.	Public Comment period on Comprehensive Study Report - *November to December 2010*
49.	Finalize EA Assessment Report, EA Certificate and Application Referral package - *December 8, 2010*
50.	Refer Application to Provincial Ministers - *December 13, 2010*
51.	Prepare French translation of Comprehensive Study Report - *November to December 2010*
52.	CEAA/RAs decision on Comprehensive Study Report - *January 2011*
53.	Decision on EA Application certificate (up to 45 days for Provincial Ministers to make decision) - *December 13, 2010 to January 27, 2011*
54.	EA Certificate of Approval from EAO - *January 29, 2011*
55.	CEAA Approval from Federal Minister of Environment - *March 25, 2011*
56.	Concurrent permits and licences (60 days after granting of certificate) - *April 1, 2011*
57.	Start Construction - *May 2011*



SEABRIDGE GOLD

KSM Project: Regulatory Review and Approval Schedule

FIGURE 1.5-1 Rescan™



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KSM Facilities within the Bounds of the Cassiar Iskut-Stikine Land and Resource Management Plan Area

FIGURE 1.6-1

Rescan™

Seabridge has met with the Board of the Regional District of Kitimat Stikine and with the Terrace Economic Development Authority to provide information on the Project and respond to questions. Rescan, on behalf of Seabridge, has held discussions with some holders of commercial recreation and forestry tenures.

The concerns raised in the course of consultation have been discussed with the Seabridge's technical team to ensure that they are considered in the design and implementation of the Project.

2. 2008 BASELINE STUDIES FIELD PROGRAM OVERVIEW

2. 2008 Baseline Studies Field Program Overview

2.1 General Description

Seabridge is committed to a comprehensive assessment of the potential environmental and socio/cultural effects of the KSM Project to support project design to ensure that the environmental and socio/cultural effects of the project are thoroughly understood so that they can be appropriately addressed. The first step in this assessment is developing a clear understanding of the pre-development environmental setting through the collection of a broad scope of baseline data. Due to the potential variability of baseline characteristics between seasons and from year to year, the baseline studies field program will span two years, with 2008 being the first year of this program.

The data collected during the baseline studies field program will be used as the basis for the preparation of an Environmental Assessment Certificate application, to support a comprehensive review under the *Canadian Environmental Assessment Act*, and to support subsequent permit applications for construction and operation of various project facilities.

Limited environmental data collection has been undertaken sporadically in the past by other operators of the KSM Project. These data will be considered along with the new data being collected by Seabridge in 2008 and 2009. Due to the broad scope and geographic distribution of the potential project facilities, the baseline studies field program is extensive. Baseline data collection is occurring in areas that could potentially be influenced by future mining activities, and from reference areas well away from potential mining activities. In addition to the assessment of preferred facilities locations, the baseline studies field program is assessing potential alternative locations for several facilities.

The mine design and mine plan for the three KSM mineral deposits are currently at a preliminary level based on limited mineral resource, geotechnical and hydrological information. A Preliminary Economic Assessment (PEA) of the KSM Project was completed in December, 2008. This PEA has assessed a preliminary design that will be updated in 2009, followed by the development of a Preliminary Feasibility Study (PFS) in 2010. Available environmental baseline information will guide the evolving engineering design of the project, and the evolving design may also drive the need for additional baseline information over time.

The baseline studies completed in 2008 are summarized in Table 2.1-1.

A full description of the results of the 2008 baseline studies is included in Chapters 3 through 17 of this report. Raw data from the baseline studies field work are reported in Appendices for each relevant chapter.

Abbreviations and acronyms used in this baseline report are listed in Appendix 2.1-1.

Table 2.1-1
Summary of Baseline Study Accomplishments in 2008

Study Component	Accomplishments in 2008
Meteorology	Installed one full meteorology station, two partial stations for wind monitoring, and eight tipping bucket rain gauges for precipitation gradient monitoring in the vicinity of the proposed tailings management facility, open pits and plant site. Conducted regular maintenance on one meteorology station that was installed in September 2007. Maintained and downloaded data from each of the installed stations. Established three snow courses and sampled them monthly in February through April.
Air Quality	Conducted baseline dustfall monitoring during summer at five stations; two near the location of the pits, one near the plant site and one along each proposed road corridor (plant and mine site roads).
Hydrology	Stream Hydrological Monitoring; continuous water level monitoring was continued at four stations established in 2007. Nine additional automated stations were installed across the Project Area. A total of 79 manual flow measurements were completed to generate stage-discharge rating curves for each monitoring site. Desktop analysis was completed to produce annual hydrographs for each site. Glacier Monitoring; installed eight ablation stakes in the lower half of Mitchell Glacier and sampled snow depths at four locations above the end-of-summer snowline. A differential GPS survey of the glacier terminus was completed. Wetland Monitoring; water table monitoring was established at three wetlands across the Project area using shallow wells. At two of the sites automated water level monitoring equipment was installed. At the third site, static water levels were recorded on a monthly basis.
Hydrogeology	Seven groundwater seeps were sampled and analysed on a monthly basis. Three additional seeps where only field measurements (pH, electrical conductivity and temperature) were collected.
Rock Geochemistry	Historical ML/ARD studies were reviewed. Several hundred core and reject samples were collected and submitted for ABA analysis. Four barrels were filled with selected core on site and their drainage monitored.
Water Quality	Completed monthly water quality sampling at 10 stream sites, quarterly sampling at 26 stream sites and annual sampling at one stream site. Completed freshet and high flow sampling at seven sites. Completed PAH analyses at two stream sites. Completed annual water quality sampling at three lake sites.
Aquatic Ecology	Completed benthic invertebrate and periphyton community assessments at 28 stream sites. Completed sediment sampling at 28 stream sites, including PAH analyses at two sites. Completed sediment sampling and benthic invertebrate, phytoplankton and zooplankton community assessments at three lake sites.
Fisheries	Completed fish and fish habitat assessments of stream crossings along the proposed access roads. Completed detailed fish and fish habitat for 32 receiving and reference environment stream sites. Determined fish habitat distribution within the tailings management facility and plant site locations. Completed fish tissue metals analysis at receiving and reference environment stream sites. Completed fish and fish habitat assessments of two wetlands and five lakes within the receiving and reference environment.
Soils and Terrain Mapping	Completed soils baseline assessment at 74 sites in the vicinity of Kerr, Sulphurets, and Mitchell pits, plant site 2B, tailings pond areas, and along some portions of the access road. Thirty-six soil samples were collected for analysis.

(continued)

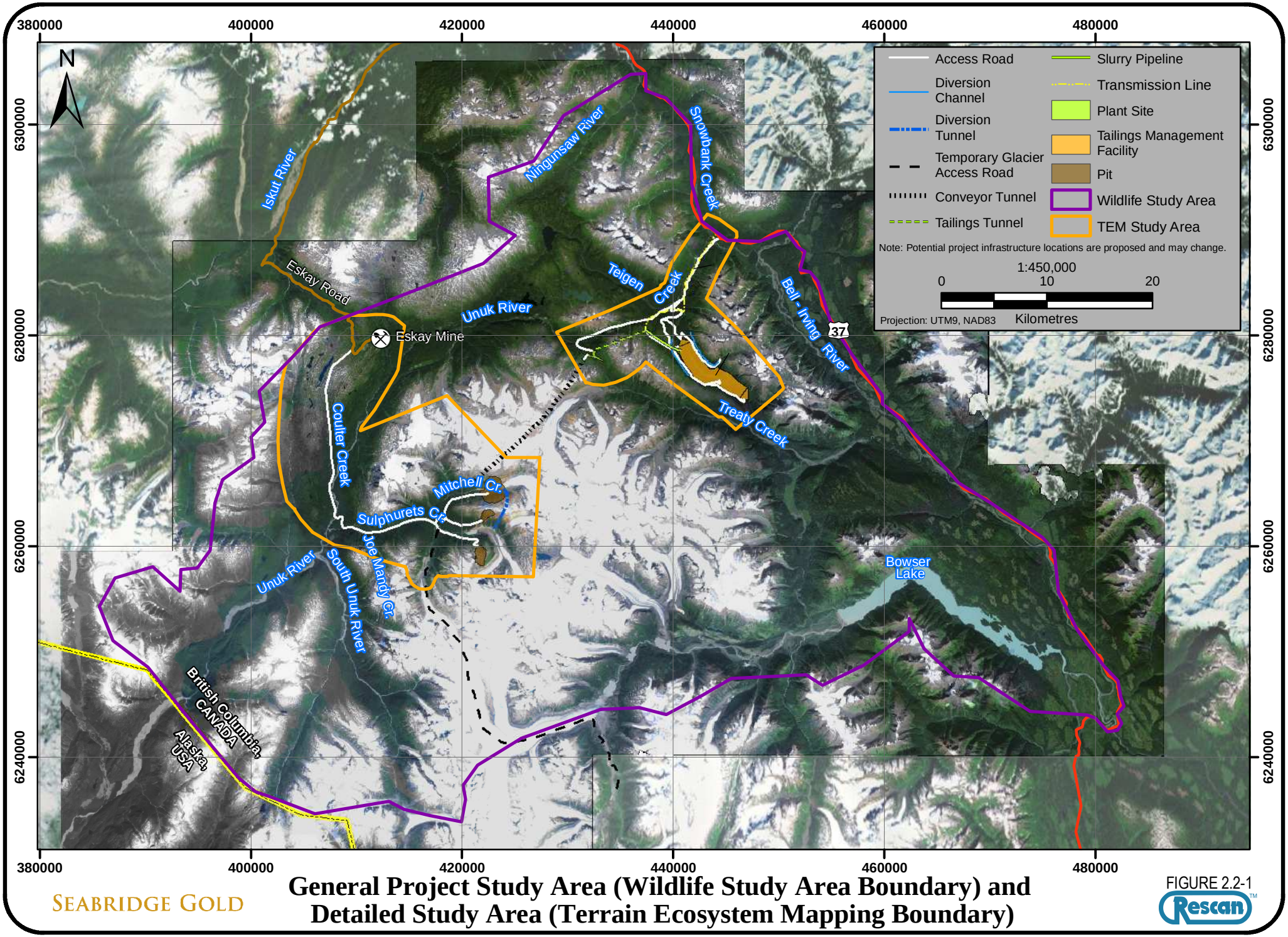
Table 2.1-1
Summary of Baseline Study Accomplishments in 2008 (completed)

Study Component	Accomplishments in 2008
Ecosystem Mapping and Vegetation	Seventy- four ground inspection sites and 143 visual inspection sites were established within the six biogeoclimatic units to characterize the ecosystems and vegetation at the Project in July, 2008. Surveys were conducted for invasive plants, rare plants and rare ecosystems. A presence/not detected level of inventory was used to document the plants of special concern (i.e., threatened, extirpated or endangered). Fifty vegetation samples were submitted for analysis to establish baseline metal concentrations on site.
Wildlife	Fieldwork completed including characterization of the terrestrial wildlife community and habitat through terrestrial ecosystem mapping (TEM) field surveys and identification of wildlife through species specific surveys. Species specific surveys included; • summer aerial surveys of alpine areas for mountain goats, hoary marmots and arctic ground squirrels to identify habitat use; • summer small mammal trapping survey to identify species which will be collected for baseline metals analysis; • summer survey of road routes, plant sites, and tailings facilities for breeding sites of the provincially-listed western toad (*Bufo boreas*); • summer survey for terrestrial breeding birds in order to characterize the species communities that utilize the Project area; • summer raptor survey including a species-specific inventory for northern goshawk (*Accipiter gentilis*); • spring, summer, and fall surveys of all major river/waterbodies for waterfowl species that occupy the Project area, with specific emphasis on the harlequin duck (*Histrionicus histrionicus*); and • spring and summer hair capture surveys for grizzly bears to allow performance of a DNA based population analysis. Completed desk-based research for available literature to contextualize the wildlife and wildlife habitat in the Project area. Completed analysis on collected baseline data not including grizzly bear DNA population analysis (laboratory analysis currently underway).
Wetlands	An initial investigation of wetlands was conducted at twenty sites focusing on suspected wetland communities in the Tailings Management Facilities and Plant Site 1 and 2a. Wetlands within these areas were delineated and classified to determine wetland extent (abundance and distribution). Classified wetland communities were inventoried to document the occurrence of ecosystems of special concern.
Archaeology	Completed an AOA and PFR for the Project. Also conducted an AIA for portions of the Project area assessed as having archaeological potential. These areas included regions along a number of proposed access routes, two tailings management facilities, two plant site locations and the open pits.
Land Use	Completed desk-based research, GIS mapping and preliminary phone interviews
Country Foods	Completed list of potential country food species for terrestrial wildlife, birds, fish and vegetation. Determined the list of metals the baseline would assess based on metal analysis from the water and soils.

2.2 Study Areas

The general project study area is shown on Figure 2.2-1, although there is of necessity some variation in study areas between the different study components.

Each chapter of the baseline studies is accompanied by a description of the specific study area for that component.



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General Project Study Area (Wildlife Study Area Boundary) and Detailed Study Area (Terrain Ecosystem Mapping Boundary)

FIGURE 2.2-1

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9. AQUATIC ECOLOGY

9. Aquatic Ecology

9.1 Summary

The 2008 KSM aquatic ecology baseline assessment was designed to collect baseline sediment quality, and primary and secondary producer community data within the streams, rivers and lakes in the KSM Project Study Area. Baseline characterization of the chemistry and biology within these aquatic systems is important in developing monitoring plans to assess potential effects from the proposed development. This report presents the findings of 2008 field program that was carried out in August 2008. This program included 28 stream and river sites where sediment quality, and periphyton and benthic invertebrate communities were assessed, and three lakes where physical limnology, sediment, phytoplankton, zooplankton and benthic invertebrate communities were assessed.

Streams in the KSM Project Study Area were characterized by sediments consisting primarily of sand, characteristic of fast flowing water. Nutrient concentrations were low in the Unuk River, Reference sites, Mitchell Creek and Sulphurets Creek watersheds and tended to be higher in the Teigen Creek and Treaty Creek Watershed. Sediments in the streams in the KSM Project Study Area were characterized by naturally high concentrations of metals that exceeded BC and CCME sediment quality guidelines for the protection of aquatic life. In particular, arsenic, copper, iron and mercury tended to be highest in the Treaty, Mitchell and Sulphurets Creek watersheds. Sites in the Teigen Creek Watershed tended to have naturally higher chromium and nickel concentrations. Since no development has begun in the Project Study Area, exceedances are related to the highly mineralized geology of the region and are considered indicative of natural background conditions.

Periphyton biomass was low, with an average periphyton biomass of 0.38 ug/cm^2. Sites in the Mitchell and Sulphurets Creek Watershed had very low periphyton biomass, density and species richness. Diatoms were the dominant group at the majority of the sites. Chlorophyta, Cryptophyta, Cyanophyta and Euglenoida occurred in low numbers at select sites. Average diversity across all sites was high, indicating that a most sites the periphyton community was quite diverse.

Benthos density followed a similar pattern to periphyton density and biomass. Density, genus richness and diversity were lowest at sites in the Mitchell and Sulphurets Creek watersheds. Diptera (primarily chironomids), and Ephemeroptera (mayflies) were the dominant taxonomic groups for streams in the KSM Project Study Area.

Sulphurets Lake (SUL) and Knipple Glacier Lake (KGL) were quite similar in their physical, chemical and biological characteristics while West Teigen Lake (LAL) had different attributes. SUL and KGL were characterized by turbid waters, and sediment containing low nutrient concentrations and higher concentrations of arsenic, cadmium, calcium, copper, magnesium, mercury and titanium than what was measured in LAL. LAL had greater concentrations of aluminum, chromium, cobalt, lithium, manganese and nickel. The CCME and BC sediment quality guidelines were exceeded at all three lakes.

KGL and SUL were characterized by very little biological productivity. The phytoplankton, zooplankton and benthic invertebrate communities in these two lakes were very sparse, and had low productivity and diversity. In contrast, LAL was characterized by diverse and abundant phytoplankton, zooplankton and benthic invertebrate communities.

9.2 Streams

9.2.1 Introduction

There is little known about the aquatic ecology and sediment quality present in the streams and rivers in the KSM Project Study Area due to its remote location. The purpose of the 2008 stream aquatic ecology baseline assessment was to begin collection of sediment quality, and both periphyton and benthic invertebrate community baseline data. Together with water quality, these are key components of stream habitat and are monitored as part of effects monitoring for mining projects.

Sediment is deposited on the bottom of streams and rivers and accumulates over time. Monitoring the chemical content and physical composition of the upper sediment layers in contact with water provides a useful tool in assessing changes in aquatic habitats. As sediment influences the quality of the overlying waters, integrates chemical exposure over time (through adsorption and absorption), and supports the benthic community, it is a key component to assess. Periphyton (algae growing on substrates) provides energy, nutrient and organic material to stream systems, and contributes to the food base of stream life. Changes in periphyton community structure can indicate altered water quality linked to impacts to other aquatic life. Benthic invertebrates are found in most stream environments and are important in nutrient and organic cycling and ecosystem diversity. They constitute an important food source for fish, and can serve as an early warning indicator in the event of impacts. Benthic invertebrates typically form the backbone of effects monitoring programs, and collecting quantitative baseline data allows for the development of future monitoring programs. Characterizing the benthic communities is also important in assessing the productivity of streams, and providing information for environmental impact assessments.

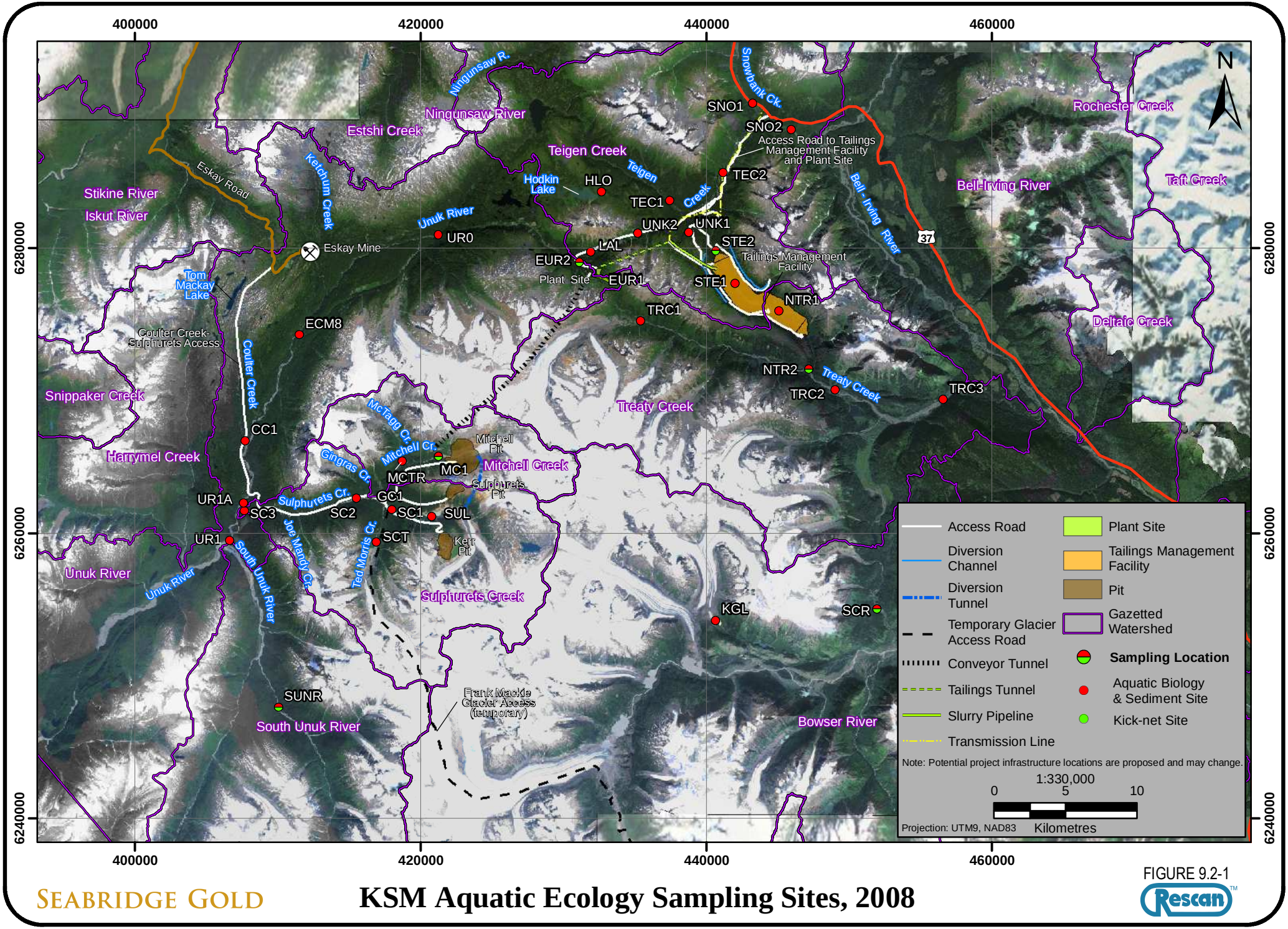
9.2.2 Objectives

The objectives of the 2008 KSM stream aquatic ecology baseline studies were to:

- Obtain baseline information of sediment quality (physical, organics, metals, nutrients, polycyclic aromatic hydrocarbons) in rivers and streams within the proposed Project Study Area, in terms of spatial variation among sites.
- Obtain baseline information regarding the diversity and distribution of algal and benthic invertebrate communities in stream and river habitat within the Project Study Area.

9.2.3 Study Area

The 2008 stream aquatic ecology baseline assessment focused on the Watersheds which could potentially be affected by Project development and operation (i.e., Mitchell/Sulphurets/Unuk, Teigen/Snowbank/ Bell-Irving and Treaty/Bell-Irving) (Figure 9.2-1).



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KSM Aquatic Ecology Sampling Sites, 2008

FIGURE 9.2-1

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A total of twenty-eight sites on stream and river systems within the Project Study Area were included in the stream aquatic ecology program. This includes two reference sites: Scott Creek (SCT) and South Unuk River (SUNR). Sites in the Snowbank and Teigen Creek drainages were selected to address the potential impacts of the tailings management facility and associated roads. Teigen Creek sites, as well as sites on the Unuk River, were selected to assess the systems located along the proposed and the alternative plant site road. Coulter Creek, Tom Mackay, 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 9.2-1.

9.2.4 Methods

9.2.4.1 Sediment Quality

Sediment samples were collected at 28 sites, and analyzed for moisture, particle size, cyanides, nutrients, organic carbon, and total metal concentrations. Two sites were assessed for polycyclic aromatic hydrocarbons (PAHs), consistent with US regulator recommendations. A list of sediment quality variables examined from the stream sites is presented in Table 9.2-2. The lowest analytical detection limits possible for the mass of sediment submitted was used for all analyses.

Sediment samples were collected in triplicate at each stream station using appropriate sampling equipment. 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 9.2-1).

Plate 9.2-1. Sediment Sample Collection in KSM Project Streams.

Table 9.2-1
KSM Aquatic Ecology Sampling Sites - Details and Rationale

	Watershed	Site Code	Site Description	Aquatic Biology	Sediment Quality	Sediment PAHs	Periphyton	Benthos (5 Hess)	Benthos (3 Hess)	Benthos Kick net (BCMOE)	Rationale for Inclusion
STREAMS											
	Unuk River										
1		EUR2	Unuk River, upstream	x	x		x		x	x	Stream under footprint of proposed tailings management facility (TMF) 2
2		UR0	Unuk River, upstream	x	x		x		x		Monitor downstream of proposed western dam of TMF 2
3		ECM8	Unuk River, near Eskay Cr mine, downstream	x	x		x		x		Long-term Eskay Cr monitoring site, downstream of Ketchum Creek mouth
4		CC1	Coulter Creek, trib of Unuk R	x	x		x		x		Possible road alternative, monitoring Coulter Creek
5		UR1	Unuk River, mid	x	x		x	x			Monitor downstream of confluence of Sulphurets Cr and Unuk R
6		UR1A	Unuk River, upstream of Sulphurets	x	x		x	x			Reference site just upstream of confluence of Sulphurets with Unuk
	South Unuk River										
7		SUNR	South Unuk River REF	x	x		x	x		x	Reference stream to compare to SC3 lower Sulphurets exposure area.
	Teigen Creek										
8		STE1	Teigen Creek, in proposed tailings management facility	x	x		x		x		Stream under footprint of proposed TMF1
9		STE2	Teigen Creek, at discharge of proposed tailings management facility	x	x		x	x		x	Possible North discharge point for TMF1
10		UNK1	Teigen Creek Upper Tributary	x	x		x		x		Stream close to proposed Plant site 1
11		UNK2	Teigen Creek, upstream	x	x		x	x		x	Site immediately downstream of proposed TMF2
12		TEC1	Teigan Creek, alternate tailings management facility	x	x		x	x			Reference stream on Teigen Creek (north tributary)
13		TEC2	Teigen Creek downstream	x	x	x	x	x			Mid-field exposure site for proposed TMF1 or TMF2, and along road access route
14		HLO	Hodkin Lake Outflow	x	x		x		x		Monitor site for Hodson Lake Outflow; Possible road alternative
15		SNO1	Snowbank Creek upstream	x	x		x	x			Reference on Snowbank Creek upstream of Teigen Creek mouth
16		SNO2	Teigen Creek, downstream of confluence with Snowbank Creek	x	x		x	x			Mid-field exposure site on Teigen Creek, downstream of confluence with Snowbank Creek
	Treaty Creek										
17		TRC1	Treaty Creek upstream	x	x		x		x		Monitor for potential pipeline spills into Treaty Creek.
18		TRC2	Treaty Creek, mid	x	x		x	x			Monitor for potential pipeline spills, or seepage from proposed S dam of TMF1 into Treaty Creek
19		TRC3	Treaty Creek Downstream	x	x		x		x		Treaty Creek downstream of TRC 2, seepage of proposed TMF1 and road corridor monitoring
20		NTR1	Treaty Creek Tributary, upper	x	x		x		x		North Treaty Creek Stream under footprint of proposed TMF1
21		NTR2	Treaty Creek Tributary, lower	x	x		x	x		x	Near-field monitoring of seepage from proposed S dam of TMF1 into North Treaty Creek
	Mitchell Creek										
22		MC1	Mitchell Creek	x	x		x	x		x	Near-field site downstream of Mitchell deposit
23		MCTR	Mitchell Creek Tributary, REF	x	x		x	x			Mitchell Creek tributary (potential waste rock storage)
	Sulphurets Creek										
24		SC1	Sulpurets Creek Upstream	x	x		x	x			Downstream of Kerr deposit, potential mine camp, and Sulphurets Lake
25		SC2	Sulphurets Creek mid	x	x	x	x	x			Midway downstream on Sulphurets, monitor mixed Mitchell and Sulphurets creeks.
26		SC3	Sulphurets Creek lower	x	x		x	x			Sulphurets Creek at mouth before it joins Unuk river
27		SCT	Ted Morris Creek (Sulphurets Creek Tributary)	x	x		x		x		Sulphurets Creek tributary, proposed road access to upper Kerr deposit zone
	Scott Creek										
28		SCR	Scott Creek REF	x	x		x	x		x	Scott Creek, far-field stream reference site
TOTAL STREAMS				**28**	**28**	**2**	**28**	**17**	**11**	**7**	
LAKES											
1	Sulperets Creek	SUL	Sulphurets Lake	x	x		x		x		Close to proposed Kerr and Sulphurets pit, mine camp
2	Bowser River	KGL	Knipple Glacier (Small Lake - not Knipple Lake)	x	x		x		x		Reference lake
3	Teigen Creek	LAL	West Teigen Lake	x	x		x		x		Lake in upper Teigen Creek Watershed, under proposed footprint of TMF2
TOTAL LAKES				**3**	**3**		**3**		**3**		

Table 9.2-2
Sediment Quality Variables and Detection Limits

Variable	Detection Limits (mg/kg)	Variable	Detection Limits (mg/kg)
Physical Tests		**Total Metals (cont'd)**	
Moisture	0.1%	Copper	1
pH (pH)	0.01	Iron	50
Particle Size	n/a	Lead	30
Nutrient/ Organic Variables		Lithium	2
Available Phosphorus	1	Magnesium	50
Total Nitrogen	0.02%	Manganese	1
Total Organic Carbon	0.1%	Mercury	0.005
Cyanides		Molybdenum	4
Total Cyanide	3	Nickel	5
Total Metals		Phosphorous	50
Aluminum	50	Potassium	200
Antimony	10	Selenium	2 to 18
Arsenic	5	Silver	2
Barium	1	Sodium	200
Beryllium	0.5	Strontium	0.5
Bismuth	20	Thallium	1
Cadmium	0.5	Tin	5
Calcium	50	Titanium	1
Chromium	2	Uranium	2
Cobalt	2	Zinc	1
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.04	Dibenz(a,h,)anthracene	0.05
Acenapthylene	0.05	Fluoranthene	0.05
Benz(a)anthracene	0.05	Fluorene	0.05
Benzo(a)pyrene	0.05	Indeno(1,2,3-c,d)pyrene	0.05
Benzo(b)fluoranthene	0.05	2-Methylnaphthalene	0.05
Benzo(g,h,i)perylene	0.05	Naphthalene	0.05
Benzo(k)fluoranthene	0.05	Phenanthrene	0.05
Chrysene	0.05	Pyrene	0.05

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 analyzed by ALS Environmental Services of Vancouver. 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, and resulted in three separate replicates per site. For larger rivers, sediment sampling was conducted in depositional areas of the shoreline that could be accessed safely by wading. Samples were kept cool and in the dark during storage and transport to the laboratory. Sediment chemistry and grain size analyses were conducted by ALS Environmental Services (Vancouver, BC).

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. Whole sediment samples were analyzed for particle size distribution.

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; however, concentrations above these levels are more likely to be associated with adverse biological effects.

9.2.4.2 Primary Producers - Periphyton

Three periphyton replicate samples were collected from each of the 28 aquatic biology stream sites. Periphyton was gently scraped off three riffle-zone rocks per site (spaced a minimum of 5 m apart) using a razor, small brush and squirt bottle. When rocks were not available, woody debris was selected for algal sampling. For each rock, multiple discs (i.e., circular areas of known size) were collected and combined in order to accurately characterize periphyton coverage on each rock. Periphyton results for each rock were normalized to the area scraped.

The samples from each rock were split and analyzed for taxonomy and biomass (as chlorophyll *a*). Taxonomy samples were retained in 500 ml plastic jars, preserved with 10 to 15 drops of Lugol's iodine solution (to achieve a tea-coloured solution), and shipped to G3 Consulting Limited (Surrey, BC) for identification and enumeration to the species level. For each sample, density, genus richness, relative abundance, evenness, diversity (as Shannon-Weiner and Simpson 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 it in half and wrapping it in aluminum foil, and labelling and freezing it until analysis by ALS Environmental Services of Vancouver. Biomass as chlorophyll *a* (mean ± SE) was plotted on graphs by site and watershed.

9.2.4.3 Secondary Producers – Benthic Invertebrate

Stream benthos samples were collected from the 28 aquatic biology stream sites using a 250 µm mesh size Hess sampler (Plate 9.2-2). Five composite replicate samples were collected at 17 of the key sites, and three composite replicates at the remaining 11 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). 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 genus or species level. All samples were transferred to 70% ethanol prior to analysis and storage.

(a) **(b)**

Plate 9.2-2. (a) Utilizing a Hess Sampler to Sample Stream Benthic Invertebrate; (b) Stonefly (Plecoptera) collected at KSM stream site (EUR2).

At seven 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 removable cup. The kick-net was used to traverse a stream section, moving upstream, in a zigzag pattern going from bank to bank, for precisely 3 minutes (Environment Canada, 2001). One replicate was taken per site with one duplicate taken for QA/QC purposes at EUR2. This sampling occurred within a week of when the sites were sampled using the Hess sampler. BC MoE samples were submitted to Fraser Environmental Services (Surrey, BC) for identification.

The kick-net sampling was conducted for two reasons: 1) to compare the Hess sample method that is being utilized 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-Weiner and Simpson diversity indices), EPT genus richness and Bray-Curtis similarities were calculated, and mean and standard error by site was determined and graphed by watershed.

9.2.4.4 Data Analysis

The following methods of data analysis were used on the biology data collected for streams and lakes for the aquatic ecology baseline.

The number of organisms per sample was converted to density (organisms/m^2 for benthos, cells/cm^2 for periphtyon, organisms/L for phytoplankton and zooplankton) by dividing the number in each sample by the area sampled. Average values with standard error of the mean were graphed using SigmaPlot software (Systat 2006). Measures of evenness, diversity, and Bray-Curtis Similarity, for the stream periphyton and benthos communities were calculated using Primer (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 (totally dissimilar pair of samples) to 1 (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 is determined. This provides data for an artificial 'median reference sample'. The similarity of the 'median reference sample' to all exposure site samples is then plotted. This is done for all watersheds to determine which benthic communities are 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. For periphtyon, phytoplankton and zooplankton data, species richness was used. The Shannon-Wiener 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 statistic is:

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

where p_i is the proportion of the total number of invertebrates 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:

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

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

The Shannon – Wiener Diversity Index places more emphasis on the richness of the community while the Simpson's Diversity Index places most weight on those species that dominate the community. Similar Shannon-Wiener and Simpson indices indicate that there are limited amounts of rare species present in the community of interest. In contrast, a high Shannon-Wiener index and a comparatively low Simpson index indicates that there is a large number of species present in the community, but many were present in low numbers.

9.2.5 Results

9.2.5.1 Sediment Quality

Particle Size

Analysis of particle size distributions indicated that, with the exception of NTR1 and UR1A, which were dominated by silt, the stream sites were dominated by sand (48 to 93%), with smaller proportions of silt (1 to 28%), gravel (1 to 43%), and clay (1 to 4%) (Figure 9.2-2). Particle size analyses are indicative of the energy of water flow in the area of the sediment sample. The predominance of larger particle sizes in the sediment, such as sand, indicates a higher energy flow regime relative to sediment that contains high proportions of smaller particle sizes.

Nutrients, TOC, pH and Cyanides

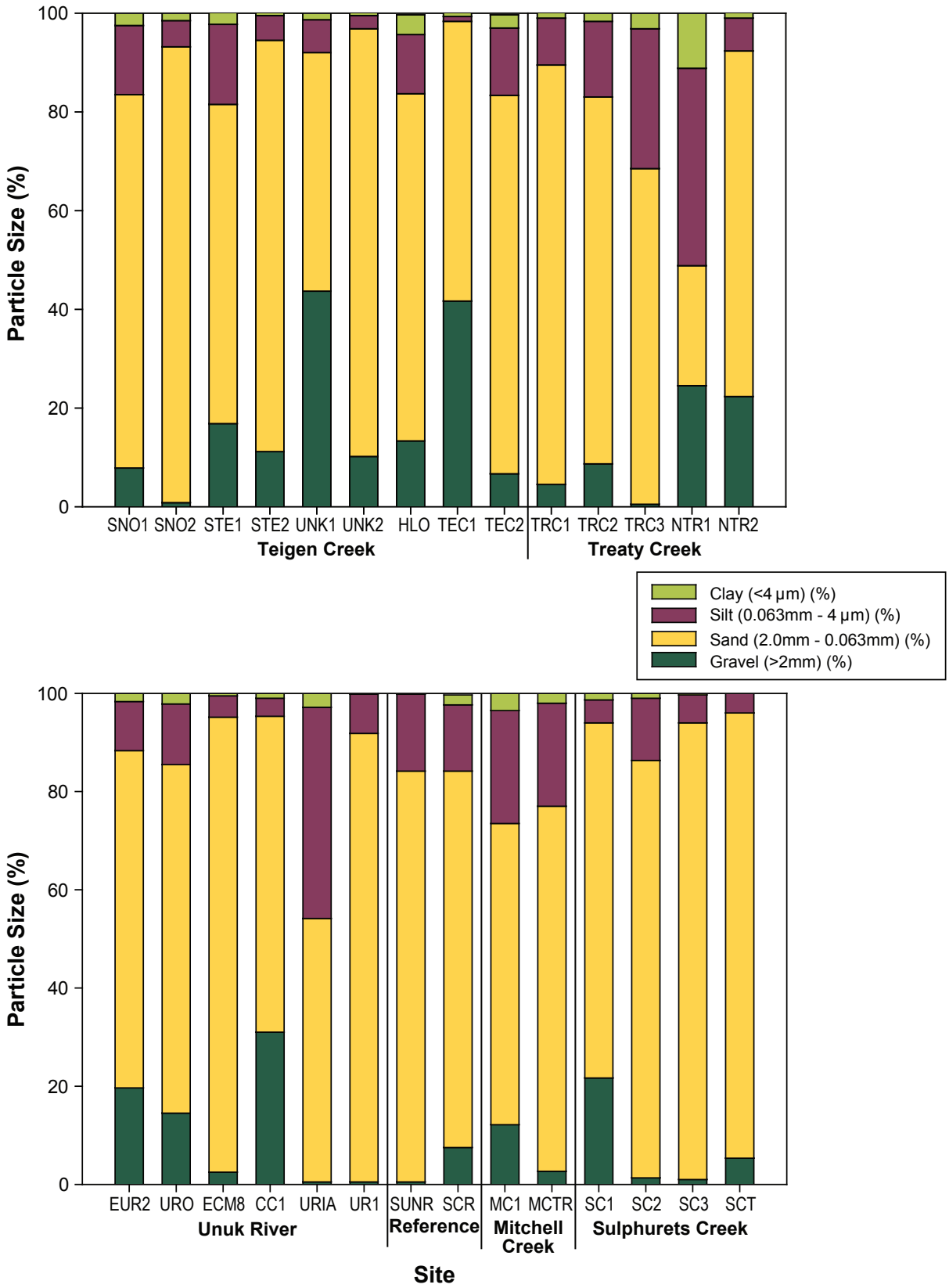
Nutrients were generally low throughout the Project Study Area. Available phosphate was below detection limits (1 mg/kg) at eleven of the stream sites (Figure 9.2-3). Detectable concentrations ranged from 1 mg/kg (just above detection limits) to a maximum average concentration of 10.3 mg/kg occurring at NTR1. Concentrations tended to be highest in the Teigen Creek and Treaty Creek watersheds. Total nitrogen concentrations also tended to be higher in Teigen Creek and Treaty Creek watersheds (Figure 9.2-4), generally ranging from below detection limits (0.02%) at three sites, to 0.12% at CC1. As seen with phosphates, total nitrogen was much higher at NTR1 (0.55%), nearly five times the concentrations observed at other sites. Site NTR1 is situated in a wetland area and therefore would have higher nutrient and organic concentrations compared to glacier-fed streams. Total organic carbon concentrations ranged from below detection limits (0.10 mg/kg) at two sites to 1.77 mg/kg (UNK1) (Figure 9.2-5). NTR1 had five times the maximum concentration measured at the other sites, with a total organic carbon average concentration of 9.17 mg/kg, again related to its position in a wetland zone.

Sediment pH ranged from 6.1 (NTR1) to 8.3 (SUNR) (Figure 9.2-6). The pH tended to be lower in the Teigen Creek and Unuk River watersheds. The acidic pH observed at NTR1 relates to natural anaerobic conditions at this wetland-fed stream site. The pH tended to be highest at the reference sites, at sites in the Mitchell and Sulphurets watersheds and at the Treaty Creek sites.

Total cyanide was below analytical detection limits (3.0 mg/kg) at all stream sites except for NTR1 (3.3 mg/kg); wetlands are a natural source of cyanides (not graphed). There are no guidelines for cyanide concentrations in sediments.

Metals

Several of the analyzed metals were detected at 20% of the samples or less, and are therefore not discussed. These metals include antimony, bismuth, lead, selenium, silver, sodium, thallium and tin. All data are provided in Appendix 9.2.5A.

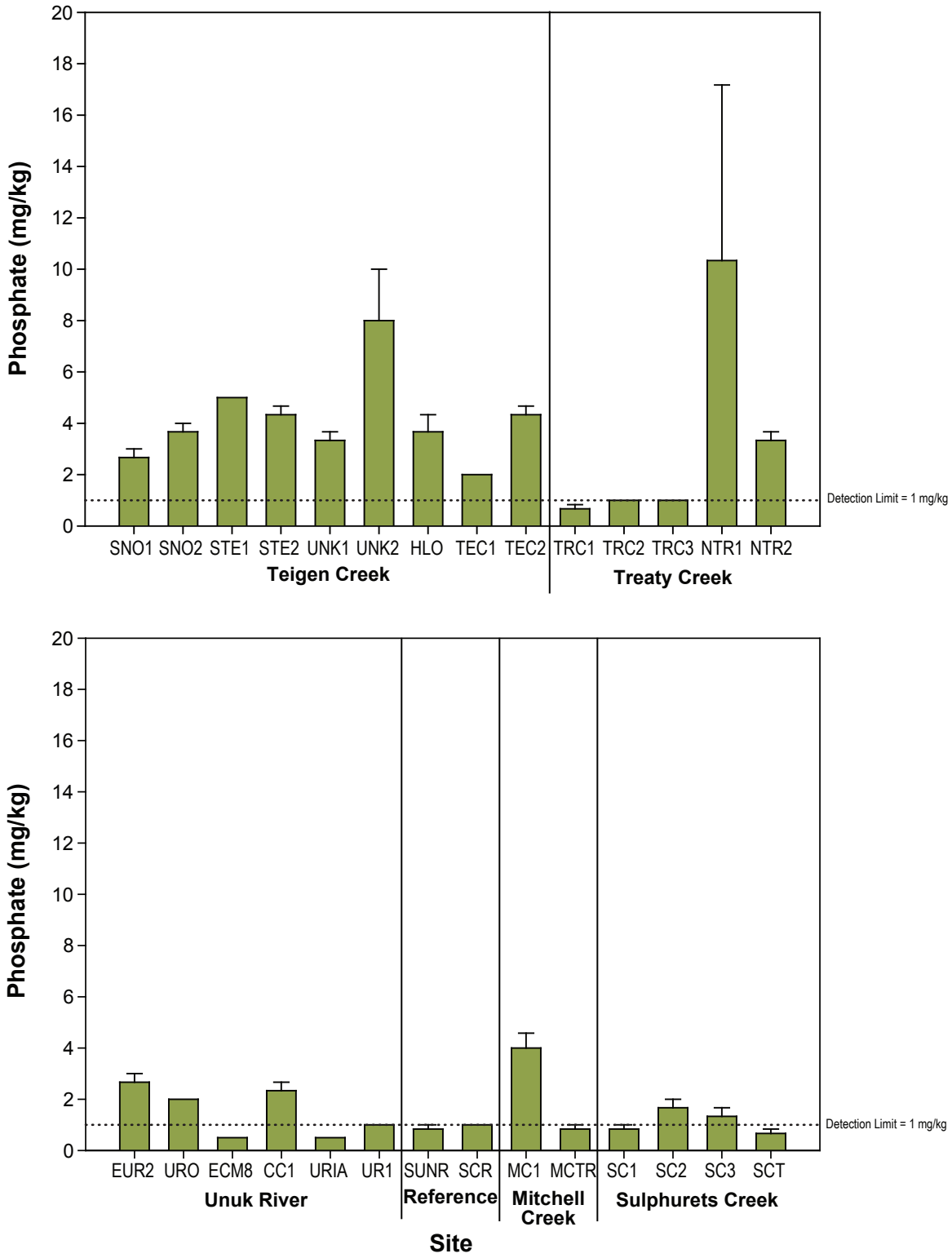


Average Particle Size Distribution for KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-2

SEABRIDGE GOLD

Rescan™



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits

Available Phosphate Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-3

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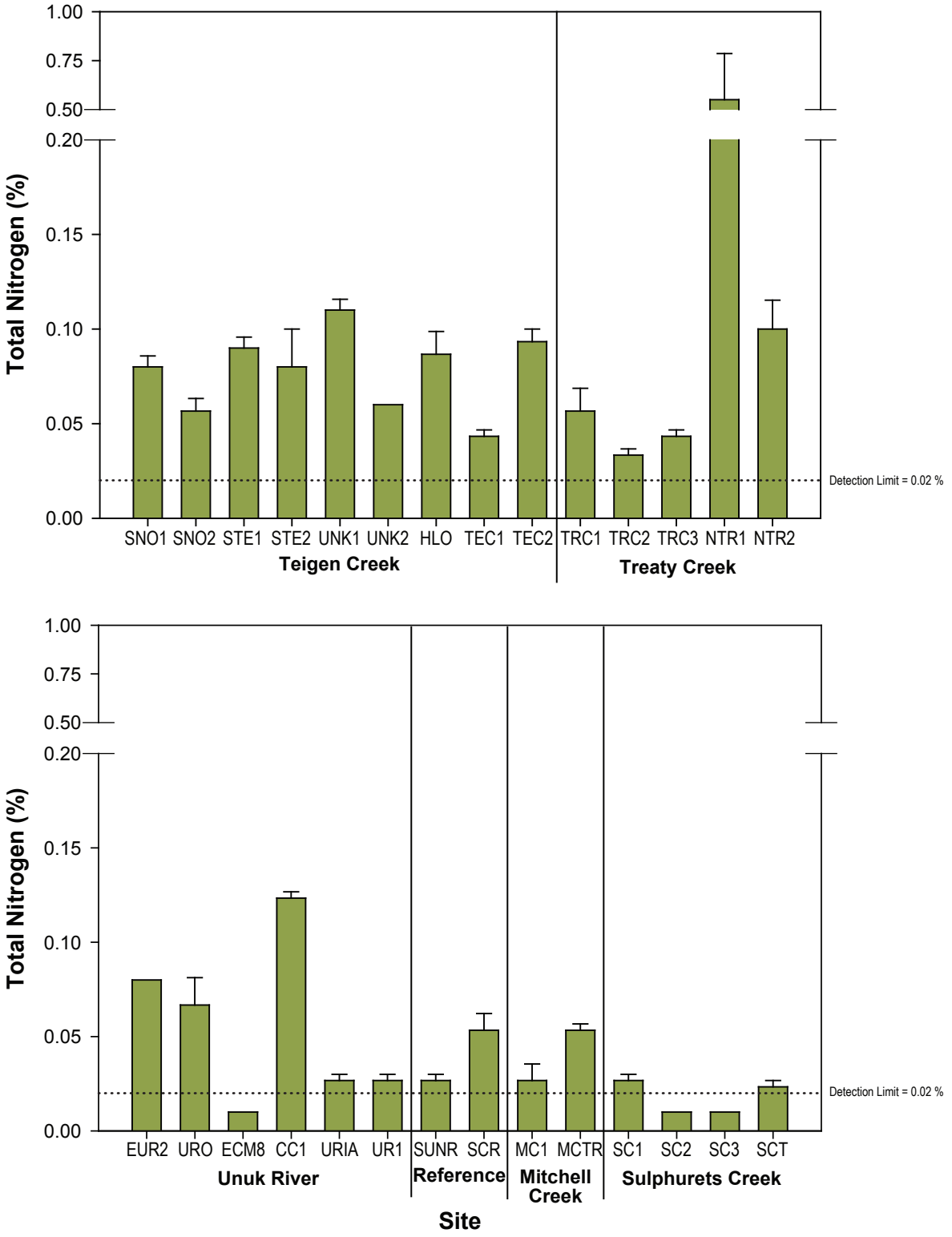

Note: Error bars represent standard error of the mean
Dotted line denotes detection limits

Total Nitrogen Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-4

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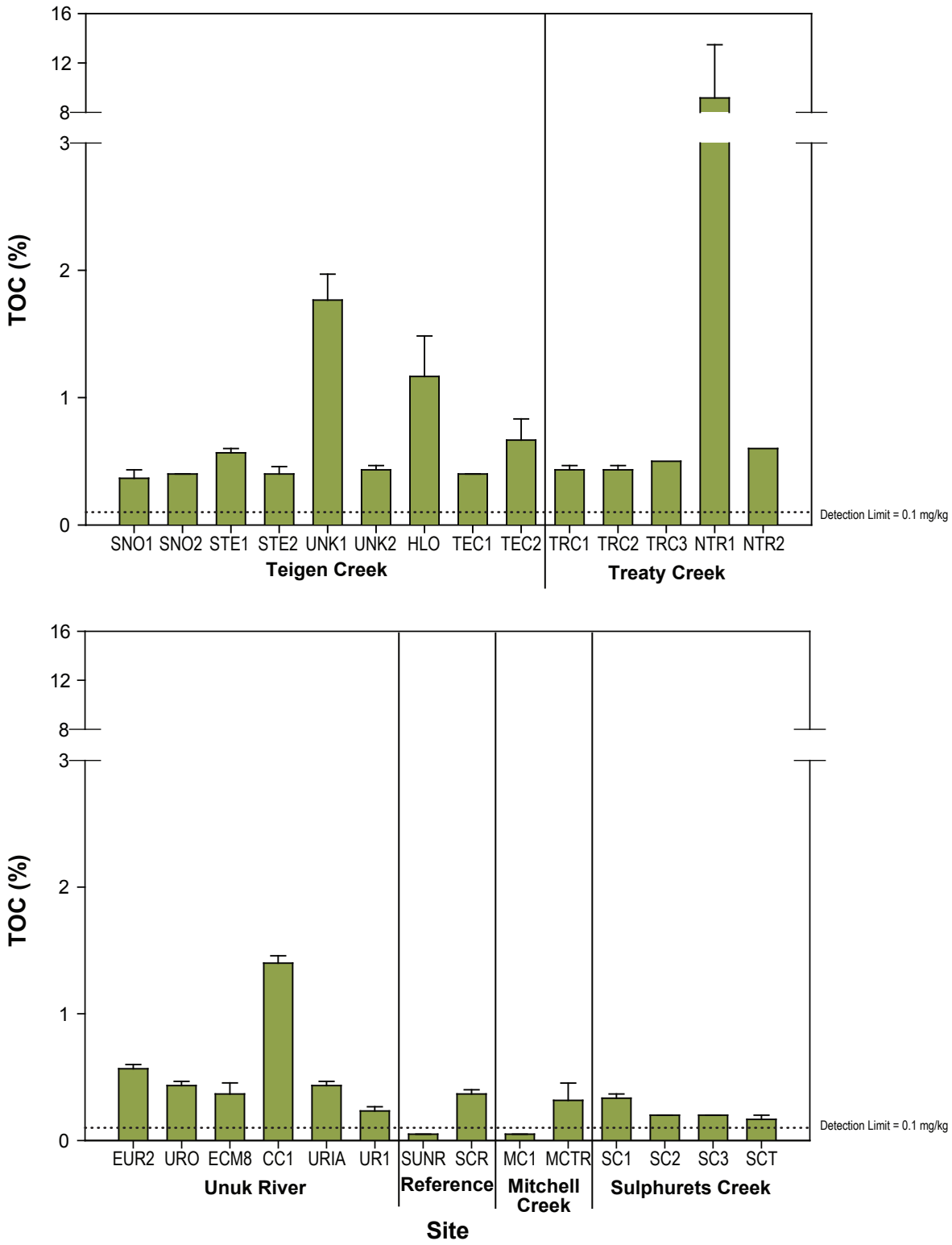


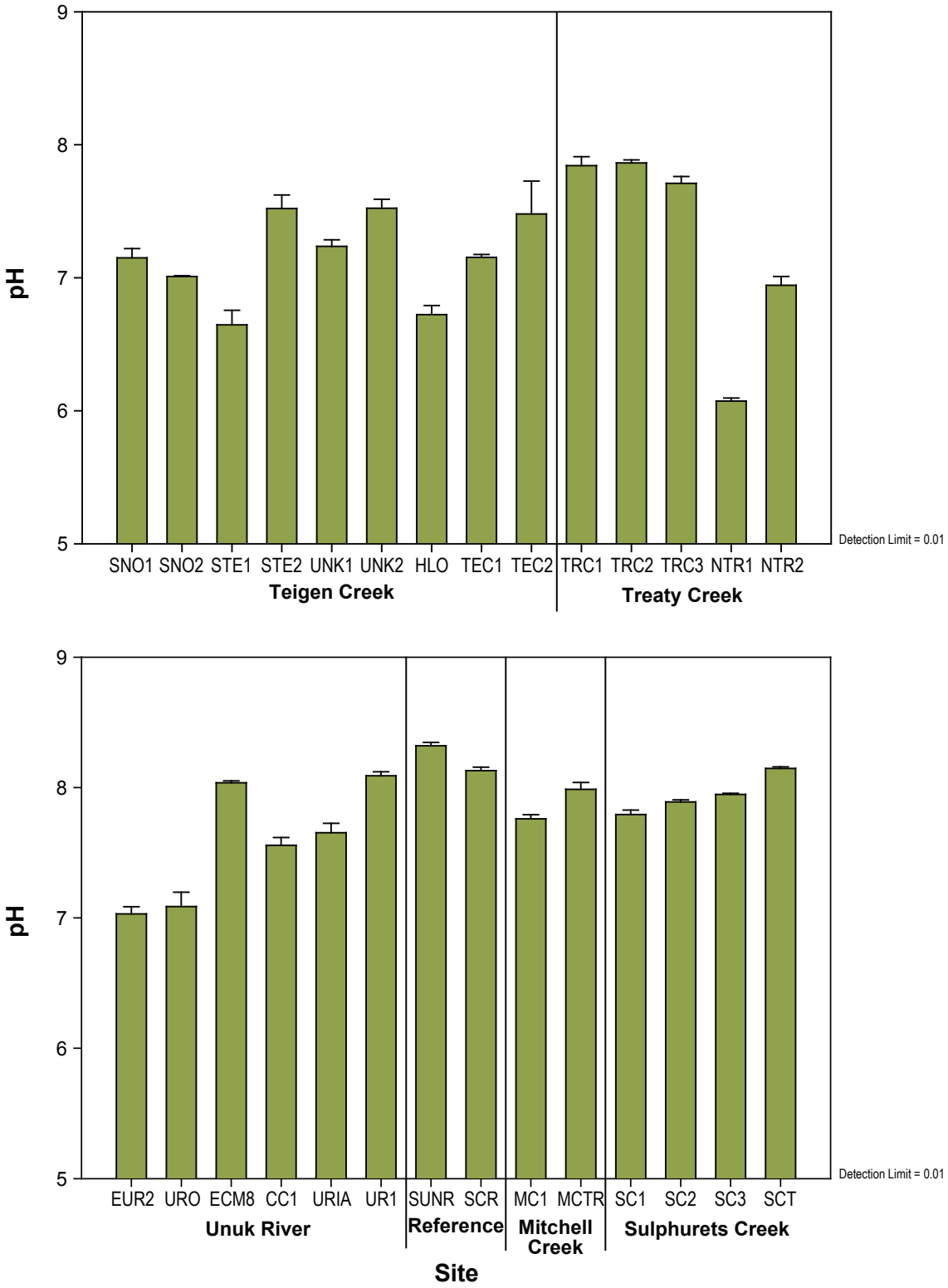
Note: Error bars represent standard error of the mean
Dotted line denotes detection limits

Total Organic Carbon (TOC) Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-5

SEABRIDGE GOLD

Rescan™



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits

pH in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-6

SEABRIDGE GOLD

Rescan™

Analyzed metals that do not have provincial or federal guidelines are discussed first prior to those metals with guidelines. Aluminum concentrations ranged from 9,310 mg/kg (MC1) to 23,033 mg/kg (UNK2). Barium concentrations ranged from 45 mg/kg (MC1) to 222 mg/kg (EUR2) and were greatest at sites in Upper Unuk River and West Teigen Tributary (EUR2, UR0, UNK2), with lower concentrations occurring at TEC1 and MC1. Beryllium concentrations were frequently below detection limits or very close to the detection limit of 0.5 mg/kg. Calcium concentrations ranged from 2,036 mg/kg (STE1) to 36, 866 mg/kg (ECM8) and decreased in a downstream trend at sites in Treaty Creek and North Treaty Creek Tributary. Concentrations of cobalt ranged from 9.4 mg/kg (SUNR) to 22.5 mg/kg (UNK1) and were generally lower in the Unuk River and Mitchell and Sulphurets creeks watersheds. Lithium concentrations ranged from 6 mg/kg (SUNR) to 43 mg/kg (UNK1) and were lower in Mitchell Creek and Sulphurets Creek watersheds. Lithium concentrations tended to be greatest in the Treaty and Teigen Creek watersheds. Manganese concentrations were variable across watersheds with the greatest concentration occurring at SNO1 (1,293 mg/kg) and the lowest concentration observed at NTR1 (328 mg/kg). Magnesium concentrations were highest at UNK2 (17,666 mg/kg) and lowest at MC1 (5,403 mg/kg). Molybdenum concentrations were below detection limits for 80 % of the samples, however concentrations were higher at MC1 (33.4 mg/kg) and lower concentrations, ranging from 4.9 mg/kg to 10. 7 mg/kg, were also evident at CC1, UR1, MCTR, SC1 and SC2. Potassium concentrations were also variable across watersheds with the maximum concentration occurring at SCT (3,203 mg/kg) and the lowest concentration occurring at MC1 (560 mg/kg).

Metal concentrations for which guidelines exist are presented graphically below. Of the eleven metals that have guidelines, two had 100% of samples below detection limits (silver and selenium). All samples were below detection limits for lead with the exception of MC1 where the average concentration was 41.7 mg/kg. This exceeds the ISQG of 35 mg/kg. Of the remaining eight metals with guidelines, guidelines were exceeded at least at one site and the following section discusses these parameters in detail.

Average arsenic concentrations ranged from below detection limits (5 mg/kg) at SUNR to 62.9 mg/kg at MC1 (Figure 9.2-7). The ISQG of 5.9 mg/kg was exceeded at all sites with the exception of SUNR. The PEL of 17 mg/kg was exceeded by twelve of the 23 sites. Concentrations were lowest in the Teigen Creek Watershed and SUNR, and were highest in Upper Treaty Creek and Upper Mitchell Creek, followed by Sulphurets Creek and some sites along the Unuk River.

Average cadmium concentrations were below detection limits at fifteen sites, including all sites in the Teigen Creek Watershed and many along the Unuk River (Figure 9.2-8). The remaining sites exceeded the ISQG of 0.6 mg/kg while one site (CC1; 8.3 mg/kg) exceeded the PEL of 3.6 mg/kg. The majority of sites had an average cadmium concentration below 1.5 mg/kg.

Average chromium concentrations ranged from 2.13 mg/kg (MC1) to 107 mg/kg (UNK1) (Figure 9.2-9). Concentrations in the Teigen Creek and North Treaty Creek watersheds were highest, ranging from 70 mg/kg to 107 mg/kg while the concentrations at Mitchell and Sulphurets creeks did not exceed 20 mg/kg. The ISQG of 37.3 mg/kg was exceeded at fourteen sites while four sites in the Teigen Creek Watershed also exceeded the PEL of 90 mg/kg.

Average copper concentrations in Teigen Creek and Treaty Creek watersheds and at the two reference streams were low, ranging from 19.1 mg/kg (HLO) to 59 mg/kg (Figure 9.2-10). Average concentrations in the Mitchell, Sulphurets and Unuk watersheds were higher, ranging from 38 mg/kg (UR0) up to 271 mg/kg at MC1). The PEL (197mg/kg) was exceeded at MC1, while the ISQG (35.7mg/kg) was exceeded at twenty-one sites. This is expected, due to the rich copper deposits located in the Mitchell Creek and Sulphurets Creek watersheds (Plate 9.2-1).

Average iron concentrations at 80% of the sites fell between 25,000 and 40,000 mg/kg and all exceeded the LEL of 21, 200 mg/kg (Figure 9.2-11). Concentrations at three sites (MC1, SC2 and SC3) exceeded the SEL of 43, 766 mg/kg with a maximum concentration of 61,116 mg/kg occurring at MC1.

Average mercury concentrations ranged from below detection limits to 0.364 mg/kg (UR1A) (Figure 9.2-12). Concentrations were lowest at the reference streams, Ted Morris Creek (SCT) and in Teigen Creek. The ISQG of 0.17 mg/kg was exceeded at four sites. The PEL (0.486 mg/kg) was not exceeded.

Average nickel concentrations ranged from below analytical detection limits (5 mg/kg at MC1) to 140 mg/kg (UNK1) (Figure 9.2-13). With the exception of three sites (MC1, SC3 and SCT), all stream sites exceeded the LEL of 16 mg/kg. Fourteen sites from the Teigen Creek, Treaty Creek and Unuk River Watersheds exceeded the SEL (75 mg/kg).

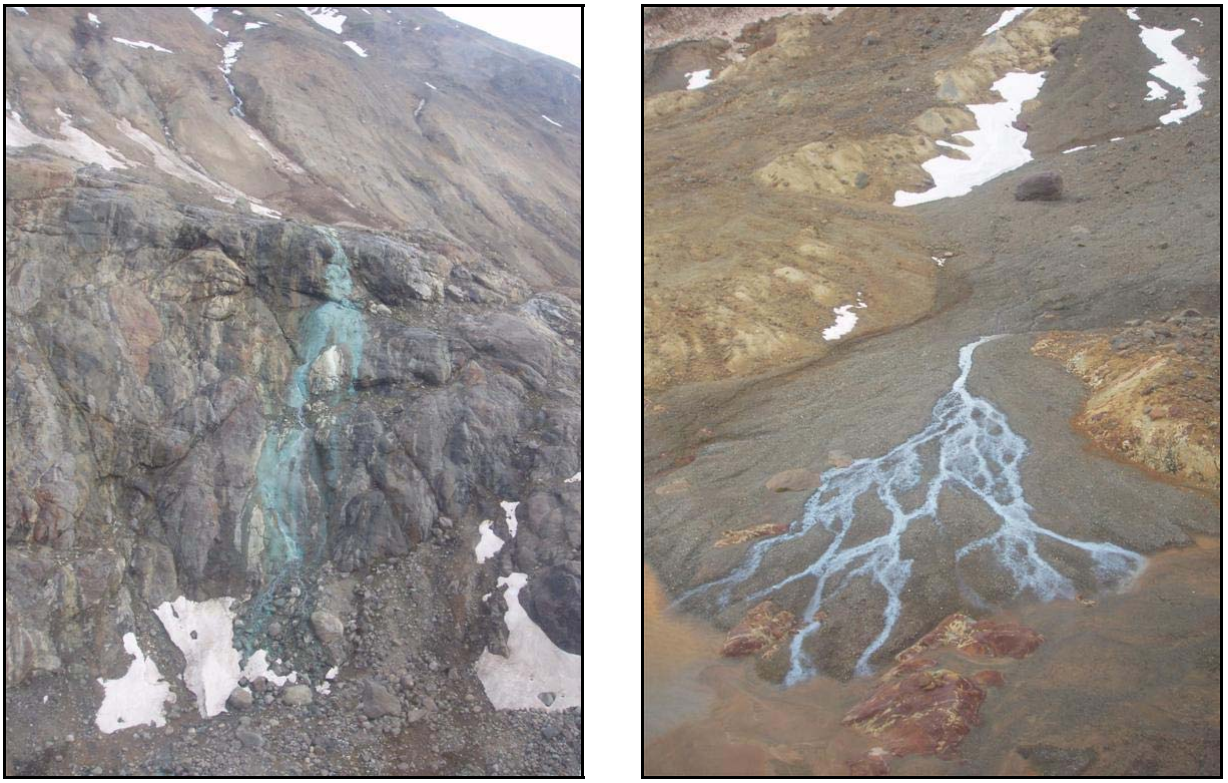
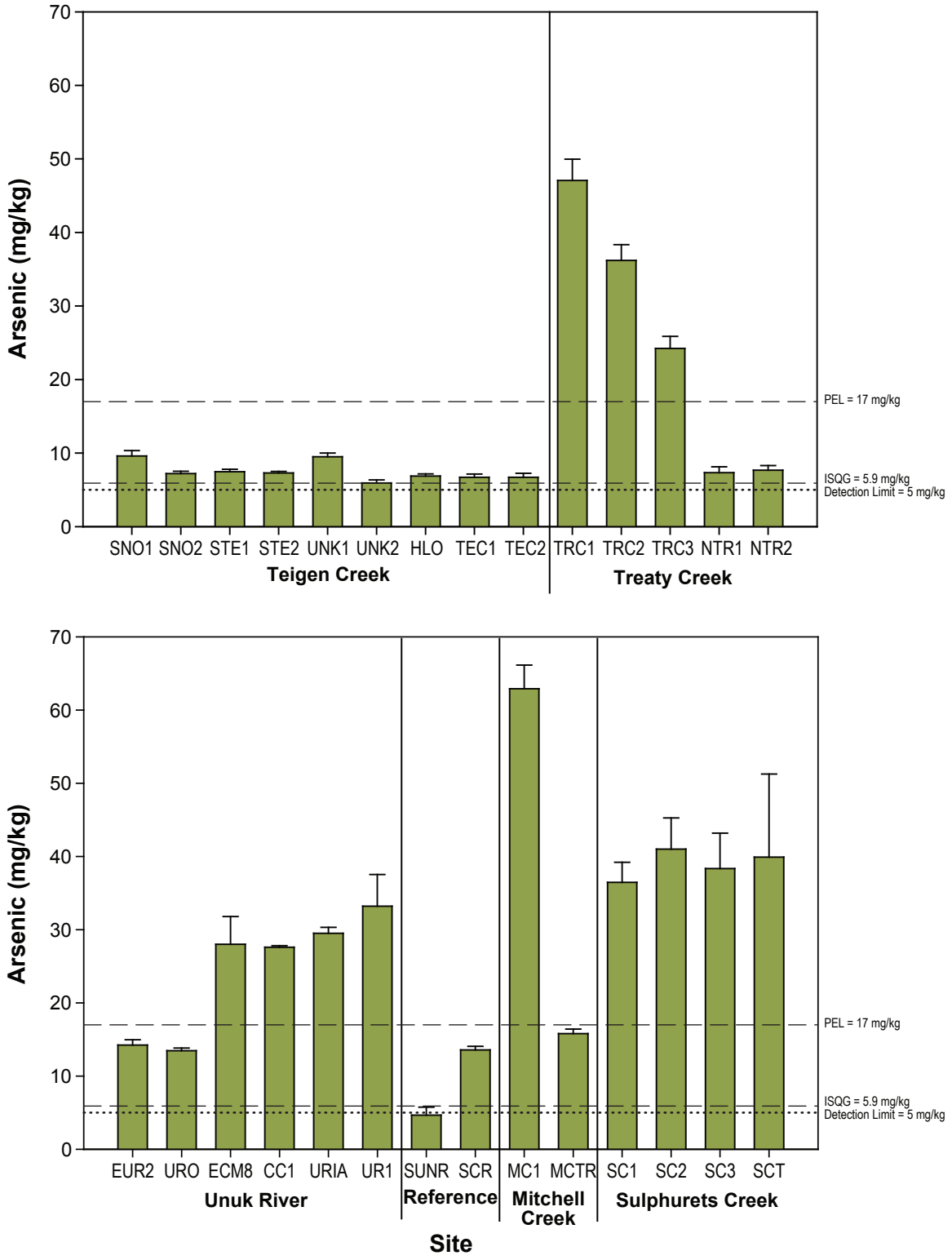


Plate 9.2-3 Evidence of copper oxidation on the banks of Mitchell Creek



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes CCME and/or BC guideline values, where available

Arsenic Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-7

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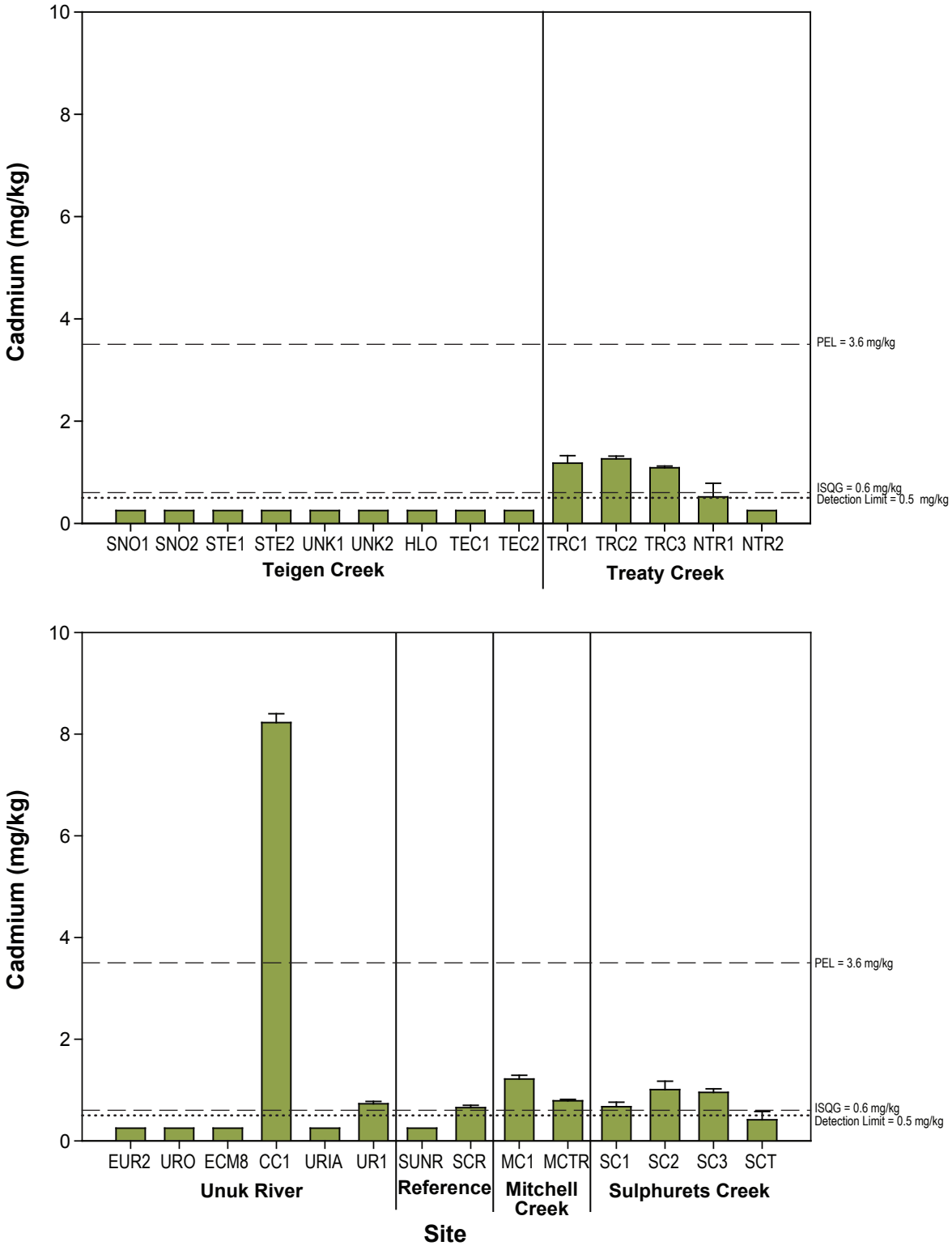


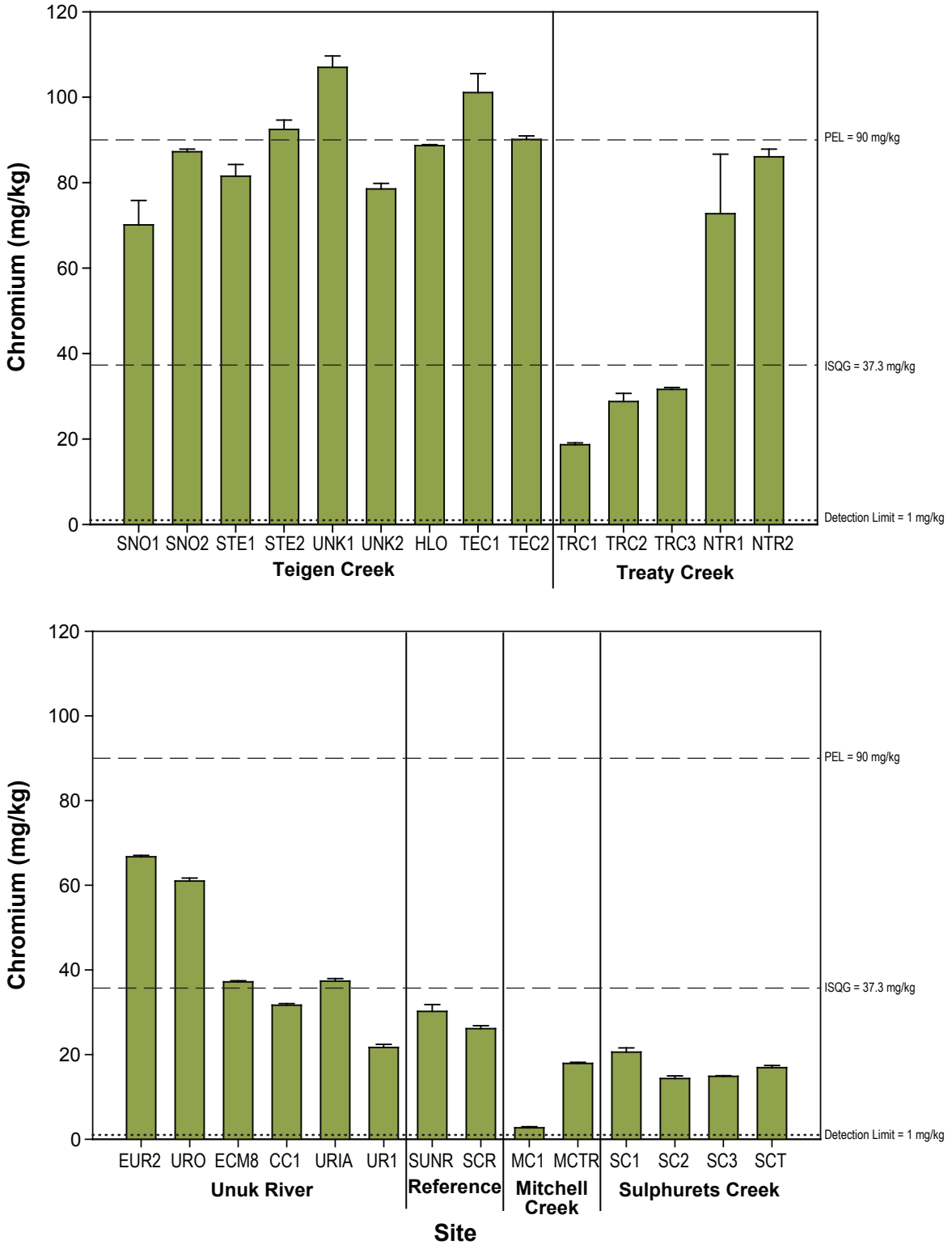
Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes CCME and/or BC guideline values, where available

Cadmium Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-8

SEABRIDGE GOLD

Rescan™



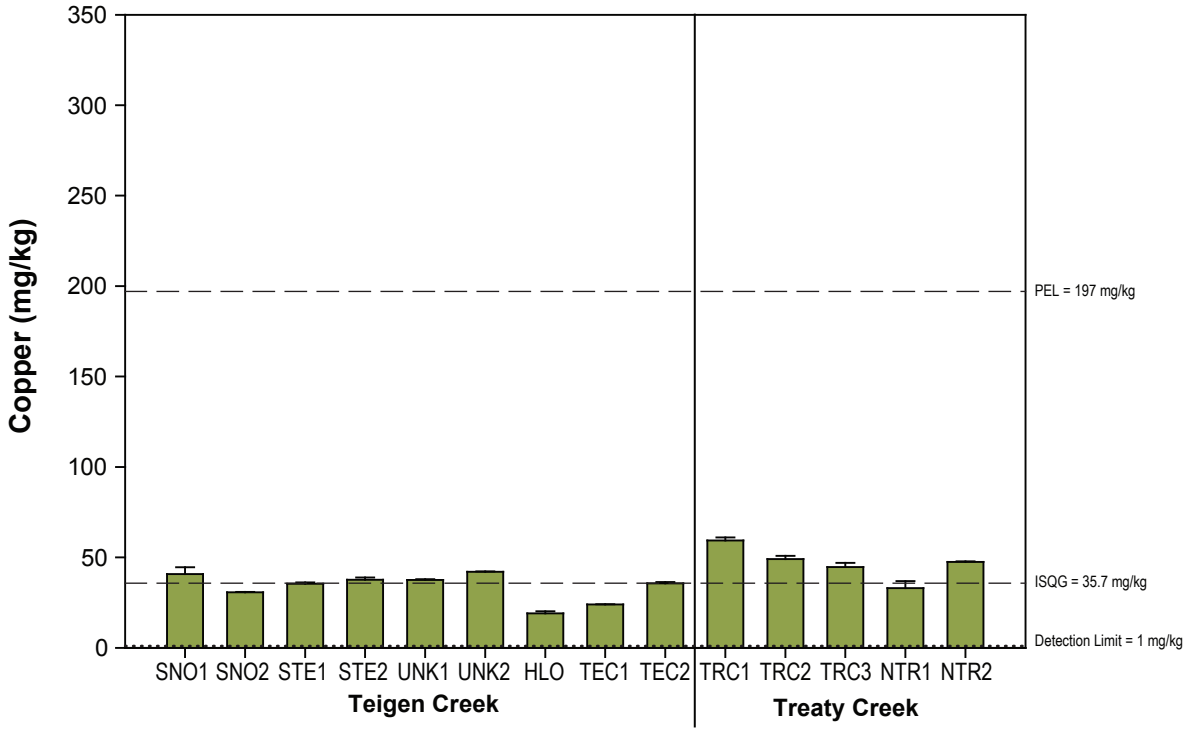
Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes CCME and/or BC guideline values, where available

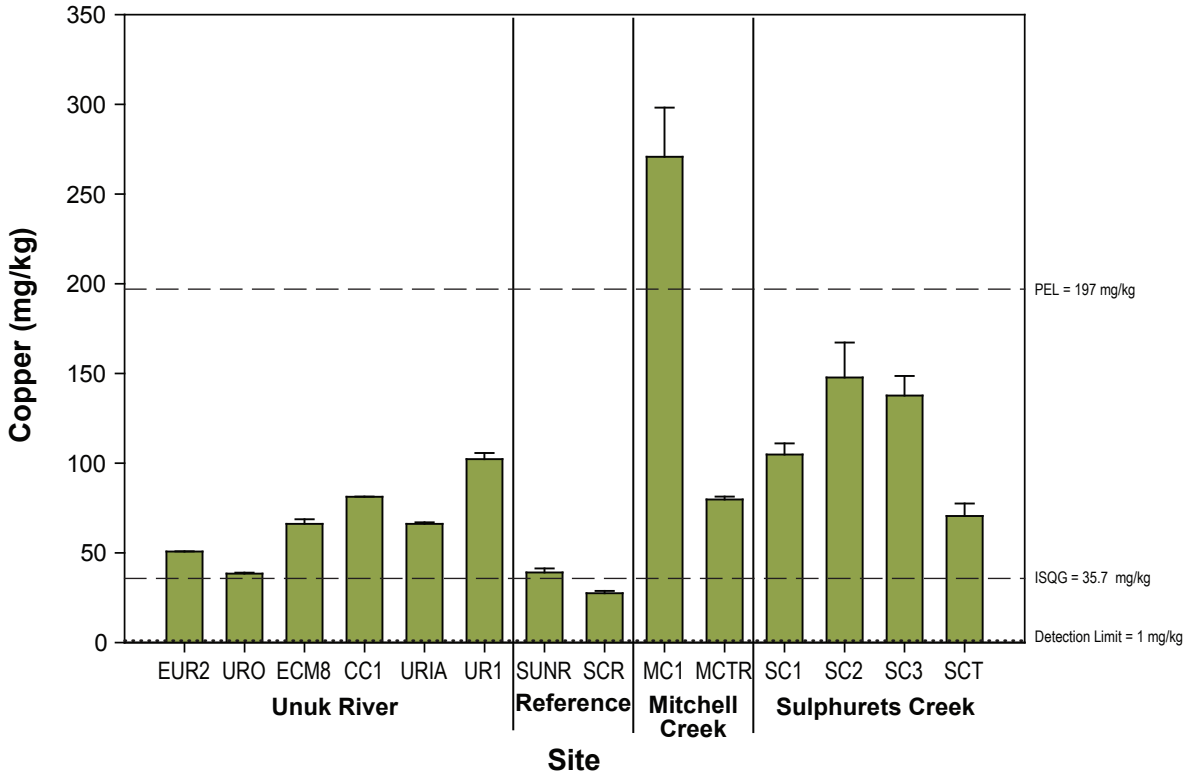
Chromium Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-9

SEABRIDGE GOLD

Rescan™





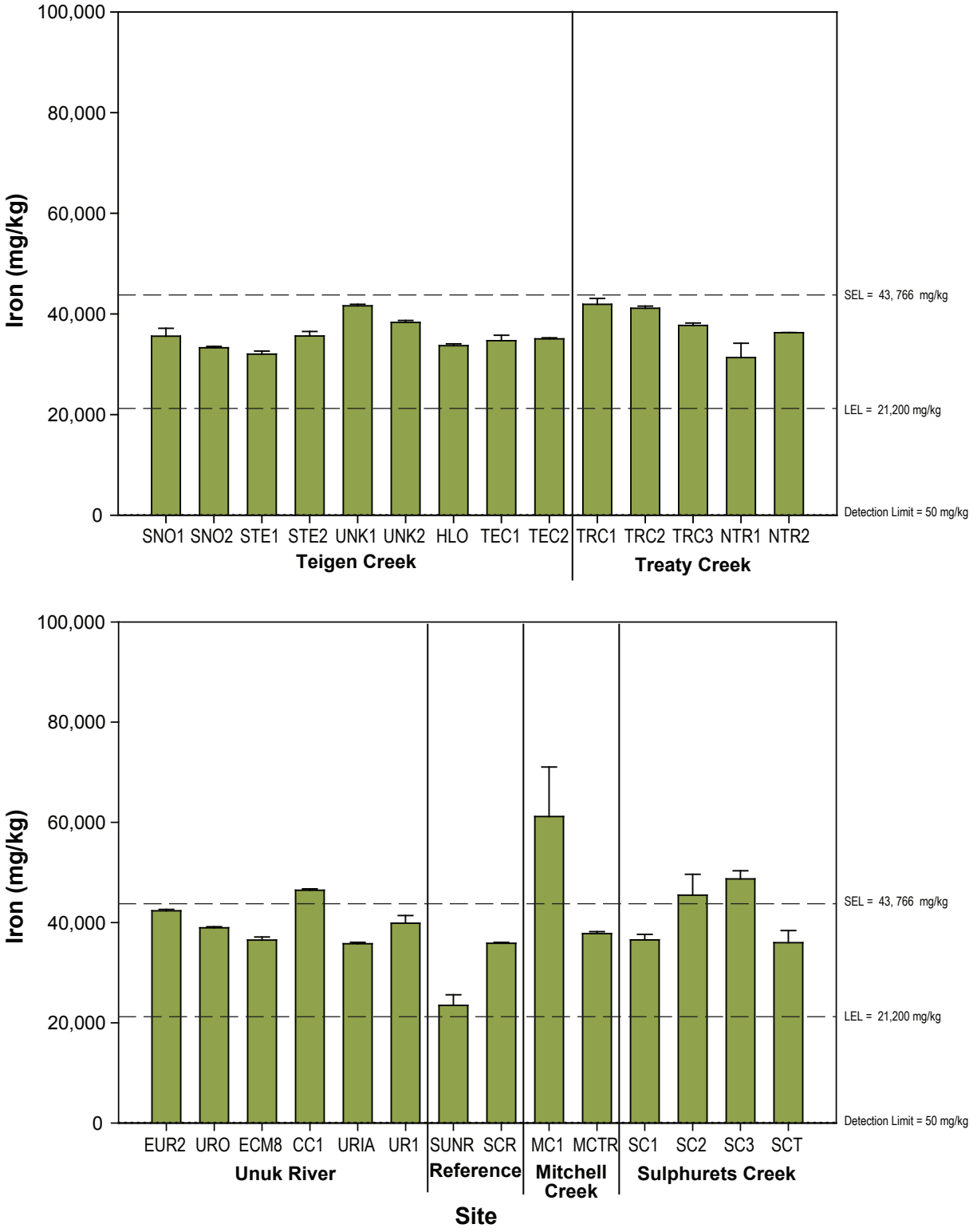
Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes CCME and/or BC guideline values, where available

Copper Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-10

SEABRIDGE GOLD

Rescan™



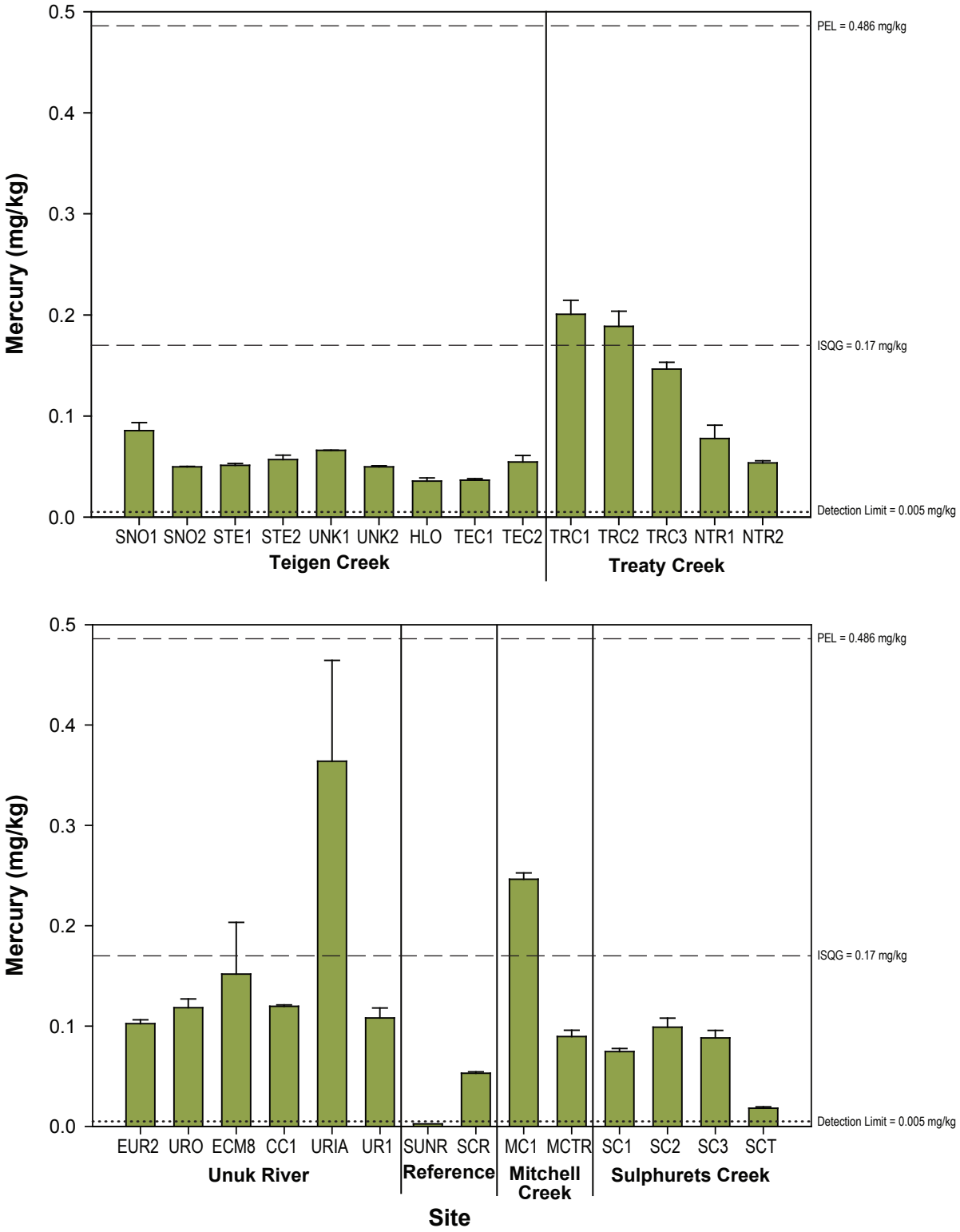
Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes CCME and/or BC guideline values, where available

Iron Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-11

SEABRIDGE GOLD

Rescan™



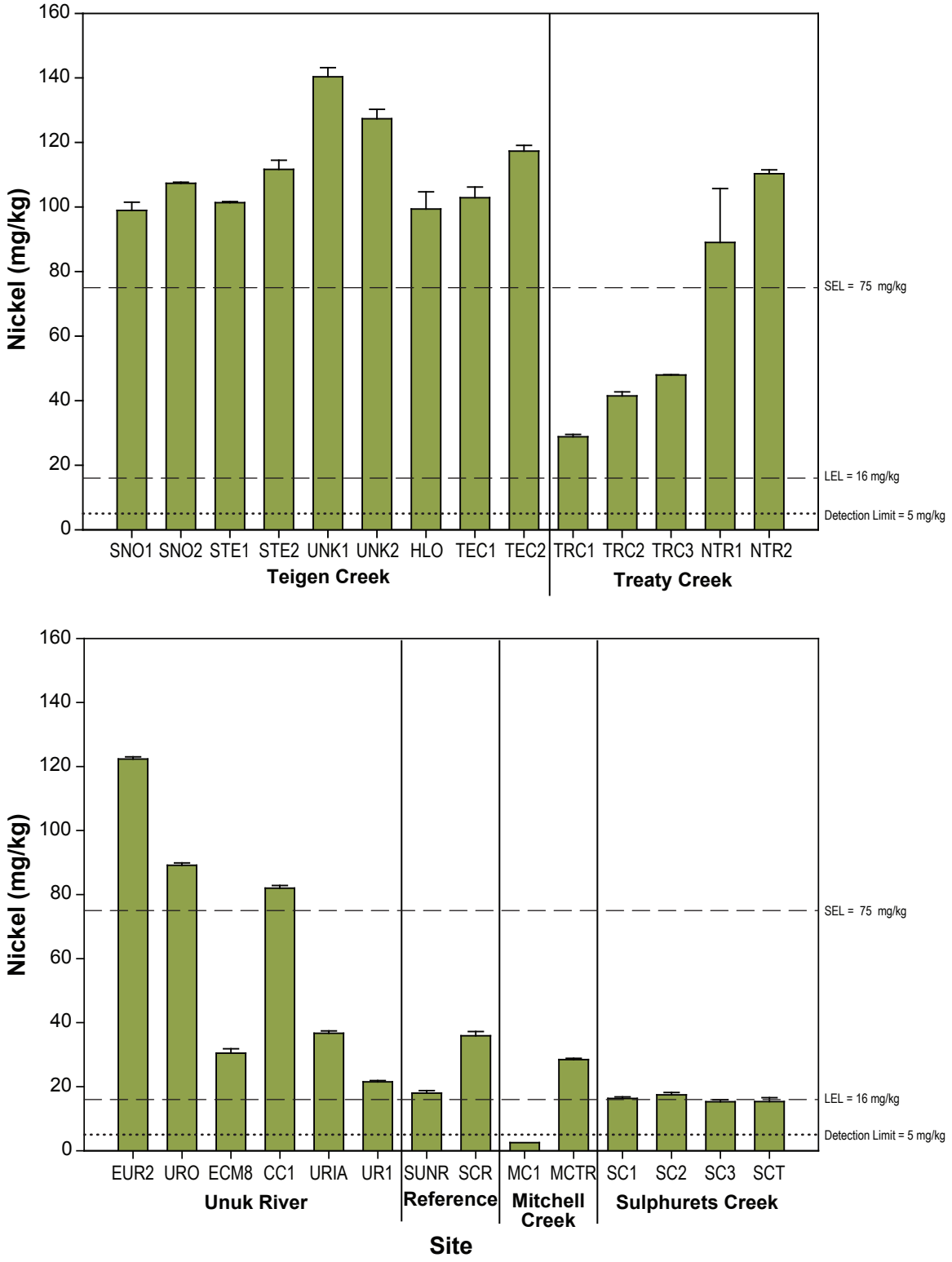
Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes CCME and/or BC guideline values, where available

Mercury Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-12

SEABRIDGE GOLD

Rescan™



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes CCME and/or BC guideline values, where available

Nickel Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-13

SEABRIDGE GOLD

Rescan™

Average zinc concentrations ranged between 90 to 150 mg/kg at all sites except CC1 (765 mg/kg), with levels five times higher than other sites and which exceeded the PEL of 315 mg/kg (Figure 9.2-14). Nine of the sites exceeded the ISQG of 123 mg/kg.

Polycyclic Aromatic Hydrocarbons (PAHs)

All PAHs analyzed at SC2 and TEC2 were below the analytical detection limit and are not further discussed (Appendix 9.2.5B).

9.2.5.2 Primary Producers – Periphyton

All chlorophyll *a* biomass data and algal taxonomic data are presented in Appendices 9.2.5C and 9.2.5D, respectively.

Biomass and Density

Periphyton biomass was measured as chlorophyll *a* in the KSM Project streams under baseline conditions. Biomass was typically low. The average periphyton biomass was 0.38 *u*g/cm^2 (Figure 9.2-15). Biomass ranged from 0.0008 *u*g/cm^2 (CC1) to 2.01 *u*g/cm^2 (STE1), and was higher at North Treaty Creek and some Treaty Creek sites. The lowest levels were measured in the Mitchell and Sulphurets Creek watersheds.

Periphyton density was quite variable among stream sites, ranging from being very low (1,037 cells/cm^2, MC1) to being quite dense with 50,607,800 cells/cm^2 at TEC2 (Figure 9.2-16). Density at most sites ranged between 100,000 cells/cm^2 to 5,000,000 cells/cm^2. HLO and UNK2 were two sites that had much higher densities.

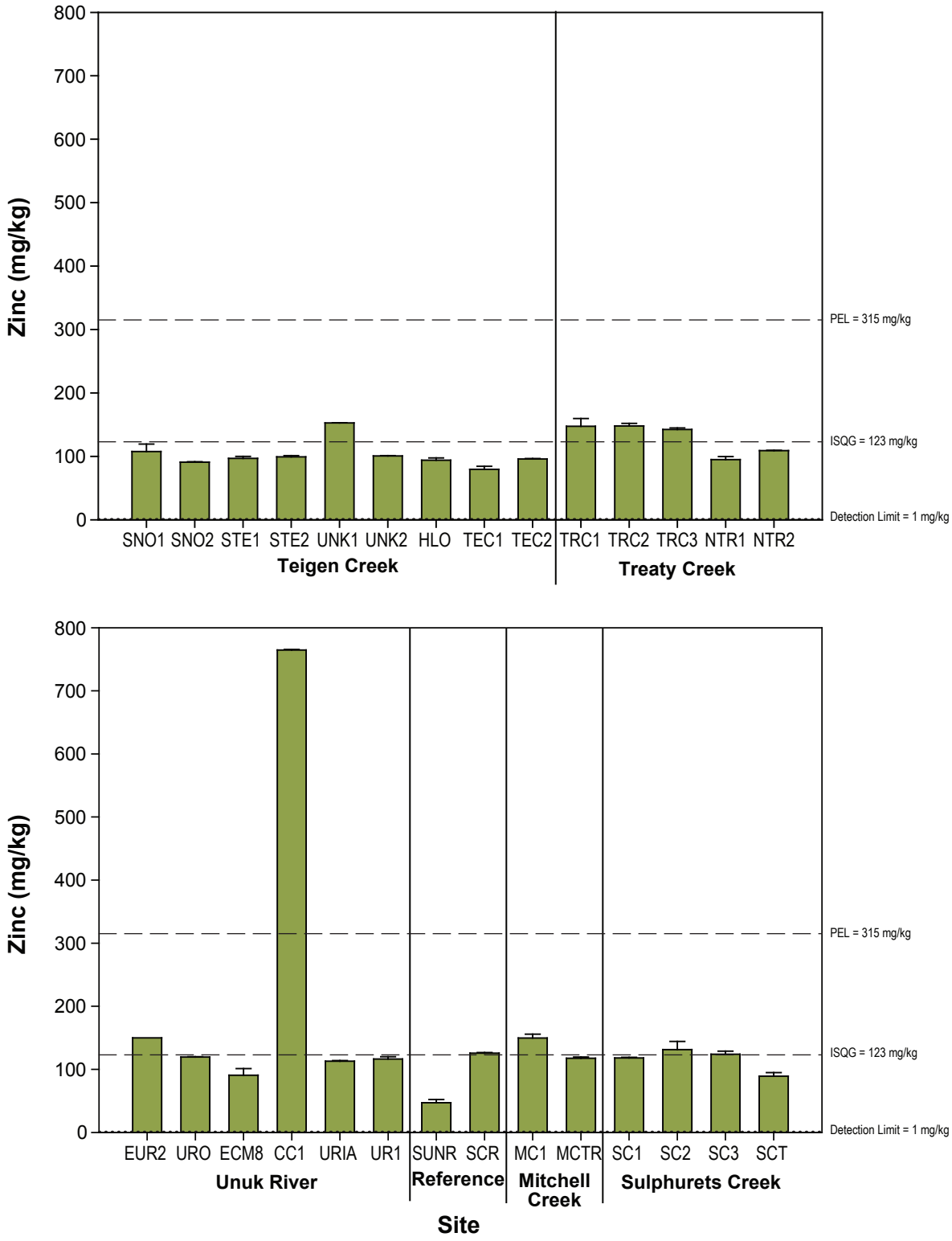
Richness and Evenness

Periphyton average species richness ranged from 1 (UR1) to 22 (NTR1) and was quite variable (Figure 9.2-17). Species richness generally ranged from 8 to 15 species per site, with some sites in Treaty Creek , Unuk River and most sites at Mitchell Creek and Sulphurets Creek watersheds had lower values.

Species evenness was high (≥ 0.70; species present in equal numbers) at most stream sites in the KSM Project Study Area (Figure 9.2-18). Evenness ranged from 0.26 (UNK2) to 0.92 (SCT), with an average evenness of 0.70. With the exception of SCT, evenness at sites in the Mitchell and Sulphurets Creek watersheds was slightly lower than the average, ranging from 0.56 (MC1) to 0.69 (SC3). Site SCT had very high evenness (0.92), related to it having low richness with equal distributions of only three species.

Community Composition

The predominant periphyton group in KSM Project streams was diatoms (Figure 9.2-19(a) to (d)) with one exception; site UNK2 had an algal community dominated by green algae (Chlorophyta), with lesser representation by diatoms. The periphyton community at most sites was made up entirely of diatoms. SNO1, SNO2, STE1, NTR1 and MCTR had low numbers of Chlorophyta, Cryptophyta, Cyanophyta and Euglenoida.



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes CCME and/or BC guideline values, where available

Zinc Concentrations in KSM Project Study Area Stream Sediments, 2008

FIGURE 9.2-14

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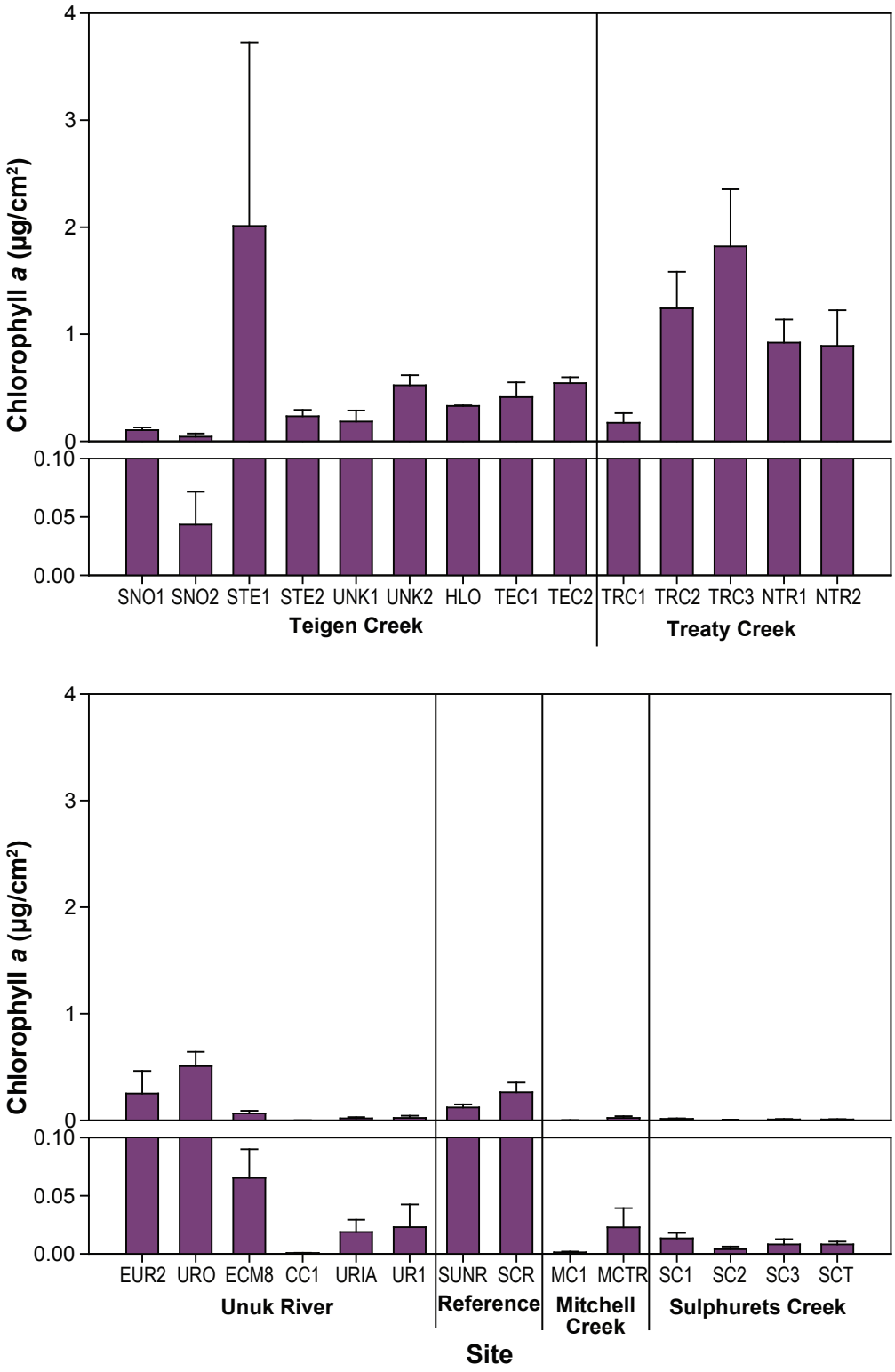


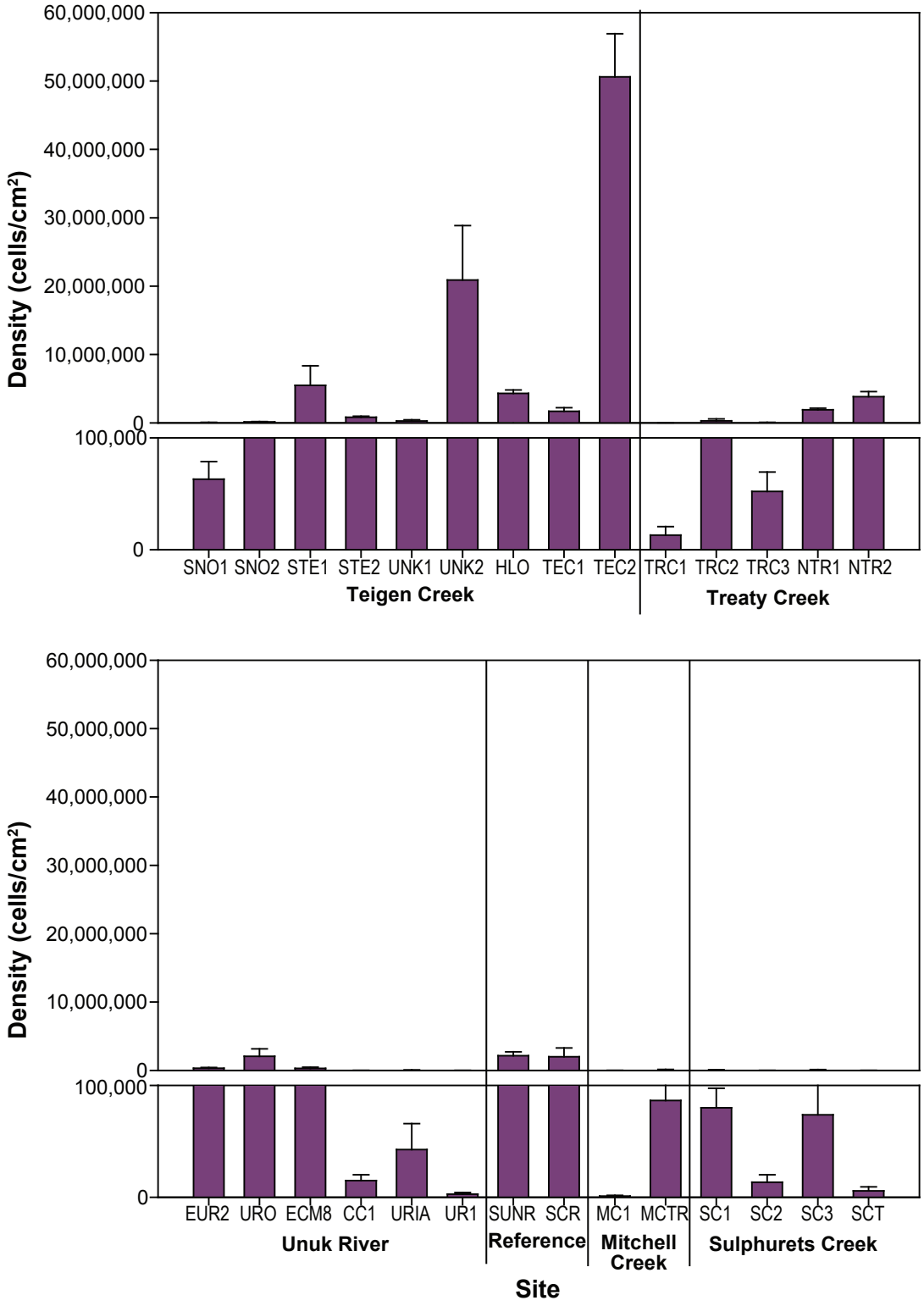
Note: Error bars represent standard error of the mean

Periphyton Biomass as Chlorophyll *a* in KSM Project Study Area Streams, 2008

FIGURE 9.2-15

SEABRIDGE GOLD

Rescan™



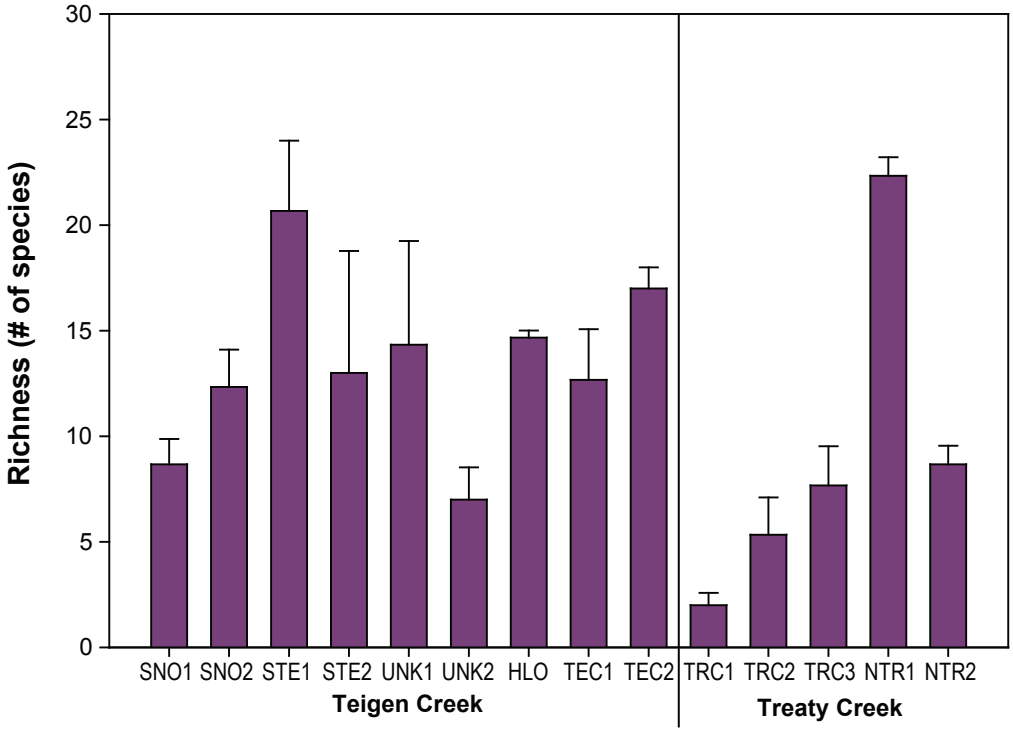
Note: Error bars represent standard error of the mean

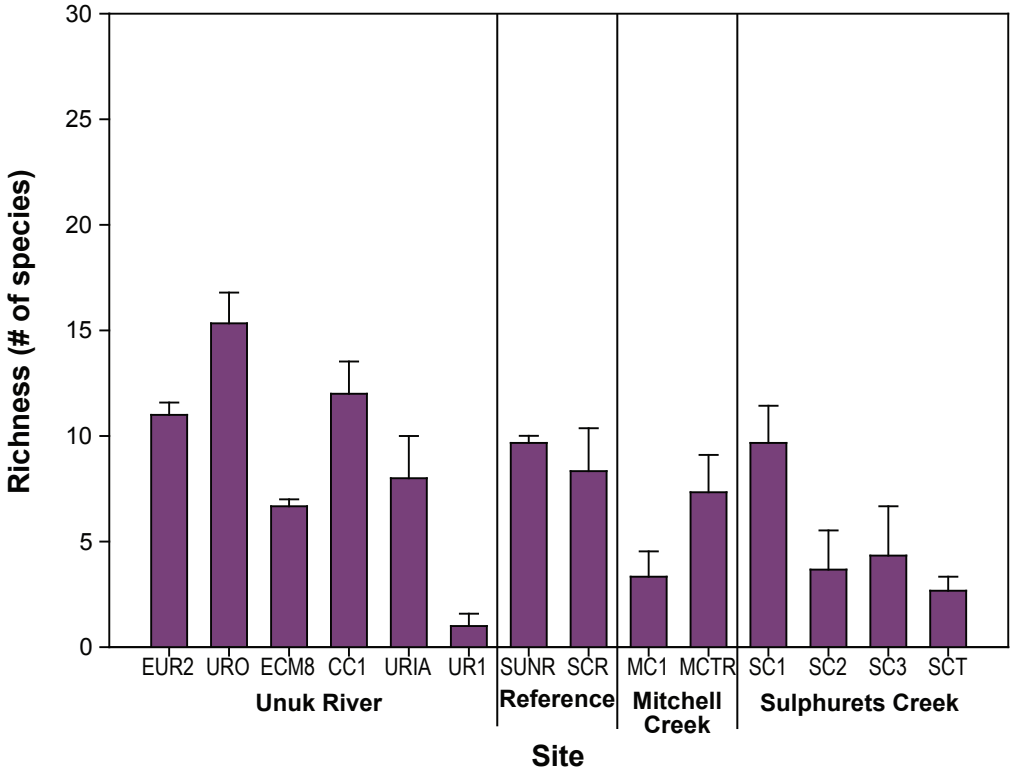
Periphyton Density for KSM Project Study Area Streams, 2008

FIGURE 9.2-16

SEABRIDGE GOLD

Rescan™





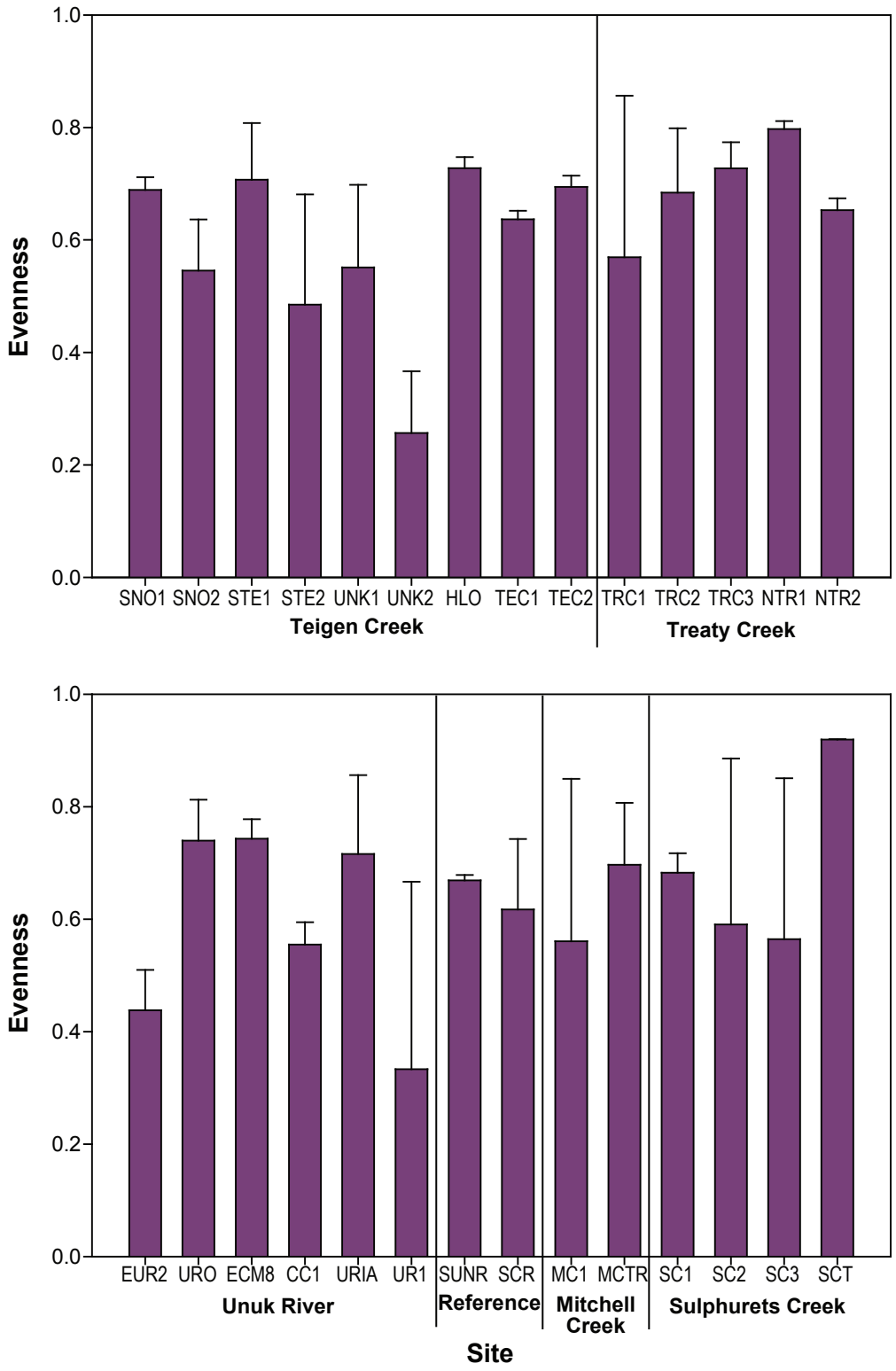
Note: Error bars represent standard error of the mean

Periphyton Species Richness for KSM Project Study Area Streams, 2008

FIGURE 9.2-17

SEABRIDGE GOLD

Rescan™



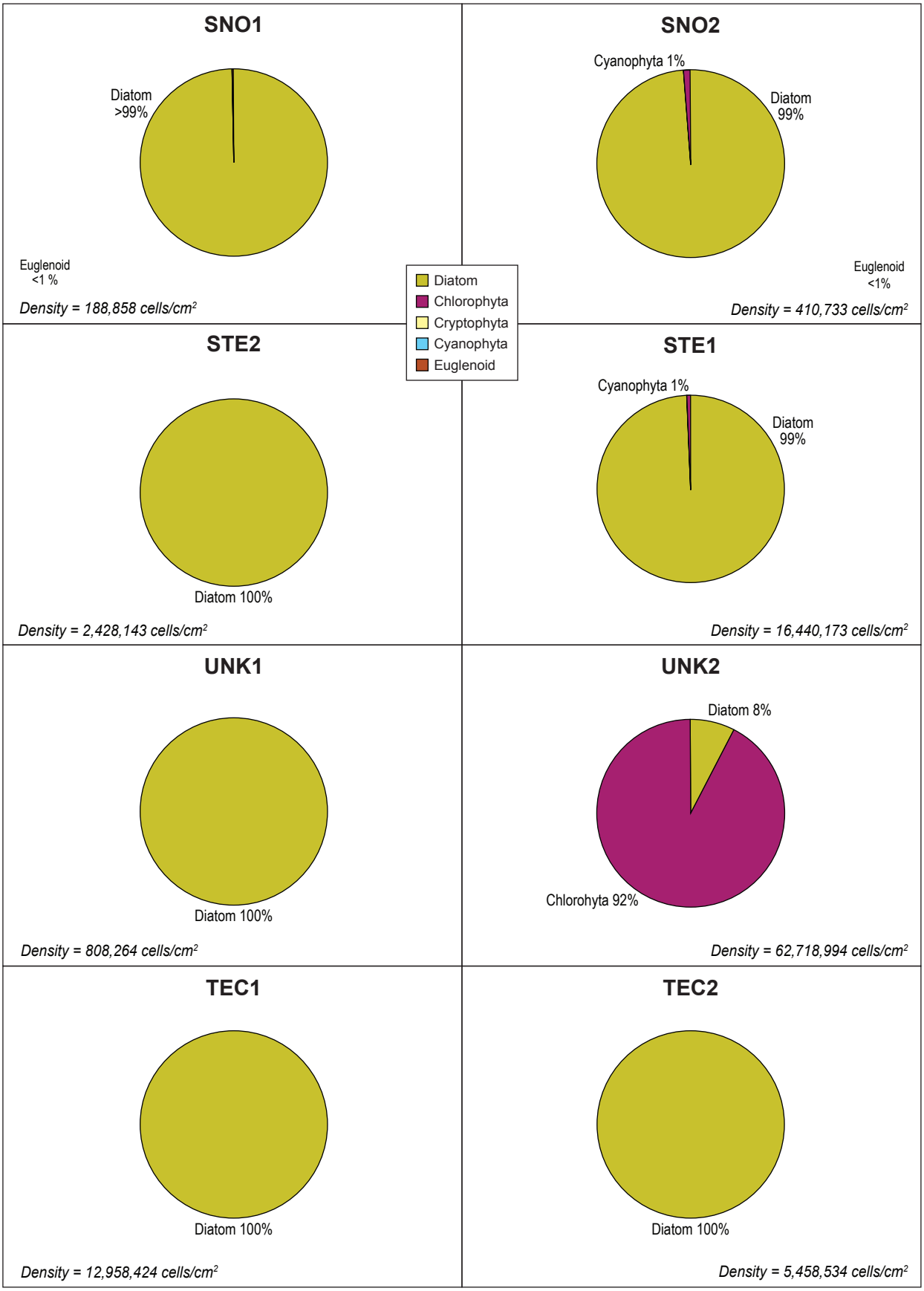
Note: Error bars represent standard error of the mean

Periphyton Species Evenness for KSM Project Study Area Streams, 2008

FIGURE 9.2-18

SEABRIDGE GOLD

Rescan™

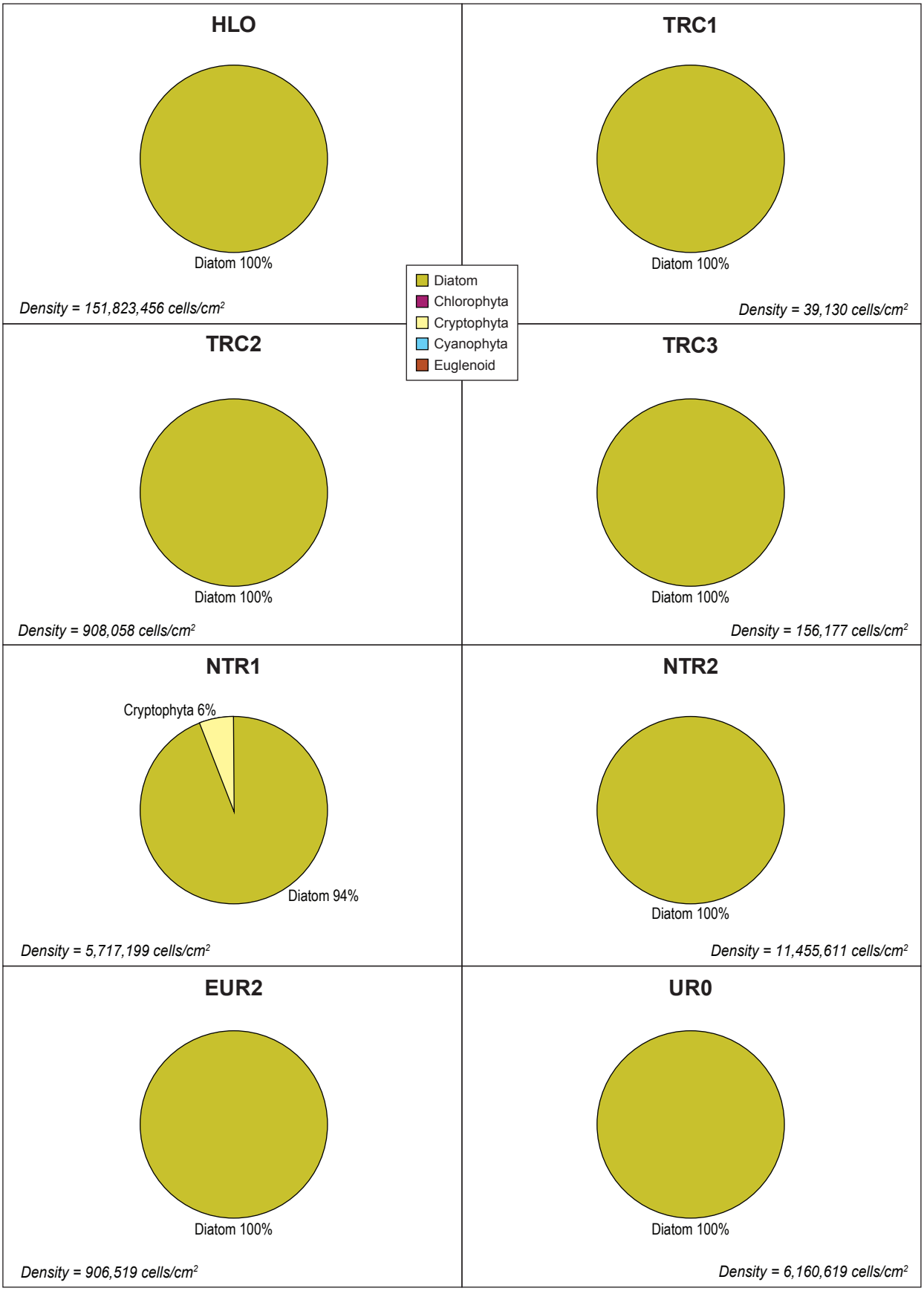


Relative Density of Periphyton in KSM Project Study Area Streams, 2008

FIGURE 9.2-19a

SEABRIDGE GOLD

Rescan™

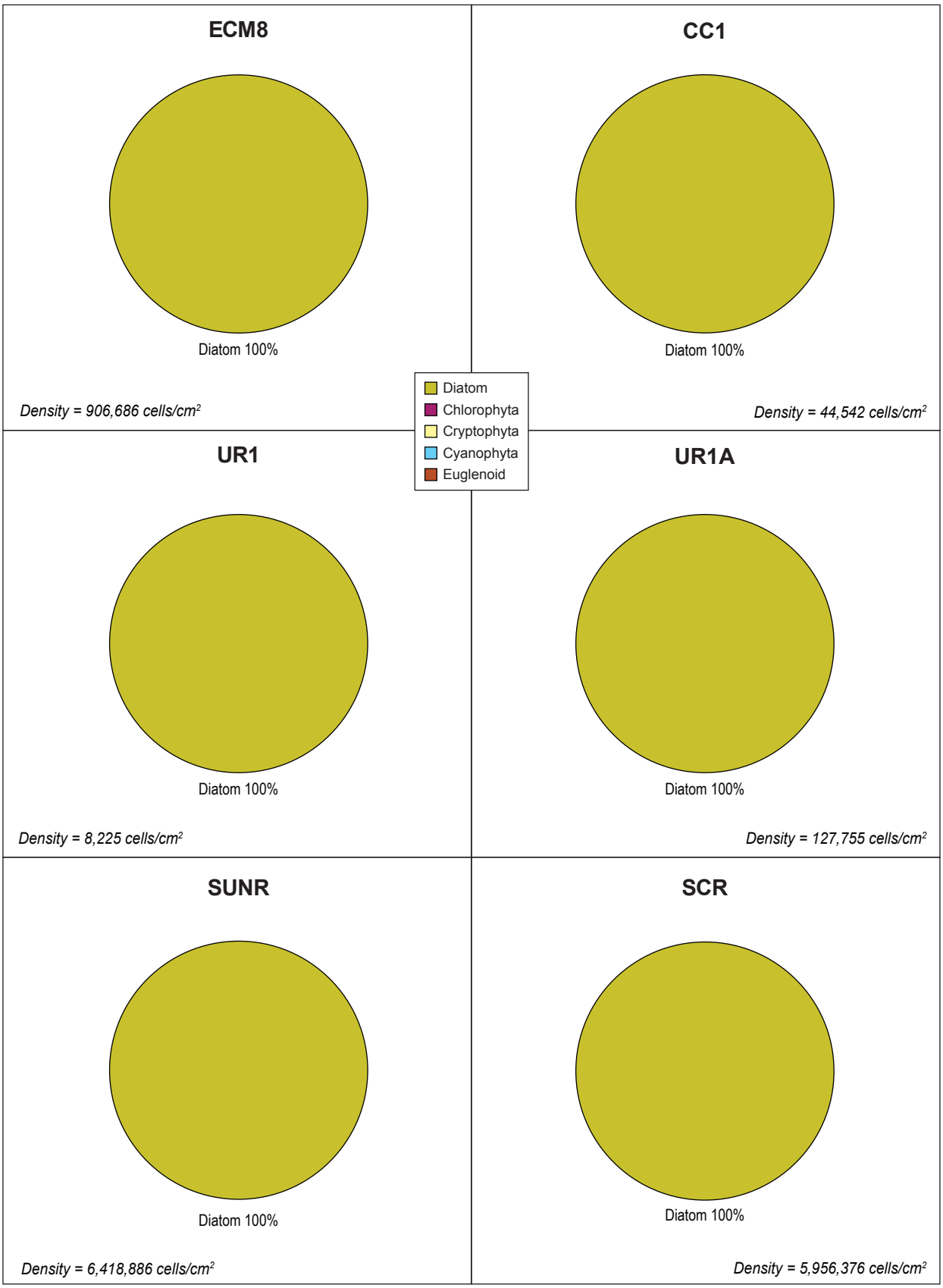


Relative Density of Periphyton in KSM Project Study Area Streams, 2008

FIGURE 9.2-19b

SEABRIDGE GOLD

Rescan™

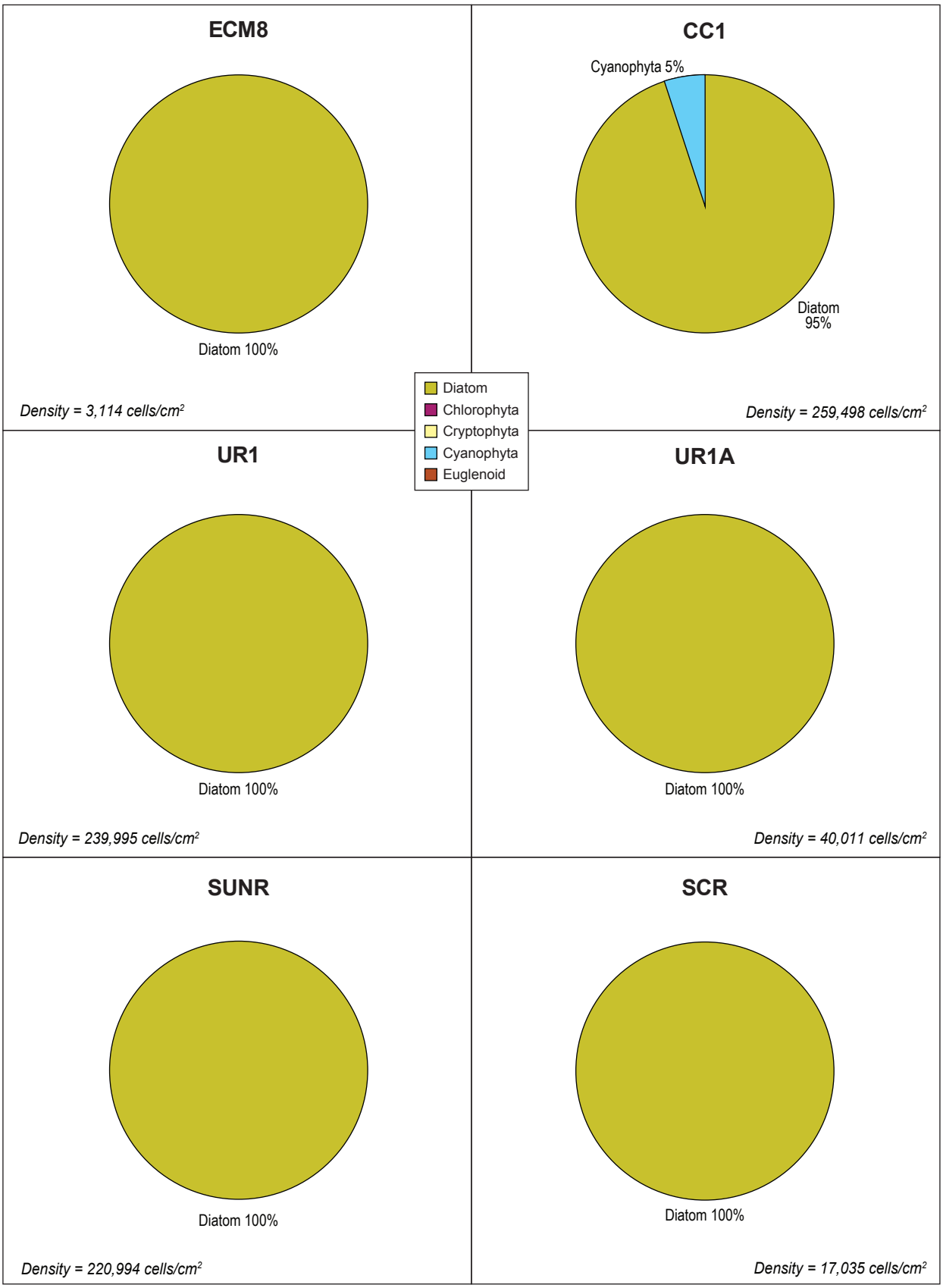


Relative Density of Periphyton in KSM Project Study Area Streams, 2008

FIGURE 9.2-19c

SEABRIDGE GOLD

Rescan™



Relative Density of Periphyton in KSM Project Study Area Streams, 2008

FIGURE 9.2-19d

SEABRIDGE GOLD

Rescan™

Diversity Indices

Shannon diversity (species level) at KSM Project streams ranged from 0.23 (UR1) to 2.50 (NTR1), with an average diversity of 1.30 across all sites (Figure 9.2-20). Shannon diversity was lowest at UR1, UNK2, and TRC1, and highest at NTR1, STE1, and UR0, but fairly similar among watersheds in general.

Periphyton Simpson diversity ranged from 0.17 (UR1) to 0.88 (NTR1), with values closer to one indicating higher diversity (Figure 9.2-21). Average diversity across all sites was 0.60, indicating moderate diversity. The pattern for Simpson Diversity values matched that seen with Shannon Diversity, corresponding to high level of evenness measured at the sites and indicating that rare species were not a characteristic of the periphyton communities in KSM.

Bray-Curtis Similarities

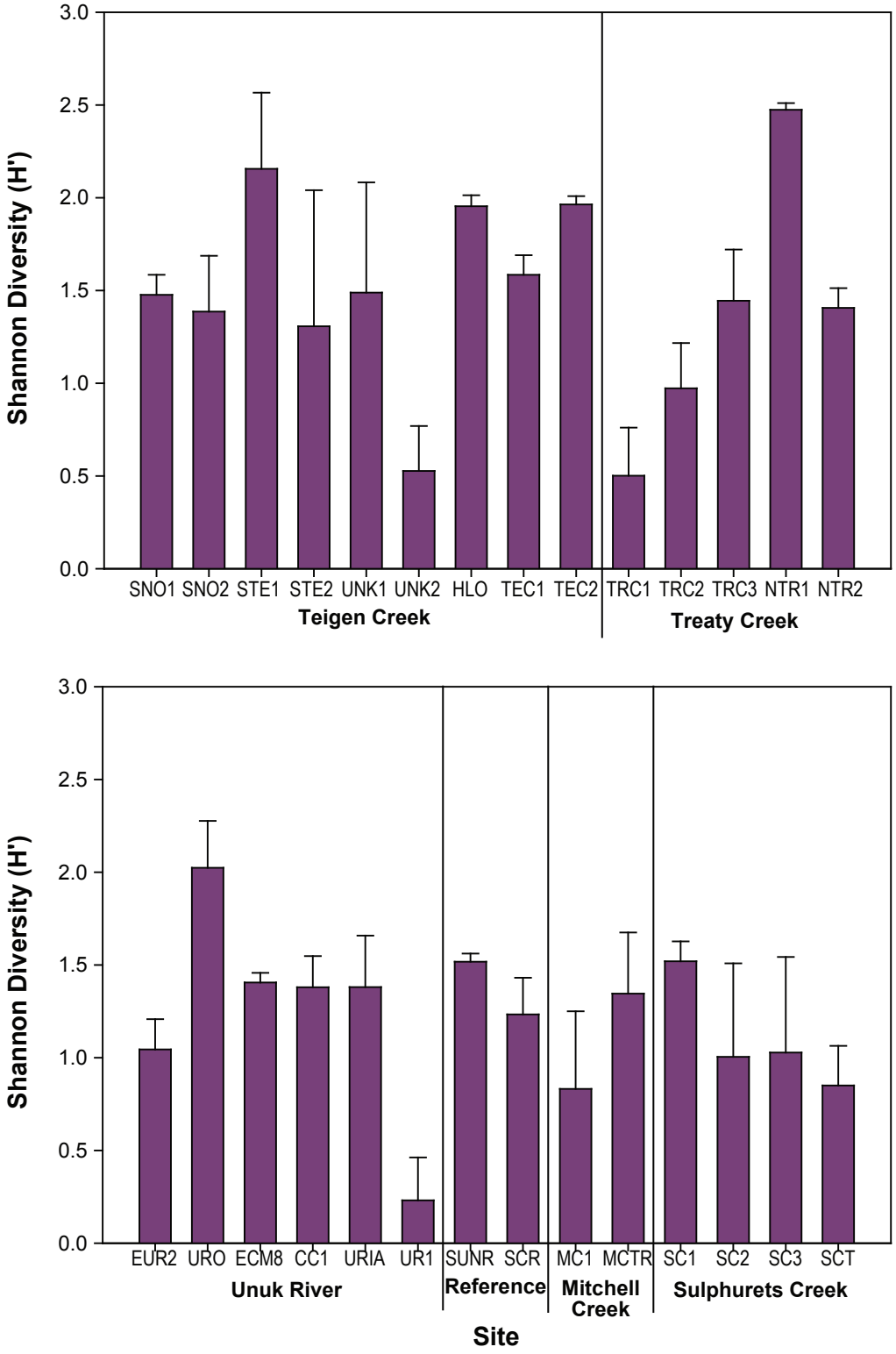
The Bray-Curtis similarity coefficient is used to determine similarity in biological community structure based on the type and relative abundance of organisms present. The coefficient ranges from 0 to 100%, with 0% being least similar, and 100% being most similar. A similarity matrix of the stream sites was generated (Appendix 9.2.5E). Benthic invertebrate communities of each stream were compared individually to both reference sites (SCR and SUNR). This was done to then determine percent similarity (Environment Canada 2003). Figure 9.2-22 and Figure 9.2-23 illustrate these comparisons along with the mean percent similarity across all sites to each reference site median. As expected, both SCR and SUNR are similar to their own median percent similarity. Similarity to the median SCR reference stream ranged from 1 % (MC1) to 68% (SCR) with an average similarity of 28% for all sites (Figure 9.2-31). TEC1, TEC2, ECM8, URO and SUNR were most similar to SCR. Sites in the Mitchell and Sulphurets Creek watersheds were least similar. UR1 and TRC1 were also not very similar to the median SCR. Similarity to the median SUNR reference stream ranged from 1% (MC1) to 83% (SUNR) (Figure 9.2-32). The average similarity was 29%. Sites in the Mitchell and Sulphurets Creek watersheds were least similar, as were UR1 and TRC1. These analyses indicate that a different periphyton community than that found at the reference sites characterized sites in the Mitchell and Sulphurets watershed.

9.2.5.3 Secondary Producers – Benthic Invertebrates

Benthic invertebrate stream communities were sampled using two different methods at select sites in the KSM Project streams. At seven sites (STE2, UNK2, NTR2, EUR2, MC1, SUNR and SCR), benthic invertebrate samples were collected using a Hess sampler and were also sampled using the kick-net method by BC Ministry of Environment staff. The two methods differ not only in terms of type of quantified sample (Hess is by surface area while kick nets are by set time sampling), but also in because the two sets of samples were sent to different taxonomic labs for identification and enumeration.

In addition, either three or five composite replicate Hess samples were collected at each site; key monitoring sites were more intensively sampled. The differences between replicate numbers are addressed in the QA/QC section.

Data for all Hess samples and kick net samples are presented in Appendices 9.2.5F and 9.2.5G, respectively.



Note: Error bars represent standard error of the mean

Periphyton Shannon Diversity Indices for KSM Project Study Area Streams, 2008

FIGURE 9.2-20

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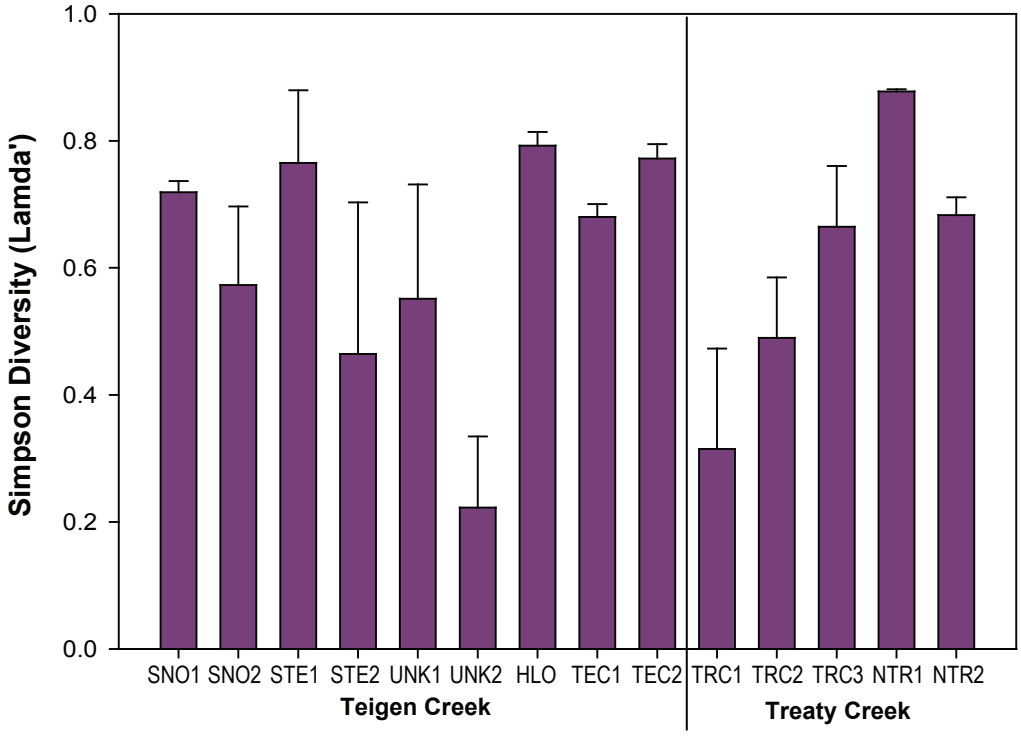

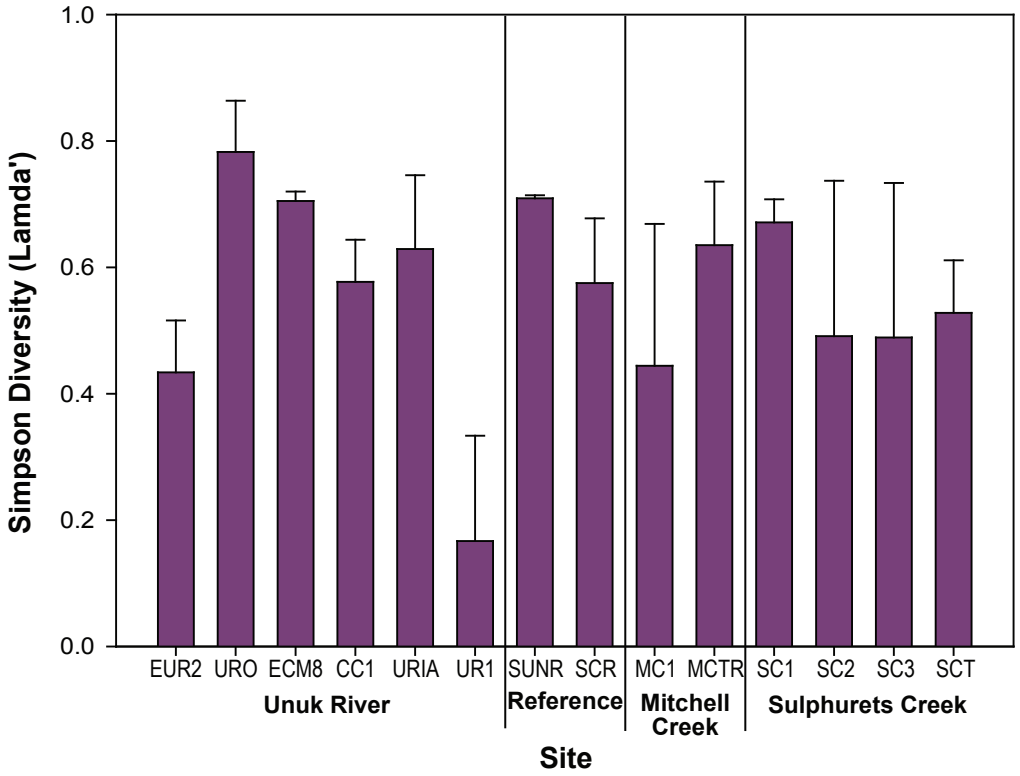

Note: Error bars represent standard error of the mean

Periphyton Simpson Diversity Indices for KSM Project Study Area Streams, 2008

FIGURE 9.2-21

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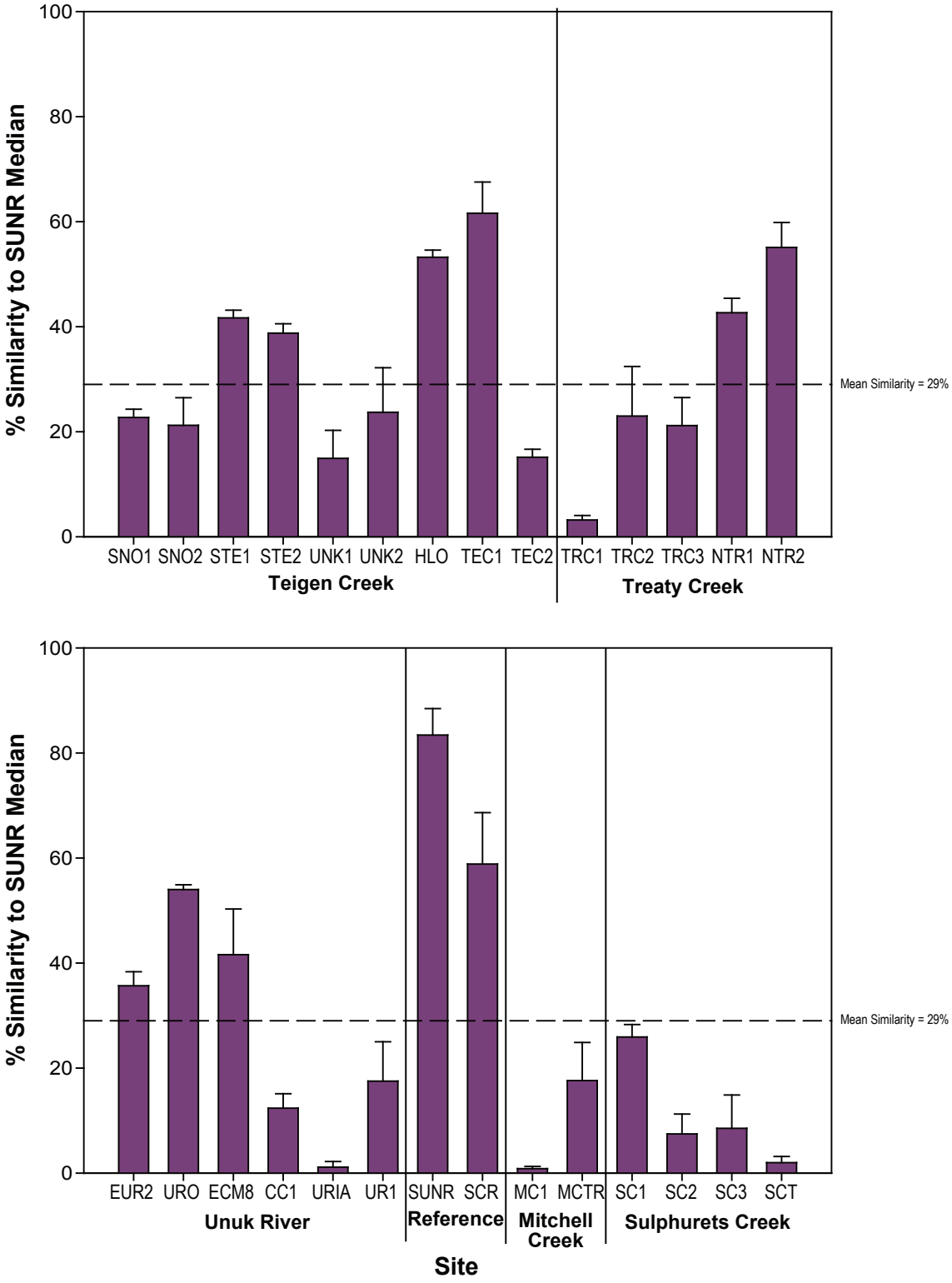

Note: Error bars represent standard error of the mean
Dashed line denotes mean similarity for all sites

Bray-Curtis Similarity Index Comparison for Periphyton in KSM Project Study Area Streams, 2008

FIGURE 9.2-22

SEABRIDGE GOLD

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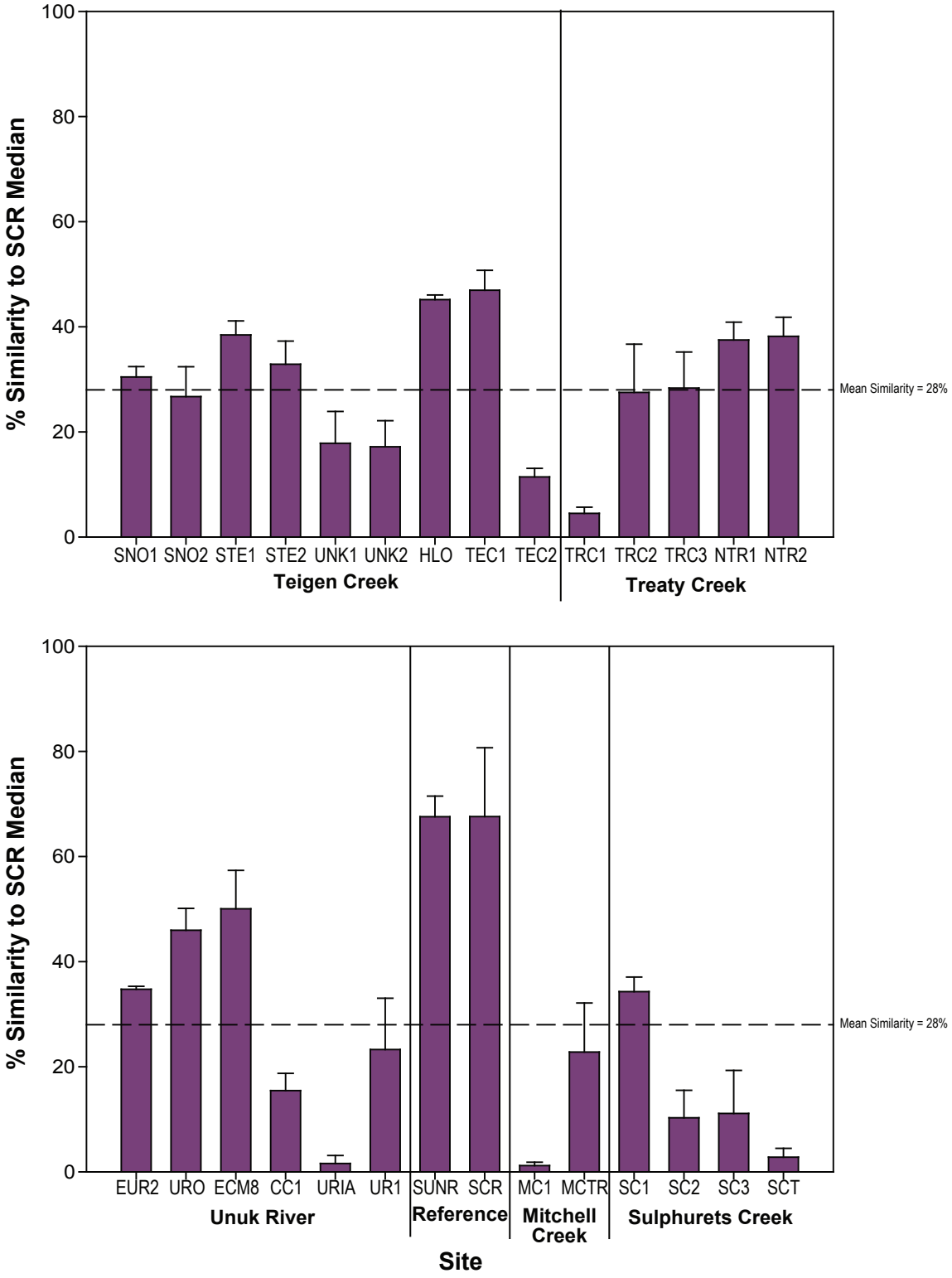

Note: Error bars represent standard error of the mean
Dashed line denotes mean similarity for all sites

Bray-Curtis Similarity Index Comparison for Periphyton in KSM Project Study Area Streams, 2008

FIGURE 9.2-23

SEABRIDGE GOLD

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Density

Benthic invertebrate densities ranged from 0.8 organisms/m^2 (MC1) to 3,373 organisms/m^2 (NTR1) for the samples collected using the Hess sampler (Figure 9.2-24). The majority of the sites had densities in the range of 200 to 400 organisms/m^2. Densities were generally higher in Teigen Creek and North Treaty Creek Tributary, and lowest in Mitchell, Sulphurets and Treaty creeks and in some Unuk River sites.

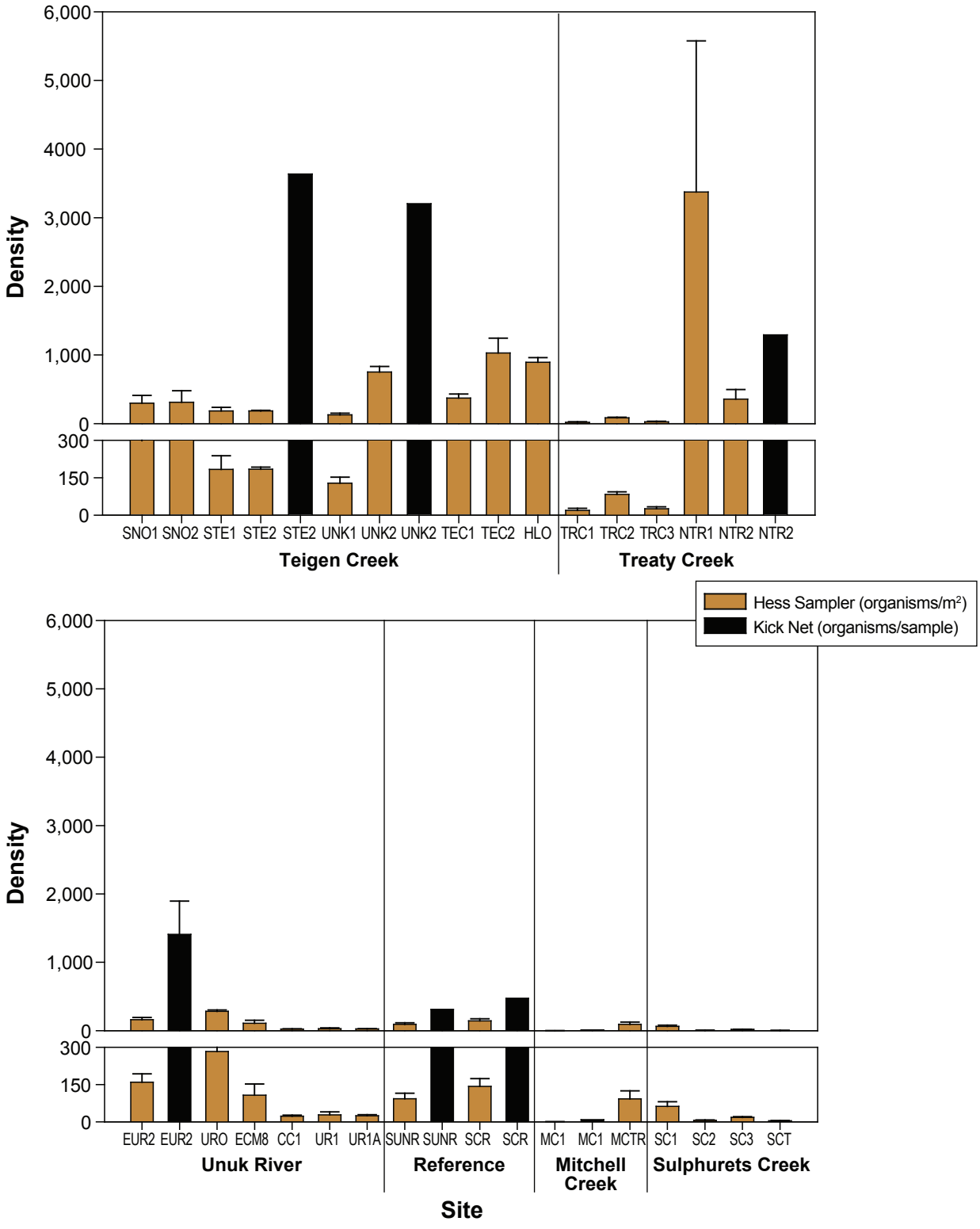
As the kick-net method is based on a measure of time (3 minutes sampling) rather than a measure of area, the density numbers reported are the total number observed/sample and can not be compared to the Hess sample data. However, relative density among kick net samples at different sites can be examined, and compared to relative density of Hess samples among sites. Kick-net density was greatest STE2 and UNK2, intermediate at NTR2 and EUR2 and lowest at MC1. There was some similarity in pattern of density among the two methods: site MC1 was consistently extremely low in density, reference sites and EUR2 were intermediate, and UNK2 consistently had the highest density.

Richness and Evenness

Average genus richness ranged from 0.8 genus/site (MC1) to 27 genera/ site (NTR2). The lowest genus richness values occurred in the Mitchell and Sulphurets Creek watersheds, though richness was low (<10) at TRC1, CC1, UR1 and UR1A as well. Richness data collected using the two different sample methods showed some similarity in trends. As seen with density, lowest richness based on both sampling methods was observed at MC1, with intermediate richness at SUNR and higher richness at EUR2 and STE2. Comparison of the two methods at each site indicated similar richness values, with slightly higher values for kick samples compared to Hess samples at each site (Figure 9.2-25).

A similar pattern was seen with EPT richness compared to overall benthos richness (Figure 9.2-26). In the Mitchell and Sulphurets Creek watersheds, richness ranged from 0 to 2.8 while in the Teigen Creek and Treaty Creek watersheds EPT genus richness was generally around 9. In the Unuk River watershed the maximum EPT richness value (14.5) was measured at EUR2 using the kick-net method. Other sites in the Unuk River watershed had relatively low richness values (1.3 at CC1). Richness values tended to be slightly greater with the kick-net method.

Evenness, which ranges from 0 to 1 with 1 representing complete evenness, measures how evenly abundance is distributed across the genera within a community. For streams in the KSM Project Study Area, evenness ranged from 0.31 (UNK2, kick-net) to 1 (MC1), though average evenness was fairly high at 0.74 (Figure 9.2-27). The high evenness at MC1 is due to this site having a richness of one taxon only. Evenness values were comparable between the kick-net and Hess samples, except at UNK2 which had a much lower evenness for the kick sample compared to the Hess sample.



Note: Error bars represent standard error of the mean

Benthic Invertebrate Density at KSM Project Study Area Project Streams, 2008

FIGURE 9.2-24

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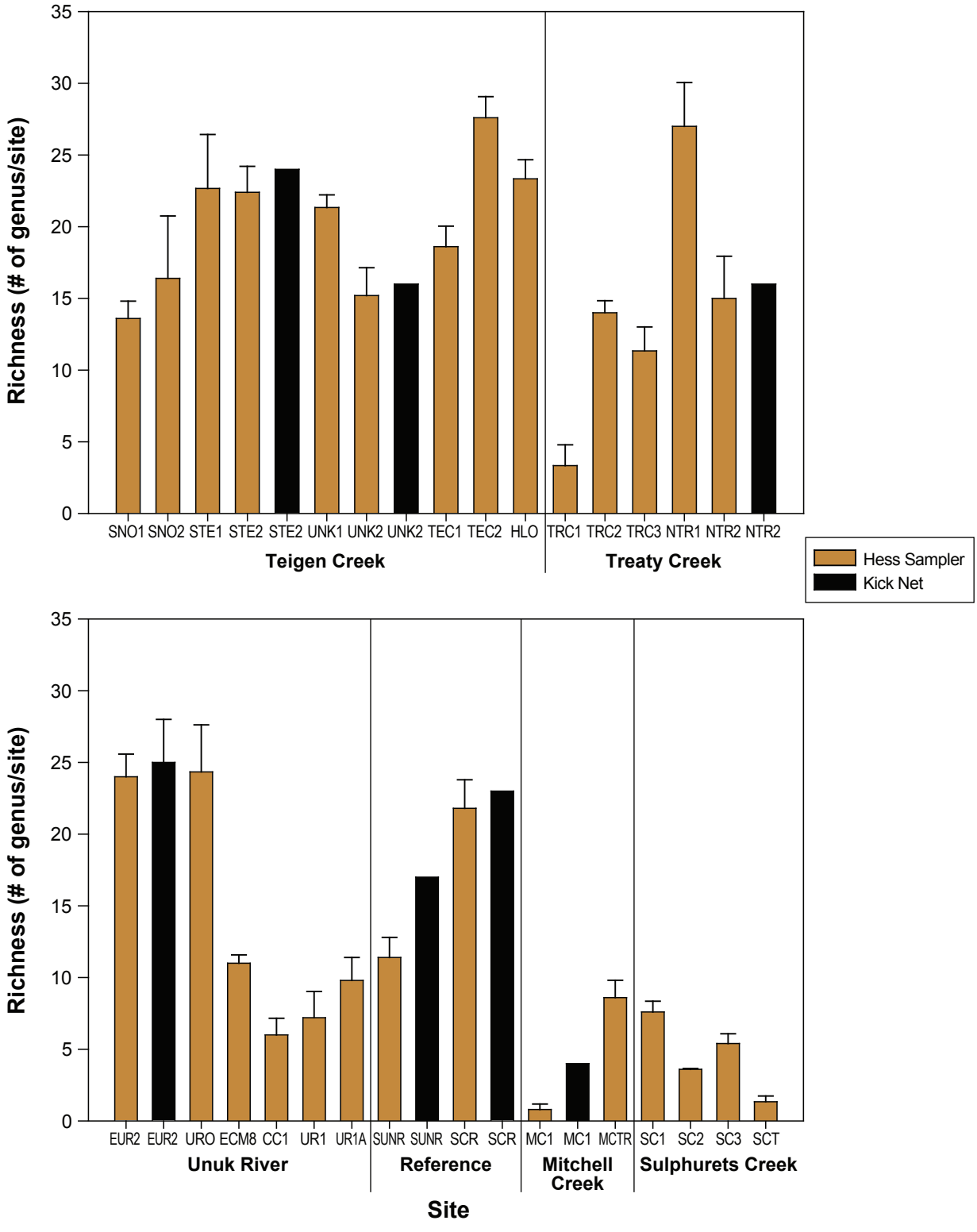

Note: Error bars represent standard error of the mean

Benthic Invertebrate Genus Richness at KSM Project Study Area Project Streams, 2008

FIGURE 9.2-25

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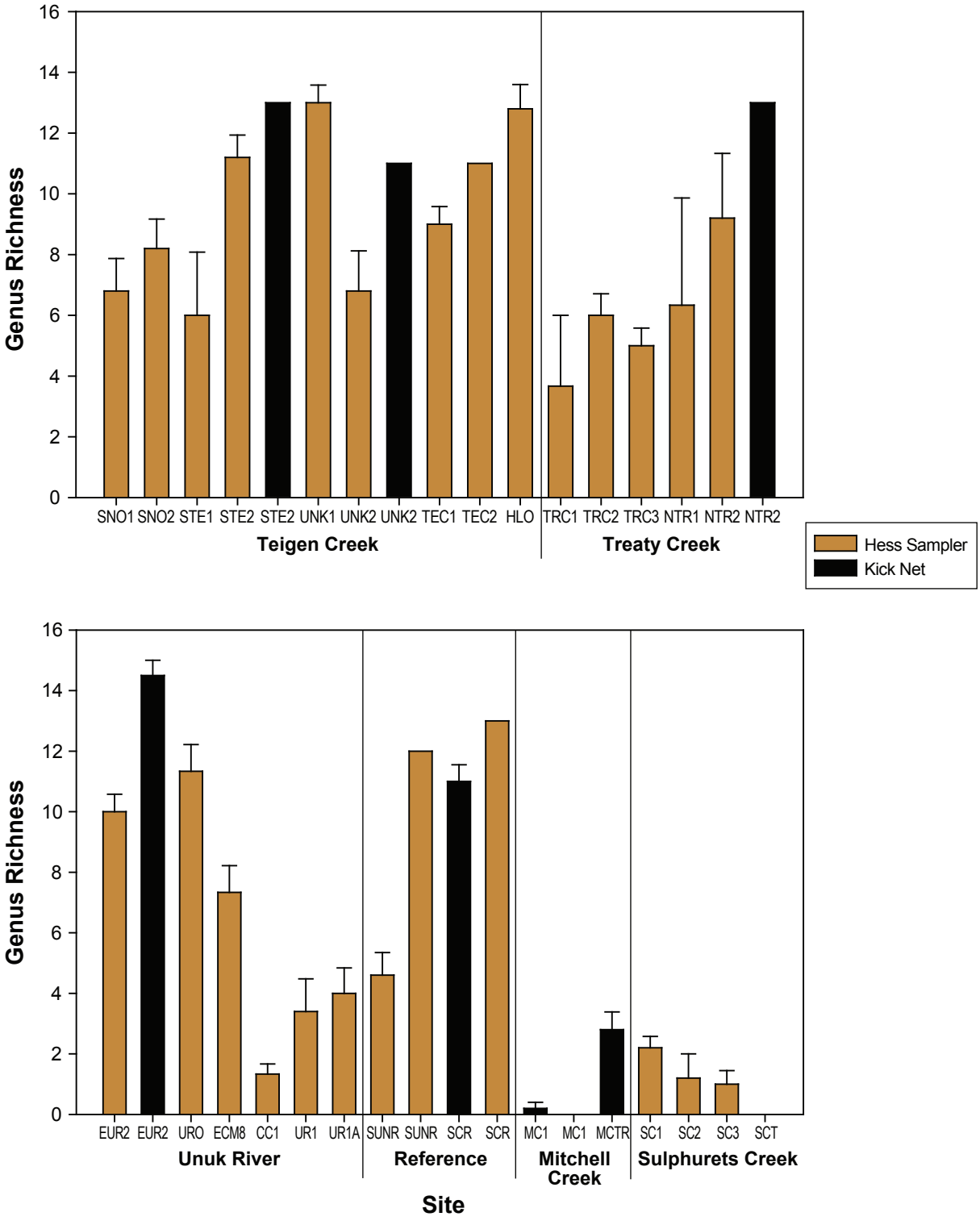

Note: Error bars represent standard error of the mean

EPT (Ephemeroptera, Plecoptera and Trichoptera) Genus Richness for KSM Project Study Area Streams, 2008

FIGURE 9.2-26

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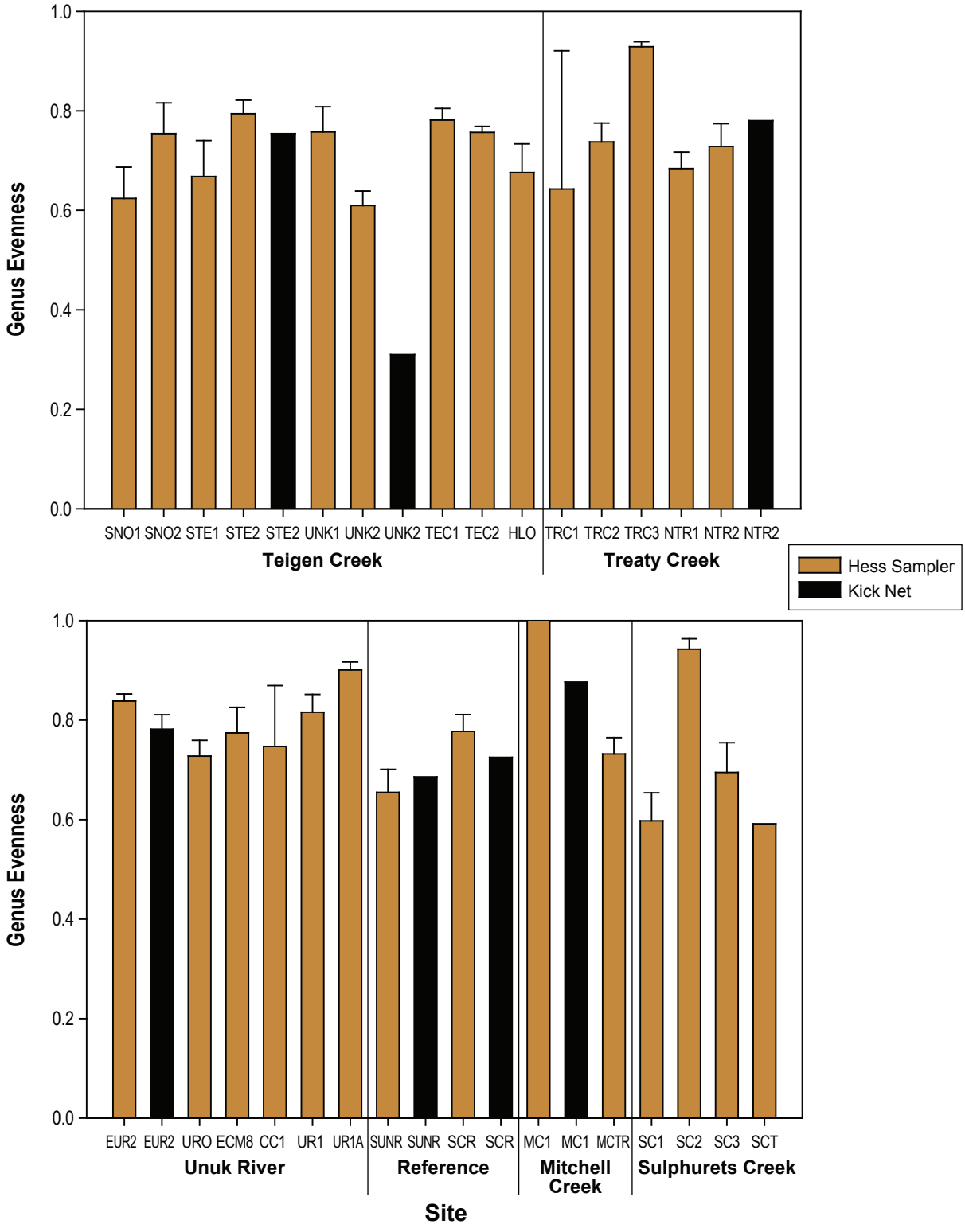

Note: Error bars represent standard error of the mean

Benthic Invertebrates Genus Evenness at KSM Project Study Area Streams, 2008

FIGURE 9.2-27

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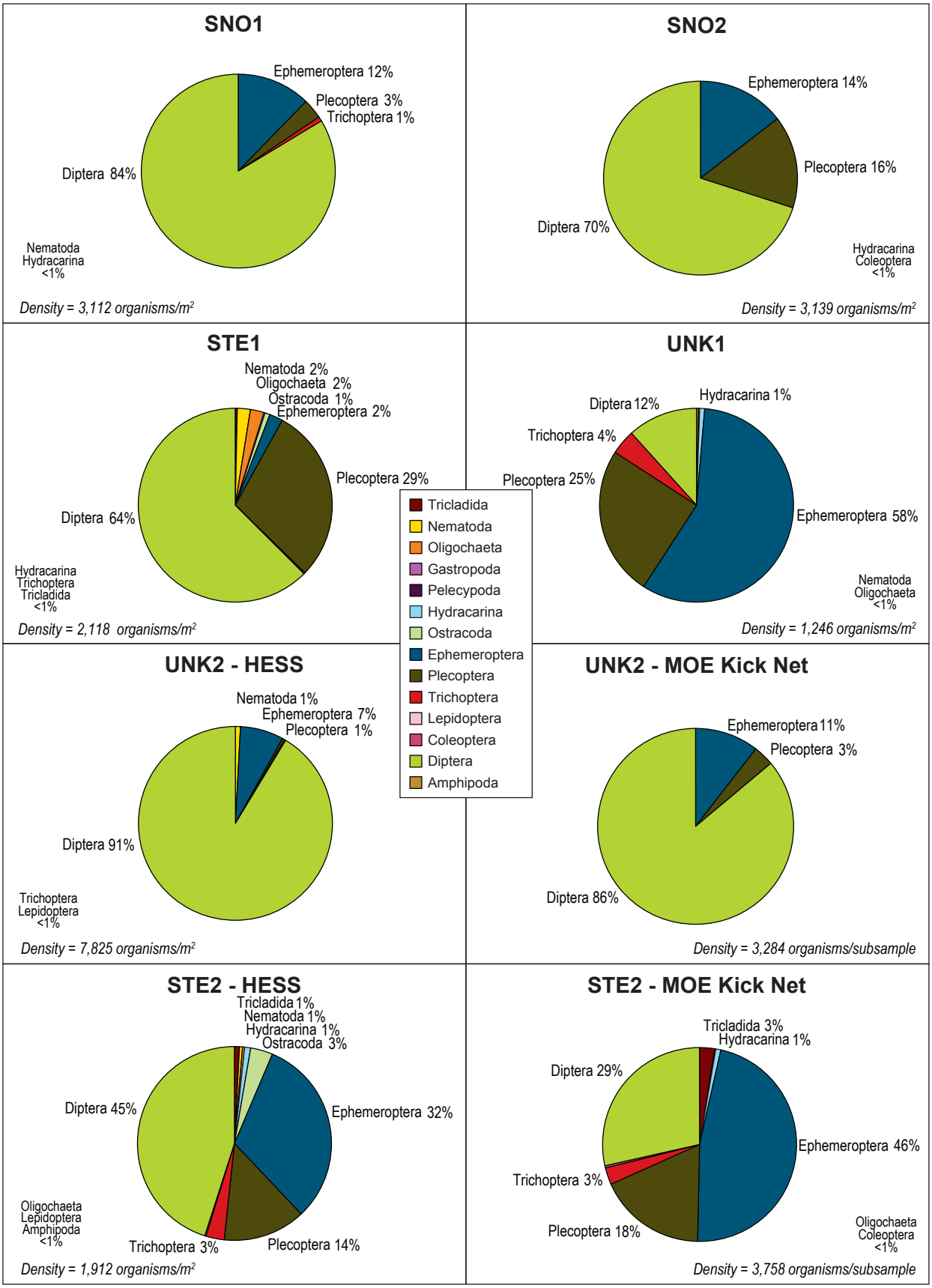
Community Composition

Diptera (primarily chironomids) dominated the benthic communities at 19 of the 28 stream sites based on one or both sampling methods (Figure 9.2-36). Ephemeroptera dominated four of the 28 sites, and oligochaetes dominated site CC1. At six 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, Gastropoda, Pelecypoda, Hydracarina, Ostracoda, Lepidoptera, Coleoptera and Amphipoda.

Hess sample data is now discussed. The benthic communities in Snowbank Creek (SNO1)and in Teigen Creek downstream of the confluence with Snowbank Creek (SNO2) were dominated by Diptera, with Ephemeroptera and Plecoptera also present in relatively high abundances (12 to 16%). South Teigen Creek (STE1 and STE2) contained a more diverse community but was also dominated by Diptera (Figure 9.2-28a). UNK1, also located in the Teigen Watershed, was dominated by Ephemeroptera (58%) while the community at UNK2 was composed primarily of Diptera (91%) (Figure 9.2-28a). The community at the outflow of Hodkin Lake (HLO) was quite diverse, though Diptera were still the dominant taxon (Figure 9.2-8b). Teigen Creek sites (TEC1 and TEC2) were predominantly composed of Ephemeroptera (40 to 47%) and Diptera (25 and 50%). The communities at the southern three sites on Treaty Creek were predominated by Diptera, Ephemeroptera and Plecoptera, with an increasing number of Ephemeroptera and Plecoptera evident at the downstream sites (TRC1 < TRC2< TRC3). In north Treaty Creek, NTR1 had a more diverse community than NTR2 though both sites were predominated by Diptera (73% and 59%) (Figure 9.2-28c). In the Unuk River, communities at ECM8, UR1A and UR1 were predominantly composed of Diptera (16 to 64%), Plecoptera (5 to 32 %) and Ephemeroptera (23 to 51%) (Figure 9.2-28d). The benthic community at MC1 in Mitchell Creek consisted of Diptera and Ephemeroptera while MCTR had a more diverse community though Diptera were still the dominant taxon (78%) (Figure 9.2-28d). The benthic communities in the Sulphurets Creek Watershed were dominated by Diptera, though SC2 and SC3 had a small proportion of other groups present (Figure 9.2-28e). The communities at the reference streams, SCR and SUNR, both contained a high proportion of Ephemeroptera and Plecoptera, though SCR contained a greater diversity of taxa than SUNR (Figure 9.2-28e).

Comparison of the results from the two sampling methods indicated some differences at most sites except UNK2. At four sites (STE2, NTR2, EUR2, and SUNR), Hess samples collected relatively more Diptera and kick nets collected more Ephemeroptera. The opposite was found at site SCR. Finally, at site MC1, relatively equal proportions of Diptera were collected using the two techniques, but Hess samples had only a couple Ephemeroptera as subdominant group while the Kick sample had a single Hydracarina (but density was extremely low at MC1, making results of relative abundance misleading).

As the data being used for this overview discussion are at a very high level of taxonomic organization (*i.e*. not detailed), kick-net and Hess sampler data were further examined to determine the number of identifiable taxa present in each (genus or species level). Appendix 9.2.5H presents these data. At this greater taxonomic resolution, the kick-net samples all had more identifiable organisms present than the Hess samples.



Relative Density of Benthic Invertebrate in KSM Project Study Area Project Streams, 2008

FIGURE 9.2-28a

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Relative Density of Benthic Invertebrate in KSM Project Study Area Project Streams, 2008

FIGURE 9.2-28b

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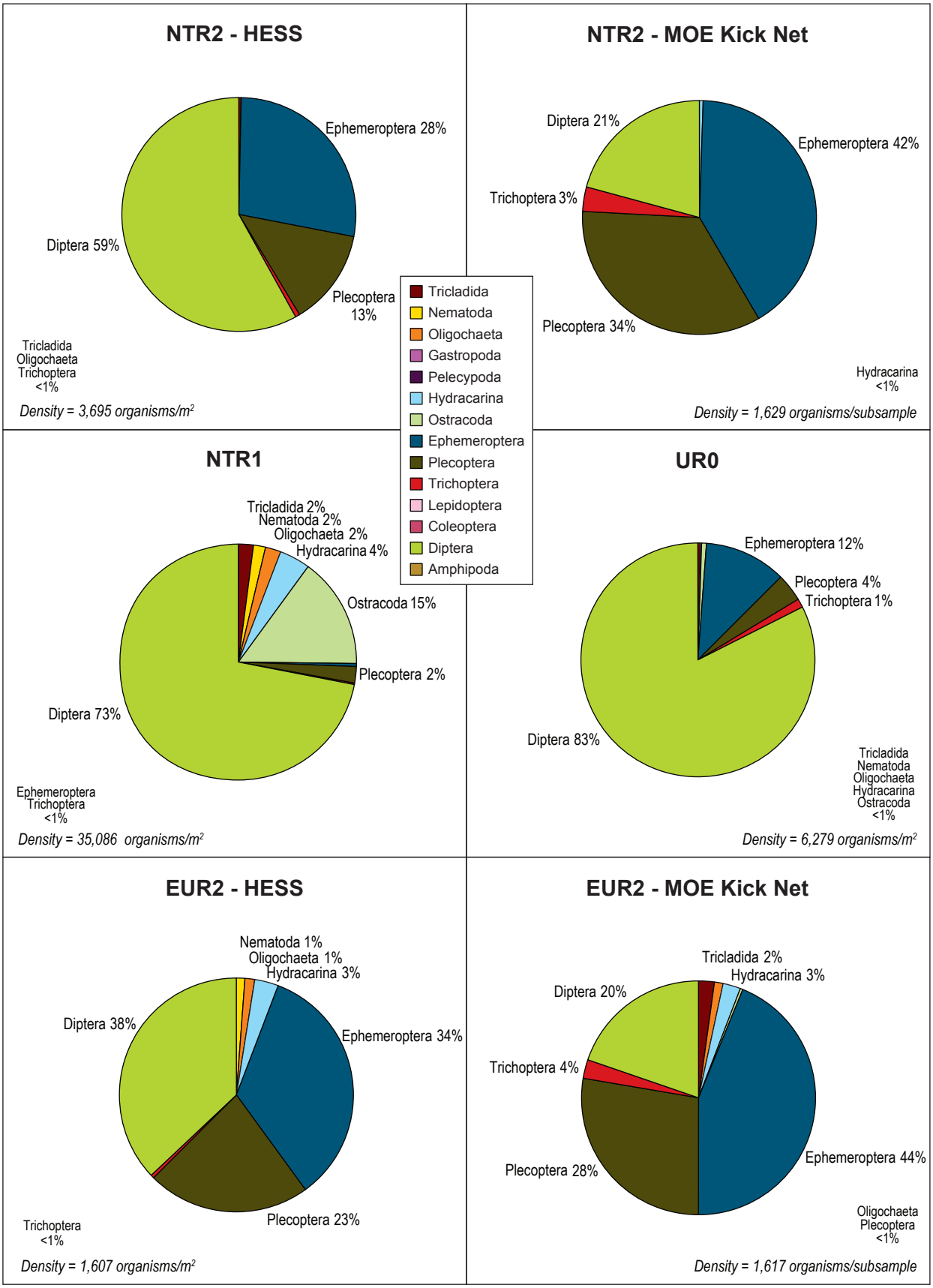

Relative Density of Benthic Invertebrate in KSM Project Study Area Project Streams, 2008

FIGURE 9.2-28c

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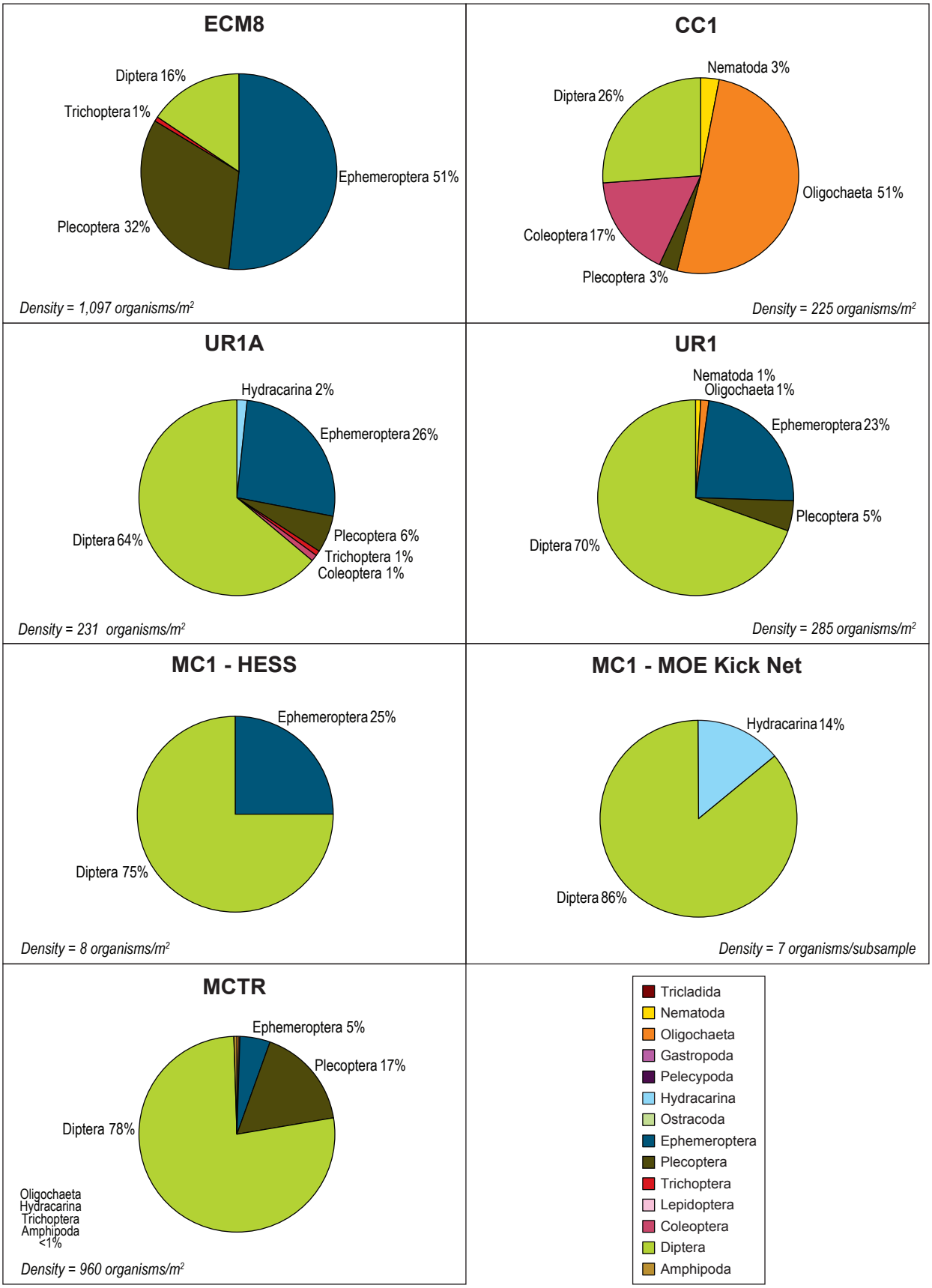

Relative Density of Benthic Invertebrate in KSM Project Study Area Project Streams, 2008

FIGURE 9.2-28d

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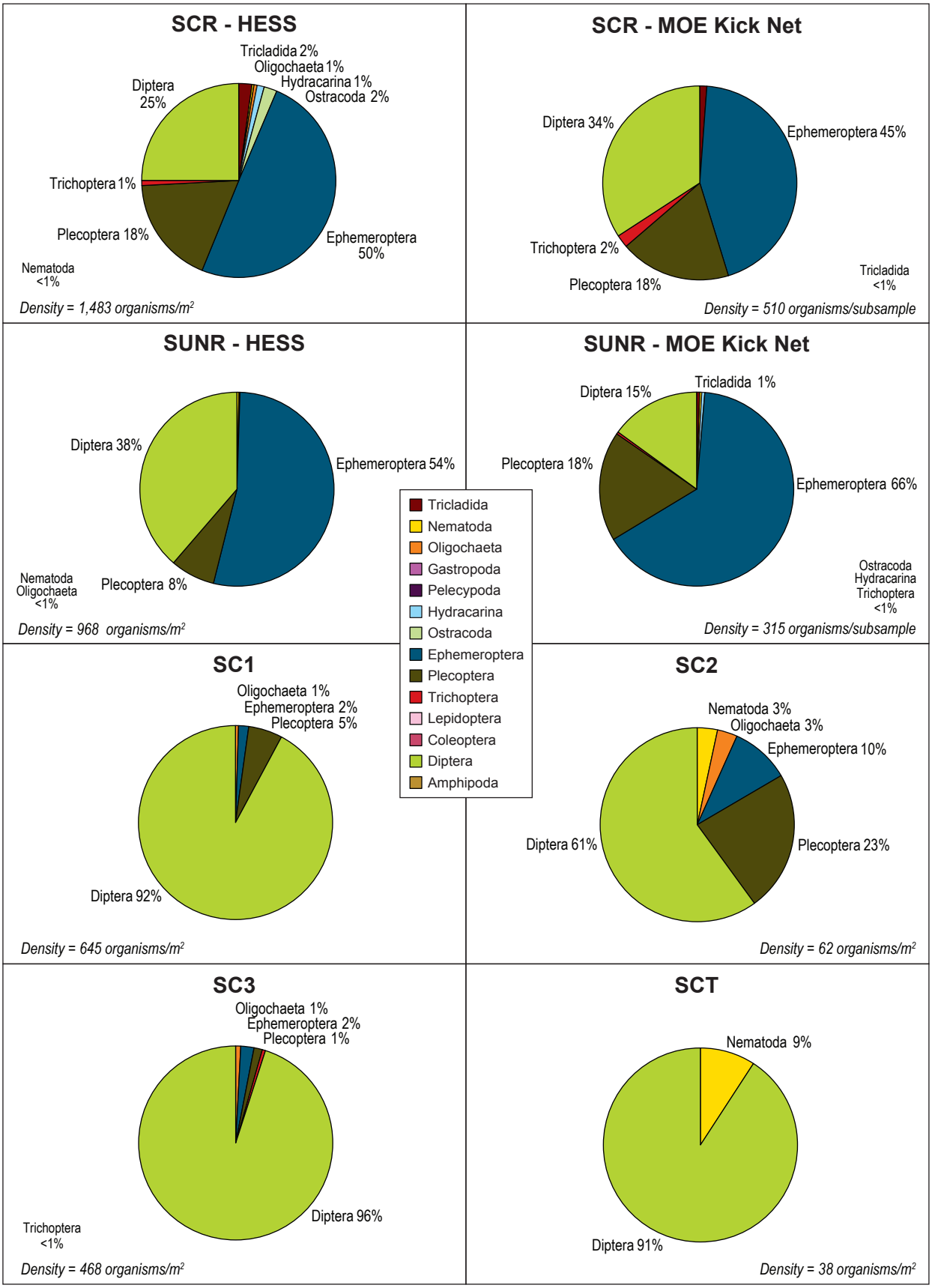

Relative Density of Benthic Invertebrate in KSM Project Study Area Project Streams, 2008

FIGURE 9.2-28e

SEABRIDGE GOLD

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Diversity Indices

The Simpson diversity index for streams ranged from 0.09 (SCT) to 0.92 (NTR1), with values closer to one indicating higher diversity. Generally, the Simpson diversity in the KSM Project ranged from 0.6 to 0.9. Lower diversity was seen at SCT, MC1 and TRC1. The kick-net method samples had a similar diversity as the Hess method for fives sites, but different and opposing differences at two sites (one had higher diversity than the Hess, the other had the opposite) (Figure 9.2-29).

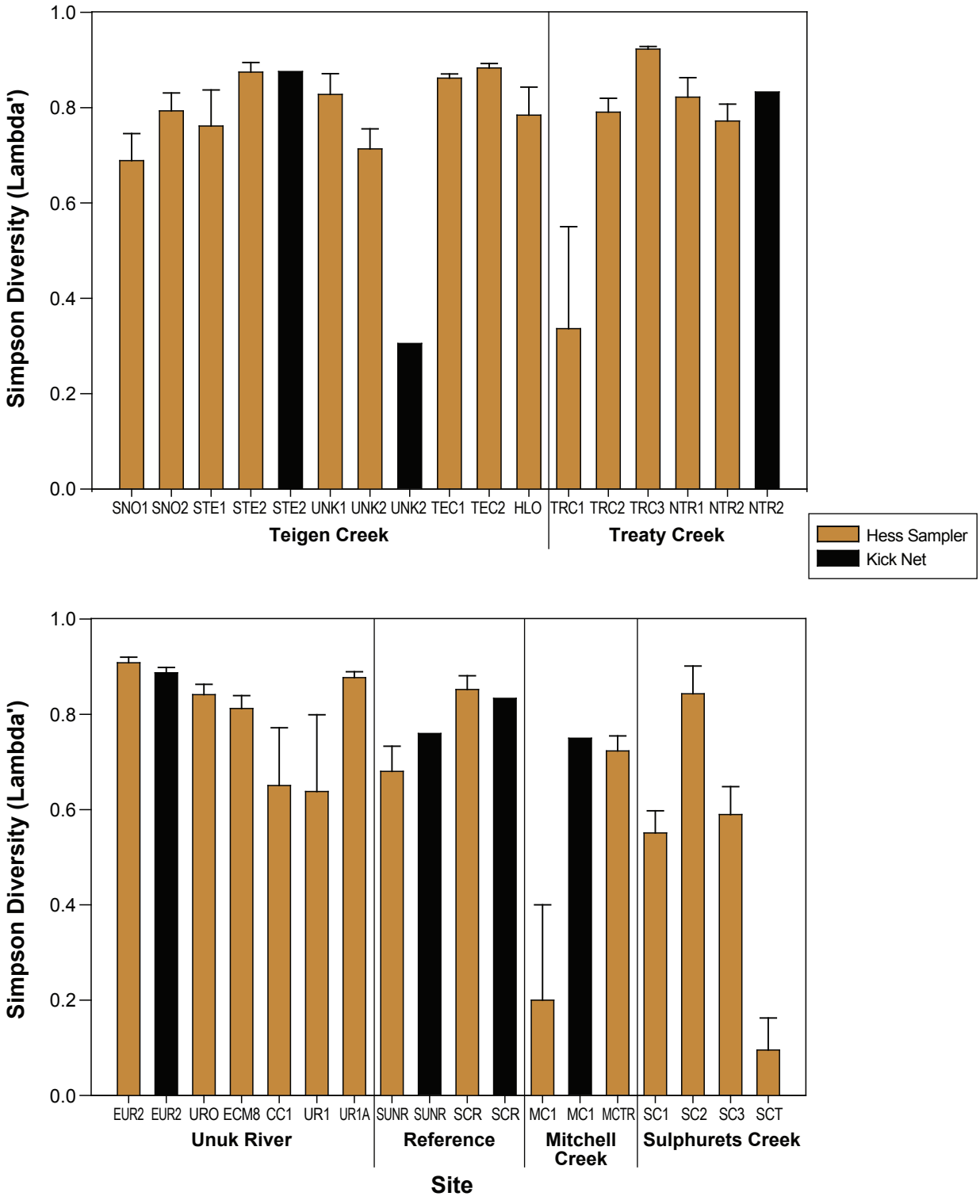
The Shannon Diversity index showed greater range among sites compared to Simpson Diversity. Shannon Diversity ranged from 0.13 (SCT) to 2.66 (EUR2), with most sites having a diversity index ranging from 1 to 2 (Figure 9.2-30). Diversity was lower in the same three sites as listed for Simpson Diversity, and generally lower in Mitchell and Sulphurets Creek sites.

Bray-Curtis Similarity

The Bray-Curtis similarity coefficient ranges from 0 to 100 with 0 being least similar, and 100 being most similar. A similarity matrix of the stream sites was produced and is available in Appendix 9.2.5I. Benthic invertebrate communities of each stream were compared to the median of each reference site (SCR and SUNR) to determine percent similarity (Environment Canada 2003). As expected, both SCR and SUNR are most similar to their own median percent similarity (Figure 9.2-31 and 9.2-32). Similarity to the median SCR reference stream ranged from 6.5% (MC1) to 76% (SCR) with an average similarity of 36%. Sites TRC1, NTR1, MC1, CC1 and SCT were the least similar to SCR. Highest similarity was seen with select sites in Teigen River, Treaty Creek, SUNR and Unuk River watersheds. Similarity to the median SUNR reference stream ranged from 6.8% (NTR1) to 72% (SUNR), similar in range to that for SCR reference stream. Sites NTR1, MC1, and HLO had the lowest similarity values compared to SCR. Sites in Treaty Creek, SCR, Unuk River, Mitchell Creek and Sulphurets Creek showed higher similarity to SUNR.

QA/QC

Five Hess samples were taken at 17 of the sample sites while only three were taken at the 11 other sites (Table 9.2-1). 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. A summary of these results is presented in Appendix 9.2.5J. 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 sampler sites (i.e., larger error bars). In particular, this was noted at STE1, HLO, TRC1, NTR1, CC1 and UR1. This indicates that the five replicate Hess samples were more effective in reducing the variation within a sample set.



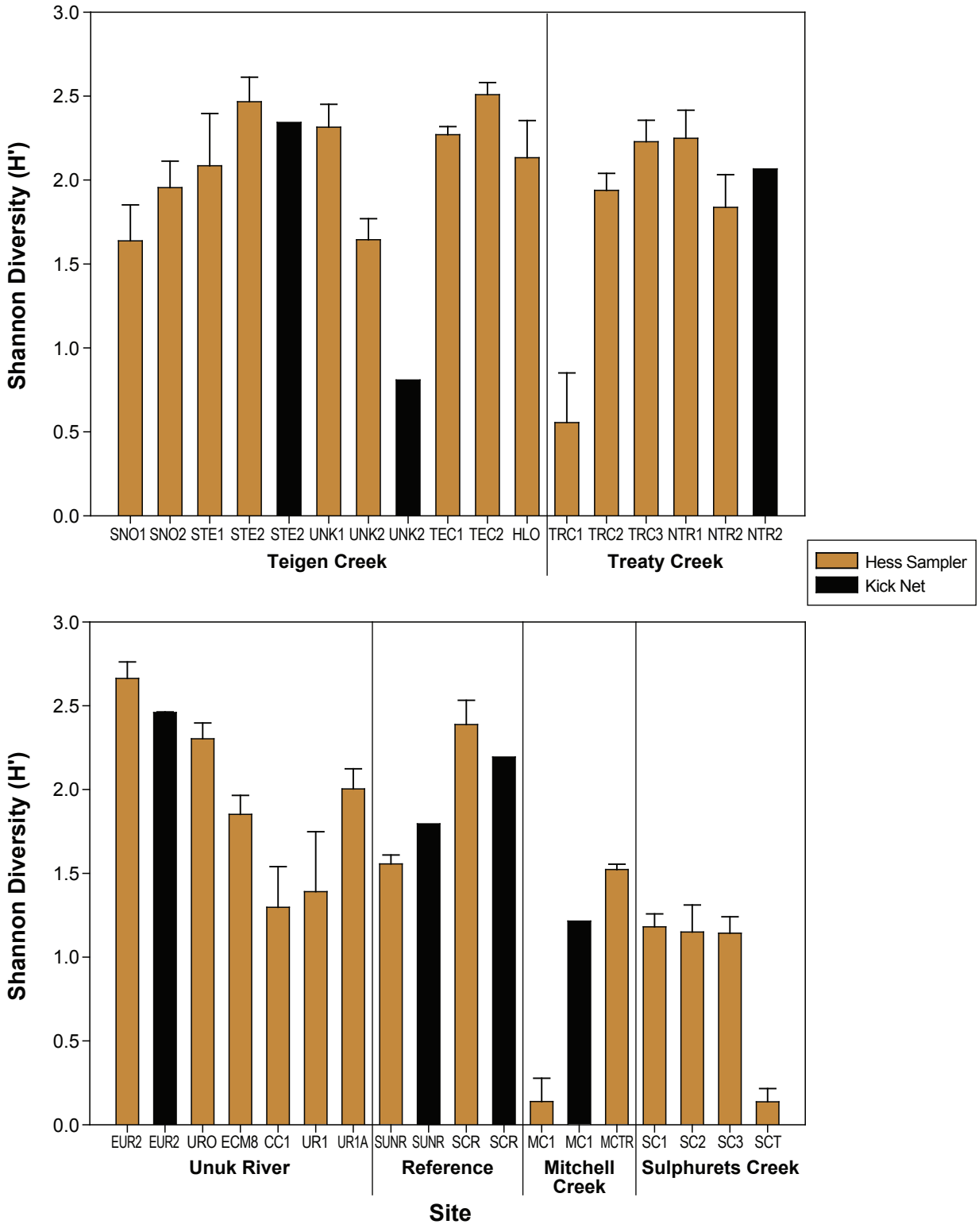
Note: Error bars represent standard error of the mean

Benthic Invertebrate Simpson Diversity Indices for KSM Project Study Area Streams, 2008

FIGURE 9.2-29

SEABRIDGE GOLD

Rescan™



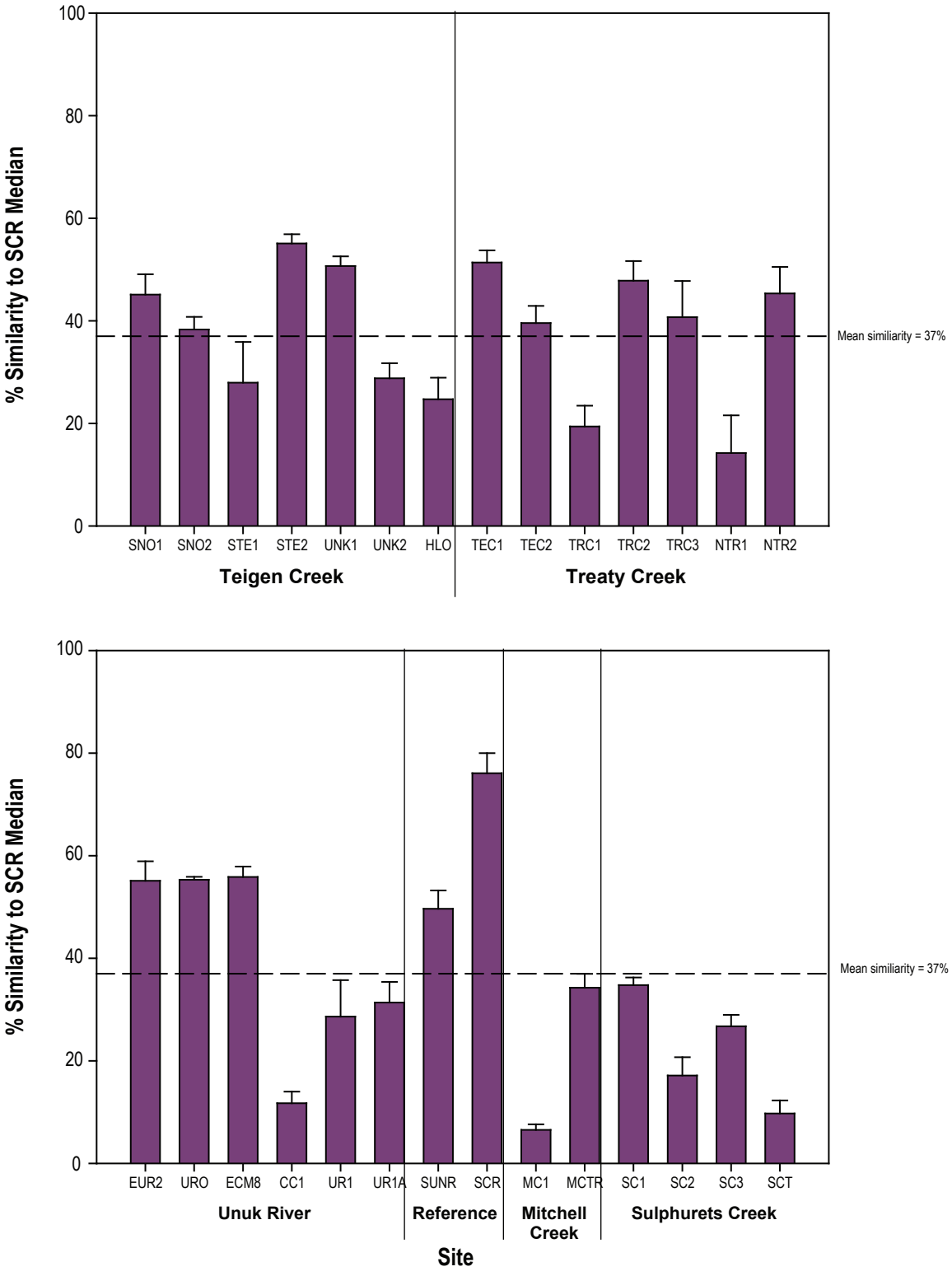
Note: Error bars represent standard error of the mean

Benthic Invertebrate Shannon Diversity Indices for KSM Project Study Area Streams, 2008

FIGURE 9.2-30

SEABRIDGE GOLD

Rescan™



Note: Error bars represent standard error of the mean.
Dashed line denotes mean similarity for all sites.

Bray-Curtis Similarity Index Comparisons for Benthic Invertebrates, KSM Project Study Area, 2008

FIGURE 9.2-31

SEABRIDGE GOLD

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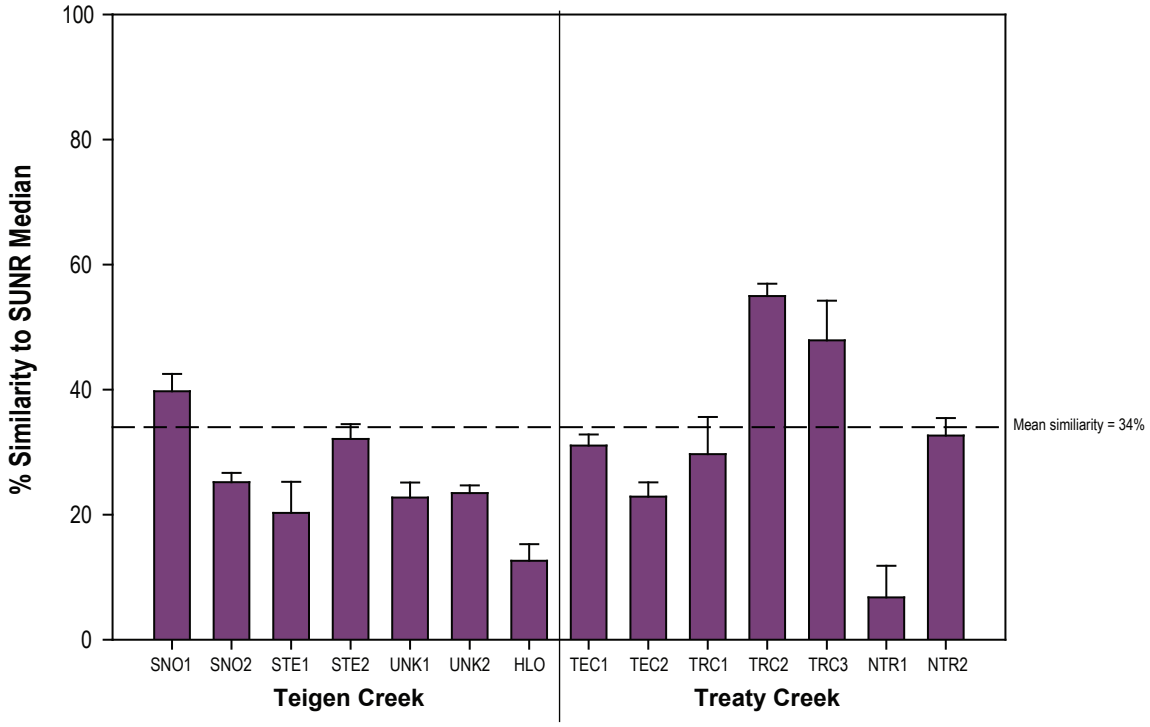

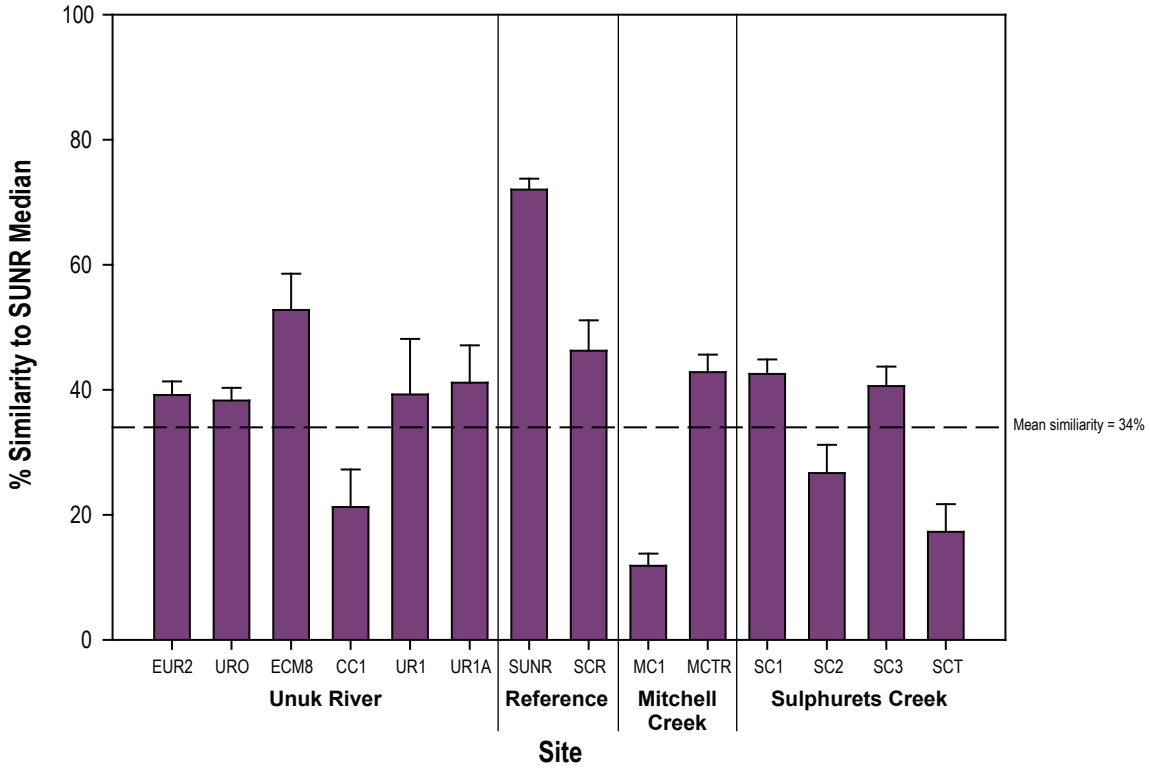

Note: Error bars represent standard error of the mean.
Dashed line denotes mean similarity for all sites.

Bray-Curtis Similarity Index Comparisons for Benthic Invertebrates, KSM Project Study Area Streams, 2008

FIGURE 9.2-32

SEABRIDGE GOLD

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9.2.6 Conclusions

With few exceptions, streams and rivers in the KSM Project Study Area were wide, large, braided channels, characterized by high, fast flows and turbid water (Plate 9.2-4). Sediment at approximately 90 % of the stream sites was low in nutrients and composed mainly of sand with only small amounts of fine particles. This is characteristic of streams with a high energy flow regime, in contrast to slower moving streams that tend to contain high proportions of smaller particle sizes and greater concentrations of nutrients and organic matter. Nutrient concentrations were low in the Unuk River, Reference sites, Mitchell Creek and Sulphurets Creek watersheds and concentrations were higher in the Teigen Creek and Treaty Creek watersheds. Stream sediments in the KSM Project Study Area were characterized by naturally high concentrations of metals. Concentrations of metals frequently exceeded existing BC and CCME guidelines. Arsenic, copper, iron and mercury tended to be highest in the Treaty, Mitchell and Sulphurets creeks watersheds. Sites in the Teigen Creek Watershed tended to have higher chromium and nickel concentrations. CC1 in the Unuk River had much greater concentrations of cadmium and zinc present in the sediments. PAHs were below detection limits at both the stream sites assessed.

Periphyton biomass was typically low, with an average periphyton biomass of 0.38 ug/cm^2. Density showed high variation among sites with HLO and UNK2 having the greatest density. Sites in the Mitchell and Sulphurets creeks watersheds had very low Periphyton biomass and density. Species richness ranged from 1 (UR1) to 22 (NTR2) taxa. Species evenness was generally around 0.5. Diatoms were the dominant group at all sites except for one, which was dominated by Chlorophyta. Chlorophyta, Cryptophyta, Cyanophyta and Euglenoida occurred in low numbers at select sites. Diversity varied widely among sites, with Shannon Diversity values ranging from 0.23 to 2.5, and Simpson Diversity values from 0.17 to 0.88. The average Simpson Diversity calculated was 0.6, suggesting that the periphyton communities in the KSM Project streams were relatively diverse. UNK1, TRC1, UR1 and MC1 consistently showed the lowest values for diversity, richness and evenness. The Bray-Curtis analyses indicated that the periphyton communities in the Mitchell and Sulphurets creeks watersheds were least similar to the reference sites, while sites in the Teigen and Treaty Creek Watersheds were more similar to reference communities.

Benthos density was highest at NTR1 in the Treaty Creek Watershed (3,373 organisms/m^2), though density at all other sites was close to or below 1,000 organisms/m^2. Benthos density followed a similar pattern to periphyton density and biomass. Genus richness ranged from 0.8 to 27 taxa, with Mitchell and Sulphurets creeks watersheds having the lowest richness. EPT richness ranged from 0 to 14.5 and was consistently high in the Teigen Creek and Treaty Creek watersheds. The lowest EPT richness was measured in the Mitchell Creek and Sulphurets Creek watersheds. Diptera (mainly chironomids), and Ephemeroptera were the dominant taxonomic groups for streams in the KSM Project Study Area, with Oligochaeta dominating CC1. Plecoptera (stoneflies) were also common at many of the stream sites. Benthic community structure at study sites was typical of coldwater streams of northwest British Columbia.

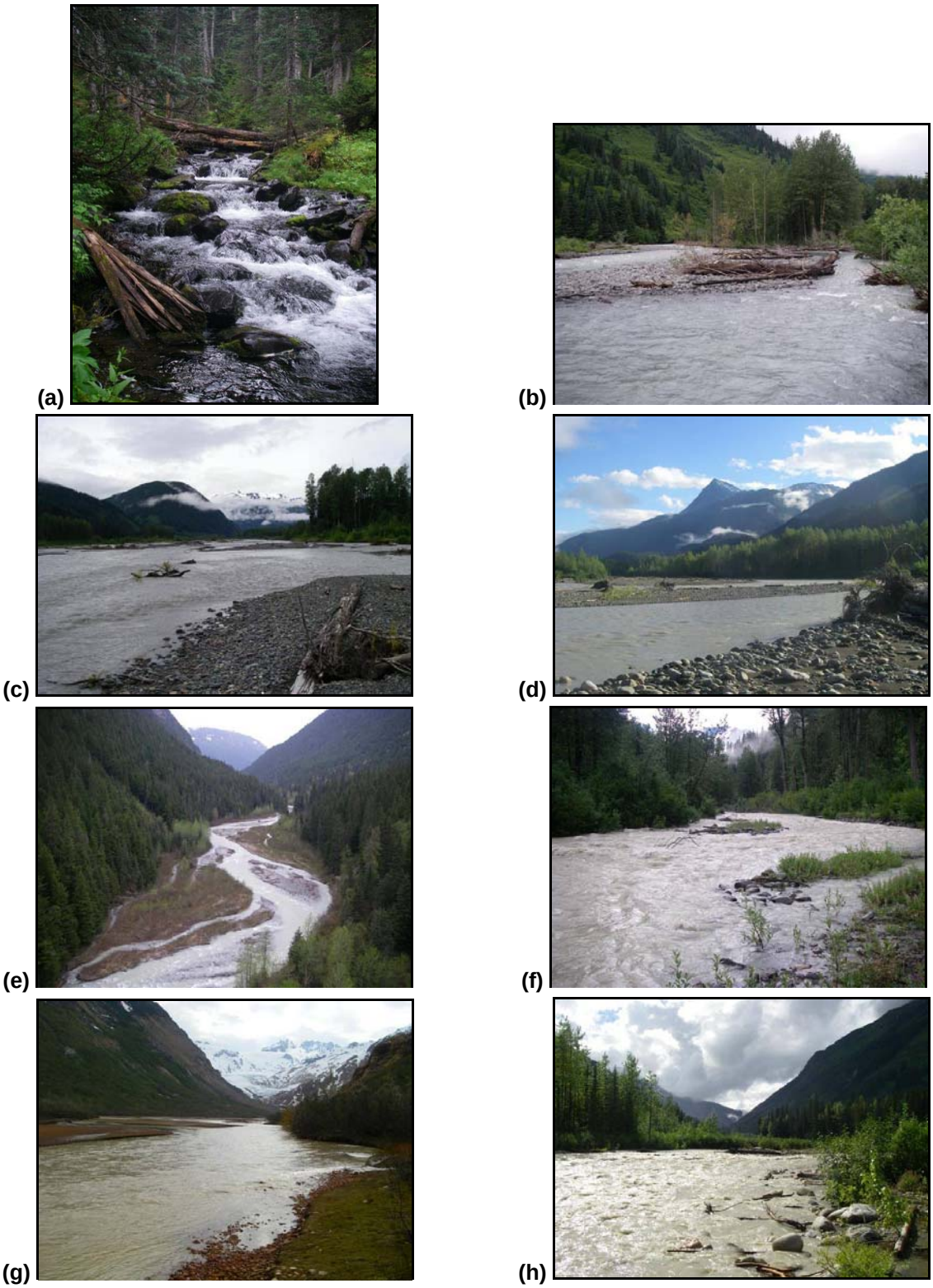


Plate 9.2-4. Select Stream Sites of the KSM Project Study Area: Teigen Creek (a. UNK1 and b.TEC2); Treaty Creek (c. TRC3); Unuk River (d. UR1); Reference sites (e. SUNR and f. SCR); Mitchell Creek (g. MC1); and Sulphurets Creek (h. SC2).

Diversity was higher in the Treaty Creek and Teigen Creek, and Unuk River watersheds while sites in the Mitchell Creek and Sulphurets Creek watersheds tended to be characterized by less diverse benthic communities. Bray-Curtis similarity values indicated that sites in the KSM Project Study Area were not very similar to the reference sites.

A comparison of the two benthic invertebrate sampling methods indicates that the kick-net samples had slightly higher richness and diversity than the Hess net samples but that the trends evident between the sites were consistent with both methods.

As a whole, the aquatic community in the Mitchell Creek and Sulphurets Creek watersheds was sparse. Periphyton and benthic invertebrates density and richness at sites in these watersheds were low. As periphyton is the food source for many benthic invertebrates, a link between their populations is expected. Both these watersheds are located within the deposit area and are characterized by low nutrients, high concentrations of metals in sediment and water (Section 8) and turbid, fast moving water.

9.3 Lakes

9.3.1 Introduction

As with the streams in the KSM Project Study Area, there is little known about the aquatic ecology and sediment quality of the lakes in the Project Study Area. Thus, the purpose of the 2008 lake aquatic ecology baseline assessment was to collect information on sediment, physical limnology, phytoplankton, zooplankton and benthic invertebrate communities in key lakes.

Sediment is deposited on the bottoms of lakes and accumulates over time, and as with streams, monitoring the chemical content and physical composition of this sediment can provide important insight related to changes (natural and other) in the lake environment. Phytoplankton, zooplankton and benthic invertebrates contribute to the food base of lake life, and changes in these communities can indicate altered water or sediment quality linked to impacts to aquatic life. These organisms also form the basis for nutrition and energy requirements of fish, amphibians, waterfowl and aquatic wildlife.

9.3.2 Objectives

The KSM lake aquatics baseline was done to assess background conditions of sediment quality in lakes within the proposed Project Study Area. The same sediment quality variables were assessed as those examined for the streams (Table 9.2-2). A baseline characterization of primary (phytoplankton and zooplankton) and secondary (benthic invertebrates) producer communities in lakes was also carried out.

9.3.3 Study Area

Three lakes were monitored as part of 2008 study: Sulphurets Lake (SUL), West Teigen Lake (LAL), and Knipple Glacier Lake (KGL) (a small reference lake northeast of Knipple Lake) (Figure 9.2-1, Table 9.2-1). SUL is located downstream of the Sulphurets deposit and proximal to the existing exploration camp. LAL is located in the proximity of the proposed Plant Site 2B. KGL was used a reference lake. Both KGL and SUL are glacial headwater lakes (Plate 9.3-1).

(a)

(b)

(c)

Plate 9.3-1. KSM Project Study Area Lake Sites: a) West Teigen Lake (LAL) b) Sulphurets Lake (SUL) c) Knipple Glacier Lake (KGL)

9.3.4 Methods

9.3.4.1 Physical Limnology

At each of the three lake sites, basic bathymetry (spot measurements using a hand-held device) was first conducted to determine the deeper areas. Three spatially separated zones were then selected at each lake site, covering shallow (0-3 m), medium (approx. one half total depth) and deep depths (1 m less than maximum depth) to fully characterize the lake habitat. Temperature/ dissolved oxygen profiles were recorded to determine the degree and position of stratification, if present. A 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 the deepest zone only, using a Secchi disk (weighted to keep line as vertical as possible) which was lowered on a metered line down through the water until it disappeared entirely. The line was then raised very slowly until the disk could just be seen, and the depth of the disk was recorded.

9.3.4.2 Sediment Quality

The sediment quality variables analyzed from lakes are the same as those listed for stream sediment samples (Table 9.2-2). Sediment samples were collected in three depth zones of each lake (shallow, mid and deep). 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 drifting sediment and benthos. Within each of the three zones at each site, one composite replicate sediment sample was collected, comprised of three field sub-samples taken from areas a minimum of 5 to 25 m apart (depending on size of the site).

Sediment samples were collected using an Ekman grab sampler. Collection depth and sediment descriptions were noted along with photographs of each sediment sample. For SUL shallow and KGL shallow, the sediment sample was collected using the spoon and bowl method previously described in the stream section as the hard packed sediment and gravel made use of the Ekman sampler a non viable option for sediment sampling at these locations.

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

9.3.4.3 Primary Producers - Phytoplankton

For each lake, phytoplankton samples were collected in triplicate near the surface of the deep zone at 1 m depth using arms' length rubber gloves and water bottles. 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 genus or species level. Biomass samples were field filtered onto a 0.45 μm filter, wrapped in foil, and frozen and kept in the dark until analysis was conducted at ALS Environmental (Vancouver, BC).

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

9.3.4.4 Secondary Producers - Zooplankton

Zooplankton samples were collected in triplicate from each lake (one composite replicate from each of the three zones). Samples were collected with a standard zooplankton net. Each composite sample was the product of two to three hauls depending on plankton density observed at that zone. 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 species 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-Weiner and Simpson diversity indices) were calculated and mean and standard error by site was determined and graphed.

9.3.4.5 Secondary Producers - Benthic Invertebrates

Lake benthos samples were collected in triplicate from each lake zone in conjunction with sediment quality samples. Samples were collected using an Ekman grab, noting the depth at which the sample was collected. Each sample was a composite of three Ekman grabs pooled. 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 species level. All samples were transferred to 70% ethanol prior to analysis and storage.

As previously mentioned, the hard-packed sediment and gravel at the shallow zone of KGL and SUL made use of the Ekman sampler a non-viable option. Consequently, no benthic samples were collected at these sites.

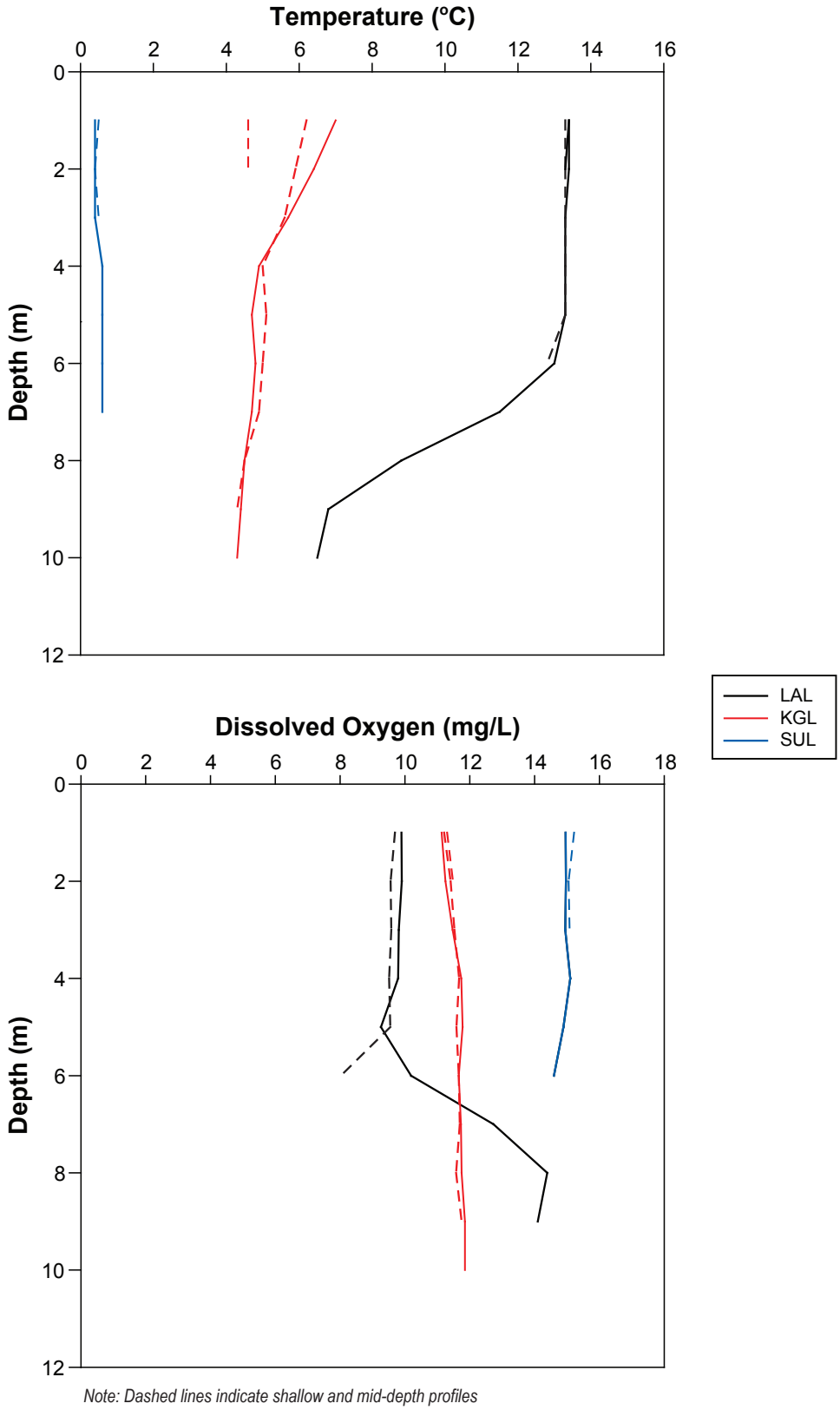
For each sample, genus richness, relative abundance, evenness, and diversity (as Shannon-Weiner and Simpson diversity indices) were calculated and mean and standard error by site was determined and graphed.

9.3.5 Results

9.3.5.1 Physical Limnology

Temperature and dissolved oxygen profiles were taken at each of the depth stations in each lake. Appendix 9.3.5A contains the profile data. Figure 9.3-1 graphically illustrates the depth profiles for temperature and dissolved oxygen concentrations for each lake. Temperature was greatest (13.4 ^{o}C) and dissolved oxygen concentrations were lowest (9.7 mg/L) at LAL. The water temperature was close to 0^{o}C at SUL, with remnants of glaciers evident in the water. SUL had the highest dissolved oxygen concentrations, with a maximum concentration of 15.1 mg/L. Temperature decreased with depth. Dissolved oxygen concentrations were generally stable throughout the water column with the exception of SUL, which showed an increase in concentrations with depth.

At the deepest point in the lake, Secchi depth was measured. Secchi depth is a measure of surface water transparency. Secchi depth at SUL and KGL was at the surface (10 cm) due to the high turbidity of the water. At LAL, a secchi depth of 6m was measured.



Note: Dashed lines indicate shallow and mid-depth profiles

Temperature and Dissolved Oxygen Profiles taken at Shallow, Mid and Deep Depth in KSM Project Study Area Lakes, 2008

FIGURE 9.3-1

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9.3.5.2 Sediment Quality

Particle Size

The three stations at KGL had very similar sediment particle size and were composed approximately of 40% silt and 60% clay (Figure 9.3-2). The shallow and mid station at LAL were both made up of 35% gravel and 30% silt with smaller portions of sand and clay. The deep station at LAL was composed almost entirely of silt (51%) and clay (47%) with a very small amount of sand and gravel in the sample. The mid and deep stations at SUL were similar to the deep LAL sample, while the shallow station at SUL was dominated by gravel and sand.

Nutrients, TOC and Cyanide

Total organic carbon (TOC) and total nitrogen (TN) concentrations were highest at LAL, with the highest concentrations being measured at the shallow station and the lowest concentrations occurring at the deep station (Figure 9.3-3). Maximum concentrations of 4.2% TOC and 0.4% TN were measured at LAL shallow. Concentrations of TOC and TN at KGL and SUL were below or close to the analytical detection limit for both variables.

Total phosphate concentrations ranged from 683 mg/kg to 1,480 mg/kg at LAL and increased with depth (Figure 9.3-3). Total phosphate concentrations at KGL and SUL were similar, ranging from 1,070 mg/kg to 1,370 mg/kg and showed little variation with depth compared to LAL.

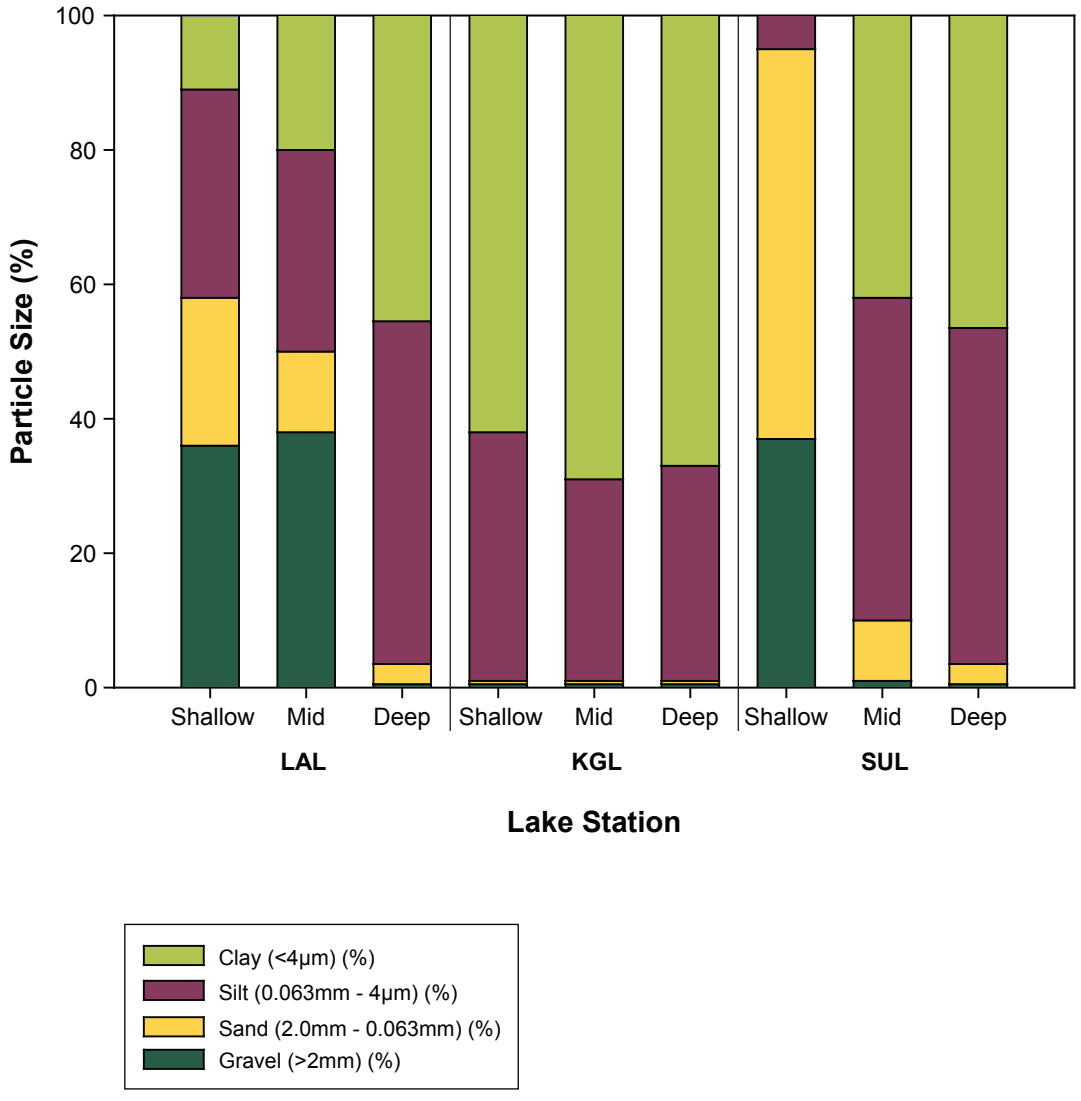
Sediment pH was lowest at LAL, ranging from 6.1 to 6.8 (not graphed). The pH in the sediment at SUL and KGL ranged from 7.5 to 8.

Cyanide was below detection limits at all sites (3.0 mg/kg) and is not further discussed.

Metals

Analyzed metals that do not have provincial or federal guidelines are discussed in the following section prior to those metals with guidelines. Of the analyzed metals without guidelines, antimony, bismuth, molybdenum, sodium, thallium and tin were not detected in more than 80% of the samples across all lake sites. These variables are not discussed. All data are provided in Appendix 9.3.5B.

KGL and SUL had similar concentrations of most metals while LAL tended to have different concentrations. Specifically, concentrations of calcium, magnesium and titanium were greater at KGL and SUL than at LAL. Calcium ranged from 4370 mg/kg (LAL deep) to 25, 800 mg/kg (SUL deep). Magnesium was greatest at KGL deep (2200 mg/kg), with the lowest concentration being measured at LAL shallow (374 mg/kg). Titanium ranged from 603 mg/kg (SUL mid) to 55 mg/kg (LAL mid). Concentrations of aluminum, cobalt, lithium and manganese were greatest at LAL deep (maximum concentrations of 34, 700 mg/kg, 52 mg/kg, 55 mg/kg and 22, 500 mg/kg respectively) while lower concentrations were measured at KGL and SUL. Barium and potassium concentrations were higher at KGL (maximum concentrations of 676 mg/kg and 4220 mg/kg, respectively) and strontium (111 mg/kg) was higher at SUL. Beryllium (ranging from <0.5 mg/kg to 0.9 mg/kg) and vanadium (ranging from 44.6 mg/kg to 82.6 mg/kg) showed less variation across all sites and stations.



Sediment Particle Size Distribution for Lakes in the KSM Project Study Area, 2008

FIGURE 9.3-2

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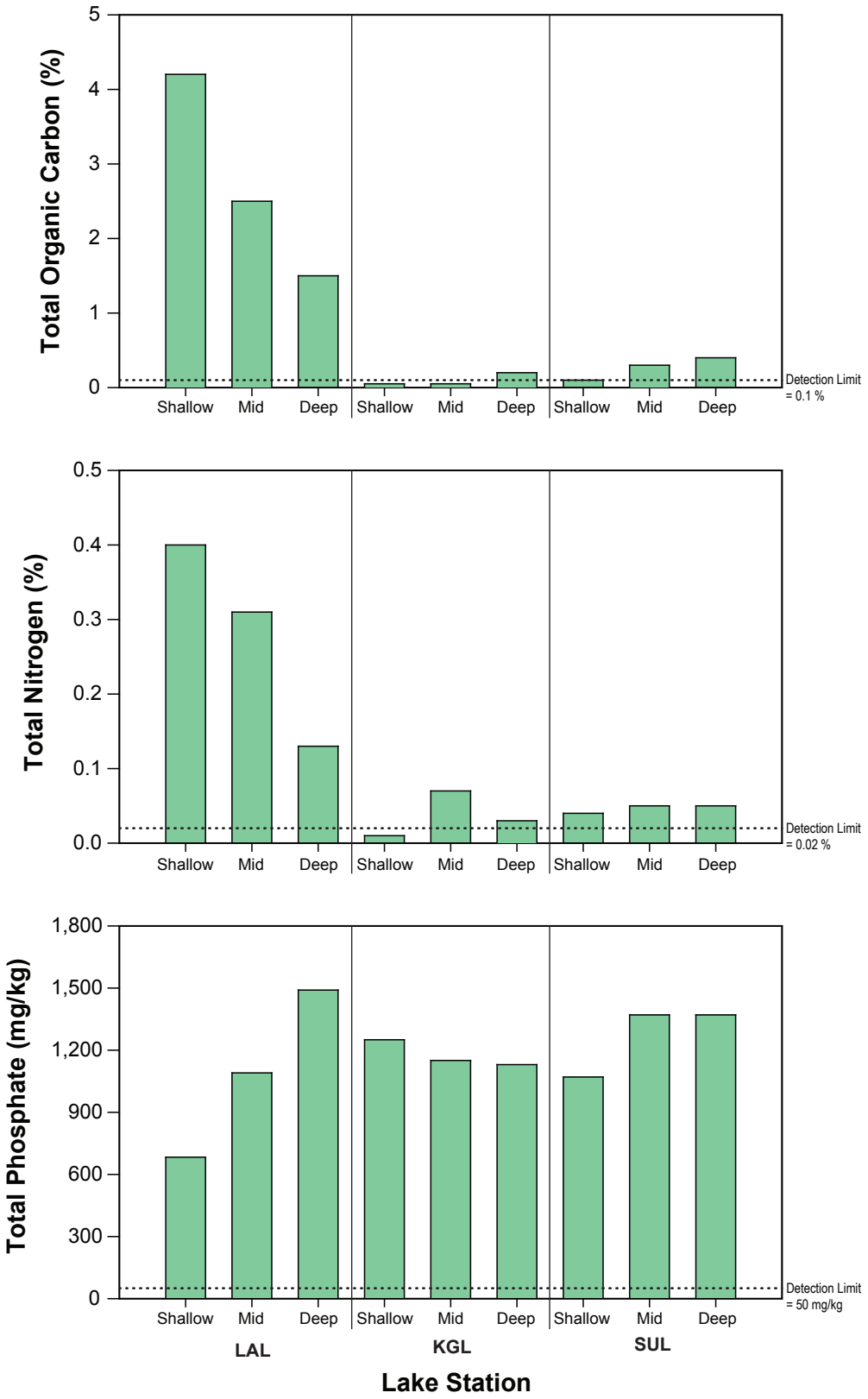

Note: Dotted line represents analytical detection limit.

Total Organic Carbon, Total Nitrogen and Phosphate Concentrations in Lake Sediments in the KSM Project Study Area, 2008

FIGURE 9.3-3

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Metals for which guidelines exist are discussed and presented graphically in the following section. Of those metals with guidelines, silver and selenium were not detected in any of the samples across all lakes sites and are not discussed below.

Arsenic concentrations at the lake sites exceeded the ISQG guideline of 5.9 mg/kg at all sites (Figure 9.3-4). Concentrations were lowest at LAL, with the lowest concentration occurring at the shallow station (9.1 mg/kg). All other stations also exceeded the PEL of 17 mg/kg. Arsenic concentrations were greatest at SUL, with a maximum concentration of 112 mg/kg at the mid-depth station.

Cadmium concentrations were below detection limits (0.5 mg/kg) at five sites. Concentrations were lowest at LAL and KGL though the deep station at KGL exceeded the ISQG of 0.6 mg/kg. The concentrations at the mid-depth and deep station at SUL were both approximately twice the ISQG with concentrations of 1.10 mg/kg and 1.15 mg/kg (Figure 9.3-4).

Chromium concentrations at KGL and SUL were relatively low, ranging from 5.8 mg/kg to 20.6 mg/kg (Figure 9.3-5). Concentrations at LAL were greater, exceeding the ISQG of 37.3 mg/kg at all three stations and the PEL of 90 mg/kg at two stations. The maximum concentration of 137 mg/kg was measured at LAL deep.

Copper concentrations ranged from 27.7 mg/kg (KGL shallow) to 286 mg/kg (SUL deep) (Figure 9.3-5). The ISQG of 35.7 mg/kg was exceeded at all stations at LAL and SUL. The PEL (197 mg/kg) was exceeded at the mid-depth and deep stations at SUL. Concentrations tended to increase with depth in each lake, as seen with chromium.

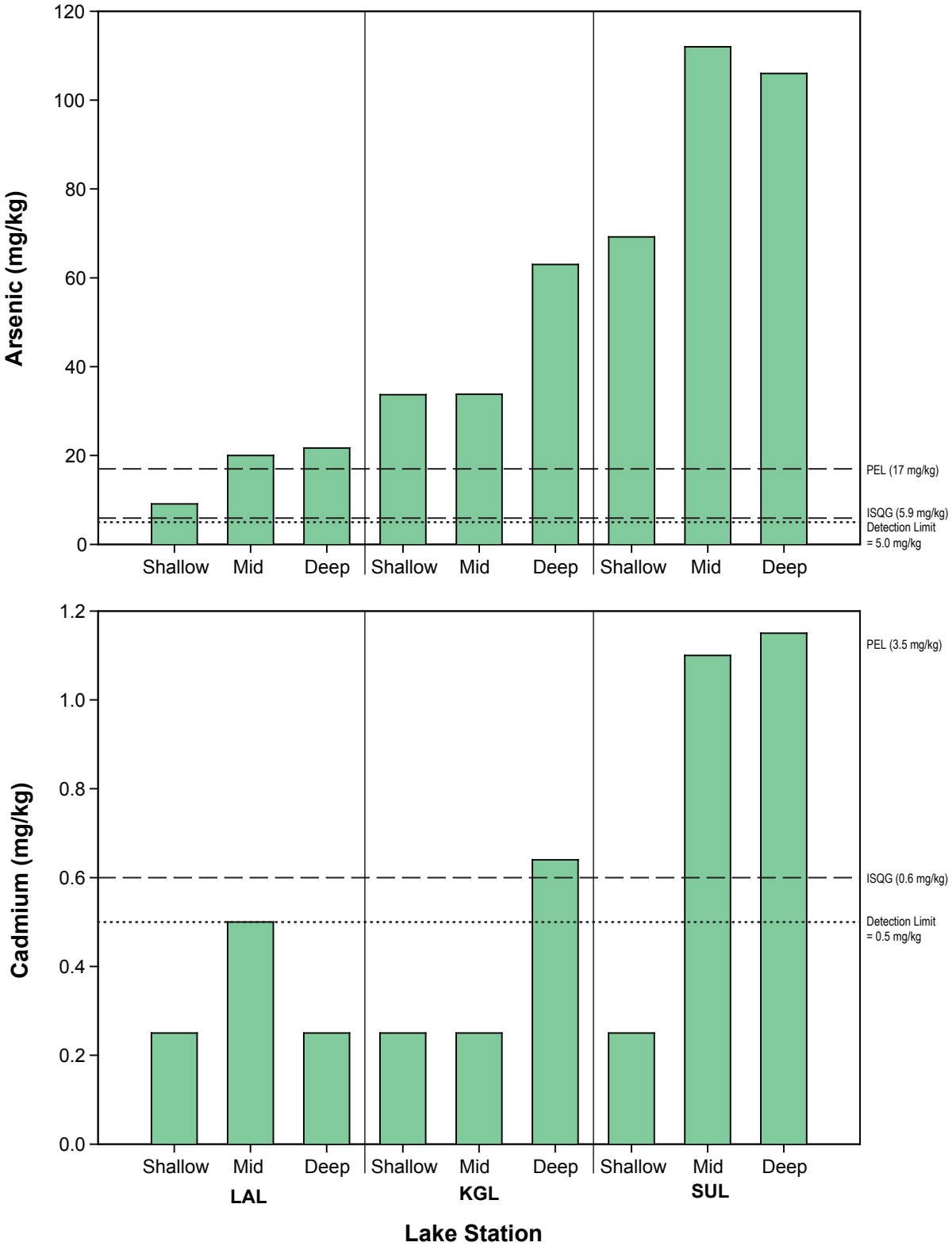
Iron concentrations tended to range from 30,000 mg/kg to 50,000 mg/kg (Figure 9.3-6). The lowest concentration was measured at LAL shallow (28,200 mg/kg) and the greatest concentration occurred at LAL deep (63,700 mg/kg). The LEL of 21, 000 mg/kg was exceeded at all sites, and the SEL guideline of 43, 766 mg/kg was exceeded at seven sites.

Lead concentrations were below or close to analytical detection limits (30 mg/kg) at LAL and KGL (Figure 9.3-6). The ISQG of 35 mg/kg was exceeded at SUL by the mid-depth and deep stations with a maximum concentration of 51 mg/kg occurring at SUL deep.

Mercury concentrations increased with depth at each site and concentrations ranged from 0.108 mg/kg (LAL shallow) to 0.373 mg/kg (SUL deep) (Figure 9.3-7). The ISGQ of 0.17 mg/kg was exceeded by all mid-depth and deep stations at each lake site.

Concentrations of nickel at KGL and SUL were relatively low, ranging from 7.3 mg/kg (KGL shallow) to 18.6 mg/kg (SUL mid) (Figure 9.3-7). The mid-depth and deep station at SUL exceeded the LEL of 16 mg/kg as did all stations at LAL. All three stations at LAL exceeded the SEL of 75 mg/kg, with a maximum concentration of 230 mg/kg occurring at LAL deep.

Zinc concentrations ranged from 106 mg/kg (SUL shallow) to 227 mg/kg (LAL deep) and increased with depth (Figure 9.3-8). Concentrations at the mid depth and deep stations at each lake all exceeded the ISQG of 123 mg/kg.



Note: Dotted line represents analytical detection limit.
Dashed lines represent CCME Sediment Quality Guidelines and/or BC Working Guidelines for Sediment.

Arsenic and Cadmium Concentrations in Lake Sediments in the KSM Project Study Area, 2008

FIGURE 9.3-4

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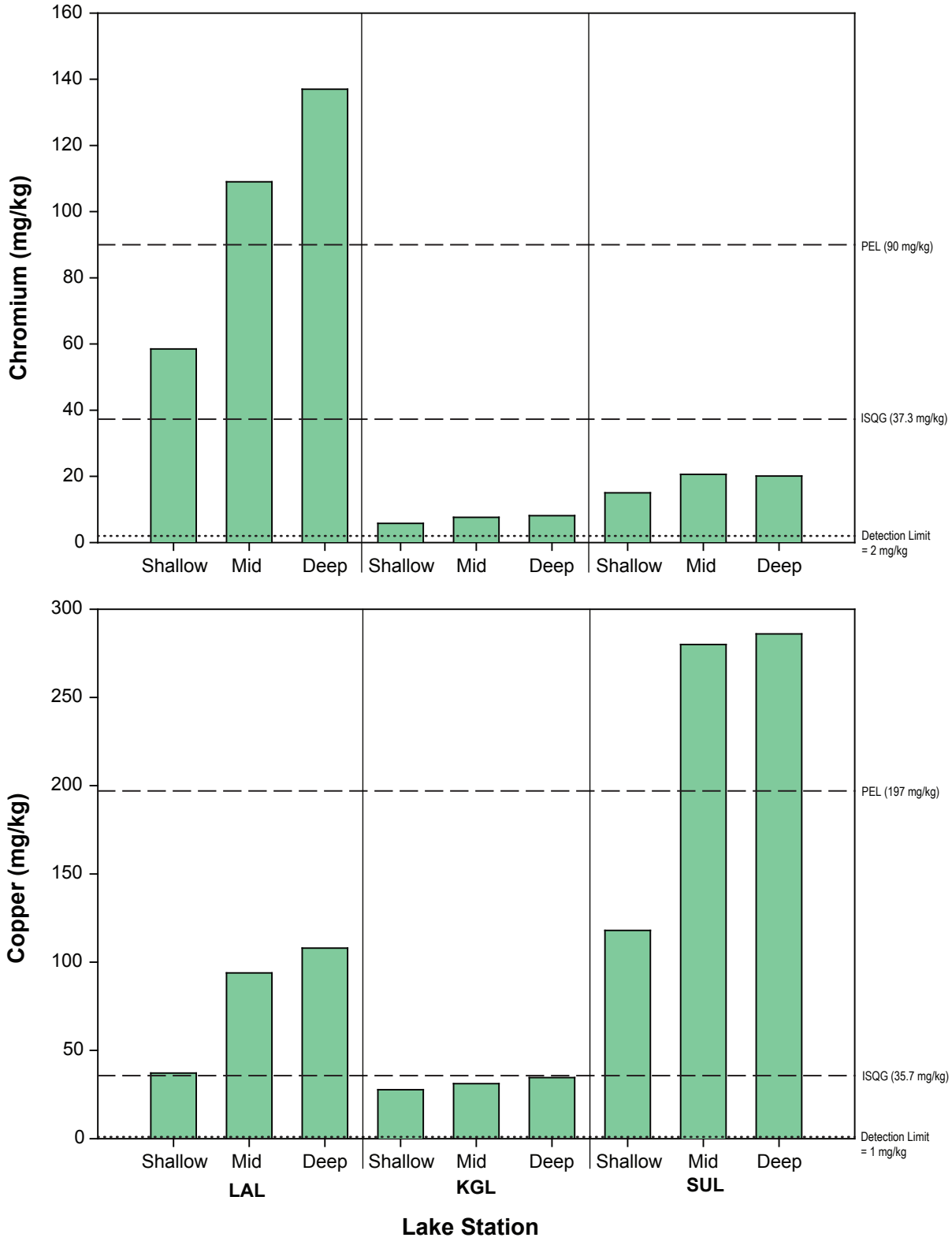

Note: Dotted line represents analytical detection limit.
Dashed lines represent CCME Sediment Quality Guidelines and/or BC Working Guidelines for Sediment.

Chromium and Copper Concentrations in Lake Sediments in the KSM Project Study Area, 2008

FIGURE 9.3-5

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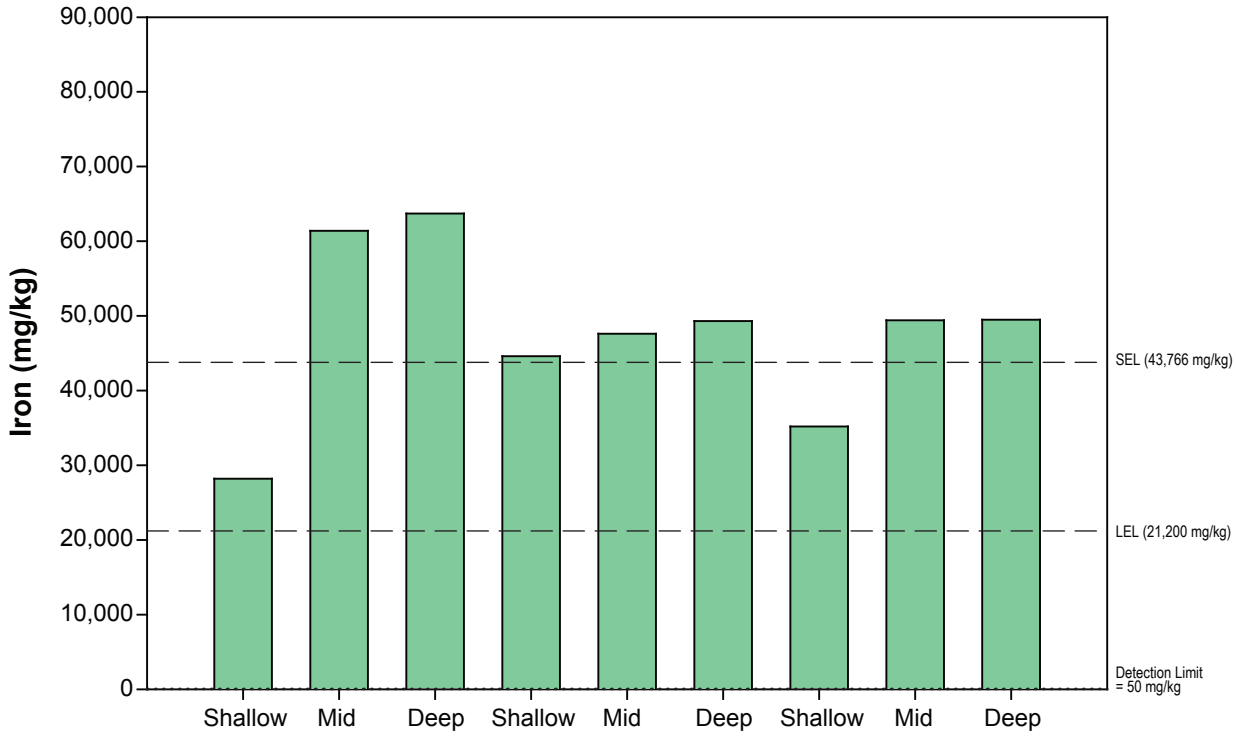

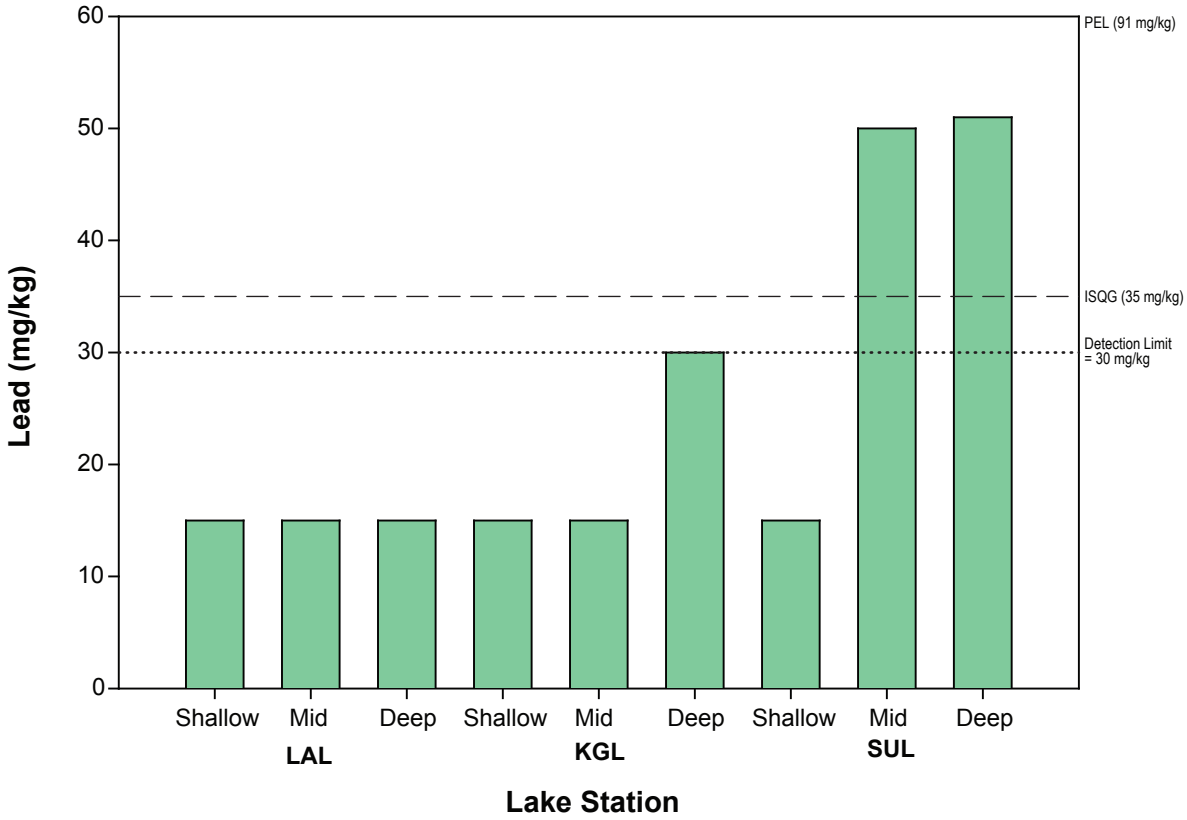

Note: Dotted line represents analytical detection limit
Dashed lines represent CCME Sediment Quality Guidelines and/or BC Working Guidelines for Sediment

Iron and Lead Concentrations in Lake Sediments in the KSM Project Study Area, 2008

FIGURE 9.3-6

SEABRIDGE GOLD

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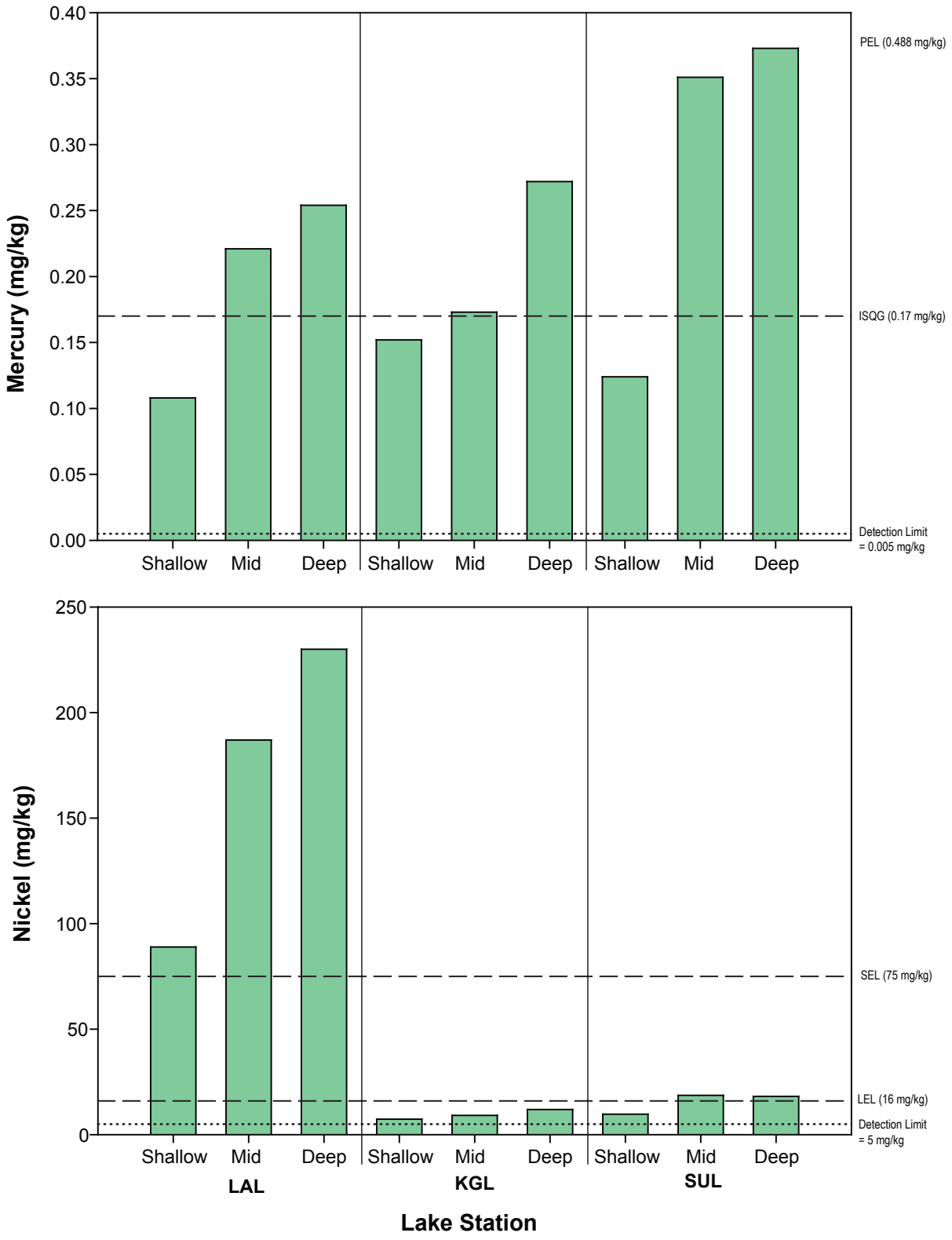

Note: Dotted line represents analytical detection limit.
Dashed lines represent CCME Sediment Quality Guidelines and/or BC Working Guidelines for Sediment.

Mercury and Nickel Concentrations in Lake Sediments in the KSM Project Study Area, 2008

FIGURE 9.3-7

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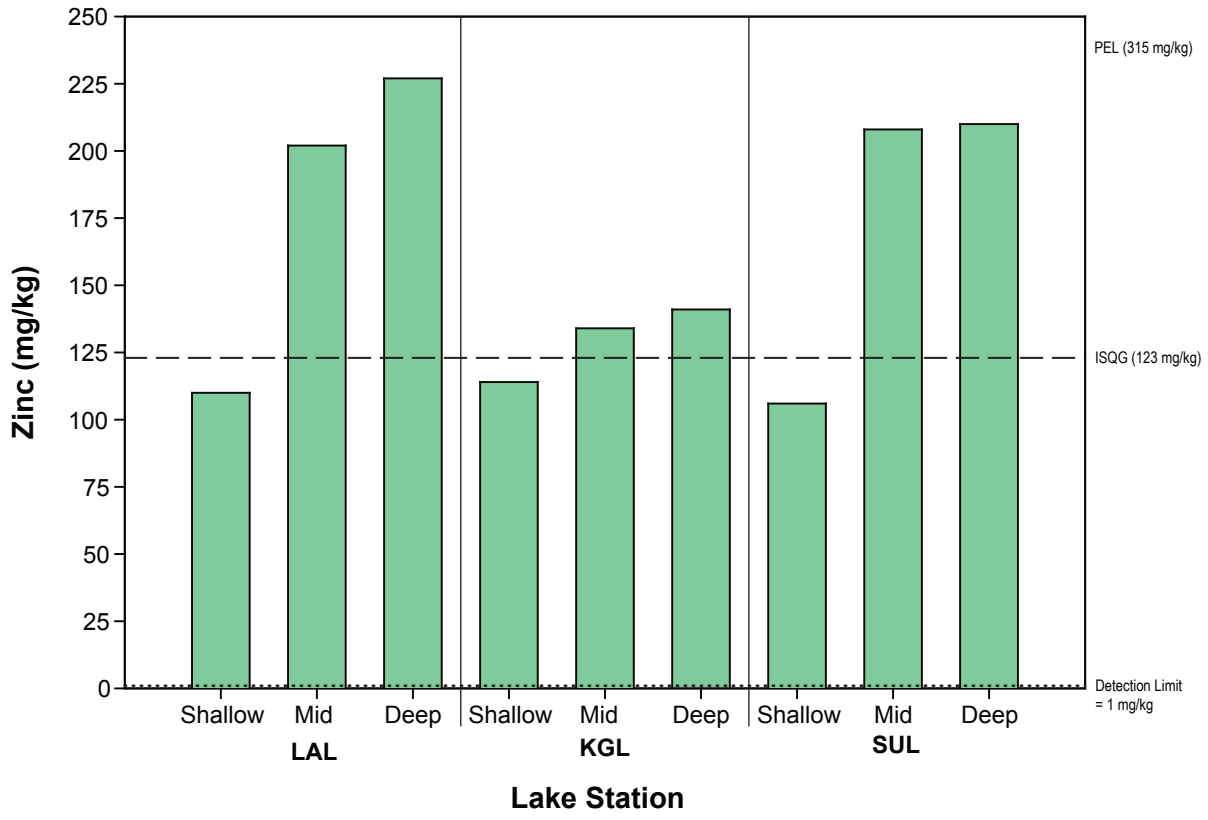

Note: Dotted line represents analytical detection limit.
Dashed lines represent CCME Sediment Quality Guidelines and/or BC Working Guidelines for Sediment.

Zinc Concentrations in Lake Sediments in the KSM Project Study Area, 2008

FIGURE 9.3-8

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9.3.5.3 Primary Producers – Phytoplankton

All analytical and taxonomic data is presented in Appendix 9.3.5C and 9.3.5D.

Biomass and Density

Phytoplankton biomass (chlorophyll *a* concentrations) was measured in the Project Study Area lakes. Biomass was greatest in LAL, with lower concentrations in KGL and with the lowest concentrations being measured in SUL. Biomass ranged from 0.024 *u*g/L (SUL-deep) to 1.08 *u*g/L (LAL mid) (Figure 9.3-9).

Phytoplankton density was also much higher at LAL (maximum density of 207 cells/mL) compared to the two other lakes (Figure 9.3-9). Density was extremely low (<10 cells/mL) in KGL and SUL, with no cells measured in the mid-depth station of SUL.

Richness and Evenness

Species richness was greatest in LAL, ranging from 16 to 19 taxa (Figure 9.3-10). Both KGL and SUL had very few species present, ranging from none observed to 3. Evenness was not calculated for those samples with less than two species present (KGL deep and all SUL stations) (Figure 9.3-10). Evenness at the other lake stations ranged from 0.56 (LAL mid) to 1 (KGL shallow).

Community Composition

The phytoplankton community in KGL and SUL was composed entirely of diatoms (Figure 9.3-11). LAL was more diverse, with Cryptophyta, Chrysophyta, Dinoflagellates and Chlorophyta making up approximately 20% of the community.

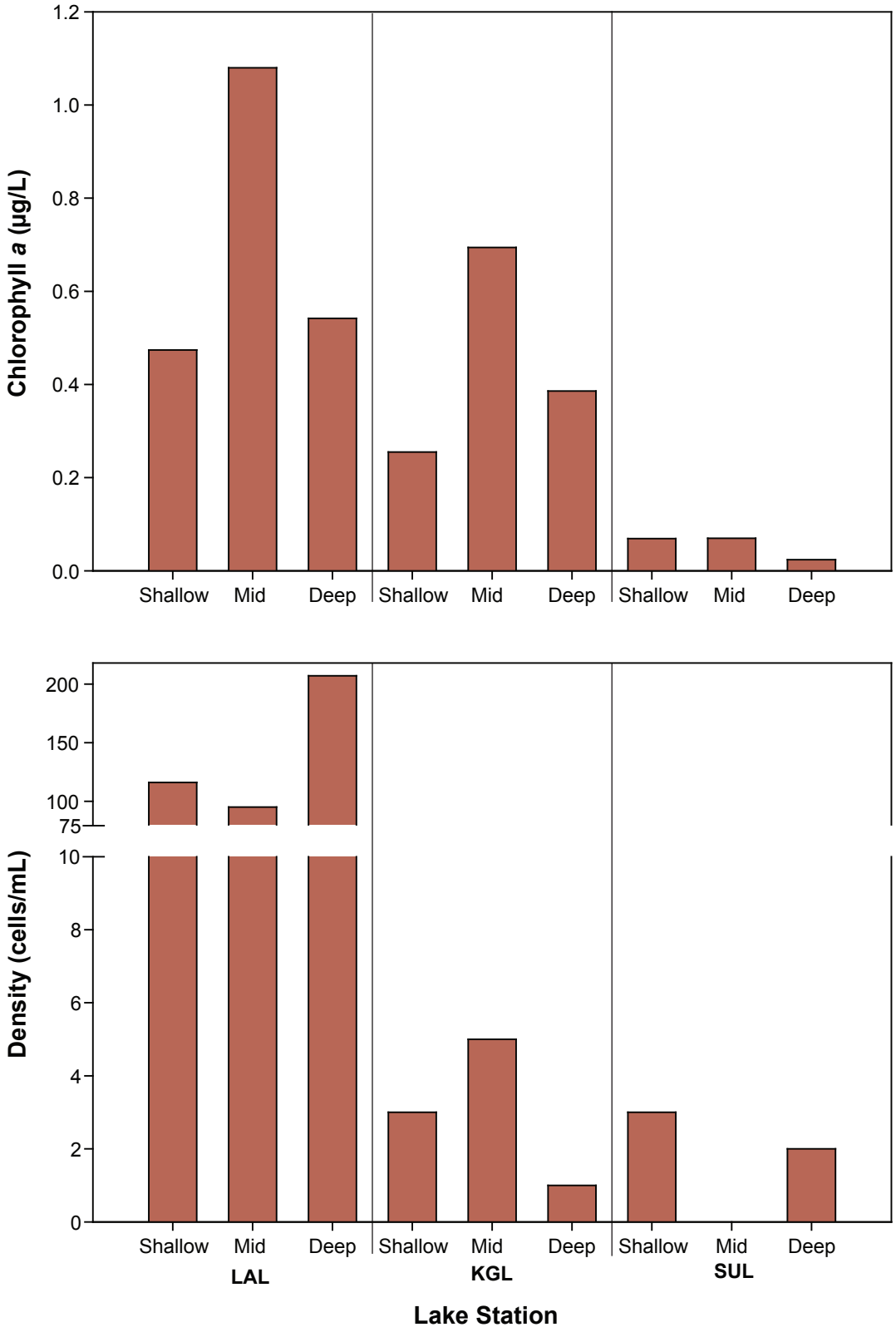
Diversity Indices

Shannon diversity was greatest at LAL, ranging from 1.5 to 2.1 (Figure 9.3-12). Diversity was lower at KGL and non computable at SUL due to lack of algae available at this site, and at the deep station of KGL. Simpson's Diversity ranged from 0.6 to 0.8 at LAL (Figure 9.3-12). The highest diversity was calculated at KGL shallow, which is a function of the perfect evenness present in this phytoplankton community biased by the low richness and density.

9.3.5.4 Secondary Producers – Zooplankton

All taxonomy data and volume calculations are presented in Appendices 9.3.5E and 9.3.5F, respectively.

Zooplankton density in KSM Project Study Area lakes ranged from near 0 at all KGL and SUL stations to 1418 organisms/m^3 (LAL deep) (Figure 9.3-13). Zooplankton species richness was much higher at LAL (8 to 9 species per station) compared to the two other sites (0 to 2 species/ station) (Figure 9.3-14). Zooplankton species evenness was likewise moderate to high at LAL (0.44 to 0.68) and not calculated at the other two lakes due to low density values (Figure 9.3-14). At those sites with 1 or 0 species present, evenness was not calculated.



Phytoplankton Biomass (as Chlorophyll *a*) and Density in KSM Project Study Area Lakes, 2008

FIGURE 9.3-9

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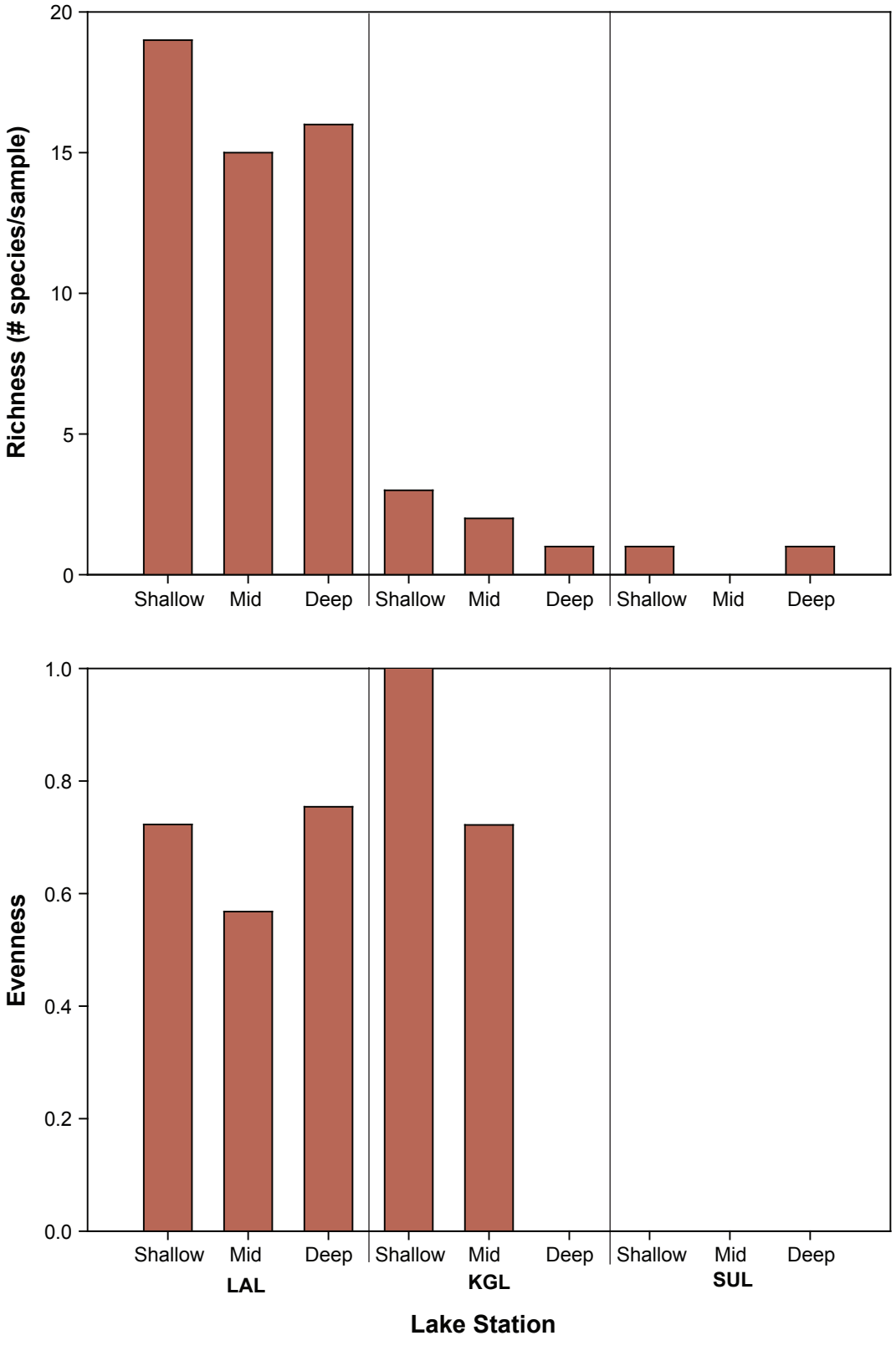

Phytoplankton Species Richness and Evenness in KSM Project Study Area Lakes, 2008

FIGURE 9.3-10

SEABRIDGE GOLD

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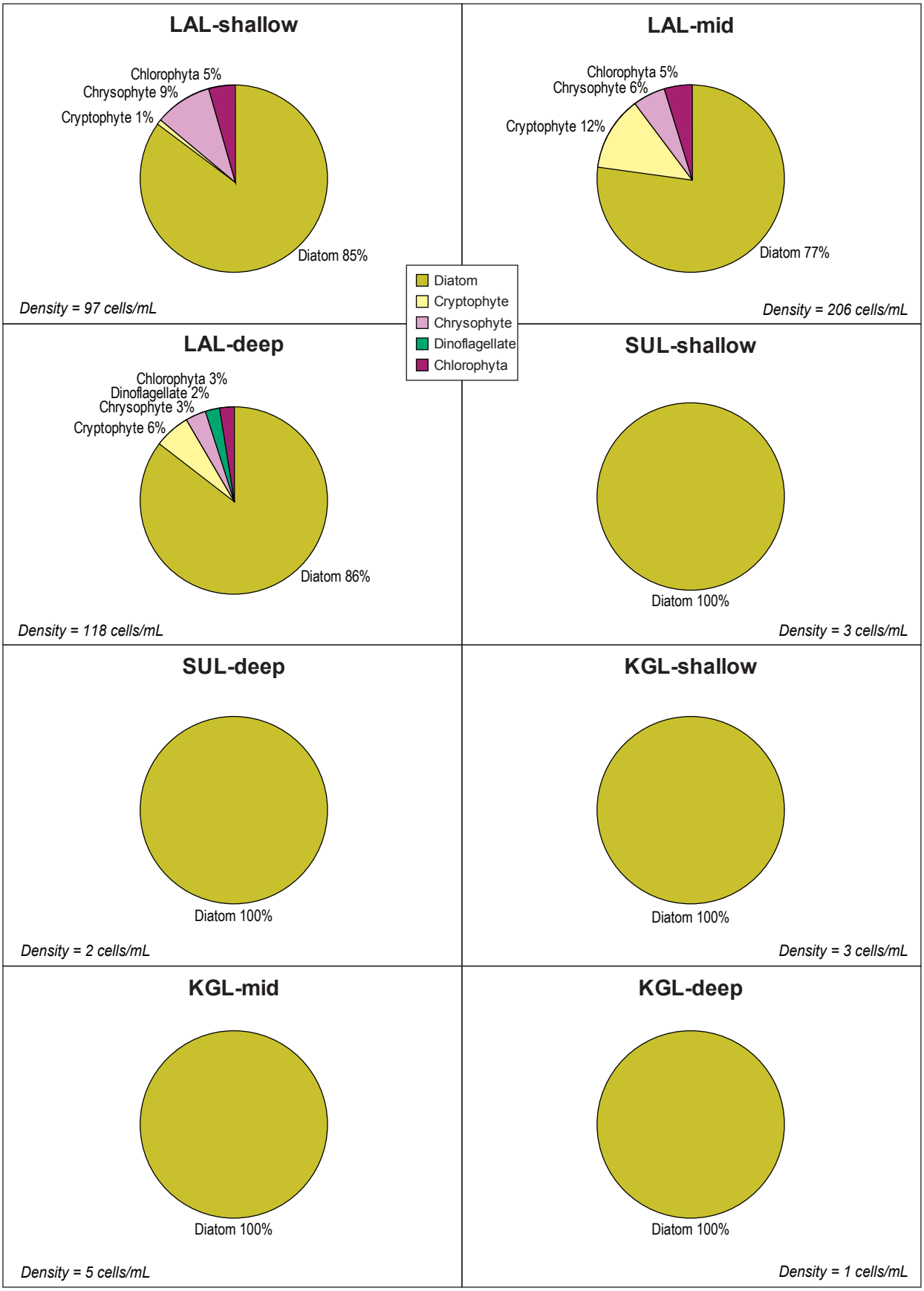

Relative Density of Phytoplankton in KSM Project Study Area Lakes, 2008

FIGURE 9.3-11

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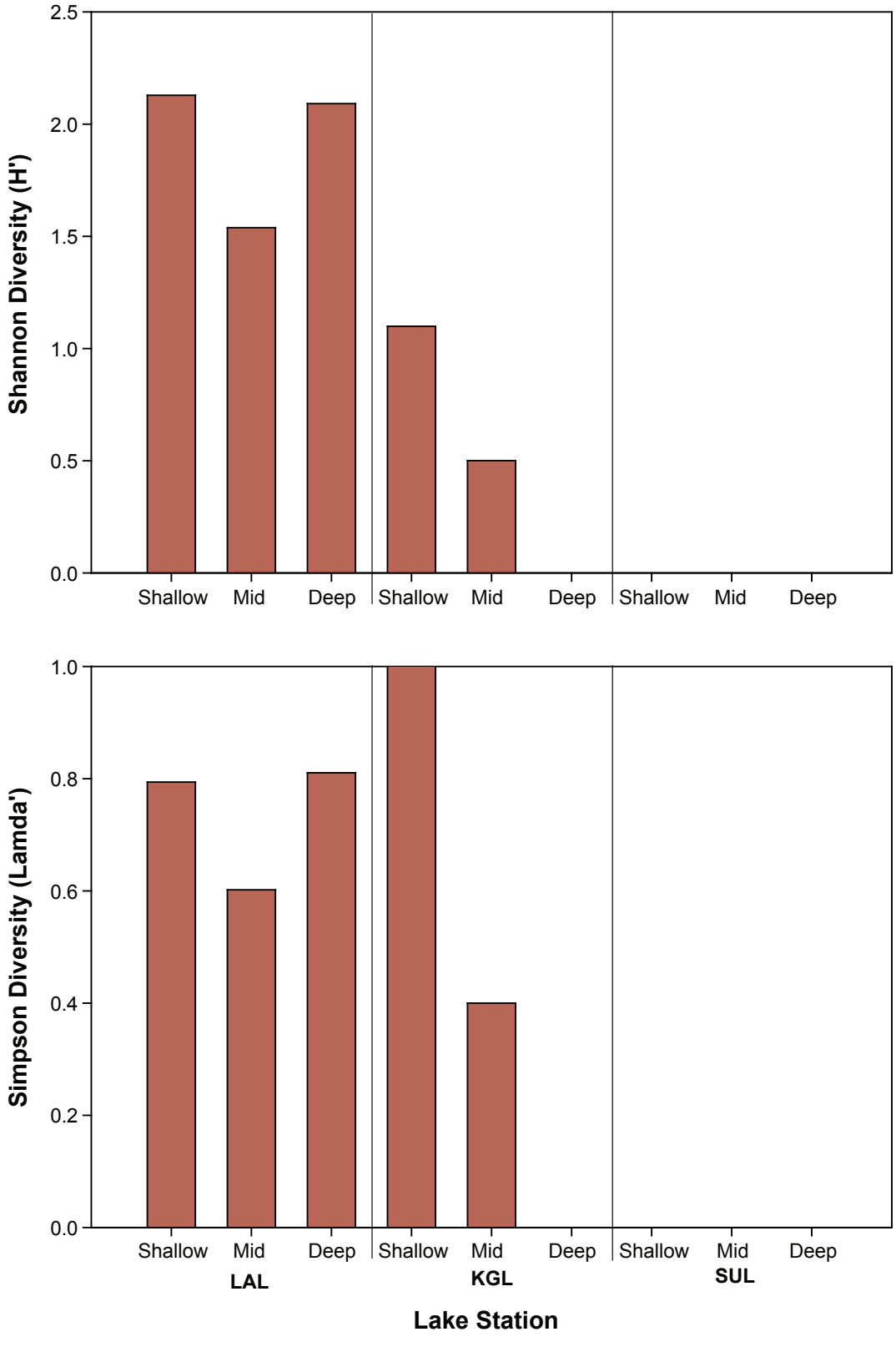

Phytoplankton Shannon and Simpson Diversity Indices for KSM Project Study Area Lakes, 2008

FIGURE 9.3-12

SEABRIDGE GOLD

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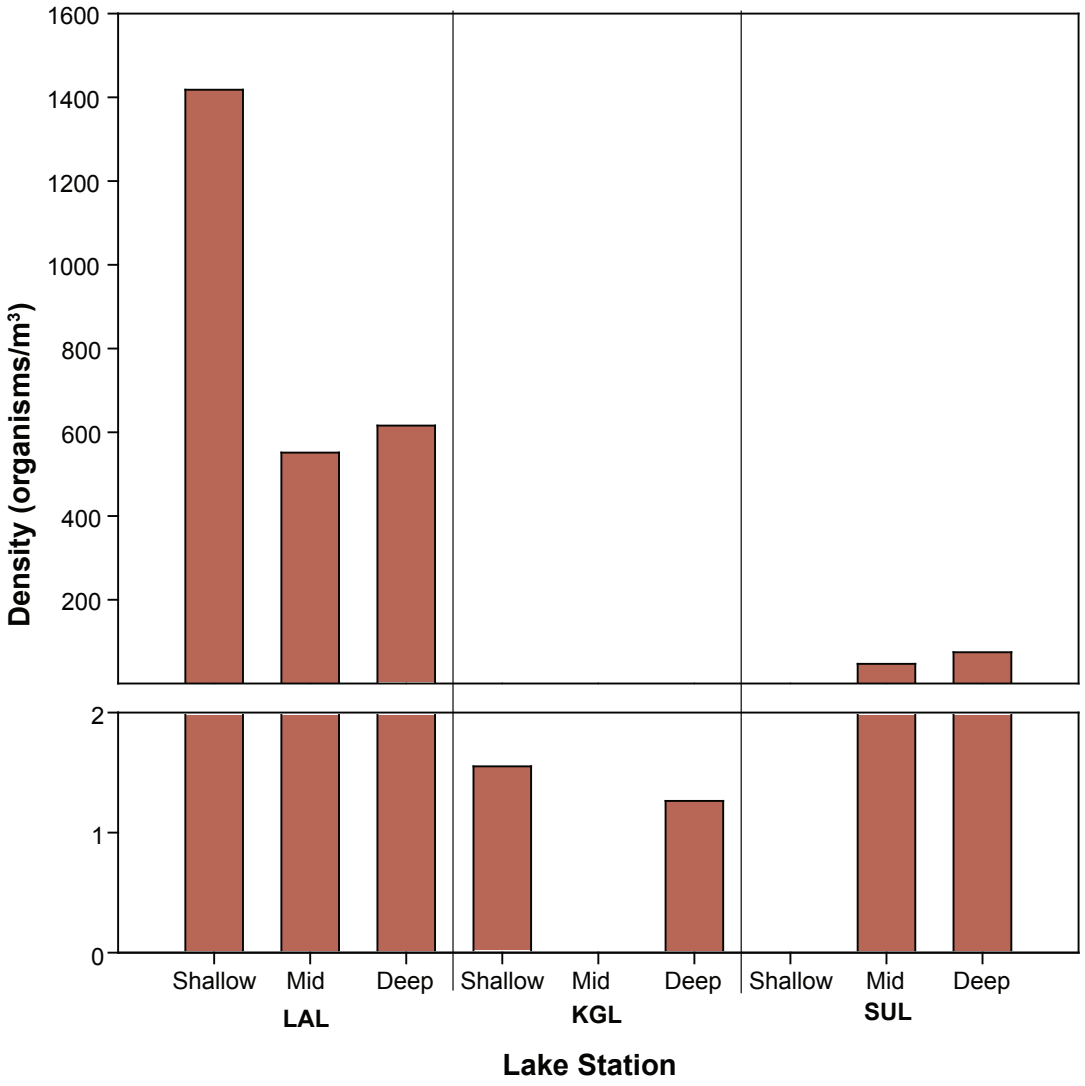

Note: No zooplankton were found at KGL mid or SUL shallow

Zooplankton Density in KSM Project Study Area Lakes, 2008

FIGURE 9.3-13

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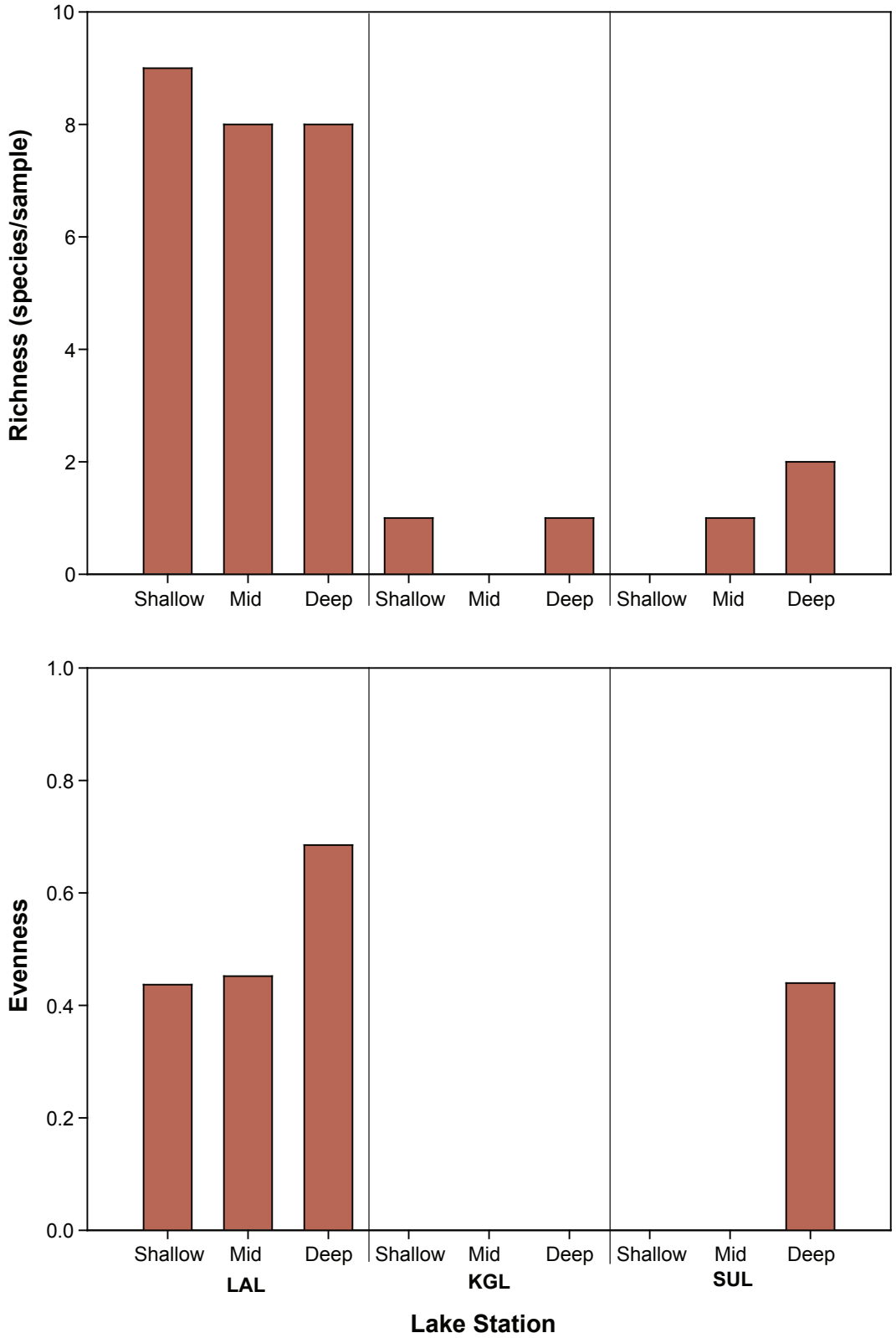
Rescan™



Note: Due to low numbers at KGL and SUL, evenness was non computable

Zooplankton Species Richness and Evenness in KSM Project Study Area Lakes, 2008

FIGURE 9.3-14

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The zooplankton community in LAL contained twelve different groups (Figure 9.3-15), with Rotifera being the predominant group in the zooplankton community. LAL deep also had a large percentage (32%) of nauplii present. Rotifera made up 100% of the zooplankton community in KGL shallow, SUL shallow and SUL deep. Diacyclops made up 100% of the community measured at KGL deep.

Zooplankton diversity was moderate at LAL and not calculated at the other two lakes (Figure 9.3-16).

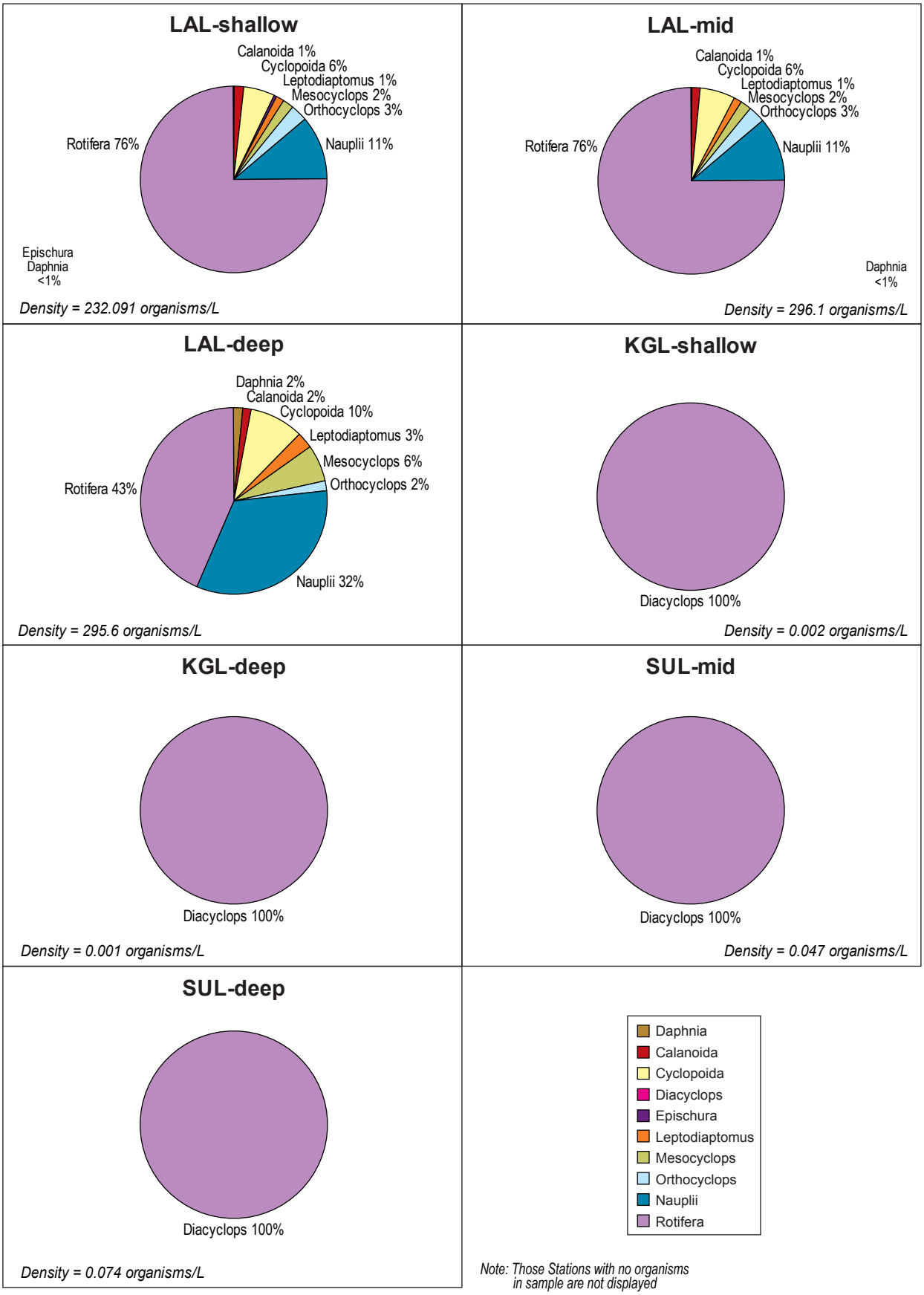
9.3.5.5 Secondary Producers - Benthic Invertebrates

The shallow zone (0-2 m deep) in SUL and KGL was characterized by boulders and hard packed sediment that made the collection of benthic invertebrate samples from these depths unfeasible. Consequently, benthic invertebrate samples were not collected from the shallow depths of SUL and KGL. All lake benthic data is provided in Appendix 9.3.5G.

Benthic invertebrate densities in the KSM Project Study Area lakes ranged from 0 to 6,552 organisms/m^2 (Figure 9.3-17). SUL and KGL were characterized by very sparse benthic invertebrate communities with density at or near zero. The mid-depth station at SUL at a density of 10 organisms/m^2. At LAL, density increased with depth, ranging from 562 to 6,552 organisms/m^2. Genus richness ranged from 4 to 11 genera at LAL, and was at zero at all KGL sites and the deep station at SUL, with 1 genera at SUL mid-depth (Figure 9.3-17).

At SUL mid-depth, Diptera (chironomids) were the only taxon in the sample. At the shallow site at LAL, the benthic community was predominantly composed of Pelecypoda (51%) and Diptera (43%), with lower numbers of Nematoda, Oligochaeta and Gastropoda. The mid-depth site was dominated by Oligochaeta (53%) with the rest of community consisting of Diptera and Pelecypoda. The community found in the deep station of LAL was composed primarily of Diptera (67%), with Nematoda, Oliogchaeta and Ostracoda composing the rest of the community (Figure 9.3-18). Therefore, chironomids, oligochaetes and clams were the dominant benthos at LAL.

Genus evenness ranged from 0.60 (LAL mid) to 0.83 (LAL deep) and was non-computable for KGL and SUL site due to the lack of organisms in samples (Figure 9.3-19). Both Shannon and Simpson Diversity indices were not computable at SUL and KGL due to an insufficient number of organisms at all sites (Figure 9.3-20). Both Shannon's and Simpson's Diversity indices were greatest at the deep station of LAL (1.73 and 0.78, respectively). Shannon Diversity and Simpson's Diversity at LAL ranged from 1.16 to 1.73 and 0.63 to 0.78, respectively.

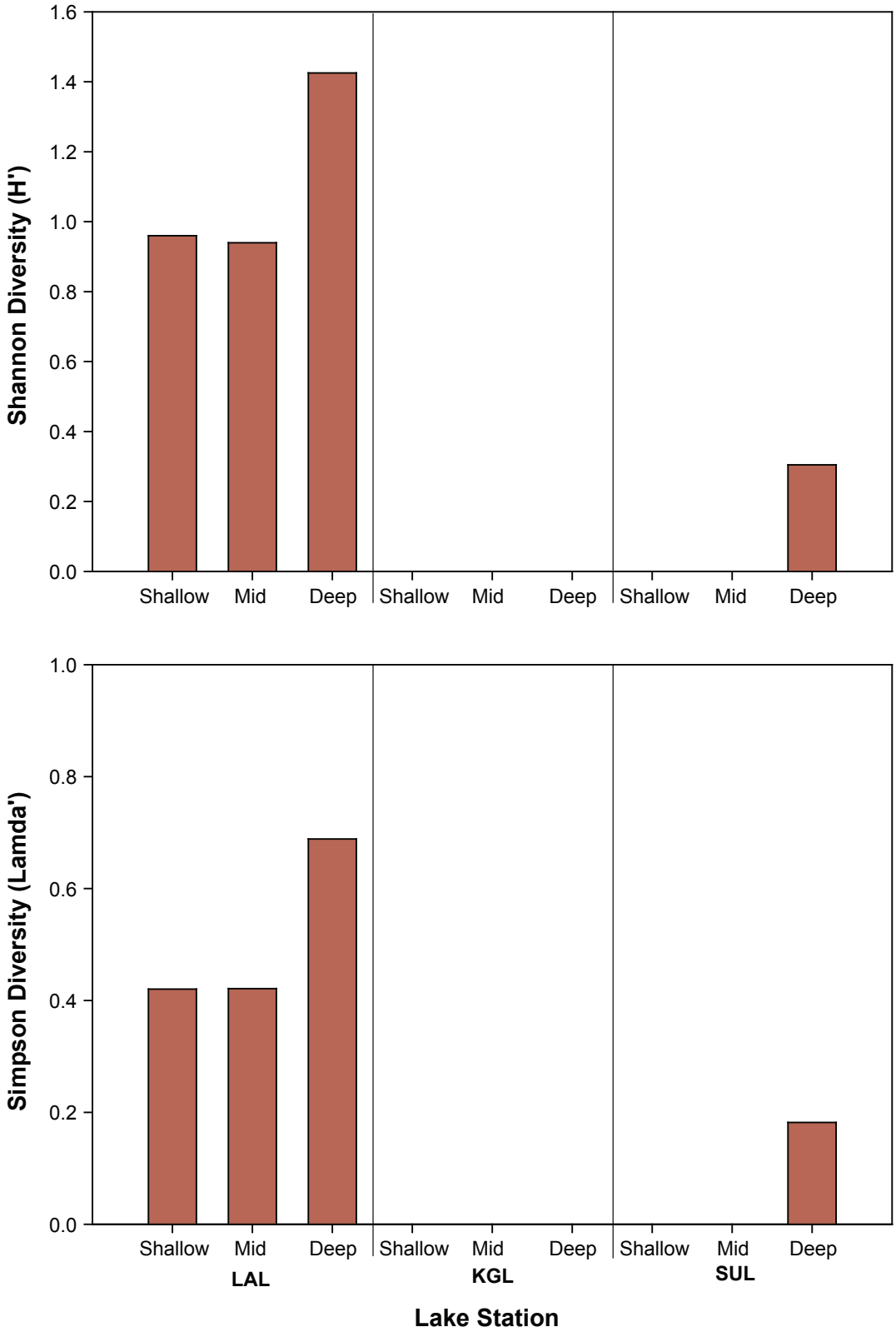


Relative Density of Zooplankton in KSM Project Study Area Lakes, 2008

FIGURE 9.3-15

SEABRIDGE GOLD

Rescan™



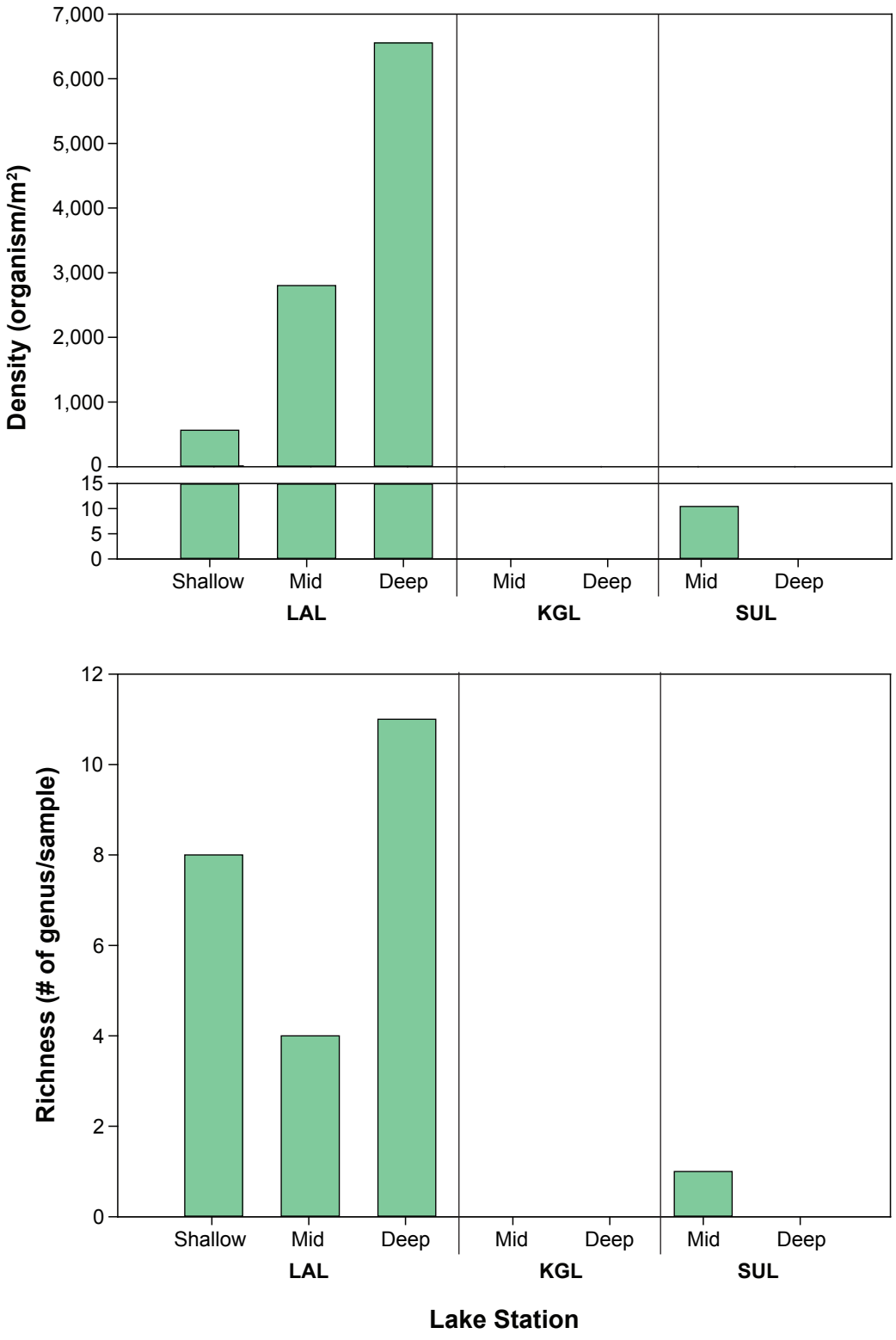
Note: Due to low numbers at KGL and SUL, diversity was non computable

Zooplankton Shannon and Simpson Diversity Indices in KSM Project Study Area Lakes, 2008

FIGURE 9.3-16

SEABRIDGE GOLD

Rescan™



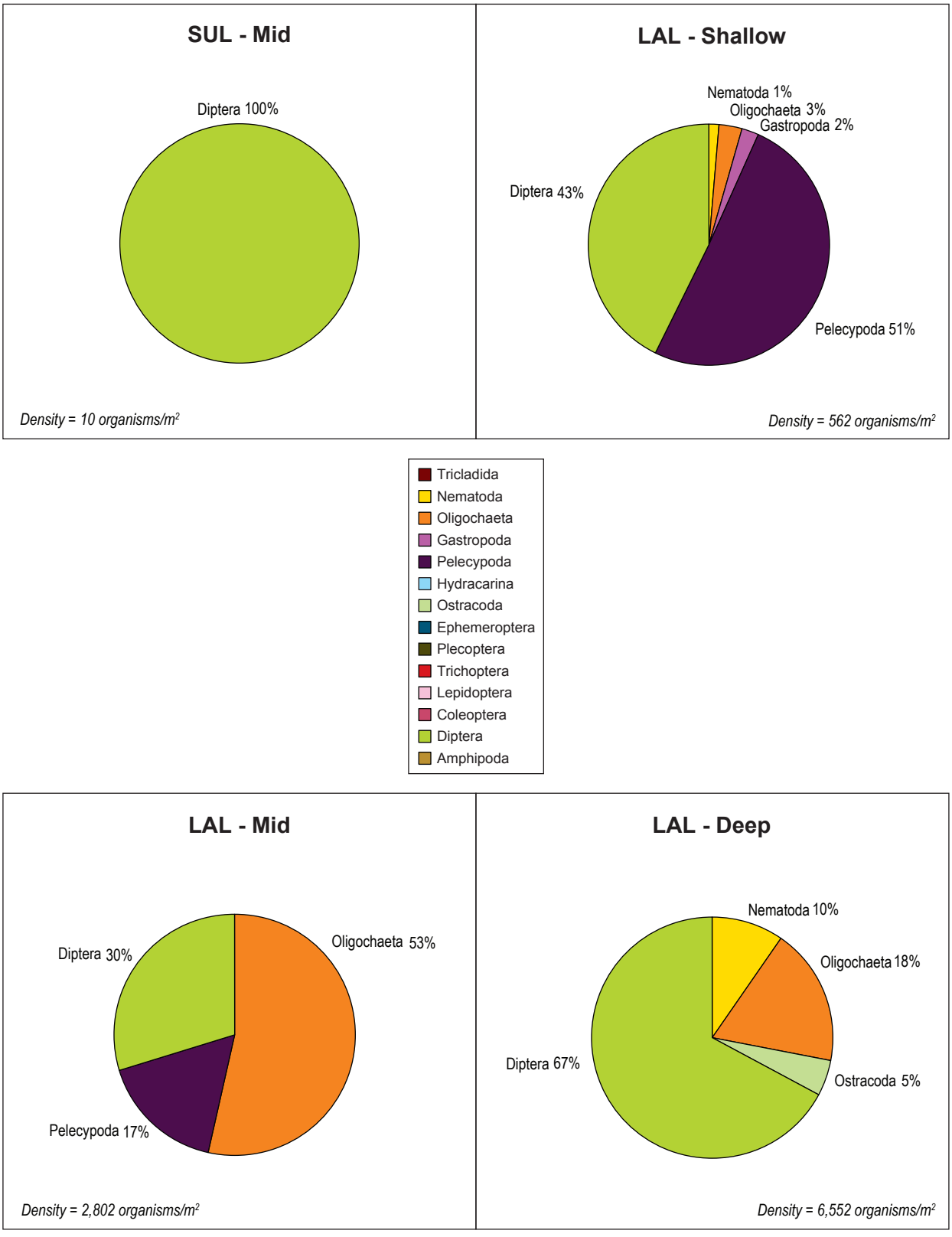
Note: No benthic invertebrate samples were collected at KGL and SUL Shallow

Benthic Invertebrate Density and Genus Richness at KSM Project Study Area Lakes, 2008

FIGURE 9.3-17

SEABRIDGE GOLD

Rescan™



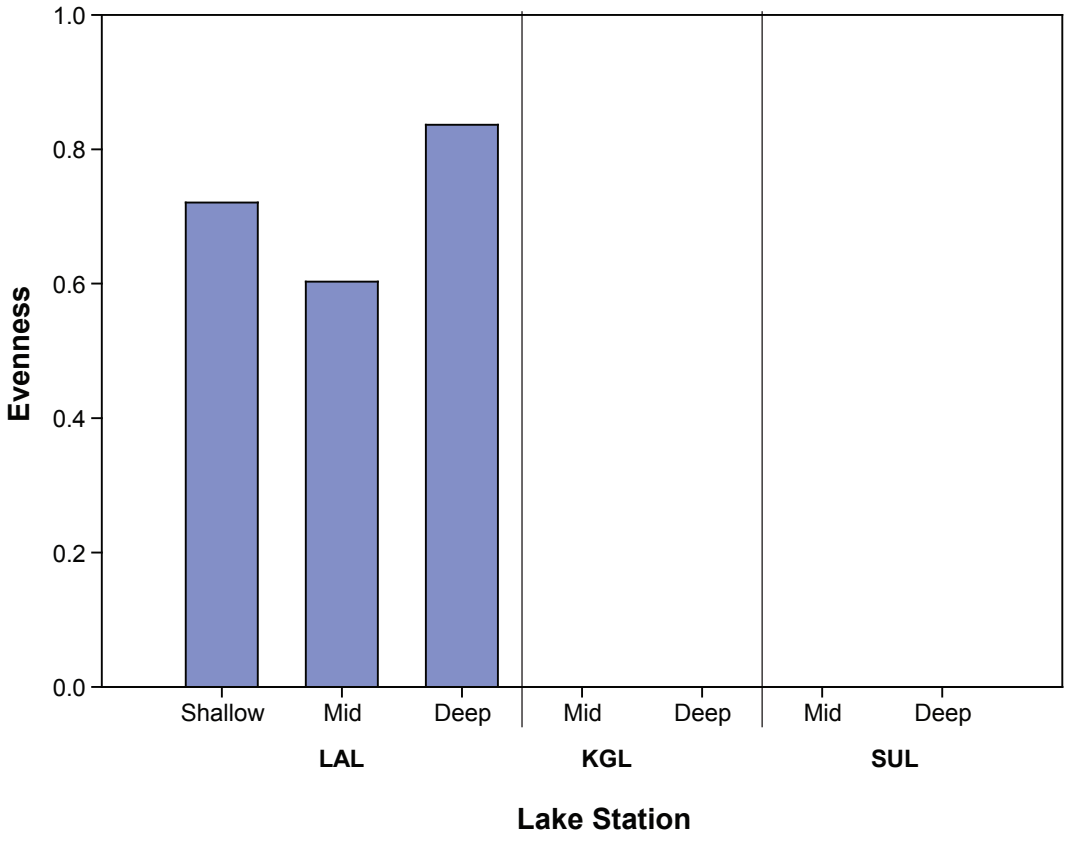
Note: Those Stations with no organisms in sample are not displayed

Relative Density of Benthic Invertebrate in KSM Project Study Area Project Lakes, 2008

FIGURE 9.3-18

SEABRIDGE GOLD

Rescan™



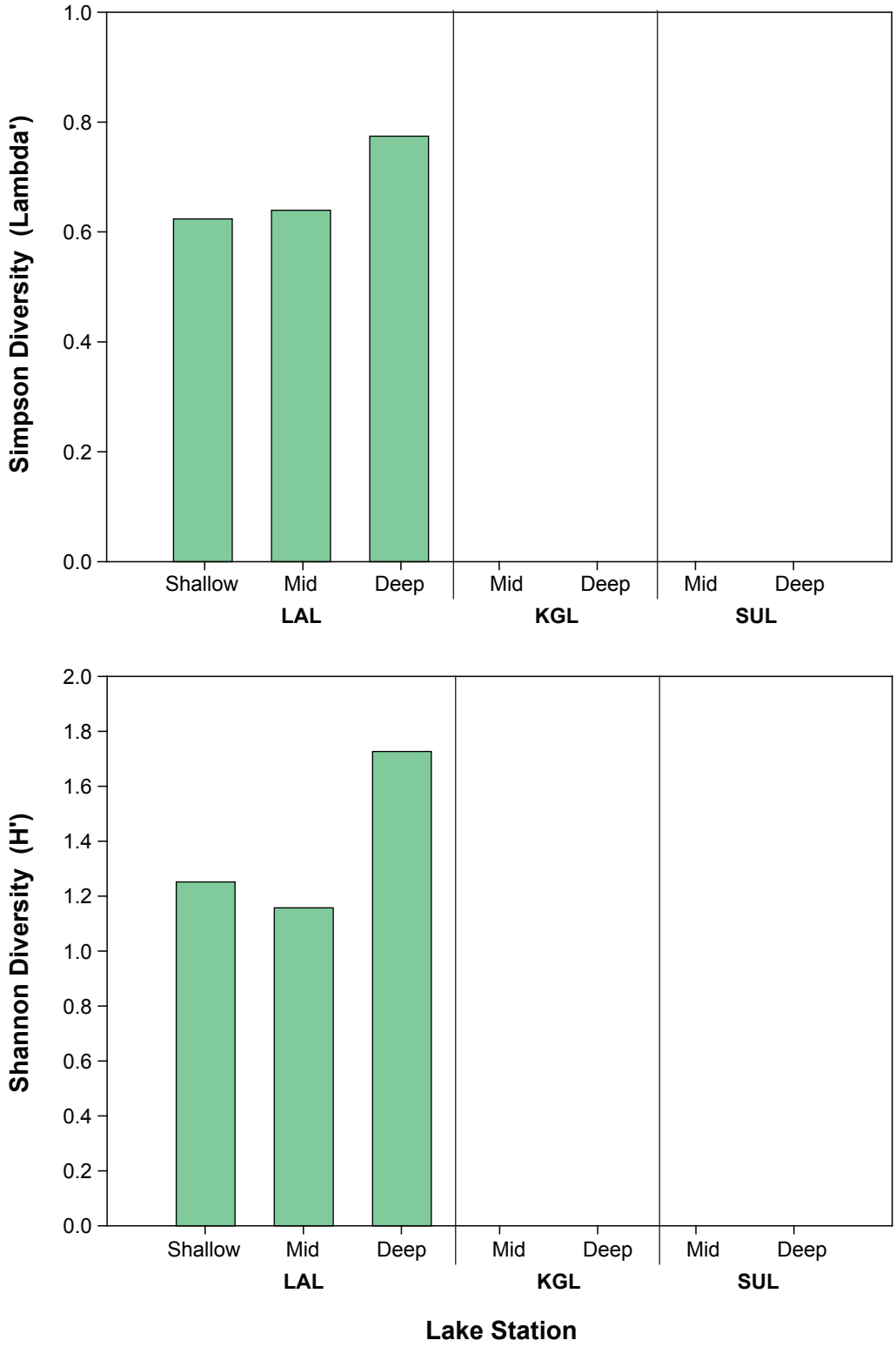
Note: No benthic invertebrate samples were collected at KGL and SUL Shallow
Due to low numbers at KGL and SUL, evenness was non computable

Genus Evenness for Benthic Invertebrates
KSM Project Study Area Lakes, 2008

FIGURE 9.3-19

SEABRIDGE GOLD

Rescan™



Note: No benthic invertebrate samples were collected at KGL and SUL Shallow
Due to low numbers at KGL and SUL, diversity was non computable

Benthic Invertebrate Simpson and Shannon Diversity Indices for KSM Project Study Area Lakes, 2008

FIGURE 9.3-20

SEABRIDGE GOLD

Rescan™

9.3.6 Conclusions

Sulphurets Lake (SUL) and Knipple Glacier Lake (KGL) were characterized by turbid water and minimal visibility. In contrast, West Teigen Lake (LAL) was much clearer and had a Secchi depth of 6 meters.

Sediments in all lakes were composed primarily of silt and clay, which increased in proportion with depth. KGL and SUL had very low nutrient and organic carbon concentrations. KGL and SUL had similar concentrations of most metals while LAL showed different patterns of sediment chemistry. Specifically, concentrations of arsenic, cadmium, calcium, copper, magnesium, mercury and titanium were greater at KGL and SUL then at LAL while aluminum, chromium, cobalt, lithium, manganese and nickel were lower. The CCME and BC guidelines for sediment quality were exceeded at all lakes based on natural baseline concentrations.

KGL and SUL were characterized by very limited biological activity. The phytoplankton, zooplankton and benthic invertebrate communities in these two lakes were very sparse, with little to no organisms found in samples. In contrast, LAL was characterized by diverse and abundant phytoplankton, zooplankton and benthic invertebrate communities, related to natural habitat differences (altitude, water quality, nutrient concentrations, benthic substrates).

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APPENDIX 9.2.5A
ANALYTICAL DATA AND DETECTION LIMITS FOR STREAM SEDIMENTS, KSM 2008

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008

ANALYTICAL DATA					
Sample ID	MC1-1	MC1-2	MC1-3	MCTR-1	MCTR-2
Date Sampled	13-AUG-08	13-AUG-08	13-AUG-08	13-AUG-08	13-AUG-08
ALS Sample ID	L676344-1	L676344-2	L676344-3	L676344-4	L676344-5
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	16.1	14.5	16.4	14.9	16.8
pH	7.81	7.77	7.7	7.89	8
Particle Size					
% Gravel (>2mm)	**0.5**	30	6	5	1
% Sand (2.0mm - 0.063mm)	65	54	65	79	70
% Silt (0.063mm - 4um)	32	13	24	14	27
% Clay (<4um)	4	2	5	2	3
Leachable Anions & Nutrients					
Total Nitrogen by LECO	**0.01**	0.03	0.04	0.05	0.06
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	**0.05**	**0.05**	**0.05**	**0.05**	0.5
Plant Available Nutrients					
Available Phosphate-P	4	3	5	**0.5**	1
Metals					
Aluminum (Al)	9720	8910	9300	15300	15800
Antimony (Sb)	**5**	**5**	11	**5**	**5**
Arsenic (As)	56.7	67.6	64.4	15.1	17
Barium (Ba)	56.9	30.7	47.9	70.5	97.6
Beryllium (Be)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	1.32	1.08	1.25	0.73	0.80
Calcium (Ca)	7270	5910	7150	24500	23700
Chromium (Cr)	2.4	3.2	2.5	17.6	17.7
Cobalt (Co)	12.9	23.2	16	12.2	13.4
Copper (Cu)	228	322	262	77.5	82.9
Iron (Fe)	47000	80200	56300	37300	38600
Lead (Pb)	36	50	39	**15**	**15**
Lithium (Li)	13.6	12.7	13.1	12.2	12.1
Magnesium (Mg)	5530	5330	5350	13100	13100
Manganese (Mn)	488	460	474	776	783
Mercury (Hg)	0.234	0.251	0.254	0.0902	0.1
Molybdenum (Mo)	34.4	31.7	35.2	4.7	5.2
Nickel (Ni)	**2.5**	**2.5**	**2.5**	28.4	29.2
Phosphorus (P)	1580	1380	1610	1410	1560
Potassium (K)	570	590	520	900	1070
Selenium (Se)	**5**	**9**	**5**	**4**	**2**
Silver (Ag)	**1**	**1**	2.1	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**
Strontium (Sr)	32.6	26.2	30.1	89.2	94
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	732	723	712	944	1140
Vanadium (V)	35.1	39.4	35.3	95.2	103
Zinc (Zn)	160	139	150	114	119

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	MCTR-3	SUNR-1	SUNR-2	SUNR-3	TEC2-1
Date Sampled	13-AUG-08	13-AUG-08	13-AUG-08	13-AUG-08	14-AUG-08
ALS Sample ID	L676344-6	L676344-7	L676344-8	L676344-9	L676344-10
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	13.2	16.4	14.3	16.2	14.8
pH	8.07	8.37	8.28	8.31	7.97
Particle Size					
% Gravel (>2mm)	2	**0.5**	**0.5**	**0.5**	12
% Sand (2.0mm - 0.063mm)	74	83	87	81	83
% Silt (0.063mm - 4um)	22	16	13	18	4
% Clay (<4um)	3	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.05	0.02	0.03	0.03	0.1
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.4	**0.05**	**0.05**	**0.05**	0.5
Plant Available Nutrients					
Available Phosphate-P	1	**0.5**	1	1	4
Metals					
Aluminum (Al)	15900	10100	11000	10500	20800
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	15.3	**2.5**	6	5.5	6.3
Barium (Ba)	85.8	67.9	81.9	71.3	112
Beryllium (Be)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	0.83	**0.25**	**0.25**	**0.25**	**0.25**
Calcium (Ca)	24600	9500	10400	10300	3500
Chromium (Cr)	18.4	27	31.7	31.9	91.2
Cobalt (Co)	12.4	8.2	10.7	9.2	12.9
Copper (Cu)	78.8	34.9	42.6	39.7	34.1
Iron (Fe)	37500	19700	27000	23700	35200
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	12.9	5.9	6.2	5.9	30.9
Magnesium (Mg)	13200	7880	8520	8170	16900
Manganese (Mn)	769	364	379	374	510
Mercury (Hg)	0.0786	**0.0025**	**0.0025**	**0.0025**	0.0474
Molybdenum (Mo)	4.7	**2**	**2**	**2**	**2**
Nickel (Ni)	27.8	16.6	19.3	18.1	118
Phosphorus (P)	1490	688	1000	908	703
Potassium (K)	1010	960	1030	940	1350
Selenium (Se)	**2**	**1**	**1**	**1**	**1**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	220	240	220	340
Strontium (Sr)	96.2	53.7	55.2	54.7	30.3
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	1100	891	1010	943	356
Vanadium (V)	102	46.8	63.1	53.9	52.4
Zinc (Zn)	120	57.5	43	41	94.8

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	TEC2-2	TEC2-3	HLO-1	HLO-2	HLO-3
Date Sampled	14-AUG-08	14-AUG-08	14-AUG-08	14-AUG-08	14-AUG-08
ALS Sample ID	L676344-11	L676344-12	L676344-13	L676344-14	L676344-15
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	18.3	22.5	25.4	22.9	22.6
pH	7.28	7.19	6.81	6.77	6.59
Particle Size					
% Gravel (>2mm)	7	1	39	**0.5**	**0.5**
% Sand (2.0mm - 0.063mm)	87	60	43	82	86
% Silt (0.063mm - 4um)	4	33	15	11	10
% Clay (<4um)	1	6	3	6	3
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.08	0.1	0.11	0.07	0.08
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.5	1	1.8	0.9	0.8
Plant Available Nutrients					
Available Phosphate-P	4	5	3	3	5
Metals					
Aluminum (Al)	20900	20700	20000	19500	19400
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	6	7.8	6.3	7	7.3
Barium (Ba)	110	126	124	84.6	83
Beryllium (Be)	**0.25**	**0.25**	0.53	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Calcium (Ca)	3530	4110	3210	3160	2940
Chromium (Cr)	88.4	90.7	88.9	88.2	88.9
Cobalt (Co)	13.4	15.2	11.8	9.9	9
Copper (Cu)	35.9	36.8	21.3	18.3	17.7
Iron (Fe)	35300	34600	34100	34000	33000
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	31.5	31.5	29.2	27.5	27.7
Magnesium (Mg)	16500	15800	14100	13800	14100
Manganese (Mn)	524	638	648	397	350
Mercury (Hg)	0.0484	0.0675	0.042	0.0318	0.0329
Molybdenum (Mo)	**2**	**2**	**2**	**2**	**2**
Nickel (Ni)	120	114	110	94.5	93.7
Phosphorus (P)	714	779	623	597	609
Potassium (K)	1310	1260	900	930	900
Selenium (Se)	**1**	**1**	**1**	**2**	**1**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	290	**100**	**100**	**100**	**100**
Strontium (Sr)	31.7	31.8	19.9	21.2	18.6
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	310	424	327	438	387
Vanadium (V)	51.5	51.8	50.4	51.2	51.1
Zinc (Zn)	95.8	97.2	101	90.4	90.3

Note: all measurements are mg/kg unless otherwise noted

(continued)

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	SNO2-1	SNO2-2	SNO2-3	TEC1-1	TEC1-2
Date Sampled	14-AUG-08	14-AUG-08	14-AUG-08	14-AUG-08	14-AUG-08
ALS Sample ID	L676344-16	L676344-17	L676344-18	L676344-19	L676344-20
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	21.4	20.4	20.6	13.4	11.7
pH	7.02	7	7.01	7.18	7.11
Particle Size					
% Gravel (>2mm)	1	**0.5**	1	30	52
% Sand (2.0mm - 0.063mm)	94	93	90	68	47
% Silt (0.063mm - 4um)	3	5	8	1	1
% Clay (<4um)	2	1	2	1	**0.5**
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.05	0.05	0.07	0.05	0.04
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.4	0.4	0.4	0.4	0.4
Plant Available Nutrients					
Available Phosphate-P	3	4	4	2	2
Metals					
Aluminum (Al)	19100	19000	18700	21000	21800
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	6.7	7.1	7.8	6.2	6.3
Barium (Ba)	86.7	84	76.3	59.9	67.7
Beryllium (Be)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Calcium (Ca)	3220	3160	3020	4740	6950
Chromium (Cr)	86.6	88.5	86.6	92.3	105
Cobalt (Co)	12.4	12	12.3	11.8	13
Copper (Cu)	30.8	30.2	31	24.1	24.1
Iron (Fe)	32800	33300	33700	32500	35900
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	30.6	30.5	30.8	31.7	28.2
Magnesium (Mg)	15200	15300	15300	17200	17600
Manganese (Mn)	681	628	669	529	602
Mercury (Hg)	0.0494	0.0505	0.0493	0.0359	0.0394
Molybdenum (Mo)	**2**	**2**	**2**	**2**	**2**
Nickel (Ni)	107	107	108	96.7	108
Phosphorus (P)	675	672	673	679	1160
Potassium (K)	1130	1030	800	730	860
Selenium (Se)	**1**	**1**	**1**	**1**	**1**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**
Strontium (Sr)	21.4	21	22.2	16.4	20.6
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	378	368	314	678	669
Vanadium (V)	47.9	48.4	46.7	53	58.8
Zinc (Zn)	91.6	89.8	91.2	72	88.1

Note: all measurements are mg/kg unless otherwise noted

(continued)

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	TEC1-3	SNO1-1	SNO1-2	SNO1-3	TRC3-1
Date Sampled	14-AUG-08	14-AUG-08	14-AUG-08	14-AUG-08	15-AUG-08
ALS Sample ID	L676344-21	L676344-22	L676344-23	L676344-24	L676344-25
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	15.9	13.4	19.9	19.8	17.8
pH	7.17	7.13	7.04	7.28	7.64
Particle Size					
% Gravel (>2mm)	43	19	4	**0.5**	**0.5**
% Sand (2.0mm - 0.063mm)	55	76	79	72	58
% Silt (0.063mm - 4um)	1	4	14	24	38
% Clay (<4um)	**0.5**	1	3	5	4
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.04	0.07	0.08	0.09	0.05
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.4	0.5	0.3	0.3	0.5
Plant Available Nutrients					
Available Phosphate-P	2	2	3	3	1
Metals					
Aluminum (Al)	22200	18500	14100	15400	15900
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	7.6	8.2	9.9	10.7	27.5
Barium (Ba)	75.5	89.8	72.1	85.9	125
Beryllium (Be)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	**0.25**	**0.25**	**0.25**	**0.25**	1.15
Calcium (Ca)	6220	3240	2730	3090	12200
Chromium (Cr)	106	81.1	61.8	67.4	30.8
Cobalt (Co)	12.9	12.3	16.3	18.9	14
Copper (Cu)	23.7	33.7	42.2	46.5	49.3
Iron (Fe)	35600	32600	36100	38000	38500
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	29.2	32.1	27.8	30.2	28.7
Magnesium (Mg)	17600	14000	10100	11100	11000
Manganese (Mn)	603	749	1470	1660	820
Mercury (Hg)	0.0344	0.0705	0.0891	0.0972	0.15
Molybdenum (Mo)	**2**	**2**	**2**	**2**	**2**
Nickel (Ni)	104	95.8	97.1	104	47.8
Phosphorus (P)	816	759	712	735	1000
Potassium (K)	920	1210	890	950	670
Selenium (Se)	**1**	**1**	**1**	**1.5**	**2**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**
Strontium (Sr)	18.6	20.2	18.2	20.5	52.4
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	810	334	103	159	532
Vanadium (V)	58.9	49.2	38.8	40.4	43.6
Zinc (Zn)	78.8	84.4	114	124	146

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	TRC3-2	TRC3-3	TRC2-1	TRC2-2	TRC2-3
Date Sampled	15-AUG-08	15-AUG-08	15-AUG-08	15-AUG-08	15-AUG-08
ALS Sample ID	L676344-26	L676344-27	L676344-28	L676344-29	L676344-30
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	16.3	18.7	18.6	16.3	16.5
pH	7.68	7.81	7.82	7.87	7.9
Particle Size					
% Gravel (>2mm)	**0.5**	**0.5**	**0.5**	25	**0.5**
% Sand (2.0mm - 0.063mm)	76	70	75	67	81
% Silt (0.063mm - 4um)	20	27	22	7	17
% Clay (<4um)	3	4	2	1	2
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.04	0.04	0.04	0.03	0.03
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.5	0.5	0.4	0.4	0.5
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	16000	15700	15200	16600	15700
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	22.8	22.4	34.7	33.5	40.4
Barium (Ba)	108	130	111	111	117
Beryllium (Be)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	1.07	1.04	1.31	1.15	1.32
Calcium (Ca)	10800	11700	15900	13700	15300
Chromium (Cr)	32.3	31.7	26.8	32.6	26.9
Cobalt (Co)	12.9	13.1	14.2	13	14.3
Copper (Cu)	42.6	42	49.8	45.8	51.7
Iron (Fe)	37800	36800	40500	41000	41900
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	29.5	28.4	25.6	28.8	26.2
Magnesium (Mg)	11300	11100	10800	11600	10900
Manganese (Mn)	768	795	758	757	752
Mercury (Hg)	0.133	0.156	0.163	0.215	0.188
Molybdenum (Mo)	**2**	**2**	**2**	**2**	**2**
Nickel (Ni)	48.1	48	39.9	43.9	40.6
Phosphorus (P)	970	945	1030	1000	1010
Potassium (K)	590	670	710	770	780
Selenium (Se)	**1**	**1**	**1.5**	**2.5**	**1**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**
Strontium (Sr)	46.8	48.8	60.1	53.3	58.9
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	489	532	739	641	747
Vanadium (V)	43.8	44.4	47.1	49.3	47.9
Zinc (Zn)	143	138	153	140	151

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	SCR-1	SCR-2	SCR-3	STE1-1	STE1-2
Date Sampled	15-AUG-08	15-AUG-08	15-AUG-08	16-AUG-08	16-AUG-08
ALS Sample ID	L676344-31	L676344-32	L676344-33	L676344-34	L676344-35
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	15.5	14.2	14.3	13	21.3
pH	8.14	8.08	8.17	6.81	6.69
Particle Size					
% Gravel (>2mm)	6	1	15	45	5
% Sand (2.0mm - 0.063mm)	75	76	79	43	67
% Silt (0.063mm - 4um)	16	19	5	10	24
% Clay (<4um)	2	3	1	1	3
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.05	0.04	0.07	0.1	0.09
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.4	0.3	0.4	0.6	0.6
Plant Available Nutrients					
Available Phosphate-P	1	1	1	5	5
Metals					
Aluminum (Al)	15500	15800	16300	18300	18200
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	13.9	14.2	12.6	8.1	7
Barium (Ba)	123	123	97.1	102	108
Beryllium (Be)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	0.63	0.74	0.59	**0.25**	**0.25**
Calcium (Ca)	14100	14200	15500	1830	2220
Chromium (Cr)	24.7	26.7	26.9	76.1	84.4
Cobalt (Co)	12.1	12.5	11.2	12.8	12.9
Copper (Cu)	25.9	29.9	26.7	36.7	34.3
Iron (Fe)	36000	36100	35500	30800	32700
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	23.5	24.4	27.3	33.9	28.6
Magnesium (Mg)	9640	9690	10300	13900	13900
Manganese (Mn)	782	831	765	398	416
Mercury (Hg)	0.0504	0.054	0.0548	0.0514	0.0541
Molybdenum (Mo)	**2**	**2**	**2**	**2**	**2**
Nickel (Ni)	33.3	36.8	37.6	102	101
Phosphorus (P)	1120	1140	1150	794	824
Potassium (K)	900	950	750	1230	1280
Selenium (Se)	**1**	**1**	**1**	**1**	**1**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**
Strontium (Sr)	57.8	63.8	69.2	19.2	19.1
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	175	171	97.8	33.4	33.3
Vanadium (V)	42	42	39.8	46.1	49.2
Zinc (Zn)	126	127	124	100	99.6

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	STE1-3	TRC1-1	TRC1-2	TRC1-3	NTR1-1
Date Sampled	16-AUG-08	16-AUG-08	16-AUG-08	16-AUG-08	16-AUG-08
ALS Sample ID	L676344-36	L676344-37	L676344-38	L676344-39	L676344-40
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	17.9	16.4	15.5	14.3	77.6
pH	6.44	7.71	7.91	7.91	6.03
Particle Size					
% Gravel (>2mm)	**0.5**	3	4	6	**0.5**
% Sand (2.0mm - 0.063mm)	84	88	88	79	22
% Silt (0.063mm - 4um)	14	8	7	13	59
% Clay (<4um)	2	1	1	1	19
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.08	0.08	0.05	0.04	1
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	3.1
Organic / Inorganic Carbon					
Total Organic Carbon	0.5	0.4	0.5	0.4	16.8
Plant Available Nutrients					
Available Phosphate-P	5	1	**0.5**	**0.5**	4
Metals					
Aluminum (Al)	19300	13200	13600	13500	10900
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	7.3	46.6	52.3	42.3	6.9
Barium (Ba)	111	85.5	91.6	94.2	135
Beryllium (Be)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	**0.25**	1.44	1.16	0.93	1.05
Calcium (Ca)	2060	18500	18300	19000	5760
Chromium (Cr)	84.1	18.2	18.3	19.5	45
Cobalt (Co)	12.8	13.7	14.5	13.2	14.5
Copper (Cu)	35.4	56.1	61.2	60.9	27
Iron (Fe)	32500	41800	44000	39900	27100
Lead (Pb)	**15**	**15**	**15**	30	**15**
Lithium (Li)	33.4	18.6	19.3	18.4	15.4
Magnesium (Mg)	14700	9800	9910	10100	5710
Manganese (Mn)	443	731	772	786	351
Mercury (Hg)	0.0482	0.202	0.176	0.224	0.104
Molybdenum (Mo)	**2**	**2**	**2**	**2**	**2**
Nickel (Ni)	101	29.9	29.1	27.4	56
Phosphorus (P)	771	1000	993	965	1130
Potassium (K)	1520	630	700	620	1110
Selenium (Se)	**1**	**1**	**1**	**1.5**	**3.5**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**
Strontium (Sr)	21.3	60.9	61.9	62.1	59
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	31.3	617	646	569	36.7
Vanadium (V)	51	48.4	51.7	50.3	31.8
Zinc (Zn)	90.5	171	141	130	87

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	NTR1-2	NTR1-3	NTR2-1	NTR2-2	NTR2-3
Date Sampled	16-AUG-08	16-AUG-08	16-AUG-08	16-AUG-08	16-AUG-08
ALS Sample ID	L676344-41	L676344-42	L676344-43	L676344-44	L676344-45
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	68.5	66.1	15.9	9.82	11.9
pH	6.09	6.1	6.81	7.01	7.01
Particle Size					
% Gravel (>2mm)	47	26	4	30	33
% Sand (2.0mm - 0.063mm)	29	22	86	64	60
% Silt (0.063mm - 4um)	20	41	9	5	6
% Clay (<4um)	5	12	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.45	0.2	0.07	0.12	0.11
Cyanides					
Cyanide, Total	**1.5**	5.3	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	8.8	1.9	0.6	0.6	0.6
Plant Available Nutrients					
Available Phosphate-P	3	24	4	3	3
Metals					
Aluminum (Al)	20600	21300	23000	22100	22000
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	8.9	6.2	6.8	7.3	8.9
Barium (Ba)	144	157	180	171	157
Beryllium (Be)	**0.25**	0.52	0.56	0.55	0.55
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Calcium (Ca)	4500	2790	2540	2480	2520
Chromium (Cr)	84.2	89	89.6	84.7	83.9
Cobalt (Co)	12.9	13.7	14.9	13.7	14.2
Copper (Cu)	31.7	40.3	47.6	47	47.9
Iron (Fe)	36700	30200	36200	36300	36300
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	34.9	36.8	38.5	37.8	38.2
Magnesium (Mg)	14700	15200	16300	16000	16200
Manganese (Mn)	404	230	627	563	616
Mercury (Hg)	0.0626	0.0666	0.0495	0.0567	0.0545
Molybdenum (Mo)	**2**	**2**	**2**	**2**	**2**
Nickel (Ni)	101	110	111	108	112
Phosphorus (P)	1090	824	844	798	807
Potassium (K)	2050	2150	2550	2230	2070
Selenium (Se)	**2**	**1**	**2**	**1**	**1**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**
Strontium (Sr)	48.7	30.4	28.7	27.9	27.4
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	20.7	23.6	20.7	18.8	18.6
Vanadium (V)	53.1	53.9	60.6	57.8	57
Zinc (Zn)	93.4	104	108	109	110

Note: all measurements are mg/kg unless otherwise noted

(continued)

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	URO-1	URO-2	URO-3	EUR2-1	EUR2-2
Date Sampled	17-AUG-08	17-AUG-08	17-AUG-08	17-AUG-08	17-AUG-08
ALS Sample ID	L676344-46	L676344-47	L676344-48	L676344-49	L676344-50
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	17.2	20.6	18.3	13.5	18
pH	7.16	7.23	6.87	6.94	7.02
Particle Size					
% Gravel (>2mm)	9	**0.5**	34	43	12
% Sand (2.0mm - 0.063mm)	74	79	60	52	74
% Silt (0.063mm - 4um)	15	17	5	5	11
% Clay (<4um)	3	3	1	1	2
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.04	0.09	0.07	0.08	0.08
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.5	0.4	0.4	0.6	0.5
Plant Available Nutrients					
Available Phosphate-P	2	2	2	3	3
Metals					
Aluminum (Al)	19300	19200	20200	19400	19800
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	13.6	14	12.8	13.1	15.6
Barium (Ba)	181	212	172	203	235
Beryllium (Be)	0.52	0.51	0.53	0.68	0.7
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Calcium (Ca)	4210	4270	4390	3620	4280
Chromium (Cr)	60.3	60.3	62.4	67.3	66.7
Cobalt (Co)	14.2	14.8	13.5	19.3	19.7
Copper (Cu)	39.2	38.4	37.7	50.6	51
Iron (Fe)	38700	38800	39400	42400	42800
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	38.6	37.6	39.9	41.6	42.5
Magnesium (Mg)	13700	13400	14100	12200	12300
Manganese (Mn)	858	857	828	962	1030
Mercury (Hg)	0.125	0.129	0.101	0.108	0.104
Molybdenum (Mo)	**2**	**2**	**2**	**2**	**2**
Nickel (Ni)	90.1	87.7	89.7	123	123
Phosphorus (P)	912	971	1060	938	1120
Potassium (K)	1020	1140	1280	1550	1630
Selenium (Se)	**1**	**1**	**1**	**2**	**1**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**
Strontium (Sr)	36.3	37.8	39.1	43.3	47.9
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	203	262	217	18.6	21.1
Vanadium (V)	50.4	53.4	55.1	52.1	54
Zinc (Zn)	120	120	119	150	150

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	EUR2-3	UNK2-1	UNK2-2	UNK2-3	URIA-1
Date Sampled	17-AUG-08	17-AUG-08	17-AUG-08	17-AUG-08	17-AUG-08
ALS Sample ID	L676344-51	L676344-52	L676344-53	L676344-54	L676344-55
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	17.9	20	19.2	21.2	16.9
pH	7.13	7.4	7.54	7.63	7.74
Particle Size					
% Gravel (>2mm)	4	**0.5**	3	27	**0.5**
% Sand (2.0mm - 0.063mm)	80	96	95	69	47
% Silt (0.063mm - 4um)	14	3	2	3	50
% Clay (<4um)	2	**0.5**	**0.5**	1	3
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.08	0.06	0.06	0.06	0.03
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.6	0.4	0.4	0.5	0.4
Plant Available Nutrients					
Available Phosphate-P	2	4	10	10	**0.5**
Metals					
Aluminum (Al)	20000	23100	23200	22800	15500
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	14	6.6	6	5.2	31.1
Barium (Ba)	229	210	207	212	182
Beryllium (Be)	0.68	0.63	0.64	0.64	0.54
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Calcium (Ca)	3530	7120	6700	8410	28900
Chromium (Cr)	66.1	78.8	80.6	76.2	38.1
Cobalt (Co)	19.4	17.5	17.5	18.5	14.3
Copper (Cu)	50.4	41.8	42.3	42.1	67.8
Iron (Fe)	41900	38000	37800	39100	36300
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	43.2	27.1	27.3	26.5	18.6
Magnesium (Mg)	12300	17300	18100	17600	14000
Manganese (Mn)	984	585	545	633	847
Mercury (Hg)	0.0953	0.0513	0.0479	0.0501	0.558
Molybdenum (Mo)	**2**	**2**	**2**	**2**	**2**
Nickel (Ni)	121	126	133	123	38.1
Phosphorus (P)	968	821	811	920	1560
Potassium (K)	1710	2080	2180	1890	1140
Selenium (Se)	**2**	**1**	**1**	**1**	**2**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	1280	1070	1720	290
Strontium (Sr)	44	65.7	63.7	81.8	119
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	17.8	703	579	911	738
Vanadium (V)	53.8	56.8	58.3	55.6	86.3
Zinc (Zn)	150	101	101	99.7	114

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	URIA-2	URIA-3	SC2-1	SC2-2	SC2-3
Date Sampled	17-AUG-08	17-AUG-08	18-AUG-08	18-AUG-08	18-AUG-08
ALS Sample ID	L676344-56	L676344-57	L676344-58	L676344-59	L676344-60
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	18.1	17.1	15.6	15.2	18.2
pH	7.51	7.71	7.86	7.91	7.9
Particle Size					
% Gravel (>2mm)	**0.5**	**0.5**	**0.5**	3	**0.5**
% Sand (2.0mm - 0.063mm)	57	57	93	67	95
% Silt (0.063mm - 4um)	40	39	6	28	4
% Clay (<4um)	3	3	**0.5**	2	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.03	0.02	**0.01**	**0.01**	**0.01**
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.5	0.4	0.2	0.2	0.2
Plant Available Nutrients					
Available Phosphate-P	**0.5**	**0.5**	1	2	2
Metals					
Aluminum (Al)	15400	15500	13600	13200	13000
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	28.5	28.9	33.2	47.9	41.9
Barium (Ba)	171	169	111	106	72.4
Beryllium (Be)	0.55	0.55	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	**0.25**	**0.25**	0.92	1.33	0.77
Calcium (Ca)	29000	28400	17500	14700	16400
Chromium (Cr)	36.2	37.8	15.4	14.4	13.2
Cobalt (Co)	13.6	13.5	13.6	18.5	19
Copper (Cu)	65	65.5	109	171	163
Iron (Fe)	35400	35600	38100	45800	52500
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	18.1	18.5	10.5	10.2	10.6
Magnesium (Mg)	13800	13800	10600	9650	9950
Manganese (Mn)	846	827	646	668	619
Mercury (Hg)	0.222	0.312	0.0839	0.0978	0.115
Molybdenum (Mo)	**2**	**2**	6.7	12	7.7
Nickel (Ni)	35.6	36.3	17	18.9	16.4
Phosphorus (P)	1490	1520	1380	1480	1300
Potassium (K)	1190	1190	1610	1530	1540
Selenium (Se)	**1**	**1**	**3**	**4**	**5**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	290	290	**100**	**100**	**100**
Strontium (Sr)	121	119	63.4	55.5	58.2
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	753	738	872	911	949
Vanadium (V)	86.4	86.6	72.6	74.7	75.8
Zinc (Zn)	111	114	122	157	115

Note: all measurements are mg/kg unless otherwise noted

(continued)

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	ECM8-1	ECM8-2	ECM8-3	CC1-1	CC1-2
Date Sampled	18-AUG-08	18-AUG-08	18-AUG-08	18-AUG-08	18-AUG-08
ALS Sample ID	L676344-61	L676344-62	L676344-63	L676344-64	L676344-65
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	17.8	15.7	16	18.7	20.6
pH	8.01	8.06	8.04	7.66	7.56
Particle Size					
% Gravel (>2mm)	6	1	**0.5**	45	42
% Sand (2.0mm - 0.063mm)	92	95	91	53	56
% Silt (0.063mm - 4um)	2	3	8	2	2
% Clay (<4um)	**0.5**	**0.5**	1	**0.5**	**0.5**
Leachable Anions & Nutrients					
Total Nitrogen by LECO	**0.01**	**0.01**	**0.01**	0.12	0.13
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.2	0.5	0.4	1.4	1.5
Plant Available Nutrients					
Available Phosphate-P	**0.5**	**0.5**	**0.5**	2	3
Metals					
Aluminum (Al)	16100	15300	15400	15000	14700
Antimony (Sb)	26	**5**	**5**	**5**	**5**
Arsenic (As)	26.7	22.2	35.1	28	27.4
Barium (Ba)	88.2	80.8	132	103	109
Beryllium (Be)	0.5	0.51	0.55	0.76	0.74
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	**0.25**	**0.25**	**0.25**	8.10	8.01
Calcium (Ca)	35200	37800	37600	2820	2360
Chromium (Cr)	37.7	37	36.8	32.4	31.4
Cobalt (Co)	13.1	12	12.5	13.2	13.9
Copper (Cu)	71.1	62.7	64.6	81	81.1
Iron (Fe)	37600	35500	36400	47000	46100
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	18.4	17	17.3	23.7	23.2
Magnesium (Mg)	15100	14800	14200	7160	7080
Manganese (Mn)	850	893	898	572	543
Mercury (Hg)	0.255	0.0974	0.103	0.121	0.117
Molybdenum (Mo)	**2**	**2**	**2**	10.7	10.7
Nickel (Ni)	33	28.4	30	80.9	81.4
Phosphorus (P)	1350	1300	1310	1080	918
Potassium (K)	990	920	1200	1210	1200
Selenium (Se)	**1.5**	**1**	**1**	**5**	**5**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	200	210	230	**100**	**100**
Strontium (Sr)	128	146	151	33.3	27
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	661	588	754	13.1	14
Vanadium (V)	97.8	95.4	94.9	49.1	48.1
Zinc (Zn)	111	75.5	85.6	766	763

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	CC1-3	UNK1-1	UNK1-2	UNK1-3	SC1-1
Date Sampled	18-AUG-08	18-AUG-08	18-AUG-08	18-AUG-08	19-AUG-08
ALS Sample ID	L676344-66	L676344-67	L676344-68	L676344-69	L676344-70
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	25.8	18.5	15.2	24.2	11.2
pH	7.45	7.29	7.28	7.14	7.75
Particle Size					
% Gravel (>2mm)	6	20	72	39	15
% Sand (2.0mm - 0.063mm)	84	71	26	48	73
% Silt (0.063mm - 4um)	7	7	2	11	9
% Clay (<4um)	2	2	**0.5**	3	3
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.12	0.11	0.1	0.12	0.03
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	1.3	1.4	1.8	2.1	0.4
Plant Available Nutrients					
Available Phosphate-P	2	3	4	3	1
Metals					
Aluminum (Al)	14600	23000	22800	23100	16200
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	27.4	10.1	8.5	9.9	32
Barium (Ba)	92.3	112	107	115	113
Beryllium (Be)	0.74	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	8.57	**0.25**	**0.25**	**0.25**	0.61
Calcium (Ca)	2890	2700	2120	2570	10900
Chromium (Cr)	31.2	103	112	106	19.5
Cobalt (Co)	15.6	22.1	20.6	21.9	12.9
Copper (Cu)	81.5	38.3	37	37.4	117
Iron (Fe)	46300	41900	41900	41000	35700
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	23	43.7	43.7	42.9	15.4
Magnesium (Mg)	7170	16600	17300	16500	12200
Manganese (Mn)	651	1100	1150	1090	1140
Mercury (Hg)	0.121	0.0665	0.0659	0.0656	0.0785
Molybdenum (Mo)	10.8	**2**	**2**	**2**	**2**
Nickel (Ni)	83.7	138	146	137	15.5
Phosphorus (P)	1080	851	691	750	1050
Potassium (K)	1120	1190	1190	1290	1200
Selenium (Se)	**5**	**1**	**1**	**1**	**1**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**
Strontium (Sr)	31.1	29.6	23.7	28.6	51.8
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	18.2	98.5	92.8	118	487
Vanadium (V)	47.6	51	51.8	51.9	68
Zinc (Zn)	765	153	153	152	118

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	SC1-2	SC1-3	SC3-1	SC3-2	SC3-3
Date Sampled	19-AUG-08	19-AUG-08	19-AUG-08	19-AUG-08	19-AUG-08
ALS Sample ID	L676344-71	L676344-72	L676344-73	L676344-74	L676344-75
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	10.4	11.4	16.1	17.5	16.3
pH	7.77	7.86	7.95	7.96	7.93
Particle Size					
% Gravel (>2mm)	37	13	2	**0.5**	**0.5**
% Sand (2.0mm - 0.063mm)	60	84	91	95	93
% Silt (0.063mm - 4um)	3	2	7	4	6
% Clay (<4um)	1	**0.5**	**0.5**	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.03	0.02	**0.01**	**0.01**	**0.01**
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.3	0.3	0.2	0.2	0.2
Plant Available Nutrients					
Available Phosphate-P	1	**0.5**	1	1	2
Metals					
Aluminum (Al)	15500	16600	13000	12900	12200
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	36	41.4	41.2	28.9	44.9
Barium (Ba)	123	122	87.3	89.7	78.1
Beryllium (Be)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	0.55	0.85	0.84	0.94	1.08
Calcium (Ca)	14600	17900	15800	16400	14800
Chromium (Cr)	22.6	19.6	15	14.6	15
Cobalt (Co)	12.2	14.8	16.9	15.2	17.3
Copper (Cu)	101	96.2	134	121	158
Iron (Fe)	35200	38700	51000	45500	49600
Lead (Pb)	32	**15**	**15**	**15**	**15**
Lithium (Li)	16.4	18.2	10.2	10.2	9.6
Magnesium (Mg)	12100	13700	9750	9930	9180
Manganese (Mn)	1190	1310	619	638	598
Mercury (Hg)	0.0688	0.0766	0.0883	0.0753	0.101
Molybdenum (Mo)	**2**	**2**	8.3	7.6	7.6
Nickel (Ni)	16.3	17.2	15.2	14.3	16.4
Phosphorus (P)	1050	1220	1120	1120	1180
Potassium (K)	1120	1080	1670	1700	1570
Selenium (Se)	**1**	**1**	**4**	**5**	**4**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**
Strontium (Sr)	74.2	80	60.3	59	53.8
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	463	427	876	808	774
Vanadium (V)	65.4	73.3	73.8	70.5	69.4
Zinc (Zn)	116	120	116	123	133

Note: all measurements are mg/kg unless otherwise noted

(continued)

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA					
Sample ID	SCT-1	SCT-2	SCT-3	UR1-1	UR1-2
Date Sampled	19-AUG-08	19-AUG-08	19-AUG-08	19-AUG-08	19-AUG-08
ALS Sample ID	L676344-76	L676344-77	L676344-78	L676344-79	L676344-80
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	12.6	13.6	13.4	17.9	15.3
pH	8.13	8.17	8.14	8.03	8.13
Particle Size					
% Gravel (>2mm)	12	2	2	**0.5**	**0.5**
% Sand (2.0mm - 0.063mm)	86	94	92	83	96
% Silt (0.063mm - 4um)	2	4	6	16	4
% Clay (<4um)	**0.5**	**0.5**	**0.5**	1	**0.5**
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.03	0.02	0.03	0.03
Cyanides					
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon					
Total Organic Carbon	0.2	0.2	0.1	0.2	0.2
Plant Available Nutrients					
Available Phosphate-P	**0.5**	**0.5**	1	1	1
Metals					
Aluminum (Al)	13000	13000	12900	14200	13800
Antimony (Sb)	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	60.9	21.9	36.9	32.3	26.2
Barium (Ba)	135	153	152	138	109
Beryllium (Be)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	**0.25**	**0.25**	0.74	0.73	0.65
Calcium (Ca)	15600	13900	14500	19900	16100
Chromium (Cr)	17.2	15.9	17.6	22.7	22.1
Cobalt (Co)	16.7	12.3	13.1	13.6	12.3
Copper (Cu)	58.8	82.8	70	107	95.6
Iron (Fe)	40500	32300	35200	38700	38000
Lead (Pb)	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	7.1	7.3	7	13.3	13
Magnesium (Mg)	9390	9170	9030	10900	10800
Manganese (Mn)	567	538	550	695	646
Mercury (Hg)	0.0195	0.0157	0.0194	0.0988	0.0976
Molybdenum (Mo)	**2**	**2**	**2**	7.7	5.2
Nickel (Ni)	17.4	13.3	15.4	22.1	21.7
Phosphorus (P)	948	893	938	1240	1070
Potassium (K)	3360	3110	3140	1570	1570
Selenium (Se)	**3**	**2**	**2**	**2**	**4**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	250	240	270	220	**100**
Strontium (Sr)	70.8	56.8	60.3	80.5	63.5
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	727	756	800	894	725
Vanadium (V)	69.1	60.9	68.4	76.5	70.6
Zinc (Zn)	81.5	86.2	100	120	109

Note: all measurements are mg/kg unless otherwise noted

(continued)

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

ANALYTICAL DATA				
Sample ID	UR1-3	STE2-1	STE2-2	STE2-3
Date Sampled	19-AUG-08	23-AUG-08	23-AUG-08	23-AUG-08
ALS Sample ID	L676344-81	L676344-88	L676344-89	L676344-90
Matrix	Soil	Soil	Soil	Soil
Physical Tests				
% Moisture	16.3	14.8	14.8	18.5
pH	8.11	7.68	7.55	7.33
Particle Size				
% Gravel (>2mm)	**0.5**	23	10	**0.5**
% Sand (2.0mm - 0.063mm)	95	75	87	88
% Silt (0.063mm - 4um)	4	2	3	10
% Clay (<4um)	1	**0.5**	1	2
Leachable Anions & Nutrients				
Total Nitrogen by LECO	0.02	0.1	0.1	0.04
Cyanides				
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon				
Total Organic Carbon	0.3	0.3	0.4	0.5
Plant Available Nutrients				
Available Phosphate-P	1	4	4	5
Metals				
Aluminum (Al)	13000	21400	19800	19500
Antimony (Sb)	**5**	**5**	**5**	**5**
Arsenic (As)	41.1	6.9	7.4	7.6
Barium (Ba)	89.6	118	96.5	102
Beryllium (Be)	**0.25**	**0.25**	**0.25**	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**
Cadmium (Cd)	0.81	**0.25**	**0.25**	**0.25**
Calcium (Ca)	16700	2200	2150	2220
Chromium (Cr)	20.2	96.3	92.4	88.7
Cobalt (Co)	15.1	12.9	13.4	13.2
Copper (Cu)	104	38.8	39	35.1
Iron (Fe)	42900	37100	35700	34000
Lead (Pb)	**15**	**15**	**15**	**15**
Lithium (Li)	12.4	38	36.4	35.4
Magnesium (Mg)	10300	16700	16000	15300
Manganese (Mn)	636	579	594	540
Mercury (Hg)	0.128	0.0495	0.0647	0.0564
Molybdenum (Mo)	5.6	**2**	**2**	**2**
Nickel (Ni)	20.8	115	114	106
Phosphorus (P)	1140	694	692	705
Potassium (K)	1400	1670	1280	1360
Selenium (Se)	**3**	**1**	**1**	**1**
Silver (Ag)	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**
Strontium (Sr)	68.4	23.5	23.2	24.4
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	682	28.2	28.1	33.6
Vanadium (V)	69.4	55.5	50.7	50.4
Zinc (Zn)	120	100	102	95.8

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	MC1-1	MC1-2	MC1-3	MCTR-1	MCTR-2
Date Sampled	13-AUG-08	13-AUG-08	13-AUG-08	13-AUG-08	13-AUG-08
ALS Sample ID	L676344-1	L676344-2	L676344-3	L676344-4	L676344-5
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	10	18	10	8	4
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	MCTR-3	SUNR-1	SUNR-2	SUNR-3	TEC2-1
Date Sampled	13-AUG-08	13-AUG-08	13-AUG-08	13-AUG-08	14-AUG-08
ALS Sample ID	L676344-6	L676344-7	L676344-8	L676344-9	L676344-10
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	4	2	2	2	2
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	TEC2-2	TEC2-3	HLO-1	HLO-2	HLO-3
Date Sampled	14-AUG-08	14-AUG-08	14-AUG-08	14-AUG-08	14-AUG-08
ALS Sample ID	L676344-11	L676344-12	L676344-13	L676344-14	L676344-15
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	2	2	2	4	2
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	SNO2-1	SNO2-2	SNO2-3	TEC1-1	TEC1-2
Date Sampled	14-AUG-08	14-AUG-08	14-AUG-08	14-AUG-08	14-AUG-08
ALS Sample ID	L676344-16	L676344-17	L676344-18	L676344-19	L676344-20
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	2	2	2	2	2
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	TEC1-3	SNO1-1	SNO1-2	SNO1-3	TRC3-1
Date Sampled	14-AUG-08	14-AUG-08	14-AUG-08	14-AUG-08	15-AUG-08
ALS Sample ID	L676344-21	L676344-22	L676344-23	L676344-24	L676344-25
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	2	2	2	3	4
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	TRC3-2	TRC3-3	TRC2-1	TRC2-2	TRC2-3
Date Sampled	15-AUG-08	15-AUG-08	15-AUG-08	15-AUG-08	15-AUG-08
ALS Sample ID	L676344-26	L676344-27	L676344-28	L676344-29	L676344-30
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	2	2	3	5	2
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	SCR-1	SCR-2	SCR-3	STE1-1	STE1-2
Date Sampled	15-AUG-08	15-AUG-08	15-AUG-08	16-AUG-08	16-AUG-08
ALS Sample ID	L676344-31	L676344-32	L676344-33	L676344-34	L676344-35
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	2	2	2	2	2
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	STE1-3	TRC1-1	TRC1-2	TRC1-3	NTR1-1
Date Sampled	16-AUG-08	16-AUG-08	16-AUG-08	16-AUG-08	16-AUG-08
ALS Sample ID	L676344-36	L676344-37	L676344-38	L676344-39	L676344-40
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	2	2	2	3	7
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	NTR1-2	NTR1-3	NTR2-1	NTR2-2	NTR2-3
Date Sampled	16-AUG-08	16-AUG-08	16-AUG-08	16-AUG-08	16-AUG-08
ALS Sample ID	L676344-41	L676344-42	L676344-43	L676344-44	L676344-45
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	4	2	4	2	2
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	URO-1	URO-2	URO-3	EUR2-1	EUR2-2
Date Sampled	17-AUG-08	17-AUG-08	17-AUG-08	17-AUG-08	17-AUG-08
ALS Sample ID	L676344-46	L676344-47	L676344-48	L676344-49	L676344-50
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	2	2	2	4	2
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	EUR2-3	UNK2-1	UNK2-2	UNK2-3	URIA-1
Date Sampled	17-AUG-08	17-AUG-08	17-AUG-08	17-AUG-08	17-AUG-08
ALS Sample ID	L676344-51	L676344-52	L676344-53	L676344-54	L676344-55
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	4	2	2	2	4
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	URIA-2	URIA-3	SC2-1	SC2-2	SC2-3
Date Sampled	17-AUG-08	17-AUG-08	18-AUG-08	18-AUG-08	18-AUG-08
ALS Sample ID	L676344-56	L676344-57	L676344-58	L676344-59	L676344-60
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	2	2	6	8	10
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	ECM8-1	ECM8-2	ECM8-3	CC1-1	CC1-2
Date Sampled	18-AUG-08	18-AUG-08	18-AUG-08	18-AUG-08	18-AUG-08
ALS Sample ID	L676344-61	L676344-62	L676344-63	L676344-64	L676344-65
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	3	2	2	10	10
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	CC1-3	UNK1-1	UNK1-2	UNK1-3	SC1-1
Date Sampled	18-AUG-08	18-AUG-08	18-AUG-08	18-AUG-08	19-AUG-08
ALS Sample ID	L676344-66	L676344-67	L676344-68	L676344-69	L676344-70
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	10	2	2	2	2
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	SC1-2	SC1-3	SC3-1	SC3-2	SC3-3
Date Sampled	19-AUG-08	19-AUG-08	19-AUG-08	19-AUG-08	19-AUG-08
ALS Sample ID	L676344-71	L676344-72	L676344-73	L676344-74	L676344-75
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	2	2	8	10	8
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (continued)

DETECTION LIMITS					
Sample ID	SCT-1	SCT-2	SCT-3	UR1-1	UR1-2
Date Sampled	19-AUG-08	19-AUG-08	19-AUG-08	19-AUG-08	19-AUG-08
ALS Sample ID	L676344-76	L676344-77	L676344-78	L676344-79	L676344-80
Matrix	Soil	Soil	Soil	Soil	Soil
Physical Tests					
% Moisture	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01
Particle Size					
% Gravel (>2mm)	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1
% Clay (<4um)	1	1	1	1	1
Leachable Anions & Nutrients					
Total Nitrogen by LECO	0.02	0.02	0.02	0.02	0.02
Cyanides					
Cyanide, Total	3	3	3	3	3
Organic / Inorganic Carbon					
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients					
Available Phosphate-P	1	1	1	1	1
Metals					
Aluminum (Al)	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10
Arsenic (As)	5	5	5	5	5
Barium (Ba)	1	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2
Copper (Cu)	1	1	1	1	1
Iron (Fe)	50	50	50	50	50
Lead (Pb)	30	30	30	30	30
Lithium (Li)	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50
Manganese (Mn)	1	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50
Potassium (K)	200	200	200	200	200
Selenium (Se)	6	4	4	4	8
Silver (Ag)	2	2	2	2	2
Sodium (Na)	200	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1	1
Tin (Sn)	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1
Vanadium (V)	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted **(continued)**

Appendix 9.2-5A
Analytical Data and Detection Limits for Stream Sediments, KSM 2008 (completed)

DETECTION LIMITS				
Sample ID	UR1-3	STE2-1	STE2-2	STE2-3
Date Sampled	19-AUG-08	23-AUG-08	23-AUG-08	23-AUG-08
ALS Sample ID	L676344-81	L676344-88	L676344-89	L676344-90
Matrix	Soil	Soil	Soil	Soil
Physical Tests				
% Moisture	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01
Particle Size				
% Gravel (>2mm)	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1
% Clay (<4um)	1	1	1	1
Leachable Anions & Nutrients				
Total Nitrogen by LECO	0.02	0.02	0.02	0.02
Cyanides				
Cyanide, Total	3	3	3	3
Organic / Inorganic Carbon				
Total Organic Carbon	0.1	0.1	0.1	0.1
Plant Available Nutrients				
Available Phosphate-P	1	1	1	1
Metals				
Aluminum (Al)	50	50	50	50
Antimony (Sb)	10	10	10	10
Arsenic (As)	5	5	5	5
Barium (Ba)	1	1	1	1
Beryllium (Be)	0.5	0.5	0.5	0.5
Bismuth (Bi)	20	20	20	20
Cadmium (Cd)	0.5	0.5	0.5	0.5
Calcium (Ca)	50	50	50	50
Chromium (Cr)	2	2	2	2
Cobalt (Co)	2	2	2	2
Copper (Cu)	1	1	1	1
Iron (Fe)	50	50	50	50
Lead (Pb)	30	30	30	30
Lithium (Li)	2	2	2	2
Magnesium (Mg)	50	50	50	50
Manganese (Mn)	1	1	1	1
Mercury (Hg)	0.005	0.005	0.005	0.005
Molybdenum (Mo)	4	4	4	4
Nickel (Ni)	5	5	5	5
Phosphorus (P)	50	50	50	50
Potassium (K)	200	200	200	200
Selenium (Se)	6	2	2	2
Silver (Ag)	2	2	2	2
Sodium (Na)	200	200	200	200
Strontium (Sr)	0.5	0.5	0.5	0.5
Thallium (Tl)	1	1	1	1
Tin (Sn)	5	5	5	5
Titanium (Ti)	1	1	1	1
Vanadium (V)	2	2	2	2
Zinc (Zn)	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted

APPENDIX 9.2.5B
POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) DATA AND DETECTION LIMITS FOR STREAM SEDIMENTS, KSM 2008

Appendix 9.2-5B
Polycyclic Aromatic Hydrocarbons (PAHs) Data and Detection Limits for Stream Sediments, KSM 2008

Sample ID	SC2	TEC2	SC3	TEC3
Date Sampled	10-SEP-08	10-SEP-08	10-SEP-08	10-SEP-08
ALS Sample ID	L683687-22	L683687-23	L683687-24	L683687-25
Matrix	Soil	Soil	Soil	Soil
Physical Tests				
% Moisture	12.4	36.5	0.1	0.1
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	<0.040	<0.040	0.04	0.00005
Acenaphthylene	<0.050	<0.050	0.05	0.00005
Anthracene	<0.050	<0.050	0.05	0.05
Benz(a)anthracene	<0.050	<0.050	0.05	0.05
Benzo(a)pyrene	<0.050	<0.050	0.05	0.05
Benzo(b)fluoranthene	<0.050	<0.050	0.05	0.05
Benzo(g,h,i)perylene	<0.050	<0.050	0.05	0.05
Benzo(k)fluoranthene	<0.050	<0.050	0.05	0.05
Chrysene	<0.050	<0.050	0.05	0.05
Dibenz(a,h)anthracene	<0.050	<0.050	0.05	0.05
Fluoranthene	<0.050	<0.050	0.05	0.05
Fluorene	<0.050	<0.050	0.05	0.05
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	0.05	0.05
2-Methylnaphthalene	<0.050	<0.050	0.05	0.05
Naphthalene	<0.050	<0.050	0.05	0.05
Phenanthrene	<0.050	<0.050	0.05	0.05
Pyrene	<0.050	<0.050	0.05	0.05
d10-Acenaphthene (SS)	87	110	-	-
d9-Acridine (SS)	-	-	-	-
d12-Chrysene (SS)	73	105	-	-
d8-Naphthalene (SS)	88	111	-	-
d10-Phenanthrene (SS)	85	106	-	-

Note: all measurements are mg/kg unless otherwise noted

APPENDIX 9.2.5C
PERIPHYTON BIOMASS (CHLOROPHYLL A) DATA AND SURFACE AREA CALCULATIONS FOR KSM PROJECT STREAMS, 2008

Appendix 9.2-5C
Periphyton Biomass (chlorophyll *a*) Data and Surface Area Calculations for KSM Project Streams, 2008

Site	Area (cm^2) SA scraped	(mL) Vol Filtered	(mL) Vol Total	ug/L (from ALS) Chlorophyll *a*	ug Chlorophyll *a*	(ug/cm^2) Biomass
MC1-1	30	150	300	1.97	0.013	0.001
MC1-2	30	150	300	1.14	0.008	0.001
MC1-3	30	150	300	5.75	0.038	0.003
MCTR-1	12	150	300	6.73	0.045	0.007
MCTR-2	12	150	300	50.1	0.334	0.056
MCTR-3	12	150	300	4.6	0.031	0.005
SUNR-1	12	150	300	92.4	0.616	0.103
SUNR-2	12	150	300	70.6	0.471	0.078
SUNR-3	12	150	300	160	1.067	0.178
TEC2-1	15	100	300	128	1.280	0.256
TEC2-2	15	100	300	148	1.480	0.296
TEC2-3	15	100	300	343	3.430	0.686
HLO-1	3	150	300	136	0.907	0.604
HLO-2	3	150	300	97.9	0.653	0.435
HLO-3	3	150	300	133	0.887	0.591
SNO2-1	12	150	300	87.5	0.583	0.097
SNO2-2	12	150	300	2.6	0.017	0.003
SNO2-3	12	150	300	27.2	0.181	0.030
TEC1-1	9	150	300	223	1.487	0.330
TEC1-2	9	150	300	214	1.427	0.317
TEC1-3	9	100	300	102	1.020	0.340
SNO1-1	24	100	300	43.4	0.434	0.054
SNO1-2	24	100	300	108	1.080	0.135
SNO1-3	24	100	300	97.1	0.971	0.121
TRC3-1	6	100	300	327	3.270	1.635
TRC3-2	6	100	300	200	2.000	1.000
TRC3-3	6	100	300	565	5.650	2.825
TRC2-1	6	100	300	116	1.160	0.580
TRC2-2	6	100	300	285	2.850	1.425
TRC2-3	6	100	300	344	3.440	1.720
SCR-1	6	100	300	18.9	0.189	0.095
SCR-2	6	100	300	55.2	0.552	0.276
SCR-3	6	100	300	83	0.830	0.415
STE1-1	6	100	300	83	0.830	0.415
STE1-2	6	100	300	35.7	0.357	0.179
STE1-3	6	50	300	272	5.440	5.440
TRC1-1	6	100	300	8.15	0.082	0.041
TRC1-2	6	50	300	17.2	0.344	0.344
TRC1-3	6	50	300	6.68	0.134	0.134
NTR1-1	6	100	300	137	1.370	0.685
NTR1-2	6	100	300	271	2.710	1.355
NTR1-3	6	100	300	145	1.450	0.725
NTR2-1	6	150	300	124	0.827	0.276
NTR2-2	6	100	300	285	2.850	1.425

(continued)

Appendix 9.2-5C
Periphyton Biomass (chlorophyll *a*) Data and Surface Area Calculations for KSM Project Streams, 2008 (completed)

Site	Area (cm^2) SA scraped	(mL) Vol Filtered	(mL) Vol Total	ug/L (from ALS) Chlorophyll *a*	ug Chlorophyll *a*	(ug/cm^2) Biomass
NTR2-3	6	100	300	194	1.940	0.970
URO-1	6	100	300	126	1.260	0.630
URO-2	6	100	300	47.7	0.477	0.239
URO-3	6	100	300	131	1.310	0.655
EUR2-1	6	50	300	33.8	0.676	0.676
EUR2-2	6	100	300	7.81	0.078	0.039
EUR2-3	6	100	300	7.38	0.074	0.037
UNK2-1	6	100	300	81.9	0.819	0.410
UNK2-2	6	100	300	89.7	0.897	0.449
UNK2-3	6	100	300	142	1.420	0.710
URIA-1	6	100	300	7.89	0.079	0.039
URIA-2	6	100	300	2.25	0.023	0.011
URIA-3	6	100	300	1.07	0.011	0.005
SC2-1	6	150	300	3.71	0.025	0.008
SC2-2	6	150	300	0.275	0.002	0.001
SC2-3	6	150	300	1.38	0.009	0.003
ECM8-1	6	100	300	6.2	0.062	0.031
ECM8-2	6	100	300	10.4	0.104	0.052
ECM8-3	6	100	300	22.6	0.226	0.113
CC1-1	6	100	300	0.195	0.002	0.001
CC1-2	6	100	300	0.153	0.002	0.001
CC1-3	6	100	300	0.131	0.001	0.001
UNK1-1	6	100	300	77.9	0.779	0.390
UNK1-2	6	100	300	21.9	0.219	0.110
UNK1-3	6	100	300	10.3	0.103	0.052
SC1-1	12	100	300	2.34	0.023	0.006
SC1-2	12	100	300	4.82	0.048	0.012
SC1-3	12	100	300	8.75	0.088	0.022
SC3-1	6	100	300	3.35	0.034	0.017
SC3-2	6	100	300	0.309	0.003	0.002
SC3-3	6	100	300	1.22	0.012	0.006
SCT-1	6	100	300	0.732	0.007	0.004
SCT-2	6	100	300	1.76	0.018	0.009
SCT-3	6	100	300	2.37	0.024	0.012
UR1-1	6	100	300	0.986	0.010	0.005
UR1-2	6	100	300	0.325	0.003	0.002
UR1-3	6	100	300	12.4	0.124	0.062
STE2-1	6	100	300	30.8	0.308	0.154
STE2-2	6	100	300	39.1	0.391	0.196
STE2-3	6	100	300	70.3	0.703	0.352

APPENDIX 9.2.5D
PERIPHYTON TAXONOMIC DATA FOR KSM PROJECT STUDY AREA STREAMS, 2008

Appendix 9.2-5D
Periphyton Taxonomic Data for KSM Project Streams, 2008

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume $um3/cm^2$		
FES Sample Number																		
Sample I.D	**MC1**						**MCTR**						**SNO1**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date	**13-Aug-08**						**13-Aug-08**						**14-Aug-08**					
Area Sampled (cm^2)	**30**						**12**						**24**					
Achnanthes flexella																		
Achnanthes hauckiana							4,377			210,093								
Achnanthes lanceolata								4,974	11,843		895,368	2,771,376			458			82,420
Achnanthes linearis								199			26,264							
Achnanthes minutissima									7,896			394,783		480			24,018	
Amphipleura pellucida																		
Amphora ovalis															458			264,658
Anomoeoneis vitrea																		
Asterionella formosa																		
Caloneis ventricosa																		
Caloneis ventricosa minuta																		
Chlamydomonas sp.																		
Cocconeis placentula																		
Cyclotella comta																		
Cyclotella ocellata																		
Cyclotella stelligera																		
Cymbella affinis																		
Cymbella angustata																		
Cymbella cesatii																		
Cymbella microcephala																		
Cymbella minuta	80			29,713			10,943		23,687	4,048,670		8,764,181	26,760	17,773	16,484	9,901,305	6,576,123	6,708,955
Cymbella muelleri																		
Cymbella naviculiformis																		
Cymbella sinuata																		
Cymbella tumida																		
Diatoma hiemale mesodon									3,948			3,158,263						
Diatoma tenue elongatum																		
Diatoma vulgare									3,948			46,426,471						
Diatomella balfouriana													1,784			535,206		
Didymosphenia geminata																		
Diploneis elliptica																		
Epithemia turgida																		
Eunotia pectinalis																		
Fragilalria leptosauron																		
Fragilaria construens																		
Fragilaria construens venter													1,784			85,633		
Fragilaria pinnata																		
Fragilaria vaucheriae							28,450		43,426	10,651,724		17,509,412						
Frustulia rhomboides									11,843			12,790,966						
Gomphoneis herculeana																		
Gomphonema angustatum	241	127		43,365	22,889				11,843			2,771,376	14,272	14,411	11,905	2,568,987	3,112,730	2,142,909
Gomphonema clevei																		
Gomphonema gracile																		
Gomphonema olivaceum																		
Gomphonema parvulum																		
Gomphonema sp.																		
Gomphonema subclavatum														480			288,216	
Gomphonema tenellum																		
Hannaea arcus								199			348,199		39,248	14,411	10,074	68,684,731	25,218,878	19,391,498
melosira ambigua																		
Melosira varians																		
Meridion circulare									51,322			29,638,327	3,598	480	2,289	1,373,695	369,877	1,234,004
Mougeotia sp.																		
Navicula anglica																		
Navicula cryptocephala																		
Navicula cryptocephala veneta		254			24,161				23,687			2,250,263	5,352		916	508,445		86,998
Navicula graciloides																		
Navicula gregaria																		
Navicula minima								199			8,755							
Navicula minuscula							2,188			98,481								
Navicula mutica																		
Navicula pupula																		
Navicula radiosa																		
Navicula rhynchocephala																		

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D				**SNO2**						**TRC3**						**TEC2**		
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**14-Aug-08**						**15-Aug-08**						**14-Aug-08**		
Area Sampled (cm^2)				**12**						**16**						**15**		
Achnanthes flexella																		
Achnanthes hauckiana																		
Achnanthes lanceolata								1,364			245,504		8,250	25,625		1,485,000	4,612,500	
Achnanthes linearis															25,243			3,332,015
Achnanthes minutissima	3,132	700		156,597	35,001		1,738	4,092		86,879	204,587		74,250	179,375	681,549	3,712,500	8,968,750	34,077,425
Amphipleura pellucida																		
Amphora ovalis																		
Anomoeoneis vitrea																		
Asterionella formosa																		
Caloneis ventricosa																		
Caloneis ventricosa minuta							1,738			486,524								
Chlamydomonas sp.																		
Cocconeis placentula																		
Cyclotella comta																		
Cyclotella ocellata																		
Cyclotella stelligera																		
Cymbella affinis																		
Cymbella angustata																		
Cymbella cesatii														25,625			470,625	
Cymbella microcephala																		
Cymbella minuta	4,698	2,100	178,801	1,738,229	777,023	66,156,483	24,326	19,095	1,364	9,000,693	7,065,060	504,647	412,500	1,511,875	555,336	152,625,000	559,393,750	205,474,254
Cymbella muelleri																		
Cymbella naviculiformis																		
Cymbella sinuata	6,264	933	2,104	876,944	130,671	294,496							16,500			2,310,000		
Cymbella tumida																		
Diatoma hiemale mesodon	12,528			10,022,222									8,250	76,875	12,621	6,600,000	61,500,000	10,094,015
Diatoma tenue elongatum																		
Diatoma vulgare													8,250			16,170,000		
Diatomella balfouriana		233			70,002													
Didymosphenia geminata			2,104			4,207,090												
Diploneis elliptica																		
Epithemia turgida		233			1,983,392													
Eunotia pectinalis																		
Fragilalria leptosauron																		
Fragilaria construens																		
Fragilaria construens venter								1,364			654,677							
Fragilaria pinnata																		
Fragilaria vaucheriae		1,167			336,010		1,738	12,275		500,425	3,535,258		33,000	128,125	63,106	9,504,000	59,040,000	18,174,627
Frustulia rhomboides																		
Gomphoneis herculeana																		
Gomphonema angustatum	20,358	14,700	6,311	4,030,813	2,646,078	1,135,914	31,277	8,183	1,364	5,629,777	1,473,024	245,504	82,500	256,250	75,728	14,850,000	50,737,500	13,630,970
Gomphonema clevei	1,566			140,938														
Gomphonema gracile																		
Gomphonema olivaceum	1,566			352,344										25,625			5,765,625	
Gomphonema parvulum																		
Gomphonema sp.		233			46,668													
Gomphonema subclavatum	3,132	233		1,879,167	140,004		1,738			1,042,551								
Gomphonema tenellum																		
Hannaea arcus	3,132	4,200	16,828	5,480,903	8,085,239	29,449,627		13,639	12,275		23,868,448	21,481,603	189,750	41,000	151,455	332,062,500	789,250,000	265,046,642
melosira ambigua																		
Melosira varians																		
Meridion circulare	70,469			29,843,516														
Mougeotia sp.																		
Navicula anglica	1,566			563,750														
Navicula cryptocephala								1,364			252,324							
Navicula cryptocephala veneta	1,566	233	2,104	148,767	22,167	199,837	5,213			495,212			16,500			1,567,500		
Navicula graciloides																		
Navicula gregaria																		
Navicula minima																		
Navicula minuscula													8,250			371,250		
Navicula mutica	1,566			86,128														
Navicula pupula																		
Navicula radiosa																		
Navicula rhynchocephala																		

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm²			Biovolume um³/cm²			Cell Density cells / cm²			Biovolume um³/cm²			Cell Density cells / cm²			Biovolume um³/cm²		
FES Sample Number																		
Sample I.D	**HLO**						**TRC2**						**STE1**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**14-Aug-08**						**15-Aug-08**						**16-Aug-08**		
Area Sampled (cm²)				**3**						**6**						**6**		
Achnanthes flexella																		
Achnanthes hauckiana																		
Achnanthes lanceolata														114,177	21,738		20,551,899	3,912,918
Achnanthes linearis	712,105			93,977,895														
Achnanthes minutissima	18,870,789	19,603,125	18,733,846	943,539,474	980,156,250	936,692,308								57,089	21,738		2,854,430	1,086,922
Amphipleura pellucida																		
Amphora ovalis																		
Anomoeoneis vitrea	1,424,211	768,750		170,905,263	92,250,000									28,544			3,425,316	
Asterionella formosa																		
Caloneis ventricosa																		
Caloneis ventricosa minuta														28,544			7,992,405	
Chlamydomonas sp.																		
Cocconeis placentula																		
Cyclotella comta			520,385			1,181,273,077												
Cyclotella ocellata			3,642,692			455,336,538												
Cyclotella stelligera			520,385			28,621,154												
Cymbella affinis																		
Cymbella angustata		384,375			74,953,125													
Cymbella cesatii																		
Cymbella microcephala																		
Cymbella minuta	1,780,263	3,075,000	6,765,000	658,697,368	1,137,750,000	2,753,355,000	40,268	2,506		17,878,929	927,056		294,985	228,354	65,215	109,144,622	84,491,139	24,129,659
Cymbella muelleri	356,053	768,750		142,421,053	307,500,000													
Cymbella naviculiformis																		
Cymbella sinuata																		
Cymbella tumida	2,136,316	384,375	1,040,769	5,340,789,474	960,937,500	2,601,923,077												
Diatoma hiemale mesodon		768,750			615,000,000		24,161			19,328,571			98,328	142,722	108,692	78,662,791	114,177,215	121,735,219
Diatoma tenue elongatum	712,105	768,750	520,385	512,715,789	553,500,000	374,676,923												
Diatoma vulgare																		
Diatomella balfouriana																		
Didymosphenia geminata																		
Diploneis elliptica																		
Epithemia turgida																		
Eunotia pectinalis														57,089			41,103,797	
Fragilalria leptosauron																		
Fragilaria construens																		
Fragilaria construens venter													98,328	28,544		4,719,767	1,370,127	
Fragilaria pinnata			520,385			93,669,231												
Fragilaria vaucheriae	356,053	1,921,875	2,601,923	102,543,158	664,200,000	1,498,707,692	32,214	2,506		11,133,257	721,600		7,472,965	485,253	695,630	3,443,542,326	167,703,494	260,443,805
Frustulia rhomboides																		
Gomphoneis herculeana	356,053			1,922,684,211														
Gomphonema angustatum		768,750			138,375,000		644,286	10,022	2,320	115,971,429	1,804,000	417,593	589,971	456,709	173,907	106,194,767	90,428,354	31,303,342
Gomphonema clevei																		
Gomphonema gracile	356,053			87,232,895										28,544			6,933,354	
Gomphonema olivaceum																		
Gomphonema parvulum																		
Gomphonema sp.																		
Gomphonema subclavatum							8,054			9,664,286								
Gomphonema tenellum															21,738			4,565,071
Hannaea arcus							88,589	22,550	6,960	170,534,375	51,301,250	12,179,784	294,985	85,633	152,169	516,224,564	194,814,873	266,295,790
melosira ambigua														85,633			166,444,690	
Melosira varians																		
Meridion circulare		384,375			147,984,375		8,054			6,201,250			983,285	428,165	456,507	643,559,956	412,108,386	421,812,532
Mougeotia sp.													98,328			139,233,140		
Navicula anglica																		
Navicula cryptocephala	356,053			65,869,737				5,011			927,056				21,738			4,021,610
Navicula cryptocephala veneta	712,105	2,306,250	520,385	67,650,000	219,093,750	49,436,538								57,089	43,477		5,423,418	4,130,302
Navicula graciloides																		
Navicula gregaria															43,477			7,608,451
Navicula minima																		
Navicula minuscula															21,738			978,229
Navicula mutica																		
Navicula pupula																		
Navicula radiosa																		
Navicula rhynchocephala																		

Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm²			Biovolume um³/cm²			Cell Density cells / cm²			Biovolume um³/cm²			Cell Density cells / cm²			Biovolume um³/cm²		
FES Sample Number																		
Sample I.D	**TRC1**						**SCR**						**SUNR**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**16-Aug-08**						**15-Aug-08**						**13-Aug-08**		
Area Sampled (cm²)				**6**						**6**						**12**		
Achnanthes flexella																		
Achnanthes hauckiana																		
Achnanthes lanceolata								82,904	12,621		14,922,794	2,271,828	21,141	11,458		3,805,313	2,062,500	
Achnanthes linearis													21,141	11,458		2,790,563	1,512,500	
Achnanthes minutissima							7,457	580,331	12,621	372,851	29,016,544	1,262,127	84,563	68,750	148,355	4,228,125	3,437,500	8,901,316
Amphipleura pellucida																		
Amphora ovalis								41,452			23,959,375							
Anomoeoneis vitrea																		
Asterionella formosa																		
Caloneis ventricosa																		
Caloneis ventricosa minuta			4,460			1,248,813												
Chlamydomonas sp.																		
Cocconeis placentula																		
Cyclotella comta																		
Cyclotella ocellata																		
Cyclotella stelligera																		
Cymbella affinis															89,013			160,223,684
Cymbella angustata																		
Cymbella cesatii																		
Cymbella microcephala																		
Cymbella minuta							29,828	290,165	138,834	11,036,376	118,097,335	51,368,563	507,375	412,500	1,038,487	187,728,750	152,625,000	384,240,132
Cymbella muelleri																		
Cymbella naviculiformis																		
Cymbella sinuata								41,452			5,803,309		42,281			5,919,375		
Cymbella tumida																		
Diatoma hiemale mesodon															29,671			23,736,842
Diatoma tenue elongatum																		
Diatoma vulgare																		
Diatomella balfouriana																		
Didymosphenia geminata																		
Diploneis elliptica																		
Epithemia turgida																		
Eunotia pectinalis								41,452			29,845,588							
Fragilalria leptosauron																		
Fragilaria construens														11,458			2,566,667	
Fragilaria construens venter																		
Fragilaria pinnata																		
Fragilaria vaucheriae	476			137,128			37,285	2,487,132	1,047,565	10,738,095	859,552,941	301,698,806	909,047	481,250	1,275,855	314,166,600	166,320,000	404,190,947
Frustulia rhomboides																		
Gomphoneis herculeana																		
Gomphonema angustatum							59,656	621,783	37,864	10,738,095	111,920,956	6,815,485	105,703	22,917	148,355	22,831,875	6,187,500	26,703,947
Gomphonema clevei																		
Gomphonema gracile																		
Gomphonema olivaceum																		
Gomphonema parvulum																		
Gomphonema sp.																		
Gomphonema subclavatum													21,141			25,368,750		
Gomphonema tenellum																		
Hannaea arcus		3,964	4,460	6,937,852		15,610,166	7,457	165,809	63,106	13,049,769	290,165,441	110,436,101	295,969	183,333	296,711	517,945,313	320,833,333	519,243,421
melosira ambigua																		
Melosira varians																		
Meridion circulare									12,621			4,859,188						
Mougeotia sp.																		
Navicula anglica																		
Navicula cryptocephala																		
Navicula cryptocephala veneta																		
Navicula graciloides														11,458			4,984,375	
Navicula gregaria																		
Navicula minima								41,452			1,823,897							
Navicula minuscula															59,342			2,670,395
Navicula mutica		7,929	17,840	436,094		981,210		41,452			2,279,871				59,342			3,263,816
Navicula pupula																		
Navicula radiosa																		
Navicula rhynchocephala																		

Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D	**ECM8**						**UR1**						**SCT**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**18-Aug-08**						**19-Aug-08**						**19-Aug-08**		
Area Sampled (cm^2)				**6**						**6**						**6**		
Achnanthes flexella																		
Achnanthes hauckiana																		
Achnanthes lanceolata																		
Achnanthes linearis																		
Achnanthes minutissima														682			34,098	
Amphipleura pellucida																		
Amphora ovalis																		
Anomoeoneis vitrea																		
Asterionella formosa																		
Caloneis ventricosa																		
Caloneis ventricosa minuta			2,676			749,288							8,509			2,382,642		
Chlamydomonas sp.																		
Cocconeis placentula																		
Cyclotella comta																		
Cyclotella ocellata																		
Cyclotella stelligera																		
Cymbella affinis																		
Cymbella angustata																		
Cymbella cesatii																		
Cymbella microcephala																		
Cymbella minuta	28,188	11,893	2,676	12,515,250	4,400,580	990,131												
Cymbella muelleri																		
Cymbella naviculiformis																		
Cymbella sinuata																		
Cymbella tumida																		
Diatoma hiemale mesodon		4,757			3,805,907													
Diatoma tenue elongatum																		
Diatoma vulgare																		
Diatomella balfouriana																		
Didymosphenia geminata																		
Diploneis elliptica																		
Epithemia turgida																		
Eunotia pectinalis																		
Fragilalria leptosauron																		
Fragilaria construens																		
Fragilaria construens venter															318			45,778
Fragilaria pinnata																		
Fragilaria vaucheriae	298,788	38,059	29,436	86,050,800	16,441,519	8,477,658												
Frustulia rhomboides																		
Gomphoneis herculeana																		
Gomphonema angustatum	186,038	64,225	13,380	33,486,750	11,560,443	2,408,426		2,502			450,333							
Gomphonema clevei																		
Gomphonema gracile																		
Gomphonema olivaceum																		
Gomphonema parvulum																		
Gomphonema sp.																		
Gomphonema subclavatum																		
Gomphonema tenellum																		
Hannaea arcus	118,388	40,438	34,788	207,178,125	70,766,086	79,143,542							4,255			7,445,755		
melosira ambigua																		
Melosira varians																		
Meridion circulare			2,676			1,030,271												
Mougeotia sp.																		
Navicula anglica																		
Navicula cryptocephala																		
Navicula cryptocephala veneta																		
Navicula graciloides																		
Navicula gregaria																		
Navicula minima															318			13,988
Navicula minuscula																		
Navicula mutica			5,352			294,363												
Navicula pupula																		
Navicula radiosa																		
Navicula rhynchocephala																		

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D	**SC2**						**STE2**						**SC3**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date	**18-Aug-08**									**18-Aug-08**						**19-Aug-08**		
Area Sampled (cm^2)	**6**						**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**
Achnanthes flexella																		
Achnanthes hauckiana																		
Achnanthes lanceolata			2,963			533,330	41,759			7,515,667				6,101			1,098,214	
Achnanthes linearis							6,960			918,704								
Achnanthes minutissima							20,880	5,318	20,880	1,043,981	265,920	1,043,981						
Amphipleura pellucida																		
Amphora ovalis							6,960			4,022,809								
Anomoeoneis vitrea																		
Asterionella formosa																		
Caloneis ventricosa																		
Caloneis ventricosa minuta									20,880			1,983,565						
Chlamydomonas sp.																		
Cocconeis placentula																		
Cyclotella comta																		
Cyclotella ocellata																		
Cyclotella stelligera																		
Cymbella affinis																		
Cymbella angustata																		
Cymbella cesatii																		
Cymbella microcephala																		
Cymbella minuta		9,223	1,481		3,412,474	548,145	20,880	26,592		7,725,463	9,839,033			6,101			2,257,440	
Cymbella muelleri																		
Cymbella naviculiformis																		
Cymbella sinuata									10,440			1,461,574						
Cymbella tumida														79,315	18,792		198,288,690	46,979,167
Diatoma hiemale mesodon							13,920		10,440	11,135,802	8,351,852							
Diatoma tenue elongatum																		
Diatoma vulgare																		
Diatomella balfouriana							6,960			4,175,926								
Didymosphenia geminata																		
Diploneis elliptica																		
Epithemia turgida																		
Eunotia pectinalis							6,960			5,011,111								
Fragilalria leptosauron																		
Fragilaria construens																		
Fragilaria construens venter																		
Fragilaria pinnata																		
Fragilaria vaucheriae		2,306			664,049		83,519			28,864,000				6,101			1,757,143	
Frustulia rhomboides																		
Gomphoneis herculeana																		
Gomphonema angustatum		4,611	4,444		1,245,092	799,996	76,559		93,958	13,780,556		16,912,500		36,607	6,264		6,589,286	1,127,500
Gomphonema clevei																		
Gomphonema gracile							6,960		10,440	1,705,170		2,557,755						
Gomphonema olivaceum																		
Gomphonema parvulum																		
Gomphonema sp.																		
Gomphonema subclavatum							20,880		10,440	12,527,778		6,263,889						
Gomphonema tenellum																		
Hannaea arcus							104,398	579,705	897,824	182,696,759	1,014,484,080	1,571,192,130						
melosira ambigua							6,960			24,596,204								
Melosira varians																		
Meridion circulare		2,306			887,704		55,679			21,436,420								
Mougeotia sp.																		
Navicula anglica																		
Navicula cryptocephala			1,481			274,073												
Navicula cryptocephala veneta							48,719			4,628,318								
Navicula graciloides																		
Navicula gregaria							6,960			1,217,978				18,304			3,203,125	
Navicula minima																		
Navicula minuscula																		
Navicula mutica			7,407			407,405								12,202	6,264		671,131	344,514
Navicula pupula																		
Navicula radiosa																		
Navicula rhynchocephala																		

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D	**UR1A**						**NTR 1**						**NTR 2**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**17-Aug-08**						**16-Aug-08**						**17-Aug-08**		
Area Sampled (cm^2)	**6**	**6**	**6**	**6**	**6**	**6**				**6**						**6**		
Achnanthes flexella																		
Achnanthes hauckiana							16,420	91,419	32,524	788,155	4,388,108	1,561,154						
Achnanthes lanceolata	1,773			319,104			16,420	182,838		2,955,583	32,910,811			27,278			4,910,081	
Achnanthes linearis							16,420	45,709		2,167,427	6,033,649							
Achnanthes minutissima	1,773		12,046	88,640		602,297		662,787	146,358		33,139,358	8,049,700		54,556	100,970		4,091,734	5,048,507
Amphipleura pellucida																		
Amphora ovalis							16,420			9,490,704								
Anomoeoneis vitrea																		
Asterionella formosa																		
Caloneis ventricosa																		
Caloneis ventricosa minuta																		
Chlamydomonas sp.																		
Cocconeis placentula									16,262			7,480,529						
Cyclotella comta																		
Cyclotella ocellata																		
Cyclotella stelligera																		
Cymbella affinis																		
Cymbella angustata																		
Cymbella cesatii																		
Cymbella microcephala								22,855			1,211,301							
Cymbella minuta	6,205		2,409	2,295,774		891,400	311,978	205,693	276,454	115,431,917	76,106,250	102,288,101	2,583,854	927,460	1,110,672	956,026,042	377,476,089	410,948,507
Cymbella muelleri																		
Cymbella naviculiformis							16,420			19,703,883								
Cymbella sinuata	1,773			248,192				22,855			3,199,662							
Cymbella tumida																		
Diatoma hiemale mesodon							16,420	91,419	16,262	26,271,845	87,762,162	13,009,615	187,917	54,556	75,728	150,333,333	43,645,161	60,582,090
Diatoma tenue elongatum																		
Diatoma vulgare									16,262			31,873,558						
Diatomella balfouriana																		
Didymosphenia geminata																		
Diploneis elliptica																		
Epithemia turgida																		
Eunotia pectinalis																		
Fragilalria leptosauron								22,855			8,410,541							
Fragilaria construens																		
Fragilaria construens venter							65,680	137,128	146,358	10,088,388	11,189,676	20,373,058						
Fragilaria pinnata							16,420	22,855		1,970,388	2,742,568							
Fragilaria vaucheriae	886		8,432	255,283		3,885,538	311,978	205,693	308,978	107,819,650	77,011,297	133,478,654	46,979	81,835	100,970	13,530,000	23,568,387	29,079,403
Frustulia rhomboides																		
Gomphoneis herculeana																		
Gomphonema angustatum	64,707	591	4,818	11,647,288	106,368	867,308	164,199	251,402	81,310	32,511,408	45,252,365	17,562,981	751,667	409,173	833,004	13,530,000	73,651,210	149,940,672
Gomphonema clevei																		
Gomphonema gracile																		
Gomphonema olivaceum																		
Gomphonema parvulum								22,855			3,291,081							
Gomphonema sp.																		
Gomphonema subclavatum			1,205			722,756									100,970			72,698,507
Gomphonema tenellum	886			186,144														
Hannaea arcus	5,318	591	3,614	9,307,193	1,034,133	6,324,119	65,680		16,262	172,408,981		28,458,534	1,644,271	1,554,859	530,093	3,452,968,750	2,993,103,327	927,663,246
melosira ambigua																		
Melosira varians								22,855	16,262		14,855,574	42,281,250						
Meridion circulare		2,364			910,037		147,779	159,983	276,454	62,584,460	67,752,846	138,365,391	46,979	54,556	25,243	18,086,979	31,506,351	19,436,754
Mougeotia sp.																		
Navicula anglica																		
Navicula cryptocephala																		
Navicula cryptocephala veneta		1,773	1,205		168,416	114,436	16,420	68,564	65,048	1,559,891	6,513,598	6,179,567			25,243			2,398,041
Navicula graciloides							16,420			7,142,658								
Navicula gregaria			1,205			210,804	32,840			5,746,966								
Navicula minima																		
Navicula minuscula							16,420			738,896								
Navicula mutica																		
Navicula pupula									16,262			4,390,745						
Navicula radiosa									16,262			5,285,156						
Navicula rhynchocephala									16,262			4,797,296						

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm2			Biovolume um³/cm²			Cell Density cells / cm2			Biovolume um³/cm²			Cell Density cells / cm2			Biovolume um³/cm²		
FES Sample Number																		
Sample I.D	**CC1**						**UNK 1**						**SC1**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date	**18-Aug-08**						**18-Aug-08**						**19-Aug-08**					
Area Sampled (cm²)	**6**						**6**						**12**					
Achnanthes flexella															1,482			718,892
Achnanthes hauckiana	206			9,900														
Achnanthes lanceolata	206	69		37,125	12,436		5,714		7,618	1,028,463		1,371,284			4,447			800,416
Achnanthes linearis	619	69	587	81,675	9,119	77,516			1,905			251,402						
Achnanthes minutissima	9,900	207	2,740	495,000	10,363	150,725	5,714	886	1,905	285,684	44,320	95,228		1,355	8,894		67,758	444,676
Amphipleura pellucida																		
Amphora ovalis																		
Anomoeoneis vitrea																		
Asterionella formosa																		
Caloneis ventricosa							5,714			1,399,852			1,683		1,482	412,377		363,152
Caloneis ventricosa minuta																		
Chlamydomonas sp.																		
Cocconeis placentula	413			189,750			5,714			2,628,294								
Cyclotella comta																		
Cyclotella ocellata																		
Cyclotella stelligera																		
Cymbella affinis																		
Cymbella angustata																		
Cymbella cesatii																		
Cymbella microcephala																		
Cymbella minuta	413			152,625			5,714		13,332	2,114,063		4,932,813	52,178	18,972	54,843	19,305,969	7,019,772	20,292,035
Cymbella muelleri																		
Cymbella naviculiformis																		
Cymbella sinuata	206	69	391	28,875	9,672	54,809									2,965			415,031
Cymbella tumida																		
Diatoma hiemale mesodon	825	138		660,000	110,539		45,709	3,989	17,141	51,194,595	3,191,038	15,084,122						
Diatoma tenue elongatum																		
Diatoma vulgare	206			404,250														
Diatomella balfouriana									5,714			1,714,105			1,482			889,351
Didymosphenia geminata																		
Diploneis elliptica																		
Epithemia turgida									1,905			8,094,383						
Eunotia pectinalis									1,905			1,371,284						
Fragilalria leptosauron																		
Fragilaria construens																		
Fragilaria construens venter	206		587	19,800		36,644			1,905			91,419						
Fragilaria pinnata																		
Fragilaria vaucheriae	619	69	196	178,200	19,897	56,375	22,855	443	1,905	6,582,162	127,642	548,514	6,733	13,552	7,411	1,939,013	3,902,885	2,134,443
Frustulia rhomboides																		
Gomphoneis herculeana																		
Gomphonema angustatum	4,744	3,109	12,724	939,263	559,605	2,290,234	5,714		7,618	1,028,463		1,645,541	11,782	9,486	14,823	2,120,795	1,707,512	3,201,665
Gomphonema clevei																		
Gomphonema gracile																		
Gomphonema olivaceum	206		391	46,406		88,086												
Gomphonema parvulum																		
Gomphonema sp.																		
Gomphonema subclavatum			196			117,448			1,905			1,142,736						
Gomphonema tenellum		69	1,566		14,508	328,854												
Hannaea arcus	1,444	484	196	2,526,563	846,316	342,556	5,714	443	1,905	9,998,944	775,599	3,332,981	3,366			5,891,098		
melosira ambigua									1,905			1,121,786						
Melosira varians																		
Meridion circulare			196			150,725	11,427	443	13,332	10,998,839	170,632	5,132,791	5,050	1,355		1,944,062	521,740	
Mougeotia sp.																		
Navicula anglica																		
Navicula cryptocephala									1,905			352,344						
Navicula cryptocephala veneta							17,141		32,378	1,628,399		3,075,866			4,447			422,442
Navicula graciloides																		
Navicula gregaria															1,482			259,394
Navicula minima																		
Navicula minuscula									1,905			85,705						
Navicula mutica													1,683	1,355		92,574	74,534	
Navicula pupula																		
Navicula radiosa																		
Navicula rhynchocephala																		

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^7			Biovolume um^3/cm^7			Cell Density cells / cm^9			Biovolume um^3/cm^9			Cell Density cells / cm^{10}			Biovolume um^3/cm^{10}		
FES Sample Number																		
Sample I.D				**TEC 1**						**EUR2**						**UNK2**		
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**14-Aug-08**						**17-Aug-08**						**17-Aug-08**		
Area Sampled (cm^2)				**9**						**6**						**6**		
Achnanthes flexella																		
Achnanthes hauckiana																		
Achnanthes lanceolata	40,268	63,701		7,248,214	11,466,102		3,546			638,208					43,365			7,805,769
Achnanthes linearis																		
Achnanthes minutissima	1,046,964	1,528,814	1,894,200	52,348,214	76,440,678	94,710,000		1,773			88,640		84,563		86,731	4,228,125		4,336,538
Amphipleura pellucida			45,100			57,728,000												
Amphora ovalis																		
Anomoeoneis vitrea																		
Asterionella formosa		31,850			7,007,062													
Caloneis ventricosa																		
Caloneis ventricosa minuta																		
Chlamydomonas sp.													16,066,875	35,234,375	6,504,808	5,221,734,375	11,451,171,875	2,114,062,500
Cocconeis placentula									2,168			997,404						
Cyclotella comta																		
Cyclotella ocellata																		
Cyclotella stelligera																		
Cymbella affinis																		
Cymbella angustata																		
Cymbella cesatii																		
Cymbella microcephala																		
Cymbella minuta	241,607	127,401	225,500	89,394,643	47,138,418	83,435,000	8,740			3,233,915			1,099,313	117,448	823,942	447,420,188	43,455,729	365,830,385
Cymbella muelleri																		
Cymbella naviculiformis																		
Cymbella sinuata																		
Cymbella tumida			45,100			112,750,000												
Diatoma hiemale mesodon	40,268		45,100	32,214,286		36,080,000		1,773			1,418,239		84,563	352,344	216,827	67,650,000	479,187,500	173,461,538
Diatoma tenue elongatum	40,268		45,100	28,992,857		32,472,000												
Diatoma vulgare								1,773			3,474,686		253,688	117,448		845,286,750	230,197,917	
Diatomella balfouriana																		
Didymosphenia geminata	80,536		45,100	161,071,429		90,200,000												
Diploneis elliptica		31,850			8,281,073													
Epithemia turgida																		
Eunotia pectinalis																		
Fragilalria leptosauron																		
Fragilaria construens	40,268			27,060,000														
Fragilaria construens venter	40,268	31,850		1,932,857	1,528,814													
Fragilaria pinnata																		
Fragilaria vaucheriae	926,161	477,754	1,307,900	266,734,286	137,593,220	376,675,200	4,370	14,182	23,851	1,258,605	4,084,528	8,242,892	169,125			48,708,000		
Frustulia rhomboides							4,370			4,719,767								
Gomphoneis herculeana																		
Gomphonema angustatum	161,071	286,653	315,700	28,992,857	51,597,458	56,826,000	30,591	23,046	17,346	5,506,395	4,563,184	3,122,308	253,688		737,212	45,663,750	145,967,885	
Gomphonema clevei																		
Gomphonema gracile																		
Gomphonema olivaceum																		
Gomphonema parvulum																		
Gomphonema sp.																		
Gomphonema subclavatum	80,536			48,321,429			8,740		4,337	5,244,186		2,601,923						
Gomphonema tenellum																		
Hannaea arcus	805,357	286,653	631,400	1,409,375,000	501,641,949	1,104,950,000	441,386	120,550	171,293	772,424,903	210,963,050	299,763,221			43,365			75,889,423
melosira ambigua																		
Melosira varians																		
Meridion circulare		95,551			47,823,199		4,370	14,182	4,337	1,682,510	8,190,330	2,504,351						
Mougeotia sp.																		
Navicula anglica																		
Navicula cryptocephala							4,370			808,479								
Navicula cryptocephala veneta			90,200			8,569,000			4,337			411,971			130,096			169,066,875
Navicula graciloides																		
Navicula gregaria																		
Navicula minima																		
Navicula minuscula													84,563			3,805,313		
Navicula mutica																		
Navicula pupula																		
Navicula radiosa																		
Navicula rhynchocephala																		

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^7			Biovolume um^3/cm^7		
FES Sample Number						
Sample I.D				**URO**		
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**17-Aug-08**		
Area Sampled (cm^2)				**6**		
Achnanthes flexella						
Achnanthes hauckiana						
Achnanthes lanceolata		10,376			1,867,638	
Achnanthes linearis						
Achnanthes minutissima	349,914	207,515	94,565	19,245,259	10,375,767	4,728,226
Amphipleura pellucida						
Amphora ovalis						
Anomoeoneis vitrea						
Asterionella formosa						
Caloneis ventricosa						
Caloneis ventricosa minuta						
Chlamydomonas sp.						
Cocconeis placentula	38,879			17,884,483		
Cyclotella comta						
Cyclotella ocellata						
Cyclotella stelligera						
Cymbella affinis						
Cymbella angustata						
Cymbella cesatii						
Cymbella microcephala						
Cymbella minuta	2,527,155	259,394	210,952	935,047,414	95,975,844	78,052,097
Cymbella muelleri						
Cymbella naviculiformis	38,879			46,655,172		
Cymbella sinuata	38,879	10,376		5,443,103	1,452,607	
Cymbella tumida						
Diatoma hiemale mesodon	77,759	20,752		62,206,897	16,601,227	
Diatoma tenue elongatum						
Diatoma vulgare						
Diatomella balfouriana						
Didymosphenia geminata	155,517	72,630	94,565	311,034,483	145,260,736	189,129,032
Diploneis elliptica						
Epithemia turgida						
Eunotia pectinalis						
Fragilalria leptosauron						
Fragilaria construens			7,274			3,258,839
Fragilaria construens venter						
Fragilaria pinnata						
Fragilaria vaucheriae	233,276	186,764	87,290	67,183,448	69,924,368	32,681,497
Frustulia rhomboides						
Gomphoneis herculeana						
Gomphonema angustatum	311,034	83,006	80,016	61,584,828	14,941,104	14,402,903
Gomphonema clevei						
Gomphonema gracile						
Gomphonema olivaceum						
Gomphonema parvulum						
Gomphonema sp.						
Gomphonema subclavatum		20,752			12,450,920	
Gomphonema tenellum		10,376			2,178,911	
Hannaea arcus	349,914	93,382	58,194	612,349,138	163,418,328	101,838,710
melosira ambigua						
Melosira varians						
Meridion circulare		10,376	21,823		3,994,670	8,401,694
Mougeotia sp.						
Navicula anglica						
Navicula cryptocephala						
Navicula cryptocephala veneta		41,503	14,548		3,942,791	1,382,097
Navicula graciloides						
Navicula gregaria						
Navicula minima						
Navicula minuscula						
Navicula mutica						
Navicula pupula						
Navicula radiosa						
Navicula rhynchocephala						

Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D	**MC1**						**MCTR**						**SNO1**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date	**13-Aug-08**						**13-Aug-08**						**14-Aug-08**					
Area Sampled (cm^2)	**30**						**12**						**24**					
Navicula seminulum hustedtii																		
Navicula sp.								199							458			68,683
Nitzschia acicularis																		
Nitzschia capitellata																		
Nitzschia clausii																		
Nitzschia communis																		
Nitzschia constricta																		
Nitzschia dissipata																		
Nitzschia fonticola	562	127		23,610	5,341													
Nitzschia frustulum								1,194			143,259							
Nitzschia linearis																		
Nitzschia microcephala																		
Nitzschia palea	80			14,455											458			82,420
Nitzschia paleacea	1,205	254	183	118,050	24,924	17,918							1,784	480	1,832	174,834	47,075	179,492
Nitzschia sp.								199			29,846							
Oscillatoria sp.								12,933			14,433,326							
pinnularia borealis																		
Pinnularia sp.																		
Rhodomonas minuta																		
Rhoicosphenia curvata																		
Stauroneis sp.																		
Stephanodiscus astrae minutula																		
Stephanodiscus hantzschii																		
surirella linearis																		
Synedra parasitica																		
Synedra radians																		
Synedra rumpens																		
Synedra socia																		
Synedra tenera																		
Synedra ulna																		
Synedra ulna constrictica																		
Tabellaria flocculosa																		
Trachelomonas hispida															458			961,562
Trachelomonas volvocina																		
Ulothrix sp.																		
Total	41,872	764	186	229,195	77,316	17,921	85,644	20,098	193,446	15,008,969	15,885,019	126,475,421	134,281	48,517	45,793	83,832,837	35,636,919	31,203,602

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D				**SNO2**						**TRC3**						**TEC2**		
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**14-Aug-08**						**15-Aug-08**						**14-Aug-08**		
Area Sampled (cm^2)				**12**						**16**						**15**		
Navicula seminulum hustedtii																		
Navicula sp.	1,566		2,104	234,896		252,425	1,738			208,510								
Nitzschia acicularis														25,625			7,175,000	
Nitzschia capitellata														25,625			9,225,000	
Nitzschia clausii																		
Nitzschia communis																		
Nitzschia constricta																		
Nitzschia dissipata																		
Nitzschia fonticola																		
Nitzschia frustulum								2,728			327,339			25,625			3,075,000	
Nitzschia linearis																		
Nitzschia microcephala																		
Nitzschia palea																		
Nitzschia paleacea		233	6,311		22,867	618,442			2,728		267,327			76,875			7,533,750	
Nitzschia sp.														25,625			3,075,000	
Oscillatoria sp.																		
pinnularia borealis													8,250			1,815,000		
Pinnularia sp.																		
Rhodomonas minuta																		
Rhoicosphenia curvata																		
Stauroneis sp.																		
Stephanodiscus astrae minutula																		
Stephanodiscus hantzschii																		
surirella linearis													8,250			2,310,000		
Synedra parasitica																		
Synedra radians																		
Synedra rumpens													8,250	51,250	12,621	1,155,000	7,175,000	3,533,955
Synedra socia																		
Synedra tenera								1,364			409,173							
Synedra ulna	31,319			62,325,694			3,475			6,915,591				128,125			305,962,500	
Synedra ulna constrictica																		
Tabellaria flocculosa																		
Trachelomonas hispida																		
Trachelomonas volvocina		233			439,846													
Ulothrix sp.			4,207			5,385,075												
Total	204,115	25,433	220,877	117,880,909	14,734,970	107,699,392	112,673	65,470	17,734	24,366,163	38,302,723	22,231,757	922,440	2,629,127	1,577,662	546,537,751	1,882,960,002	553,363,906

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D	**HLO**						**TRC2**						**STE1**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date	**14-Aug-08**						**15-Aug-08**						**16-Aug-08**					
Area Sampled (cm^2)	**3**						**6**						**6**					
Navicula seminulum hustedtii																		
Navicula sp.														28,544			4,281,646	
Nitzschia acicularis			520,385			145,707,692												
Nitzschia capitellata			520,385			187,338,462												
Nitzschia clausii																		
Nitzschia communis															21,738			978,229
Nitzschia constricta	356,053			413,021,053											21,738			12,608,290
Nitzschia dissipata													98,328	114,177	43,477	26,450,363	30,713,671	11,659,276
Nitzschia fonticola																		
Nitzschia frustulum													98,328		65,215	11,799,419	7,825,835	
Nitzschia linearis																		
Nitzschia microcephala																		
Nitzschia palea	1,068,158	1,153,125		192,268,421	207,562,500			2,506			451,000		98,328	28,544	21,738	17,699,128	5,137,975	3,912,918
Nitzschia paleacea														28,544	43,477		2,797,342	4,260,733
Nitzschia sp.														57,089			6,850,633	
Oscillatoria sp.																		
pinnularia borealis																		
Pinnularia sp.			520,385			208,153,846								57,089	21,738		22,835,443	8,695,373
Rhodomonas minuta																		
Rhoicosphenia curvata																		
Stauroneis sp.																		
Stephanodiscus astrae minutula														57,089			19,981,013	
Stephanodiscus hantzschii							8,054			966,429								
surirella linearis																		
Synedra parasitica	712,105			99,694,737														
Synedra radians																		
Synedra rumpens	1,424,211	2,306,250	5,203,846	199,389,474	322,875,000	728,538,462							786,628	171,266	173,907	121,140,698	23,977,215	24,347,044
Synedra socia															21,738			7,173,683
Synedra tenera	7,477,105	12,684,375	15,611,538	2,243,131,579	3,805,312,500	4,683,461,538									43,477			13,043,059
Synedra ulna	1,424,211	384,375	4,683,462	3,401,014,737	764,906,250	10,252,097,308							98,328	28,544		195,673,692	56,803,165	
Synedra ulna constrictica	356,053			124,618,421														
Tabellaria flocculosa													98,328		21,738	58,013,808		51,302,699
Trachelomonas hispida																		
Trachelomonas volvocina																		
Ulothrix sp.																		
Total	40,985,733	48,431,252	62,446,157	16,782,164,740	10,992,356,252	26,178,988,849	893,362	45,103	9,283	351,678,527	56,131,964	12,597,380	11,249,126	2,882,977	2,347,748	5,472,059,042	1,501,026,837	1,290,005,157

Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D	**TRC1**						**SCR**						**SUNR**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**16-Aug-08**						**15-Aug-08**						**13-Aug-08**		
Area Sampled (cm^2)				**6**						**6**						**12**		
Navicula seminulum hustedtii																		
Navicula sp.																		
Nitzschia acicularis																		
Nitzschia capitellata																		
Nitzschia clausii																		
Nitzschia communis																		
Nitzschia constricta																		
Nitzschia dissipata									12,621			3,395,121						
Nitzschia fonticola																		
Nitzschia frustulum																		
Nitzschia linearis																		
Nitzschia microcephala																		
Nitzschia palea													21,141			3,805,313		
Nitzschia paleacea								41,452			4,062,316							
Nitzschia sp.																		
Oscillatoria sp.																		
pinnularia borealis																		
Pinnularia sp.																		
Rhodomonas minuta																		
Rhoicosphenia curvata																		
Stauroneis sp.																		
Stephanodiscus astrae minutula																		
Stephanodiscus hantzschii																		
surirella linearis																		
Synedra parasitica																		
Synedra radians																		
Synedra rumpens															29,671			4,153,947
Synedra socia																		
Synedra tenera																		
Synedra ulna																		
Synedra ulna constrictica																		
Tabellaria flocculosa																		
Trachelomonas hispida																		
Trachelomonas volvocina																		
Ulothrix sp.																		
Total	###	11,895	26,763	7,511,075	2	17,840,192	181,365	4,476,838	1,337,856	45,935,187	1,491,450,369	482,107,222	2,069,188	1,214,584	3,174,805	1,088,589,978	660,529,377	1,537,328,450

Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D	**ECM8**						**UR1**						**SCT**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**18-Aug-08**						**19-Aug-08**						**19-Aug-08**		
Area Sampled (cm^2)				**6**						**6**						**6**		
Navicula seminulum hustedtii																		
Navicula sp.																		
Nitzschia acicularis																		
Nitzschia capitellata																		
Nitzschia clausii																		
Nitzschia communis																		
Nitzschia constricta																		
Nitzschia dissipata																		
Nitzschia fonticola																		
Nitzschia frustulum								2,502			300,222							
Nitzschia linearis																		
Nitzschia microcephala																		
Nitzschia palea									3,221			579,857						
Nitzschia paleacea															954			93,464
Nitzschia sp.																		
Oscillatoria sp.																		
pinnularia borealis																		
Pinnularia sp.														1,364			545,565	
Rhodomonas minuta																		
Rhoicosphenia curvata																		
Stauroneis sp.																		
Stephanodiscus astrae minutula																		
Stephanodiscus hantzschii																		
surirella linearis																		
Synedra parasitica																		
Synedra radians															636			228,891
Synedra rumpens	11,275	2,379		1,578,500	333,017													
Synedra socia	5,638			1,860,375														
Synedra tenera	5,638			1,691,250														
Synedra ulna																		
Synedra ulna constrictica																		
Tabellaria flocculosa																		
Trachelomonas hispida																		
Trachelomonas volvocina																		
Ulothrix sp.																		
Total	693,638	161,753	90,987	344,361,051	107,307,554	93,093,682	39,686	5,006	3,224	1	750,557	579,860	52,450	2,048	2,229	9,828,398	579,665	382,124

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D	**SC2**						**STE2**						**SC3**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date	**18-Aug-08**									**18-Aug-08**						**19-Aug-08**		
Area Sampled (cm^2)	**6**						**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**
Navicula seminulum hustedtii																		
Navicula sp.														6,101			915,179	
Nitzschia acicularis																		
Nitzschia capitellata																		
Nitzschia clausii																		
Nitzschia communis																		
Nitzschia constricta																		
Nitzschia dissipata																		
Nitzschia fonticola							6,960			292,315								
Nitzschia frustulum							20,880			2,505,556								
Nitzschia linearis																		
Nitzschia microcephala																		
Nitzschia palea							13,920			2,505,556					12,528			225,500
Nitzschia paleacea		2,306			225,962		69,599		31,319	6,820,679		3,069,306			6,264			613,861
Nitzschia sp.									10,440			1,252,778						
Oscillatoria sp.																		
pinnularia borealis			1,481			325,924												
Pinnularia sp.																		
Rhodomonas minuta																		
Rhoicosphenia curvata																		
Stauroneis sp.																		
Stephanodiscus astrae minutula																		
Stephanodiscus hantzschii																		
surirella linearis							6,960		10,440	1,948,765		2,923,148						
Synedra parasitica																		
Synedra radians																		
Synedra rumpens									10,440			1,461,574						
Synedra socia																		
Synedra tenera							13,920			4,175,926								
Synedra ulna									10,440			20,775,231						
Synedra ulna constrictica																		
Tabellaria flocculosa																		
Trachelomonas hispida																		
Trachelomonas volvocina																		
Ulothrix sp.																		
Total	39,685	20,754	19,260	1	6,435,283	2,888,876	707,837	611,623	1,148,390	351,251,450	1,032,940,893	1,630,897,440	39,686	170,840	50,121	7	214,780,216	49,290,551

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm^2			Biovolume um^3/cm^2			Cell Density cells / cm2			Biovolume um^3/cm^2		
FES Sample Number																		
Sample I.D	**UR1A**						**NTR 1**						**NTR 2**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date	**17-Aug-08**						**16-Aug-08**						**17-Aug-08**					
Area Sampled (cm^2)	**6**	**6**	**6**	**6**	**6**	**6**	**6**						**6**					
Navicula seminulum hustedtii																		
Navicula sp.	886			265,920					16,262			2,439,303			25,243			3,786,381
Nitzschia acicularis																		
Nitzschia capitellata																		
Nitzschia clausii									16,262			5,203,846						
Nitzschia communis																		
Nitzschia constricta																		
Nitzschia dissipata									16,262			4,374,483						
Nitzschia fonticola																		
Nitzschia frustulum																		
Nitzschia linearis							16,420			25,023,932								
Nitzschia microcephala			1,205			120,459												
Nitzschia palea							16,420	45,709	32,524	2,955,583	8,227,703	5,854,327						
Nitzschia paleacea							32,480			3,218,301			46,979			4,603,958		
Nitzschia sp.																		
Oscillatoria sp.																		
pinnularia borealis																		
Pinnularia sp.								22,855			9,141,892							
Rhodomonas minuta							328,398			6,567,961								
Rhoicosphenia curvata																		
Stauroneis sp.								22,855	16,262		7,770,608	5,529,087						
Stephanodiscus astrae minutula																		
Stephanodiscus hantzschii																		
surirella linearis																		
Synedra parasitica																		
Synedra radians			1,205			433,654												
Synedra rumpens							32,840	68,564	16,262	4,597,573	9,598,986	2,276,683		54,556			15,275,806	
Synedra socia																		
Synedra tenera	886			265,920					16,262			4,878,606						
Synedra ulna									32,524			64,722,837						
Synedra ulna constrictica																		
Tabellaria flocculosa																		
Trachelomonas hispida																		
Trachelomonas volvocina																		
Ulothrix sp.																		
Total	124,777	5,327	37,353	24,879,465	2,218,962	14,172,780	1,730,575	2,399,750	1,626,203	621,744,551	516,510,038	660,714,464	5,348,330	3,218,831	2,928,139	4,609,079,063	3,567,228,148	1,681,582,111

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm2			Biovolume um³/cm²			Cell Density cells / cm2			Biovolume um³/cm²			Cell Density cells / cm2			Biovolume um³/cm²		
FES Sample Number																		
Sample I.D	**CC1**						**UNK 1**						**SC1**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**18-Aug-08**						**18-Aug-08**						**19-Aug-08**		
Area Sampled (cm²)				**6**						**6**						**12**		
Navicula seminulum hustedtii									11,427			857,052						
Navicula sp.									1,905			285,648						
Nitzschia acicularis																		
Nitzschia capitellata																		
Nitzschia clausii																		
Nitzschia communis	206			9,281			5,714		5,714	257,116		257,116						
Nitzschia constricta																		
Nitzschia dissipata																		
Nitzschia fonticola																		
Nitzschia frustulum		69			8,290				11,427			1,371,284			1,482			177,870
Nitzschia linearis																		
Nitzschia microcephala															1,482			148,225
Nitzschia palea																		
Nitzschia paleacea																		
Nitzschia sp.																		
Oscillatoria sp.																		
pinnularia borealis																		
Pinnularia sp.													1,683	1,355		673,268	542,067	
Rhodomonas minuta																		
Rhoicosphenia curvata													1,683			196,931		
Stauroneis sp.																		
Stephanodiscus astrae minutula																		
Stephanodiscus hantzschii																		
surirella linearis																		
Synedra parasitica																		
Synedra radians																		
Synedra rumpens							439,954	28,808	30,473	61,693,497	4,033,117	4,266,216						
Synedra socia																		
Synedra tenera																		
Synedra ulna							11,427			22,740,456								
Synedra ulna constrictica																		
Tabellaria flocculosa																		
Trachelomonas hispida																		
Trachelomonas volvocina																		
Ulothrix sp.																		
Total	60,104	4,354	19,773	5,778,714	1,600,747	3,693,975	633,910	35,014	179,037	173,578,828	8,342,350	56,481,623	125,533	47,432	106,725	32,576,088	13,836,270	30,267,595

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (continued)

	Cell Density cells / cm^7			Biovolume um^3/cm^7			Cell Density cells / cm^9			Biovolume um^3/cm^9			Cell Density cells / cm^{10}			Biovolume um^3/cm^{10}		
FES Sample Number																		
Sample I.D	**TEC 1**						**EUR2**						**UNK2**					
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**14-Aug-08**						**17-Aug-08**						**17-Aug-08**		
Area Sampled (cm^2)				**9**						**6**						**6**		
Navicula seminulum hustedtii																		
Navicula sp.							4,370		2,168	655,523		325,240						
Nitzschia acicularis																		
Nitzschia capitellata																		
Nitzschia clausii																		
Nitzschia communis																		
Nitzschia constricta																		
Nitzschia dissipata																		
Nitzschia fonticola																		
Nitzschia frustulum		31,850			3,822,034			1,773			212,736		84,653			10,147,500		
Nitzschia linearis																		
Nitzschia microcephala																		
Nitzschia palea		31,850	45,100		5,733,051	8,118,000												
Nitzschia paleacea							4,370	1,773		428,275	173,734							
Nitzschia sp.			45,100			5,412,000												
Oscillatoria sp.																		
pinnularia borealis																		
Pinnularia sp.																		
Rhodomonas minuta																		
Rhoicosphenia curvata																		
Stauroneis sp.																		
Stephanodiscus astrae minutula																		
Stephanodiscus hantzschii																		
surirella linearis																		
Synedra parasitica																		
Synedra radians																		
Synedra rumpens	523,482	350,353	225,500	73,287,500	49,049,435	31,570,000		3,546	2,168		496,384	303,558			130,096			18,213,462
Synedra socia																		
Synedra tenera							4,370	5,318	2,168	1,311,047	2,712,382	650,481						
Synedra ulna	161,071	127,401	180,400	320,532,143	253,528,249	358,996,000												
Synedra ulna constrictica	40,268			14,093,750														
Tabellaria flocculosa																		
Trachelomonas hispida																		
Trachelomonas volvocina																		
Ulothrix sp.																		
Total	4,308,077	3,503,533	5,186,503	2,561,599,466	1,202,650,744	2,458,491,203	563,277	189,691	234,176	797,911,814	236,377,895	318,923,352	18,220,715	35,821,617	8,716,445	6,694,644,002	12,349,980,908	2,928,666,493

Note: Highlighted area Indicates no algae present

(continued)

Appendix 9.2-5D
Periphyton Taxanomic Data for KSM Project Streams, 2008 (completed)

	Cell Density cells / cm^7			Biovolume um^3/cm^7		
FES Sample Number						
Sample I.D			**URO**			
Replicate Number	**1**	**2**	**3**	**1**	**2**	**3**
Sampling Date				**17-Aug-08**		
Area Sampled (cm^2)				**6**		
Navicula seminulum hustedtii						
Navicula sp.			7,274			1,091,129
Nitzschia acicularis	38,879			13,996,552		
Nitzschia capitellata						
Nitzschia clausii						
Nitzschia communis						
Nitzschia constricta						
Nitzschia dissipata		20,752			5,582,163	
Nitzschia fonticola			7,274			305,516
Nitzschia frustulum		10,376			2,490,184	
Nitzschia linearis						
Nitzschia microcephala						
Nitzschia palea						
Nitzschia paleacea		51,879	58,194		5,084,126	5,702,968
Nitzschia sp.			7,274			872,904
Oscillatoria sp.						
pinnularia borealis						
Pinnularia sp.	38,879			15,551,724		
Rhodomonas minuta						
Rhoicosphenia curvata						
Stauroneis sp.						
Stephanodiscus astrae minutula						
Stephanodiscus hantzschii						
surirella linearis						
Synedra parasitica						
Synedra radians						
Synedra rumpens		10,376			1,452,607	
Synedra socia						
Synedra tenera	38,879	31,127	14,548	11,663,793	15,874,923	4,364,516
Synedra ulna			7,247			14,475,645
Synedra ulna constrictica						
Tabellaria flocculosa						
Trachelomonas hispida						
Trachelomonas volvocina						
Ulothrix sp.						
Total	4,277,527	1,151,714	771,041	2,179,846,295	572,868,916	460,687,776

Indicates no algae present

APPENDIX 9.2.5E
BRAY-CURTIS SIMILARITY MATRIX, MEAN PERIPHYTON FOR KSM PROJECT STUDY AREA STREAMS, 2008

Appendix 9.2.5E
Bray-Curtis Similarity Matrix, Mean Periphyton for KSM Project Study Area Streams, 2008

	MC1	MCTR	SNO1	SNO2	TRC3	TEC2	HLO	TRC2	STE1	TRC1	SCR	SUNR	ECM8	UR1	SCT
MC1															
MCTR	5.0														
SNO1	14.9	36.5													
SNO2	7.7	40.0	54.2												
TRC3	12.3	44.1	67.5	54.2											
TEC2	2.3	25.4	20.7	30.5	24.0										
HLO	0.2	4.5	2.7	5.4	3.3	18.9									
TRC2	3.5	34.0	48.3	40.8	45.6	32.3	6.3								
STE1	1.2	15.5	12.5	18.4	14.5	40.7	27.0	21.5							
TRC1	0.7	3.6	12.4	12.5	19.4	3.0	0.1	9.5	2.3						
SCR	2.1	22.6	24.0	28.4	22.3	51.6	15.9	38.4	46.2	8.1					
SUNR	1.1	20.6	18.9	25.6	20.1	61.2	17.4	33.6	41.5	7.3	65.5				
ECM8	2.5	34.6	41.5	34.5	43.2	37.6	6.5	62.8	24.5	18.3	43.4	42.8			
UR1	19.0	10.1	12.5	5.4	15.6	3.3	0.6	9.9	2.4	0.6	1.9	3.6	5.1		
SCT	15.0	5.5	18.7	10.1	23.0	3.2	0.3	5.6	3.4	40.7	4.2	2.5	9.2	0.7	
SC2	17.4	34.9	41.5	31.0	43.7	11.8	1.7	29.5	6.5	25.0	16.7	12.1	28.9	14.3	6.5
STE2	4.3	36.1	31.5	37.7	34.4	50.0	9.0	40.5	39.3	6.2	40.5	45.8	43.8	6.8	7.4
SC3	11.2	23.7	33.3	29.0	38.1	12.0	3.2	24.5	10.0	19.5	17.0	16.3	24.5	17.8	4.1
UR1A	7.6	39.9	51.9	43.6	63.6	19.0	2.9	40.0	11.2	16.1	21.4	19.1	37.5	9.8	16.9
NTR1	1.6	21.4	16.6	25.1	17.0	51.3	21.2	24.3	50.6	1.9	47.8	46.4	27.4	2.2	3.0
NTR2	2.0	24.4	20.9	28.6	20.7	59.7	18.5	35.4	43.0	2.6	45.0	55.1	34.7	1.4	2.8
CC1	7.7	31.5	33.7	29.6	39.7	12.7	1.6	21.8	6.2	13.9	11.6	12.2	19.5	16.8	18.9
UNK1	2.8	45.7	31.6	38.1	41.7	31.7	8.1	32.5	28.1	6.6	18.2	23.0	27.5	7.5	6.5
SC1	5.5	49.8	53.7	51.9	56.6	24.5	4.1	38.7	14.1	14.5	28.3	24.0	38.2	11.7	13.2
TEC1	0.9	17.8	14.3	21.6	15.3	49.9	29.8	26.1	55.3	1.8	50.7	53.1	26.7	3.0	1.7
EUR2	6.6	44.5	46.1	42.4	51.4	32.9	4.4	51.3	23.1	8.1	30.1	36.2	52.3	7.8	8.8
UNK2	0.7	14.8	7.7	11.4	10.2	39.0	15.1	17.1	29.6	0.3	25.3	33.6	16.4	1.8	0.4
URO	2.6	23.6	20.5	30.8	23.3	69.5	19.6	32.6	43.9	2.6	53.8	59.2	37.6	2.8	3.6
SCR-MED	2.1	22.6	24.0	28.4	22.3	51.6	15.9	38.4	46.2	8.1	100.0	65.5	43.4	1.9	4.2
SUNR-MED	1.1	20.6	18.9	25.6	20.1	61.2	17.4	33.6	41.5	7.3	65.5	100.0	42.8	3.6	2.5

Note: SCR-MED and SUNR-MED are median abundance values of all replicates for reference sites SCR and SUNR.

(continued)

Appendix 9.2.5E
Bray-Curtis Similarity Matrix, Mean Periphyton for KSM Project Study Area Streams, 2008 (completed)

	SC2	STE2	SC3	UR1A	NTR1	NTR2	CC1	UNK1	SC1	TEC1	EUR2	UNK2	URO	SCR-MED	SUNR-MED
MC1															
MCTR															
SNO1															
SNO2															
TRC3															
TEC2															
HLO															
TRC2															
STE1															
TRC1															
SCR															
SUNR															
ECM8															
UR1															
SCT															
SC2															
STE2	15.8														
SC3	49.0	21.1													
UR1A	40.6	29.1	39.6												
NTR1	7.8	37.3	13.0	14.8											
NTR2	10.6	51.4	12.2	18.3	42.7										
CC1	29.6	16.3	21.7	52.2	8.9	9.4									
UNK1	25.0	42.0	17.9	33.2	27.6	27.6	25.9								
SC1	43.5	31.8	35.8	60.7	18.6	21.5	37.1	39.1							
TEC1	6.4	43.5	10.9	12.3	47.9	49.6	7.0	29.8	15.8						
EUR2	31.0	55.1	30.6	46.5	23.1	38.6	25.4	40.0	39.3	26.5					
UNK2	5.1	20.4	5.9	9.0	30.9	39.0	5.2	19.1	12.9	28.8	11.5				
URO	10.4	51.4	12.0	20.1	53.6	61.5	11.2	30.3	24.1	50.9	39.0	33.8			
SCR-MED	16.7	40.5	17.0	21.4	47.8	45.0	11.6	18.2	28.3	50.7	30.1	25.3	53.8		
SUNR-MED	12.1	45.8	16.3	19.1	46.4	55.1	12.2	23.0	24.0	53.1	36.2	33.6	59.2	65.5	

Note: SCR-MED and SUNR-MED are median abundance values of all replicates for reference sites SCR and SUNR.

APPENDIX 9.2.5F
BENTHIC INVERTEBRATE DATA COLLECTED USING HESS SAMPLER AT KSM PROJECT STUDY AREA STREAMS, 2008

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008

				Site	SC1					SC2					SC3				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Tricladida	Planariidae		*Polycelis coronata*																
Nematoda												1							
Oligochaeta	Enchytraeidae				1				1				1				2		
Oligochaeta	Naididae																		
Oligochaeta	Tubificidae																		
Gastropoda	Valvatidae		*Valvata sincera*																
Pelecypoda	Sphaeriidae		*Pisidium*																
Pelecypoda	Sphaeriidae (d)		*Pisidium/Sphaerium*																
Hydracarina																			
Ostracoda																			
Cladocera	Chydoridae																		
Copepoda - Calanoida																			
Copepoda - Cyclopoida																			
Copepoda - Harpacticoida																			
Amphipoda	Talitridae		*Hyallela azteca*																
Collembola					1														
Ephemeroptera	Ameletidae		*Ameletus* sp.																
Ephemeroptera	Ameletidae		*Ameletus celer*			1													
Ephemeroptera	Ameletidae		*Ameletus inopinatus*																
Ephemeroptera	Ameletidae		*Ameletus sparsatus*																
Ephemeroptera	Baetidae		*Baetis*		1	1			1	2		1			1	1			
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*																
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*																
Ephemeroptera	Ephemerellidae		*Drunella doddsi*																
Ephemeroptera	Ephemerellidae		*Serratella*																
Ephemeroptera	Ephemerellidae (d)																		
Ephemeroptera	Heptageniidae		*Cynigmula*																
Ephemeroptera	Heptageniidae		*Epeorus*																
Ephemeroptera	Heptageniidae		*Rhithrogena*			1									2			1	
Ephemeroptera	Heptageniidae (d)																		
Ephemeroptera	Leptophlebiidae (d)																		
Ephemeroptera	Leptophlebiidae		*Leptophlebia*																
Plecoptera (d)																			
Plecoptera	Capniidae																		
Plecoptera	Chloroperlidae																		
Plecoptera	Leuctridae		*Despaxia augusta*																
Plecoptera	Leuctridae		*Paraleuctra*																
Plecoptera	Leuctridae (d)																		
Plecoptera	Nemouridae		*Podmosta*																
Plecoptera	Nemouridae		*Visoka cataractae*																
Plecoptera	Nemouridae		*Zapada*		3	4	1	1		1		1							
Plecoptera	Nemouridae (d)																		
Plecoptera	Perlidae (d)																		
Plecoptera	Perlodidae		*Isoperla*																
Plecoptera	Perlodidae		*Kogotus*																
Plecoptera	Perlodidae		*Skwala*			3		3	1						1				
Plecoptera	Perlodidae (d)										1						1	1	2
Plecoptera	Taeniopterygidae		*Taenionema*					1		5					1			1	
Trichoptera (d)																			
Trichoptera - pupa																			
Trichoptera	Brachycentridae		*Micrasema*																
Trichoptera	Glossosomatidae		*Glossosoma*																
Trichoptera	Hydropsychidae		*Parapsyche*													1			
Trichoptera	Limnephilidae (d)																		
Trichoptera	Limnephilidae		*Dicosmoecus*																
Trichoptera	Limnephilidae		*Ecclisomyia?*																
Trichoptera	Rhyacophilidae		*Rhyacophila*																
Trichoptera	Uenoidae		*Oligophlebodes*																
Lepidoptera	Noctuidae																		
Coleoptera	Dytiscidae		*Liodessus*																
Coleoptera	Hydraenidae		*Hydraena*						1										

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	TRC1			TRC2					TRC3			UR1				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**
Tricladida	Planariidae		*Polycelis coronata*											1						
Nematoda						1									1	1				
Oligochaeta	Enchytraeidae									1				3			1			1
Oligochaeta	Naididae											1								
Oligochaeta	Tubificidae																			
Gastropoda	Valvatidae		*Valvata sincera*																	
Pelecypoda	Sphaeriidae		*Pisidium*																	
Pelecypoda	Sphaeriidae (d)		*Pisidium/Sphaerium*																	
Hydracarina											2	1								
Ostracoda								2												
Cladocera	Chydoridae																			
Copepoda - Calanoida								6												
Copepoda - Cyclopoida										1							1			
Copepoda - Harpacticoida																				
Amphipoda	Talitridae		*Hyallela azteca*																	
Collembola						1	1									1				
Ephemeroptera	Ameletidae		*Ameletus* sp.					1							4	1			1	
Ephemeroptera	Ameletidae		*Ameletus celer*																	
Ephemeroptera	Ameletidae		*Ameletus inopinatus*										1							
Ephemeroptera	Ameletidae		*Ameletus sparsatus*																	
Ephemeroptera	Baetidae		*Baetis*			1		2	5	13	5	3	3	4	5	3	9		1	11
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*																	
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*																	
Ephemeroptera	Ephemerellidae		*Drunella doddsi*							1										
Ephemeroptera	Ephemerellidae		*Serratella*																	
Ephemeroptera	Ephemerellidae (d)																			
Ephemeroptera	Heptageniidae		*Cynigmula*					1	1					2		2	1			1
Ephemeroptera	Heptageniidae		*Epeorus*						1	4	1				1				1	1
Ephemeroptera	Heptageniidae		*Rhithrogena*			1		30	16	24	6	1	1	1		2				
Ephemeroptera	Heptageniidae (d)									1										
Ephemeroptera	Leptophlebiidae (d)																			
Ephemeroptera	Leptophlebiidae		*Leptophlebia*																	
Plecoptera (d)									1			1								
Plecoptera	Capniidae				2			2												
Plecoptera	Chloroperlidae							5		2	1	1	1	6	5				1	1
Plecoptera	Leuctridae		*Despaxia augusta*																	
Plecoptera	Leuctridae		*Paraleuctra*								1									
Plecoptera	Leuctridae (d)									2					1					
Plecoptera	Nemouridae		*Podmosta*																	
Plecoptera	Nemouridae		*Visoka cataractae*																	
Plecoptera	Nemouridae		*Zapada*					2		2					2					1
Plecoptera	Nemouridae (d)																			
Plecoptera	Perlidae (d)																			
Plecoptera	Perlodidae		*Isoperla*																	
Plecoptera	Perlodidae		*Kogotus*																	
Plecoptera	Perlodidae		*Skwala*					3	4	3	2	1		4	1					
Plecoptera	Perlodidae (d)																			2
Plecoptera	Taeniopterygidae		*Taenionema*			1			2	4	6									4
Trichoptera (d)																				
Trichoptera - pupa														2						
Trichoptera	Brachycentridae		*Micrasema*																	
Trichoptera	Glossosomatidae		*Glossosoma*																	
Trichoptera	Hydropsychidae		*Parapsyche*																	
Trichoptera	Limnephilidae (d)																			
Trichoptera	Limnephilidae		*Dicosmoecus*																	
Trichoptera	Limnephilidae		*Ecclisomyia?*																	
Trichoptera	Rhyacophilidae		*Rhyacophila*									1								
Trichoptera	Uenoidae		*Oligophlebodes*																	
Lepidoptera	Noctuidae																			
Coleoptera	Dytiscidae		*Liodessus*																	
Coleoptera	Hydraenidae		*Hydraena*																	

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	UR1A					UNK1			UNK2					NTR1		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**
Tricladida	Planariidae		*Polycelis coronata*															117	75	
Nematoda										1			3	7	10	8	4		144	20
Oligochaeta	Enchytraeidae				1					1				2	2				56	
Oligochaeta	Naididae																		128	
Oligochaeta	Tubificidae																	16	17	10
Gastropoda	Valvatidae		*Valvata sincera*																	
Pelecypoda	Sphaeriidae		*Pisidium*															3		1
Pelecypoda	Sphaeriidae (d)		*Pisidium/Sphaerium*															1		10
Hydracarina						1			1	1	2							189	208	30
Ostracoda																		208	1096	250
Cladocera	Chydoridae																		8	10
Copepoda - Calanoida																				
Copepoda - Cyclopoida																		16	144	80
Copepoda - Harpacticoida																		16	40	
Amphipoda	Talitridae		*Hyallela azteca*																	
Collembola						3	6	1											8	
Ephemeroptera	Ameletidae		*Ameletus* sp.		3	3				1	4		1	1				8	8	
Ephemeroptera	Ameletidae		*Ameletus celer*																	
Ephemeroptera	Ameletidae		*Ameletus inopinatus*																	
Ephemeroptera	Ameletidae		*Ameletus sparsatus*			1														
Ephemeroptera	Baetidae		*Baetis*		3	8	6	5	1	11	3	10	13	12	25	2	5	18		
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*							1										
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*																	
Ephemeroptera	Ephemerellidae		*Drunella doddsi*					1			1	2	30	30	42	8	24	1		
Ephemeroptera	Ephemerellidae		*Serratella*																	
Ephemeroptera	Ephemerellidae (d)										2		9	2			2		16	
Ephemeroptera	Heptageniidae		*Cynigmula*							10	9	4			1			1		
Ephemeroptera	Heptageniidae		*Epeorus*			1		1	1	2	8	3	4	1	15		3	3		
Ephemeroptera	Heptageniidae		*Rhithrogena*			2			2	48	81	14	14	5	8	8	12	1		
Ephemeroptera	Heptageniidae (d)									21	36	10	2	2				8		
Ephemeroptera	Leptophlebiidae (d)											3								
Ephemeroptera	Leptophlebiidae		*Leptophlebia*							1		1								
Plecoptera (d)													3	2	2					
Plecoptera	Capniidae								1		4	2			2			64	64	
Plecoptera	Chloroperlidae						1			12	4	5		3	1					
Plecoptera	Leuctridae		*Despaxia augusta*							2	16	1								
Plecoptera	Leuctridae		*Paraleuctra*							1	1									
Plecoptera	Leuctridae (d)									2	5							8		
Plecoptera	Nemouridae		*Podmosta*																	
Plecoptera	Nemouridae		*Visoka cataractae*								2	1								
Plecoptera	Nemouridae		*Zapada*			1				8	13	18			5			40	24	10
Plecoptera	Nemouridae (d)										2									
Plecoptera	Perlidae (d)																			
Plecoptera	Perlodidae		*Isoperla*				1											8		
Plecoptera	Perlodidae		*Kogotus*																	
Plecoptera	Perlodidae		*Skwala*										1		3			1		
Plecoptera	Perlodidae (d)								1			1								
Plecoptera	Taeniopterygidae		*Taenionema*			2	1						3	2				2		
Trichoptera (d)																				
Trichoptera - pupa																				
Trichoptera	Brachycentridae		*Micrasema*																	
Trichoptera	Glossosomatidae		*Glossosoma*									1	1							
Trichoptera	Hydropsychidae		*Parapsyche*									1			1					
Trichoptera	Limnephilidae (d)																		32	
Trichoptera	Limnephilidae		*Dicosmoecus*																	
Trichoptera	Limnephilidae		*Ecclisomyia?*															3	1	
Trichoptera	Rhyacophilidae		*Rhyacophila*			1				3	2	8			2	1		13	11	
Trichoptera	Uenoidae		*Oligophlebodes*																	
Lepidoptera	Noctuidae																			
Coleoptera	Dytiscidae		*Liodessus*																	
Coleoptera	Hydraenidae		*Hydraena*			1														

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	NTR2					SNO1					SNO2				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Tricladida	Planariidae		*Polycelis coronata*		4														
Nematoda										1									
Oligochaeta	Enchytraeidae								2										
Oligochaeta	Naididae																		
Oligochaeta	Tubificidae								1										
Gastropoda	Valvatidae		*Valvata sincera*																
Pelecypoda	Sphaeriidae		*Pisidium*																
Pelecypoda	Sphaeriidae (d)		*Pisidium/Sphaerium*																
Hydracarina												1					1	1	
Ostracoda																			
Cladocera	Chydoridae																		
Copepoda - Calanoida																			
Copepoda - Cyclopoida																			
Copepoda - Harpacticoida																			
Amphipoda	Talitridae		*Hyallela azteca*																
Collembola										1									
Ephemeroptera	Ameletidae		*Ameletus* sp.		4	1			6						2	5	17	23	
Ephemeroptera	Ameletidae		*Ameletus celer*																
Ephemeroptera	Ameletidae		*Ameletus inopinatus*														1		
Ephemeroptera	Ameletidae		*Ameletus sparsatus*																
Ephemeroptera	Baetidae		*Baetis*		21	3		11	8	21	7	3	41	24		1	15	31	21
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*																
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*		1					2	1							1	1
Ephemeroptera	Ephemerellidae		*Drunella doddsi*		5	1		1	2	7	3			1			7	4	18
Ephemeroptera	Ephemerellidae		*Serratella*																
Ephemeroptera	Ephemerellidae (d)									3							1	2	
Ephemeroptera	Heptageniidae		*Cynigmula*		3	3		15	8	15	4				11	10	20	5	41
Ephemeroptera	Heptageniidae		*Epeorus*		23	8		49	19	11	7			2	1	1	3	3	17
Ephemeroptera	Heptageniidae		*Rhithrogena*		103	37	5	133	30		2	2	10	19			2	1	
Ephemeroptera	Heptageniidae (d)				20	3		48	14						2		52	48	124
Ephemeroptera	Leptophlebiidae (d)																		
Ephemeroptera	Leptophlebiidae		*Leptophlebia*																
Plecoptera (d)					4	1				6	1					1	2	9	
Plecoptera	Capniidae				4			8	6	3		2			1		8	25	8
Plecoptera	Chloroperlidae				26	12		20	12	6	2	2		2	2	5	21	13	39
Plecoptera	Leuctridae		*Despaxia augusta*																
Plecoptera	Leuctridae		*Paraleuctra*																
Plecoptera	Leuctridae (d)																		
Plecoptera	Nemouridae		*Podmosta*										2						
Plecoptera	Nemouridae		*Visoka cataractae*																
Plecoptera	Nemouridae		*Zapada*		3			2	3		1		1					5	
Plecoptera	Nemouridae (d)																		
Plecoptera	Perlidae (d)																		
Plecoptera	Perlodidae		*Isoperla*													1	2	29	
Plecoptera	Perlodidae		*Kogotus*																
Plecoptera	Perlodidae		*Skwala*		36	13		28	20		1		10	1					
Plecoptera	Perlodidae (d)																1		
Plecoptera	Taeniopterygidae		*Taenionema*		28	8		4	5	10	5				2	1	15	25	32
Trichoptera (d)									2								1		
Trichoptera - pupa																			
Trichoptera	Brachycentridae		*Micrasema*																
Trichoptera	Glossosomatidae		*Glossosoma*							2									
Trichoptera	Hydropsychidae		*Parapsyche*		1														
Trichoptera	Limnephilidae (d)									1							1		
Trichoptera	Limnephilidae		*Dicosmoecus*																
Trichoptera	Limnephilidae		*Ecclisomyia?*																
Trichoptera	Rhyacophilidae		*Rhyacophila*		4	2			1		1			10					
Trichoptera	Uenoidae		*Oligophlebodes*																
Lepidoptera	Noctuidae																		
Coleoptera	Dytiscidae		*Liodessus*															1	
Coleoptera	Hydraenidae		*Hydraena*															1	

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	SCR					TEC1					TEC2				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Tricladida	Planariidae		*Polycelis coronata*		11	1		2	2						1		1	1	12
Nematoda								1				4		4	4			4	4
Oligochaeta	Enchytraeidae				1				4										
Oligochaeta	Naididae																		
Oligochaeta	Tubificidae																		
Gastropoda	Valvatidae		*Valvata sincera*																
Pelecypoda	Sphaeriidae		*Pisidium*																
Pelecypoda	Sphaeriidae (d)		*Pisidium/Sphaerium*																
Hydracarina					6			1		6		4			1	16		4	
Ostracoda					16		1												
Cladocera	Chydoridae																		
Copepoda - Calanoida																			
Copepoda - Cyclopoida																			
Copepoda - Harpacticoida																			
Amphipoda	Talitridae		*Hyallela azteca*																
Collembola							1												
Ephemeroptera	Ameletidae		*Ameletus* sp.					1		40	36	134	20			76	20	20	16
Ephemeroptera	Ameletidae		*Ameletus celer*																
Ephemeroptera	Ameletidae		*Ameletus inopinatus*																
Ephemeroptera	Ameletidae		*Ameletus sparsatus*													3			
Ephemeroptera	Baetidae		*Baetis*		56	54	43	17	5	36	111	32	121	19	169	340	151	118	217
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*					1			1					4			
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*			1	1			1				3		2	1	1	8
Ephemeroptera	Ephemerellidae		*Drunella doddsi*		8			1	3	4	29	19	4	5	42	144	63	29	57
Ephemeroptera	Ephemerellidae		*Serratella*															1	
Ephemeroptera	Ephemerellidae (d)									2	12	32		24	2	4		8	8
Ephemeroptera	Heptageniidae		*Cynigmula*		21	4	10	1	11	15	30	23	45	9	20	37	16	62	16
Ephemeroptera	Heptageniidae		*Epeorus*		9	24	13	15	9	18	26	5	109	42	51	134	55	101	119
Ephemeroptera	Heptageniidae		*Rhithrogena*		2	5	5	4	31	2	5	2	10	46	5		12		13
Ephemeroptera	Heptageniidae (d)				2				1	11	108	12	52	176	46	48	28	128	460
Ephemeroptera	Leptophlebiidae (d)																		
Ephemeroptera	Leptophlebiidae		*Leptophlebia*																
Plecoptera (d)					2		1	1	2		4								8
Plecoptera	Capniidae					1	1	1	3	5		33		8			1	14	9
Plecoptera	Chloroperlidae				9	1	3	2	6	4	16	1	14	30	14	6	5	18	45
Plecoptera	Leuctridae		*Despaxia augusta*																
Plecoptera	Leuctridae		*Paraleuctra*																
Plecoptera	Leuctridae (d)																		
Plecoptera	Nemouridae		*Podmosta*																
Plecoptera	Nemouridae		*Visoka cataractae*																
Plecoptera	Nemouridae		*Zapada*		40	11	6	6	6	3	33	2	66	22	47	49	19	14	23
Plecoptera	Nemouridae (d)															8		4	2
Plecoptera	Perlidae (d)															4			
Plecoptera	Perlodidae		*Isoperla*			1	1									5			
Plecoptera	Perlodidae		*Kogotus*								1					2		1	
Plecoptera	Perlodidae		*Skwala*		1		1	1	3					2	4		1	1	7
Plecoptera	Perlodidae (d)										12			1					
Plecoptera	Taeniopterygidae		*Taenionema*		2	1	3	8	11	23	98	7	28	5	32	32	12	46	28
Trichoptera (d)											8	4					12		
Trichoptera - pupa									1								1		
Trichoptera	Brachycentridae		*Micrasema*																
Trichoptera	Glossosomatidae		*Glossosoma*													4	4	9	
Trichoptera	Hydropsychidae		*Parapsyche*										4			1	2		
Trichoptera	Limnephilidae (d)				24	4	1												
Trichoptera	Limnephilidae		*Dicosmoecus*																
Trichoptera	Limnephilidae		*Ecclisomyia?*																
Trichoptera	Rhyacophilidae		*Rhyacophila*		2			2	1	1		4	9	12	1	13	4	4	9
Trichoptera	Uenoidae		*Oligophlebodes*																
Lepidoptera	Noctuidae																		
Coleoptera	Dytiscidae		*Liodessus*																
Coleoptera	Hydraenidae		*Hydraena*																

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	MC1					MCTR					SUNR				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Tricladida	Planariidae		*Polycelis coronata*																
Nematoda																		1	
Oligochaeta	Enchytraeidae											1			1	1			
Oligochaeta	Naididae																		
Oligochaeta	Tubificidae																		
Gastropoda	Valvatidae		*Valvata sincera*																
Pelecypoda	Sphaeriidae		*Pisidium*																
Pelecypoda	Sphaeriidae (d)		*Pisidium/Sphaerium*																
Hydracarina													1						
Ostracoda																			
Cladocera	Chydoridae																		
Copepoda - Calanoida																			
Copepoda - Cyclopoida																			
Copepoda - Harpacticoida																			
Amphipoda	Talitridae		*Hyallela azteca*							2									
Collembola										1		1		1				1	
Ephemeroptera	Ameletidae		*Ameletus* sp.																
Ephemeroptera	Ameletidae		*Ameletus celer*																
Ephemeroptera	Ameletidae		*Ameletus inopinatus*																
Ephemeroptera	Ameletidae		*Ameletus sparsatus*																
Ephemeroptera	Baetidae		*Baetis*							17	1	2		3	29	54	69	58	19
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*																
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*																
Ephemeroptera	Ephemerellidae		*Drunella doddsi*														1		
Ephemeroptera	Ephemerellidae		*Serratella*																
Ephemeroptera	Ephemerellidae (d)																		
Ephemeroptera	Heptageniidae		*Cynigmula*																
Ephemeroptera	Heptageniidae		*Epeorus*													1		2	
Ephemeroptera	Heptageniidae		*Rhithrogena*		1										2	8	3	2	
Ephemeroptera	Heptageniidae (d)														1				
Ephemeroptera	Leptophlebiidae (d)																		
Ephemeroptera	Leptophlebiidae		*Leptophlebia*																
Plecoptera (d)																			
Plecoptera	Capniidae																		
Plecoptera	Chloroperlidae															1	1	1	
Plecoptera	Leuctridae		*Despaxia augusta*																
Plecoptera	Leuctridae		*Paraleuctra*																
Plecoptera	Leuctridae (d)																1		
Plecoptera	Nemouridae		*Podmosta*							1									
Plecoptera	Nemouridae		*Visoka cataractae*																
Plecoptera	Nemouridae		*Zapada*									1		1	1			1	
Plecoptera	Nemouridae (d)																2		
Plecoptera	Perlidae (d)																		
Plecoptera	Perlodidae		*Isoperla*																
Plecoptera	Perlodidae		*Kogotus*																
Plecoptera	Perlodidae		*Skwala*											1		2	5		1
Plecoptera	Perlodidae (d)																		
Plecoptera	Taeniopterygidae		*Taenionema*							26	14	2	14	17	1	10	11		
Trichoptera (d)																			
Trichoptera - pupa																			
Trichoptera	Brachycentridae		*Micrasema*																
Trichoptera	Glossosomatidae		*Glossosoma*																
Trichoptera	Hydropsychidae		*Parapsyche*																
Trichoptera	Limnephilidae (d)																1		
Trichoptera	Limnephilidae		*Dicosmoecus*																
Trichoptera	Limnephilidae		*Ecclisomyia?*																
Trichoptera	Rhyacophilidae		*Rhyacophila*																
Trichoptera	Uenoidae		*Oligophlebodes*							1									
Lepidoptera	Noctuidae																		
Coleoptera	Dytiscidae		*Liodessus*																
Coleoptera	Hydraenidae		*Hydraena*																

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	STE1			STE2					SCT			ECM8			CC1		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Tricladida	Planariidae		*Polycelis coronata*				1	1	1		3	2									
Nematoda					1	1	12	2	2			2	1							2	
Oligochaeta	Enchytraeidae					2	8		1		1								23	3	7
Oligochaeta	Naididae				1	1															
Oligochaeta	Tubificidae				1		1														
Gastropoda	Valvatidae		*Valvata sincera*																		
Pelecypoda	Sphaeriidae		*Pisidium*																		
Pelecypoda	Sphaeriidae (d)		*Pisidium/Sphaerium*																		
Hydracarina						1		3	3	3	2										
Ostracoda					1		4	2	26	1		3									
Cladocera	Chydoridae																				
Copepoda - Calanoida																					
Copepoda - Cyclopoida					1																
Copepoda - Harpacticoida																					
Amphipoda	Talitridae		*Hyallela azteca*																		
Collembola																			1	1	
Ephemeroptera	Ameletidae		*Ameletus* sp.		3					1		2				3	2		1		2
Ephemeroptera	Ameletidae		*Ameletus celer*																		
Ephemeroptera	Ameletidae		*Ameletus inopinatus*		2																
Ephemeroptera	Ameletidae		*Ameletus sparsatus*																		
Ephemeroptera	Baetidae		*Baetis*		3		3	18	16	13	11	13				12	33	19			
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*																		
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*																		
Ephemeroptera	Ephemerellidae		*Drunella doddsi*					10	11	1	3	7									
Ephemeroptera	Ephemerellidae		*Serratella*																		
Ephemeroptera	Ephemerellidae (d)									2	1	2					1				
Ephemeroptera	Heptageniidae		*Cynigmula*		3		2		7	5		9					5	1			
Ephemeroptera	Heptageniidae		*Epeorus*				1	31	21	15	20	22				4	48	8			
Ephemeroptera	Heptageniidae		*Rhithrogena*					8	23	8	9	10				6	25	2			
Ephemeroptera	Heptageniidae (d)							8	10	1	5	7									
Ephemeroptera	Leptophlebiidae (d)																				
Ephemeroptera	Leptophlebiidae		*Leptophlebia*																		
Plecoptera (d)					1	1	8					1									
Plecoptera	Capniidae				64	3	84	4	3	2	1	5									
Plecoptera	Chloroperlidae				6		14	2	6		4	1									
Plecoptera	Leuctridae		*Despaxia augusta*																		
Plecoptera	Leuctridae		*Paraleuctra*																		
Plecoptera	Leuctridae (d)							2	4	1	1										
Plecoptera	Nemouridae		*Podmosta*																		
Plecoptera	Nemouridae		*Visoka cataractae*																		
Plecoptera	Nemouridae		*Zapada*		2	1	1	5	7	34	5	4				2	2				
Plecoptera	Nemouridae (d)																				
Plecoptera	Perlidae (d)																				
Plecoptera	Perlodidae		*Isoperla*																		
Plecoptera	Perlodidae		*Kogotus*																		
Plecoptera	Perlodidae		*Skwala*		1		1	11	6			8					2	1		1	
Plecoptera	Perlodidae (d)								1	7						6	8				
Plecoptera	Taeniopterygidae		*Taenionema*		1			6	9	1	1	1				6	70	18		1	
Trichoptera (d)																					
Trichoptera - pupa																					
Trichoptera	Brachycentridae		*Micrasema*																		
Trichoptera	Glossosomatidae		*Glossosoma*					1	2			4									
Trichoptera	Hydropsychidae		*Parapsyche*					2													
Trichoptera	Limnephilidae (d)				1		1					1					3	1			
Trichoptera	Limnephilidae		*Dicosmoecus*																		
Trichoptera	Limnephilidae		*Ecclisomyia?*																		
Trichoptera	Rhyacophilidae		*Rhyacophila*		1			3	9	1	3	3				1	2				
Trichoptera	Uenoidae		*Oligophlebodes*																		
Lepidoptera	Noctuidae								1												
Coleoptera	Dytiscidae		*Liodessus*																		
Coleoptera	Hydraenidae		*Hydraena*																1	6	4

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	EUR2			URO			HLO		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Tricladida	Planariidae		*Polycelis coronata*					1		2			4
Nematoda					1	3	1			1	4	28	8
Oligochaeta	Enchytraeidae					3	3		3	2		4	
Oligochaeta	Naididae												
Oligochaeta	Tubificidae											1	
Gastropoda	Valvatidae		*Valvata sincera*										11
Pelecypoda	Sphaeriidae		*Pisidium*										
Pelecypoda	Sphaeriidae (d)		*Pisidium/Sphaerium*									4	28
Hydracarina					1	7	8		3	1	96	80	76
Ostracoda							1		1	8		36	104
Cladocera	Chydoridae												
Copepoda - Calanoida													
Copepoda - Cyclopoida													
Copepoda - Harpacticoida													
Amphipoda	Talitridae		*Hyallela azteca*										
Collembola							1						
Ephemeroptera	Ameletidae		*Ameletus* sp.			8	4	8	8	19			
Ephemeroptera	Ameletidae		*Ameletus celer*			1	1						
Ephemeroptera	Ameletidae		*Ameletus inopinatus*										
Ephemeroptera	Ameletidae		*Ameletus sparsatus*										
Ephemeroptera	Baetidae		*Baetis*		19	21	3	37	41	30	8	5	2
Ephemeroptera	Ephemerellidae		*Caudatella heterocaudata*										
Ephemeroptera	Ephemerellidae		*Drunella coloradensis*					1	5				
Ephemeroptera	Ephemerellidae		*Drunella doddsi*		7	7	1	1				9	5
Ephemeroptera	Ephemerellidae		*Serratella*										
Ephemeroptera	Ephemerellidae (d)				2	5	3					4	
Ephemeroptera	Heptageniidae		*Cynigmula*		2				8	10	1	3	2
Ephemeroptera	Heptageniidae		*Epeorus*		9	11	3	36	11	8	12		
Ephemeroptera	Heptageniidae		*Rhithrogena*		25	19	31	3	3	15	5		
Ephemeroptera	Heptageniidae (d)					2	11	4		2	28		4
Ephemeroptera	Leptophlebiidae (d)											4	8
Ephemeroptera	Leptophlebiidae		*Leptophlebia*								36	21	53
Plecoptera (d)													
Plecoptera	Capniidae				1	5	12	2		2		4	8
Plecoptera	Chloroperlidae				2		15	1		2	6	35	82
Plecoptera	Leuctridae		*Despaxia augusta*										
Plecoptera	Leuctridae		*Paraleuctra*										
Plecoptera	Leuctridae (d)						1						4
Plecoptera	Nemouridae		*Podmosta*										
Plecoptera	Nemouridae		*Visoka cataractae*										
Plecoptera	Nemouridae		*Zapada*		5	5	1	33	7	3	24	33	11
Plecoptera	Nemouridae (d)								37	24			
Plecoptera	Perlidae (d)												
Plecoptera	Perlodidae		*Isoperla*										
Plecoptera	Perlodidae		*Kogotus*							1			
Plecoptera	Perlodidae		*Skwala*			9	6	3	2	4			
Plecoptera	Perlodidae (d)				2	2	4	16	1	10	4	4	
Plecoptera	Taeniopterygidae		*Taenionema*		4	30	10	8		1	4		
Trichoptera (d)													
Trichoptera - pupa													1
Trichoptera	Brachycentridae		*Micrasema*										4
Trichoptera	Glossosomatidae		*Glossosoma*						7	4			
Trichoptera	Hydropsychidae		*Parapsyche*										
Trichoptera	Limnephilidae (d)				1	7			8	12			
Trichoptera	Limnephilidae		*Dicosmoecus*										1
Trichoptera	Limnephilidae		*Ecclisomyia?*										
Trichoptera	Rhyacophilidae		*Rhyacophila*			1	1	7	2	3	10	9	27
Trichoptera	Uenoidae		*Oligophlebodes*										
Lepidoptera	Noctuidae												
Coleoptera	Dytiscidae		*Liodessus*										
Coleoptera	Hydraenidae		*Hydraena*										

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	SC1					SC2					SC3				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Diptera	Empididae - pupa																		
Diptera	Empididae		Genus #1																
Diptera	Empididae		*Chelifera/Metachela*																
Diptera	Empididae		*Clinocera*																
Diptera	Empididae		*Neoplasta*																
Diptera	Empididae		*Oreogeton*																
Diptera	Empididae		*Phyllodromia*																
Diptera	Dixidae		*Dixa*																
Diptera	Blephariceridae		*Bibiocephala grandis* (pupa)																
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*																
Diptera	Ceratopogonidae	Forcipomyiinae	*Forcipomyia*																1
Diptera	Deuterophlebiidae		*Deuterophlebia*																
Diptera	Ephydridae								2										
Diptera	Psychodidae		*Pericoma*																
Diptera	Simulidae		*Helodon clavatus* (pupa)																
Diptera	Simulidae		*Helodon onychodactylus* (pupa)																
Diptera	Simulidae		*Helodon*								1				1				
Diptera	Simulidae		*Simulium*																
Diptera	Tipulidae		*Dicranota*																
Diptera	Tipulidae		*Erioptera*																
Diptera	Tipulidae		*Gonomyodes*		3	1	3	2	3										
Diptera	Tipulidae		*Limnophila*																
Diptera	Tipulidae		*Hexatoma/Limnophila*																
Diptera	Tipulidae		*Rhabdomastix*																
Diptera	Tipulidae		*Rhabdomastix* (pupa)																
Diptera	Tipulidae (d)																		
Diptera	Chironomidae - Pupa					3						1			1				1
Diptera	Chironomidae	Chironomini (d)																	
Diptera	Chironomidae	Chironomini	*Chironomus*																
Diptera	Chironomidae	Chironomini	*Dicrotendipes*																
Diptera	Chironomidae	Chironomini	*Endochironomus*																
Diptera	Chironomidae	Chironomini	*Polypedilum*																
Diptera	Chironomidae	Chironomini	*Sergentia*																
Diptera	Chironomidae	Chironomini	*Stictochironomus*																
Diptera	Chironomidae	Tanytarsini (d)																	
Diptera	Chironomidae	Tanytarsini	*Micropsectra*																
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*																
Diptera	Chironomidae	Tanytarsini	*Rheotanytarsus*																
Diptera	Chironomidae	Tanytarsini	*Stempellinella*																
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*																
Diptera	Chironomidae	Orthocladiinae (d)								1									
Diptera	Chironomidae	Orthocladiinae	*sp.1*																
Diptera	Chironomidae	Orthocladiinae	*sp.2*																
Diptera	Chironomidae	Orthocladiinae	*Brillia*																
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*																
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*																
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*																
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*								1		1						
Diptera	Chironomidae	Orthocladiinae	*Heleniella*																
Diptera	Chironomidae	Orthocladiinae	*Hydrobaenus*																
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*																
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*																
Diptera	Chironomidae	Orthocladiinae	*Orthocladius lignicola*																
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*																
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*																
Diptera	Chironomidae	Orthocladiinae	*cf. Platysmittia*		4	17	12	2	1					1			1	1	3
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*							1		1							1
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*																
Diptera	Chironomidae	Orthocladiinae	*Smittia*		1														
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*																
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*																
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*												3	1		1	
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*		7	13	4	1	1			1	1		1	1	4		4
Diptera	Chironomidae	Orthocladiinae	*Zalutschia*																

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	TRC1			TRC2					TRC3			UR1				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**
Diptera	Empididae - pupa																			
Diptera	Empididae		Genus #1										1							
Diptera	Empididae		*Chelifera/Metachela*																	
Diptera	Empididae		*Clinocera*																	
Diptera	Empididae		*Neoplasta*																	
Diptera	Empididae		*Oreogeton*																	
Diptera	Empididae		*Phyllodromia*																	
Diptera	Dixidae		*Dixa*																	
Diptera	Blephariceridae		*Bibiocephala grandis* (pupa)																	1
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*																	
Diptera	Ceratopogonidae	Forcipomyiinae	*Forcipomyia*																	
Diptera	Deuterophlebiidae		*Deuterophlebia*																	
Diptera	Ephydridae																			
Diptera	Psychodidae		*Pericoma*																	
Diptera	Simulidae		*Helodon clavatus* (pupa)																	
Diptera	Simulidae		*Helodon onychodactylus* (pupa)									1								
Diptera	Simulidae		*Helodon*																	
Diptera	Simulidae		*Simulium*																	
Diptera	Tipulidae		*Dicranota*									2								1
Diptera	Tipulidae		*Erioptera*														1			
Diptera	Tipulidae		*Gonomyodes*								1									
Diptera	Tipulidae		*Limnophila*																	
Diptera	Tipulidae		*Hexatoma/Limnophila*																	
Diptera	Tipulidae		*Rhabdomastix*																	
Diptera	Tipulidae		*Rhabdomastix* (pupa)																	
Diptera	Tipulidae (d)																			
Diptera	Chironomidae - Pupa							2	1	4	8	6				1				
Diptera	Chironomidae	Chironomini (d)																		
Diptera	Chironomidae	Chironomini	*Chironomus*																	
Diptera	Chironomidae	Chironomini	*Dicrotendipes*																	
Diptera	Chironomidae	Chironomini	*Endochironomus*					1												
Diptera	Chironomidae	Chironomini	*Polypedilum*																	
Diptera	Chironomidae	Chironomini	*Sergentia*																	
Diptera	Chironomidae	Chironomini	*Stictochironomus*																	
Diptera	Chironomidae	Tanytarsini (d)																		
Diptera	Chironomidae	Tanytarsini	*Micropsectra*											1					1	
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*																	
Diptera	Chironomidae	Tanytarsini	*Rheotanytarsus*																	
Diptera	Chironomidae	Tanytarsini	*Stempellinella*										1							
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*						1											
Diptera	Chironomidae	Orthocladiinae (d)									3	1								
Diptera	Chironomidae	Orthocladiinae	*sp.1*																	
Diptera	Chironomidae	Orthocladiinae	*sp.2*																	
Diptera	Chironomidae	Orthocladiinae	*Brillia*																	
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*																	
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*																	
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*					1									2	5		
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*					2	2	2	2	1		1	1		3			5
Diptera	Chironomidae	Orthocladiinae	*Heleniella*																	
Diptera	Chironomidae	Orthocladiinae	*Hydrobaenus*								1									
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*																	
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*																	
Diptera	Chironomidae	Orthocladiinae	*Orthocladius lignicola*																	
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*							1					1					
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*																	
Diptera	Chironomidae	Orthocladiinae	*cf. Platysmittia*		1			4	9	18	25	49		2	4	2	9			10
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*											1						
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*							1		2								
Diptera	Chironomidae	Orthocladiinae	*Smittia*																	
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*																	
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*							1										
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*												1					
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*			1		5	2	6	34	15	1	6	2	1	1			6
Diptera	Chironomidae	Orthocladiinae	*Zalutschia*																	

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	UR1A					UNK1			UNK2					NTR1		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**
Diptera	Empididae - pupa					1														
Diptera	Empididae		Genus #1																	
Diptera	Empididae		*Chelifera/Metachela*															1		
Diptera	Empididae		*Clinocera*															9		
Diptera	Empididae		*Neoplasta*																	
Diptera	Empididae		*Oreogeton*								1									
Diptera	Empididae		*Phyllodromia*																	
Diptera	Dixidae		*Dixa*																8	
Diptera	Blephariceridae		*Bibiocephala grandis* (pupa)																	
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*																	
Diptera	Ceratopogonidae	Forcipomyiinae	*Forcipomyia*																	
Diptera	Deuterophlebiidae		*Deuterophlebia*																	
Diptera	Ephydridae																			
Diptera	Psychodidae		*Pericoma*												2				16	
Diptera	Simulidae		*Helodon clavatus* (pupa)																	
Diptera	Simulidae		*Helodon onychodactylus* (pupa)										1	1	20	27				
Diptera	Simulidae		*Helodon*								1		41	12	226	5	9		16	
Diptera	Simulidae		*Simulium*																	
Diptera	Tipulidae		*Dicranota*													1		13	145	
Diptera	Tipulidae		*Erioptera*			1			1											
Diptera	Tipulidae		*Gonomyodes*												2					10
Diptera	Tipulidae		*Limnophila*															1		
Diptera	Tipulidae		*Hexatoma/Limnophila*				1													
Diptera	Tipulidae		*Rhabdomastix*			1	3	4	5								2			
Diptera	Tipulidae		*Rhabdomastix* (pupa)				1													
Diptera	Tipulidae (d)																			
Diptera	Chironomidae - Pupa								1	6	7	3	133	58	141	55	153	45	80	11
Diptera	Chironomidae	Chironomini (d)																		
Diptera	Chironomidae	Chironomini	*Chironomus*																	
Diptera	Chironomidae	Chironomini	*Dicrotendipes*																	
Diptera	Chironomidae	Chironomini	*Endochironomus*																	
Diptera	Chironomidae	Chironomini	*Polypedilum*																	1
Diptera	Chironomidae	Chironomini	*Sergentia*																	20
Diptera	Chironomidae	Chironomini	*Stictochironomus*																	
Diptera	Chironomidae	Tanytarsini (d)																	8	
Diptera	Chironomidae	Tanytarsini	*Micropsectra*									1								3
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*																	
Diptera	Chironomidae	Tanytarsini	*Rheotanytarsus*																	
Diptera	Chironomidae	Tanytarsini	*Stempellinella*																136	10
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*												2				1168	730
Diptera	Chironomidae	Orthocladiinae (d)				1							1						336	
Diptera	Chironomidae	Orthocladiinae	*sp.1*																	
Diptera	Chironomidae	Orthocladiinae	*sp.2*																	
Diptera	Chironomidae	Orthocladiinae	*Brillia*			1				1									32	
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*																	
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*																376	60
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*					1										1	595	151
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*		3	3	7		1		2	4	2					1	1784	10
Diptera	Chironomidae	Orthocladiinae	*Heleniella*																	
Diptera	Chironomidae	Orthocladiinae	*Hydrobaenus*																178	60
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*															12	106	58
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*							1										
Diptera	Chironomidae	Orthocladiinae	*Orthocladius lignicola*															1		
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*							3	8	1								
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*		2					1			99	117	90	136	126			
Diptera	Chironomidae	Orthocladiinae	*cf. Platysmittia*		4	3	4	1												
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*																	
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*							2			7	23			16			
Diptera	Chironomidae	Orthocladiinae	*Smittia*																	
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*																	
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*							5	4	6						8	88	10
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*							6	2	3			2			10	90	
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*		5	7	5	2			4	3	570	215	167	269	415	10	514	
Diptera	Chironomidae	Orthocladiinae	*Zalutschia*						1											

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	NTR2					SNO1					SNO2				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Diptera	Empididae - pupa																		
Diptera	Empididae		Genus #1																
Diptera	Empididae		*Chelifera/Metachela*																
Diptera	Empididae		*Clinocera*							1								1	
Diptera	Empididae		*Neoplasta*																
Diptera	Empididae		*Oreogeton*																
Diptera	Empididae		*Phyllodromia*																
Diptera	Dixidae		*Dixa*																
Diptera	Blephariceridae		*Bibiocephala grandis* (pupa)																
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*														1	1	
Diptera	Ceratopogonidae	Forcipomyiinae	*Forcipomyia*																
Diptera	Deuterophlebiidae		*Deuterophlebia*																
Diptera	Ephydridae																		
Diptera	Psychodidae		*Pericoma*																
Diptera	Simulidae		*Helodon clavatus* (pupa)																
Diptera	Simulidae		*Helodon onychodactylus* (pupa)																
Diptera	Simulidae		*Helodon*					1	2	1		1	3	2					
Diptera	Simulidae		*Simulium*																
Diptera	Tipulidae		*Dicranota*		1					10		1	8					2	
Diptera	Tipulidae		*Erioptera*																
Diptera	Tipulidae		*Gonomyodes*									1	1	8					
Diptera	Tipulidae		*Limnophila*			1													
Diptera	Tipulidae		*Hexatoma/Limnophila*																
Diptera	Tipulidae		*Rhabdomastix*															1	
Diptera	Tipulidae		*Rhabdomastix* (pupa)																
Diptera	Tipulidae (d)						1												4
Diptera	Chironomidae - Pupa				21	7	1	44	15		8	10	69	91	1	1	1	16	
Diptera	Chironomidae	Chironomini (d)																	
Diptera	Chironomidae	Chironomini	*Chironomus*																
Diptera	Chironomidae	Chironomini	*Dicrotendipes*															1	
Diptera	Chironomidae	Chironomini	*Endochironomus*																
Diptera	Chironomidae	Chironomini	*Polypedilum*																
Diptera	Chironomidae	Chironomini	*Sergentia*														2		
Diptera	Chironomidae	Chironomini	*Stictochironomus*																
Diptera	Chironomidae	Tanytarsini (d)															1		
Diptera	Chironomidae	Tanytarsini	*Micropsectra*							1							2	2	
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*																
Diptera	Chironomidae	Tanytarsini	*Rheotanytarsus*																
Diptera	Chironomidae	Tanytarsini	*Stempellinella*															1	
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*																
Diptera	Chironomidae	Orthocladiinae (d)			4					1				2			1	5	
Diptera	Chironomidae	Orthocladiinae	*sp.1*																
Diptera	Chironomidae	Orthocladiinae	*sp.2*														24		
Diptera	Chironomidae	Orthocladiinae	*Brillia*																
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*																
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*															2	
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*														1		
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*		4	1		8	8	46	11		30	80	1		102	519	37
Diptera	Chironomidae	Orthocladiinae	*Heleniella*																
Diptera	Chironomidae	Orthocladiinae	*Hydrobaenus*												1		27	11	
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*																
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*		4														
Diptera	Chironomidae	Orthocladiinae	*Orthocladius lignicola*																
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*										9						
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*														17	21	1
Diptera	Chironomidae	Orthocladiinae	*cf. Platysmittia*							3		1					1		
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*																
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*		10	3		8	6				8				4	7	
Diptera	Chironomidae	Orthocladiinae	*Smittia*																
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*																
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*							7	1				1		13	66	1
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*					4	2									1	1
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*		100	11	4	311	209	2	7	39	104	81			7	141	29
Diptera	Chironomidae	Orthocladiinae	*Zalutschia*																

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	SCR					TEC1					TEC2				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Diptera	Empididae - pupa																		
Diptera	Empididae		Genus #1																
Diptera	Empididae		*Chelifera/Metachela*												2				
Diptera	Empididae		*Clinocera*														4	1	2
Diptera	Empididae		*Neoplasta*												1				
Diptera	Empididae		*Oreogeton*		2														
Diptera	Empididae		*Phyllodromia*																
Diptera	Dixidae		*Dixa*																
Diptera	Blephariceridae		*Bibiocephala grandis* (pupa)						1										
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*								4		1			4		4	
Diptera	Ceratopogonidae	Forcipomyiinae	*Forcipomyia*																
Diptera	Deuterophlebiidae		*Deuterophlebia*																
Diptera	Ephydridae																		
Diptera	Psychodidae		*Pericoma*																
Diptera	Simulidae		*Helodon clavatus* (pupa)																
Diptera	Simulidae		*Helodon onychodactylus* (pupa)												1		3		
Diptera	Simulidae		*Helodon*		1				1		1			1	2		2	2	72
Diptera	Simulidae		*Simulium*																
Diptera	Tipulidae		*Dicranota*				1					1				4		1	
Diptera	Tipulidae		*Erioptera*																
Diptera	Tipulidae		*Gonomyodes*		4		5		5										
Diptera	Tipulidae		*Limnophila*								1	1						1	1
Diptera	Tipulidae		*Hexatoma/Limnophila*																
Diptera	Tipulidae		*Rhabdomastix*								2		1		1	4			
Diptera	Tipulidae		*Rhabdomastix* (pupa)																
Diptera	Tipulidae (d)													4					
Diptera	Chironomidae - Pupa				9		1	1				1	4		15	24	19	25	16
Diptera	Chironomidae	Chironomini (d)																	
Diptera	Chironomidae	Chironomini	*Chironomus*																
Diptera	Chironomidae	Chironomini	*Dicrotendipes*																
Diptera	Chironomidae	Chironomini	*Endochironomus*																
Diptera	Chironomidae	Chironomini	*Polypedilum*																
Diptera	Chironomidae	Chironomini	*Sergentia*																
Diptera	Chironomidae	Chironomini	*Stictochironomus*																
Diptera	Chironomidae	Tanytarsini (d)																	
Diptera	Chironomidae	Tanytarsini	*Micropsectra*																
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*																
Diptera	Chironomidae	Tanytarsini	*Rheotanytarsus*		1														
Diptera	Chironomidae	Tanytarsini	*Stempellinella*		6	1	1	2	2			8	36				20	4	12
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*											4	7	28	2	7	2
Diptera	Chironomidae	Orthocladiinae (d)			4			1				4	2	4		112		6	20
Diptera	Chironomidae	Orthocladiinae	*sp.1*																
Diptera	Chironomidae	Orthocladiinae	*sp.2*																
Diptera	Chironomidae	Orthocladiinae	*Brillia*		1							2	16	8			4		
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*																
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*				1	1		1									
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*																
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*								4				121	148	61	52	32
Diptera	Chironomidae	Orthocladiinae	*Heleniella*															4	
Diptera	Chironomidae	Orthocladiinae	*Hydrobaenus*									1						4	
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*																
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*				1												
Diptera	Chironomidae	Orthocladiinae	*Orthocladius lignicola*																
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*		15	1	2	2	1										
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*		2							5			13	288	56	93	8
Diptera	Chironomidae	Orthocladiinae	*cf. Platysmittia*		7		2	9						4					
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*																
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*		6	1	4			1	9	30	13	15	14	125	33	22	62
Diptera	Chironomidae	Orthocladiinae	*Smittia*																
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*																
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*							4		9			3	48	8	9	4
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*		8	3		2				4	1			12	8	12	41
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*		22	7	3	23	4	47	72	90	9		149	246	161	47	287
Diptera	Chironomidae	Orthocladiinae	*Zalutschia*																

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	MC1					MCTR					SUNR				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Diptera	Empididae - pupa																		
Diptera	Empididae		Genus #1																
Diptera	Empididae		*Chelifera/Metachela*																
Diptera	Empididae		*Clinocera*												1				
Diptera	Empididae		*Neoplasta*																
Diptera	Empididae		*Oreogeton*																
Diptera	Empididae		*Phyllodromia*																
Diptera	Dixidae		*Dixa*														1		
Diptera	Blephariceridae		*Bibiocephala grandis* (pupa)																
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*																
Diptera	Ceratopogonidae	Forcipomyiinae	*Forcipomyia*																
Diptera	Deuterophlebiidae		*Deuterophlebia*																
Diptera	Ephydridae																		
Diptera	Psychodidae		*Pericoma*																
Diptera	Simulidae		*Helodon clavatus* (pupa)																
Diptera	Simulidae		*Helodon onychodactylus* (pupa)																
Diptera	Simulidae		*Helodon*																
Diptera	Simulidae		*Simulium*																
Diptera	Tipulidae		*Dicranota*											1					
Diptera	Tipulidae		*Erioptera*																
Diptera	Tipulidae		*Gonomyodes*								2	2		4					
Diptera	Tipulidae		*Limnophila*																
Diptera	Tipulidae		*Hexatoma/Limnophila*																
Diptera	Tipulidae		*Rhabdomastix*												1	2			
Diptera	Tipulidae		*Rhabdomastix* (pupa)												1				
Diptera	Tipulidae (d)																		
Diptera	Chironomidae - Pupa									23	3	1		10	1	1	3		
Diptera	Chironomidae	Chironomini (d)					1												
Diptera	Chironomidae	Chironomini	*Chironomus*																
Diptera	Chironomidae	Chironomini	*Dicrotendipes*																
Diptera	Chironomidae	Chironomini	*Endochironomus*																
Diptera	Chironomidae	Chironomini	*Polypedilum*																
Diptera	Chironomidae	Chironomini	*Sergentia*																
Diptera	Chironomidae	Chironomini	*Stictochironomus*																
Diptera	Chironomidae	Tanytarsini (d)																	
Diptera	Chironomidae	Tanytarsini	*Micropsectra*																
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*																
Diptera	Chironomidae	Tanytarsini	*Rheotanytarsus*																
Diptera	Chironomidae	Tanytarsini	*Stempellinella*																
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*																
Diptera	Chironomidae	Orthocladiinae (d)																	
Diptera	Chironomidae	Orthocladiinae	*sp.1*								1								
Diptera	Chironomidae	Orthocladiinae	*sp.2*																
Diptera	Chironomidae	Orthocladiinae	*Brillia*																
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*												4				
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*																
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*																
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*			1				13	4	2		6			20	1	
Diptera	Chironomidae	Orthocladiinae	*Heleniella*																
Diptera	Chironomidae	Orthocladiinae	*Hydrobaenus*																
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*												1				
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*																
Diptera	Chironomidae	Orthocladiinae	*Orthocladius lignicola*																
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*																
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*								2	2						1	
Diptera	Chironomidae	Orthocladiinae	*cf. Platysmittia*						1		4	7		1	9	21	13	1	4
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*														1	1	8
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*																
Diptera	Chironomidae	Orthocladiinae	*Smittia*																
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*																
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*																
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*							1						1	1		
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*							34	25	18	4	37	13	10	34	4	3
Diptera	Chironomidae	Orthocladiinae	*Zalutschia*																

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (continued)

				Site	STE1			STE2					SCT			ECM8			CC1		
Major Taxon	Family	Subfamily/Tribe	Genus/Species	Rep	1	2	3	1	2	3	4	5	1	2	3	1	2	3	1	2	3
Diptera	Empididae - pupa																				
Diptera	Empididae		Genus #1																		
Diptera	Empididae		*Chelifera/Metachela*																		
Diptera	Empididae		*Clinocera*																		
Diptera	Empididae		*Neoplasta*																		
Diptera	Empididae		*Oreogeton*									3		1							
Diptera	Empididae		*Phyllodromia*																1		
Diptera	Dixidae		*Dixa*		1																
Diptera	Blephariceridae		*Bibiocephala grandis* (pupa)																		
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*						1												
Diptera	Ceratopogonidae	Forcipomyiinae	*Forcipomyia*																		
Diptera	Deuterophlebiidae		*Deuterophlebia*																		
Diptera	Ephydridae																				
Diptera	Psychodidae		*Pericoma*																		
Diptera	Simulidae		*Helodon clavatus* (pupa)						1												
Diptera	Simulidae		*Helodon onychodactylus* (pupa)						7												
Diptera	Simulidae		*Helodon*					10	3	33	43	4									
Diptera	Simulidae		*Simulium*																		
Diptera	Tipulidae		*Dicranota*		8				5	1	1	1									
Diptera	Tipulidae		*Erioptera*																		
Diptera	Tipulidae		*Gonomyodes*																		
Diptera	Tipulidae		*Limnophila*			1															
Diptera	Tipulidae		*Hexatoma/Limnophila*																		
Diptera	Tipulidae		*Rhabdomastix*																		
Diptera	Tipulidae		*Rhabdomastix* (pupa)																		
Diptera	Tipulidae (d)																				
Diptera	Chironomidae - Pupa								1			1								1	
Diptera	Chironomidae	Chironomini (d)																			
Diptera	Chironomidae	Chironomini	*Chironomus*																		
Diptera	Chironomidae	Chironomini	*Dicrotendipes*																		
Diptera	Chironomidae	Chironomini	*Endochironomus*																		
Diptera	Chironomidae	Chironomini	*Polypedilum*																		
Diptera	Chironomidae	Chironomini	*Sergentia*																		
Diptera	Chironomidae	Chironomini	*Stictochironomus*																		
Diptera	Chironomidae	Tanytarsini (d)																			
Diptera	Chironomidae	Tanytarsini	*Micropsectra*		20	1						1									
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*																		
Diptera	Chironomidae	Tanytarsini	*Rheotanytarsus*																		
Diptera	Chironomidae	Tanytarsini	*Stempellinella*																		
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*																		
Diptera	Chironomidae	Orthocladiinae (d)			1	3				1											
Diptera	Chironomidae	Orthocladiinae	*sp.1*								1										
Diptera	Chironomidae	Orthocladiinae	*sp.2*				24														
Diptera	Chironomidae	Orthocladiinae	*Brillia*																		
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*						2	3											
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*			1															
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*		7	1															
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*		3	1	12	70	14	47	53	33				3	1	1			
Diptera	Chironomidae	Orthocladiinae	*Heleniella*																		
Diptera	Chironomidae	Orthocladiinae	*Hydrobaenus*		2	62	33														
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*		1	23	8														
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*																		
Diptera	Chironomidae	Orthocladiinae	*Orthocladius lignicola*																		
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*		1		4		1												
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*		5		44					3				1			2	1	
Diptera	Chironomidae	Orthocladiinae	*cf. Platysmittia*		1	3	12	2	5								2	1	2	8	2
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*																		
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*						3		3	1									
Diptera	Chironomidae	Orthocladiinae	*Smittia*																		
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*																	1	
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*		1																
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*		3		4	3		20		1									
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*		3		8	2	8	1	14	8				12	4	19			
Diptera	Chironomidae	Orthocladiinae	*Zalutschia*																		

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate Data Collected using Hess Sampler at KSM Project Study Area Streams, 2008 (completed)

				Site	EUR2			URO			HLO		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Diptera	Empididae - pupa												
Diptera	Empididae		Genus #1										
Diptera	Empididae		*Chelifera/Metachela*										4
Diptera	Empididae		*Clinocera*		1					1			
Diptera	Empididae		*Neoplasta*									4	
Diptera	Empididae		*Oreogeton*			2	3				1		4
Diptera	Empididae		*Phyllodromia*										
Diptera	Dixidae		*Dixa*										
Diptera	Blephariceridae		*Bibiocephala grandis* (pupa)										
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*										
Diptera	Ceratopogonidae	Forcipomyiinae	*Forcipomyia*										
Diptera	Deuterophlebiidae		*Deuterophlebia*			1					4		
Diptera	Ephydridae												
Diptera	Psychodidae		*Pericoma*										
Diptera	Simulidae		*Helodon clavatus* (pupa)										
Diptera	Simulidae		*Helodon onychodactylus* (pupa)										
Diptera	Simulidae		*Helodon*				1	3					
Diptera	Simulidae		*Simulium*									4	
Diptera	Tipulidae		*Dicranota*		1		6			1			
Diptera	Tipulidae		*Erioptera*										
Diptera	Tipulidae		*Gonomyodes*		3	6	14		2	1			
Diptera	Tipulidae		*Limnophila*										
Diptera	Tipulidae		*Hexatoma/Limnophila*										
Diptera	Tipulidae		*Rhabdomastix*				1		1	5			
Diptera	Tipulidae		*Rhabdomastix* (pupa)										
Diptera	Tipulidae (d)									1			
Diptera	Chironomidae - Pupa				5	4	9	5	4	3	20	16	40
Diptera	Chironomidae	Chironomini (d)											
Diptera	Chironomidae	Chironomini	*Chironomus*										
Diptera	Chironomidae	Chironomini	*Dicrotendipes*										
Diptera	Chironomidae	Chironomini	*Endochironomus*										
Diptera	Chironomidae	Chironomini	*Polypedilum*										
Diptera	Chironomidae	Chironomini	*Sergentia*										
Diptera	Chironomidae	Chironomini	*Stictochironomus*										
Diptera	Chironomidae	Tanytarsini (d)											
Diptera	Chironomidae	Tanytarsini	*Micropsectra*								16	8	12
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*								4		4
Diptera	Chironomidae	Tanytarsini	*Rheotanytarsus*									92	104
Diptera	Chironomidae	Tanytarsini	*Stempellinella*						1				
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*										
Diptera	Chironomidae	Orthocladiinae (d)				3	1	6	2	4	12		4
Diptera	Chironomidae	Orthocladiinae	*sp.1*		1								
Diptera	Chironomidae	Orthocladiinae	*sp.2*										
Diptera	Chironomidae	Orthocladiinae	*Brillia*		1								
Diptera	Chironomidae	Orthocladiinae	*Cardiocladius*										
Diptera	Chironomidae	Orthocladiinae	*Corynoneura*			1					100	32	72
Diptera	Chironomidae	Orthocladiinae	*Diplocladius*										
Diptera	Chironomidae	Orthocladiinae	*Eukiefferiella*		2	13	3	14	17	16	4	4	4
Diptera	Chironomidae	Orthocladiinae	*Heleniella*										
Diptera	Chironomidae	Orthocladiinae	*Hydrobaenus*										
Diptera	Chironomidae	Orthocladiinae	*Heterotrissocladius*										
Diptera	Chironomidae	Orthocladiinae	*Krenosmittia*										
Diptera	Chironomidae	Orthocladiinae	*Orthocladius lignicola*										
Diptera	Chironomidae	Orthocladiinae	*Parametriocnemus*				1						
Diptera	Chironomidae	Orthocladiinae	*Parorthocladius*					16	47	44			
Diptera	Chironomidae	Orthocladiinae	*cf. Platysmittia*			5	12		2	22			
Diptera	Chironomidae	Orthocladiinae	*Pseudosmittia*										
Diptera	Chironomidae	Orthocladiinae	*Rheocricotopus*			1			1	4	4		
Diptera	Chironomidae	Orthocladiinae	*Smittia*										
Diptera	Chironomidae	Orthocladiinae	*Stilocladius*										
Diptera	Chironomidae	Orthocladiinae	*Thienemanniella*		1	1			4				
Diptera	Chironomidae	Orthocladiinae	*Tvetenia*			1			1	1	8	45	28
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*		11	36	7	65	119	88	396	493	164
Diptera	Chironomidae	Orthocladiinae	*Zalutschia*										

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate data collected in KSM Project Study Area Streams, 2008 (continued)

				Site	SC1					SC2					SC3				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Diptera	Chironomidae	Tanypodinae (d)																	
Diptera	Chironomidae	Tanypodinae	*Procladius*																
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.																
Diptera	Chironomidae	Diamesinae	*Diamesa*		71	79	22	15	22	4	2	2		2	18	10	10	12	5
Diptera	Chironomidae	Diamesinae	*Pagastia*																
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*																
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*																
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*																
Terrestrial					1				1	1									
			Total		***95***	***127***	***48***	***33***	***44***	***17***	***9***	***14***	***11***	***13***	***31***	***18***	***24***	***25***	***27***

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate data collected in KSM Project Study Area Streams, 2008 (continued)

				Site	TRC1			TRC2					TRC3			UR1				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**
Diptera	Chironomidae	Tanypodinae (d)																		
Diptera	Chironomidae	Tanypodinae	*Procladius*																	
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.																	
Diptera	Chironomidae	Diamesinae	*Diamesa*		3	29	17	4	14	4	25	17		4	2	6	5		6	31
Diptera	Chironomidae	Diamesinae	*Pagastia*									1								
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*										1							
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*																	
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*																	
Terrestrial					2	2		1	2	1	2	1		1	2					
			Total		***10***	***41***	***24***	***76***	***65***	***102***	***133***	***116***	***12***	***43***	***39***	***22***	***37***	***11***	***19***	***86***

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate data collected in KSM Project Study Area Streams, 2008 (continued)

				Site	UR1A					UNK1			UNK2					NTR1		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**
Diptera	Chironomidae	Tanypodinae (d)																	8	
Diptera	Chironomidae	Tanypodinae	*Procladius*																	
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.																	
Diptera	Chironomidae	Diamesinae	*Diamesa*		4	1							99	87	180	36	154			
Diptera	Chironomidae	Diamesinae	*Pagastia*										46	66	88	62	59	12	600	30
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*															12	71	61
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*																	
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*							1										44
Terrestrial					1	1	1			3	2		1	7	8		5	10	40	10
				Total	***28***	***48***	***43***	***24***	***26***	***157***	***230***	***112***	***1086***	***659***	***1053***	***626***	***999***	***893***	***8479***	***1706***

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate data collected in KSM Project Study Area Streams, 2008 (continued)

				Site	NTR2					SNO1					SNO2				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Diptera	Chironomidae	Tanypodinae (d)																	
Diptera	Chironomidae	Tanypodinae	*Procladius*																
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.																
Diptera	Chironomidae	Diamesinae	*Diamesa*		86	13	1	195	38	1	40	62	391	288	3			1	
Diptera	Chironomidae	Diamesinae	*Pagastia*																
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*				1												
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*																
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*																
Terrestrial					5	4		2	2	3	7	1	3	9	1	3	3	6	8
				Total	***527***	***136***	***19***	***900***	***431***	***167***	***113***	***132***	***698***	***630***	***31***	***33***	***383***	***1040***	***392***

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate data collected in KSM Project Study Area Streams, 2008 (continued)

				Site	SCR					TEC1					TEC2				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Diptera	Chironomidae	Tanypodinae (d)																	
Diptera	Chironomidae	Tanypodinae	*Procladius*																
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.																
Diptera	Chironomidae	Diamesinae	*Diamesa*			4	3	3				1			18	21	21	4	42
Diptera	Chironomidae	Diamesinae	*Pagastia*		6										1	18			
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*		1		1												
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*																
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*																
Terrestrial									1		1	1		1	2			1	
			Total		***309***	***129***	***122***	***117***	***124***	***226***	***640***	***508***	***539***	***455***	***791***	***2038***	***800***	***903***	***1660***

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate data collected in KSM Project Study Area Streams, 2008 (continued)

				Site	MC1					MCTR					SUNR				
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Diptera	Chironomidae	Tanypodinae (d)																	
Diptera	Chironomidae	Tanypodinae	*Procladius*																
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.																
Diptera	Chironomidae	Diamesinae	*Diamesa*							115	18	11	8	33	1	7	3	8	1
Diptera	Chironomidae	Diamesinae	*Pagastia*		1									1	2		1		
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*																
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*																
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*																
Terrestrial					2	1		0	1	5	2								
			Total		***6***	***6***	***7***	***8***	***12***	***241***	***80***	***56***	***35***	***126***	***71***	***123***	***177***	***90***	***46***

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate data collected in KSM Project Study Area Streams, 2008 (continued)

				Site	*STE1*			*STE2*					*SCT*			*ECM8*			*CC1*		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Diptera	Chironomidae	Tanypodinae (d)																			
Diptera	Chironomidae	Tanypodinae	*Procladius*																		
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.																		
Diptera	Chironomidae	Diamesinae	*Diamesa*		4			2			7	1		6	3	1		4			
Diptera	Chironomidae	Diamesinae	*Pagastia*		2																
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*			1	6														
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*			3	1														
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*		4																
Terrestrial					4				1	1	1	2		1		3	1	1	6	2	1
			Total		***166***	***114***	***303***	***210***	***225***	***209***	***201***	***176***	***3***	***12***	***9***	***62***	***213***	***82***	***39***	***31***	***22***

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

(continued

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

Appendix 9.2-5F
Benthic Invertebrate data collected in KSM Project Study Area Streams, 2008 (completed)

				Site	*EUR2*			*URO*			*HLO*		
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Rep**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Diptera	Chironomidae	Tanypodinae (d)											
Diptera	Chironomidae	Tanypodinae	*Procladius*										
Diptera	Chironomidae	Tanypodinae	*Thienemannimyia* gr.								4		8
Diptera	Chironomidae	Diamesinae	*Diamesa*		5	19	5	5	2	1			
Diptera	Chironomidae	Diamesinae	*Pagastia*		2	3	1		3		44	68	72
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*					1	2				
Diptera	Chironomidae	Prodiamesinae	*Odontomesa*										
Diptera	Chironomidae	Prodiamesinae	*Prodiamesa*										
Terrestrial					2	3	3		1	3	8	2	4
				Total	***118***	***249***	***194***	***278***	***360***	***365***	***865***	***1056***	***973***

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia

APPENDIX 9.2.5G
BENTHIC INVERTEBRATE DATA COLLECTED USING THE KICK-NET METHOD BY THE MOE-SKEENA, SMITHERS AT KSM PROJECT STUDY AREA STREAMS, 2008

Appendix 9.2-5G
Benthic Invertebrate data collected using the kick-net method by the MOE-Skeena, Smithers at KSM Project Study Area Streams, 2008

	Sample ID:	South Unuk	Scott Creek RCA	Treaty Creek Tributary	Teigen Creek Tributary	Mitchell Creek	Teigen Creek Trib. 2	Unuk River	Unuk River (duplicate)
	Rescan ID	**SUNR**	**SCR**	**NTR2**	**STE2**	**MC1**	**UNK2**	**EUR2**	**EUR2**
	Subsample:	100	100	100	100	100	100	100	100
Order: Ephemeroptera	adult							1	2
Family: Ameletidae									
Ameletus sp.	nymph	1	1	16			8		8
Family: Baetidae	adult		3						
Baetis sp.	nymph	3	43	25	60			4	54
Baetis bicaudatus	nymph	129	38	44	636		58	132	176
Baetis tricaudatus	nymph								
Family: Heptageniidae	nymph (dam./juv.)	3	11	156	68		18	106	190
Rhithrogena sp.	nymph	47	94	320	156		82	155	90
Cinygmula sp.	nymph		1	3	14		14	3	
Epeorus sp.	nymph	18	20	94	614		38	83	218
Family: Leptophlebiidae	nymph (dam./juv.)								
Family: Ephemerellidae	nymph (dam./juv.)								48
Caudatella sp.	nymph				2				
Ephemerella sp.	nymph								
Serratella sp.	nymph								
Drunella doddsi	nymph	4	11	12	212		128	58	96
Drunella spinifera	nymph								
Drunella coloradensis	nymph		3	1					
Order: Plecoptera	nymph (dam./juv.)		1	16					
Family: Chloroperlidae	nymph (dam./juv.)			67			16		
Sweltsa sp.	nymph	3			16			1	
Suwallia sp.	nymph	1	21	176	34		50		14
Alloperla fraterna	nymph			52			4	74	18
Family: Perlodidae	nymph (dam./juv.)		3	45				4	8
Skwala sp.	nymph	16	18	127	260		2	39	30
Megarcys sp.	nymph	3	3	9					4
Isoperla sp.	nymph								
Family: Perlidae	nymph (dam./juv.)								
Hesperoperla sp.	nymph								
Family: Nemouridae									
Zapada sp.	nymph		13	8	196			60	356
Zapada oregonensis/haysi	nymph	1						19	8
Zapada columbiana	nymph				6		2	2	10
Zapada cinctipes	nymph								
Podmosta sp.	nymph								
Visoka sp.	nymph							4	
Family: Taeniopterygidae	nymph (dam./juv.)								
Taeniopteryx sp.	nymph	33	20	40	96		16	86	140
Family: Capniidae	nymph (dam./juv.)	1	14	8			16	12	8
Capnia sp.	nymph								
Mesocapnia/Utacapnia sp.	nymph								
Family: Leuchtidae	nymph (dam./juv.)			8	66				
Order: Trichoptera	larvae (juv./dam.)								
Order: Trichoptera	pupae				4				
Family: Hydropsychidae	larvae (juv./dam.)								
Arctopsyche sp.	larvae								
Parapsyche sp.	larvae		2		6				2
Family: Rhyacophilidae									
Rhyacophila sp.	larvae	1	10	22	92			20	26
Family: Brachycentridae									
Brachycentrus sp.	larvae								
Micrasema sp.	larvae							4	
Family: Glossosomatidae									
Glossosoma sp.	larvae								
Family: Limnephilidae	larvae (juv./dam.)			32				20	8
Ecclisomyia sp.	larvae								
Order: Coleoptera UID	adult				16				

juv. = juvenile, dam. = damaged

(continued)

Appendix 9.2-5G
Benthic Invertebrate data collected using the kick-net method by the MOE-Skeena, Smithers at KSM Project Study Area Streams, 2008 (completed)

	Sample ID:	South Unuk	Scott Creek RCA	Treaty Creek Tributary	Teigen Creek Tributary	Mitchell Creek	Teigen Creek Trib. 2	Unuk River	Unuk River (duplicate)
	Rescan ID	**SUNR**	**SCR**	**NTR2**	**STE2**	**MC1**	**UNK2**	**EUR2**	**EUR2**
Order: Diptera UID1	pupae		1						8
Order: Diptera UID2	pupae								
Family: Tipulidae	larvae (dam./juv.)					1			
Dicranota sp.	larvae		1		2		8		
Hexatoma sp.	larvae								
Limnophila sp.	larvae								
Rhabdomastix sp.	larvae				2				
Gonomyodes sp.	larvae		5					5	12
Hesperoconopa sp.	larvae								
Molophilus sp.	larvae								
Family: Psychodidae									
Pericoma sp.	larvae								
Family: Oreoleptidae									
Oreoleptis sp.	larvae								
Family: Deuterophlebiidae									
Deuterophlebia sp.	larvae	1							
Family: Blephariceridae	larvae (dam./juv.)		8						
Agathon sp.	larvae		13						2
Family: Ceratopogonidae									
Bezzia/Palpomyia sp.	larvae				16				
Family: Empididae									
Clinocera sp.	larvae						2		10
Chelifera/Metachela sp.	larvae		1					4	2
Oreogeton sp.	larvae		3			1	8	27	32
Famly: Simuliidae	pupae			5			30		4
Simulium sp.	larvae								
Prosimulium sp.	larvae		2		628		122	1	20
Twinnia sp.	larvae							4	
Family: Chironomidae	larvae	46	140	334	424	4	2662	109	398
Class: Lepidoptera	larvae								
Order: Collembola	larvae		2		16	3			
Class: Crustacea									
Order: Copepoda									
Order: Cladocera									
Order: Ostracoda									8
Class: Turbellaria									
Order: Tricladida									
Polycelis coronata		2	5		98			24	50
Phylum: Annelida									
Class: Oligochaeta									10
Family: Lumbriculidae									
Family: Naididae					2			4	16
Phylum: Nematoda		1	1	1					
Order: Bivalvia									
Family: Sphaeriidae									
Pisidium sp.									
Order: Gastropoda									
Family: Valvatidae									
Valvata sincera helicoidea									
Order: Prostigmata	deutonymph								34
Order: Prostigmata UID	adult			8					
Family: Hydryzetidae	adult	1			16	1			
Family: Torrenticolidae									
Torrenticola	adult								
Family: Hygrobatidae									
Hygrobates	adult								
Family: Spechontidae									
Sperchon sp.	adult				16				32
Family: Lebertiidae									
Lebertia	adult								
Family: Hydryphantidae	adult								16
Wandesia	adult								
TOTAL SUBSAMPLE		315	512	1629	3774	10	3284	1064	2166

juv. = juvenile, dam. = damaged

APPENDIX 9.2.5H
TOTAL NUMBER OF IDENTIFIABLE ORGANISMS IN KICK-NET SAMPLES IN COMPARISON TO HESS NET SAMPLES TAKEN AT THE SAME SAMPLE SITE, KSM PROJECT STUDY AREA STREAMS 2008

Appendix 9.2.5H
Total Number of Identifiable Organisms in Kick Net Samples in Comparison to Hess Net Samples Taken at the Same Sample Site, KSM Project Area Streams 2008

Site	Number of taxa			
	Hess-net Replicates	Mean	Kick-net Replicates	Mean
	25		26	
	18			
NTR2	6	18		26
	18			
	23			
	33		32	
	18			
SCR	26	25		32
	26			
	22			
	2		5	
	1			
MC1	1	1		5
	0			
	1			
	16		20	
	13			
SUNR	18	13		20
	12			
	6			
	24		29	
	33			
STE2	23	27		29
	22			
	31			
	25		29	
EUR2	32	30	38	34
	33			
	22		20	
	20			
UNK2	25	19		20
	13			
	14			

APPENDIX 9.2.5I
BRAY-CURTIS SIMILARITY MATRIX, MEAN BENTHIC INVERTEBRATE DATA FOR KSM PROJECT STUDY AREA STREAMS, 2008

Appendix 9.2.5I
Bray-Curtis Similarity Matrix, Mean Benthic Invertebrate Data for KSM Project Study Area Streams, 2008

	SC1	SC2	SC3	TRC1	TRC2	TRC3	UR1	UR1A	UNK1	UNK2	NRT1	NTR2	SNO1	SNO2
SC1														
SC2	39.8													
SC3	55.9	58.2												
TRC1	50.6	56.6	64.7											
TRC2	50.5	30.7	38.8	34.3										
TRC3	46.2	45.4	48.0	33.1	51.5									
UR1	53.0	51.8	55.8	51.3	58.6	64.0								
UR1A	42.1	40.8	40.1	33.5	53.0	54.3	64.0							
UNK1	17.1	17.1	19.9	13.5	44.4	40.0	31.7	36.7						
UNK2	27.7	15.5	20.7	17.4	39.1	25.3	26.3	25.1	30.5					
NRT1	6.5	4.2	4.8	3.3	13.2	9.7	8.7	9.8	16.2	23.0				
NTR2	33.9	18.4	26.9	21.1	50.7	37.7	33.9	31.6	52.7	54.4	18.9			
SNO1	39.0	22.1	26.7	26.6	55.7	37.1	38.8	34.1	45.4	52.3	18.8	61.8		
SNO2	17.7	15.0	15.3	13.3	38.2	31.5	29.0	35.2	41.3	34.8	26.1	48.0	51.4	
SCR	33.6	21.6	26.4	19.0	54.7	45.5	35.6	38.2	58.6	39.8	20.0	55.1	55.0	45.4
TEC1	16.4	13.8	16.6	11.8	39.4	28.9	23.6	29.2	50.6	41.1	23.4	55.1	46.9	57.0
TEC2	14.6	8.8	12.4	10.8	29.1	19.5	17.1	19.5	35.8	52.3	33.7	48.8	43.2	52.5
MC1	16.1	34.1	24.6	31.7	14.0	18.9	21.3	19.0	7.1	5.2	1.7	5.4	7.6	6.3
MCTR	59.8	37.3	44.7	37.7	54.3	40.6	51.9	47.4	21.6	34.5	10.5	44.7	51.4	36.3
SUNR	44.5	37.6	41.6	28.9	60.5	52.7	53.4	53.3	31.5	33.7	11.0	40.7	47.9	36.4
STE1	24.7	18.2	20.0	15.3	39.8	41.6	35.4	33.7	36.0	27.7	28.0	33.6	32.9	44.1
STE2	25.9	21.4	25.3	17.6	51.0	41.5	35.7	37.1	56.9	43.2	22.5	56.5	60.6	50.4
SCT	22.2	47.1	33.2	50.5	13.3	22.9	27.6	15.6	7.7	7.2	1.1	7.7	10.1	5.0
ECM8	37.0	31.5	32.0	24.2	56.8	48.6	47.1	49.6	42.2	33.7	10.0	53.3	49.6	42.1
CC1	32.4	26.8	28.0	23.6	19.8	31.3	32.4	32.1	11.5	10.8	5.1	9.2	9.5	10.5
EUR2	37.5	22.2	28.3	23.0	63.2	44.3	41.8	40.9	52.7	43.9	21.4	60.3	60.2	52.6
URO	28.9	18.9	21.5	16.0	51.0	38.7	33.3	37.8	48.7	51.9	25.3	60.0	61.2	53.5
HLO	9.5	8.4	8.9	6.8	23.6	18.8	15.8	17.1	32.5	42.6	39.0	37.6	29.1	30.2
SUNR-MOE	13.0	9.2	8.6	8.4	26.8	22.7	16.3	18.9	33.2	22.4	7.1	40.1	27.0	18.6
SCR-MOE	13.3	6.4	7.1	5.9	22.6	16.8	12.9	14.0	33.8	22.8	11.5	36.6	26.0	16.8
NTR2-MOE	7.5	4.6	4.4	4.2	15.9	12.1	8.8	10.6	24.6	17.1	7.8	28.2	17.9	15.2
STE2-MOE	3.8	2.0	2.7	1.8	9.7	5.7	4.3	6.1	14.8	12.0	10.0	17.8	11.7	8.6
MC1-MOE	7.3	13.3	10.3	12.6	4.6	7.0	7.7	7.0	5.4	2.1	0.7	2.7	3.0	2.6
UNK2-MOE	7.0	3.5	4.1	3.1	14.9	10.5	8.2	9.2	19.2	16.5	7.1	22.9	17.2	15.2
EUR2-MOE	9.0	3.8	4.3	3.3	16.3	10.0	7.1	8.7	24.9	17.5	11.9	27.3	18.8	11.7
EUR2-MOE	6.6	2.5	3.4	2.2	12.5	8.1	5.5	7.1	18.7	14.1	15.1	21.8	14.1	11.3
SUNR MED	48.8	38.1	47.1	35.5	53.3	50.1	50.8	44.9	21.6	24.7	5.9	29.7	38.6	25.7
SCR MED	38.9	24.0	32.2	25.2	54.1	49.4	39.0	38.9	51.0	34.3	13.3	52.2	57.1	41.6

Note: SCR-MED and SUNR-MED are median abundance values of all replicates for reference sites SCR and SUNR.

(continued)

Appendix 9.2.5I
Bray-Curtis Similarity Matrix, Mean Benthic Invertebrate Data for KSM Project Study Area Streams, 2008 (continued)

	SCR	TEC1	TEC2	MC1	MCTR	SUNR	STE1	STE2	SCT	ECM8	CC1	EUR2	URO	HLO
SC1														
SC2														
SC3														
TRC1														
TRC2														
TRC3														
UR1														
UR1A														
UNK1														
UNK2														
NRT1														
NTR2														
SNO1														
SNO2														
SCR														
TEC1	59.8													
TEC2	44.6	66.7												
MC1	7.6	5.3	3.1											
MCTR	38.7	30.3	25.0	14.7										
SUNR	52.4	38.5	28.9	15.3	55.1									
STE1	41.4	32.4	28.5	6.9	29.6	34.3								
STE2	67.6	55.4	51.0	6.9	35.1	45.7	40.7							
SCT	10.9	4.5	4.2	30.2	16.6	17.0	7.8	10.2						
ECM8	57.0	52.0	33.3	13.3	50.7	58.6	29.7	54.3	12.7					
CC1	18.1	11.8	6.0	18.0	23.0	24.0	22.2	16.1	18.1	20.3				
EUR2	65.7	56.8	44.8	8.5	50.5	53.9	45.4	64.2	11.5	56.5	19.4			
URO	69.5	61.3	58.9	7.2	39.1	52.6	43.4	66.4	8.1	51.5	18.0	63.1		
HLO	36.3	34.9	38.4	3.7	17.6	20.7	28.2	37.8	3.3	20.3	5.1	36.6	38.6	
SUNR-MOE	36.9	33.6	27.6	5.1	10.2	29.8	13.2	36.3	5.4	39.7	10.1	36.3	33.6	15.3
SCR-MOE	38.1	36.7	30.0	3.5	10.8	22.9	12.4	38.4	5.0	31.0	7.2	36.7	34.5	19.4
NTR2-MOE	24.2	32.8	27.6	2.4	5.8	17.4	8.5	26.5	2.6	23.9	5.2	25.6	27.0	13.6
STE2-MOE	16.7	21.7	27.4	1.3	3.6	10.3	5.7	18.0	0.9	12.7	1.3	15.0	17.1	10.5
MC1-MOE	5.0	2.2	1.3	21.0	5.6	5.0	2.8	4.9	29.3	5.1	10.0	5.8	2.4	3.0
UNK2-MOE	20.9	25.7	24.0	2.2	6.0	16.2	8.2	21.8	2.4	21.1	3.6	24.4	21.9	9.1
EUR2-MOE	28.5	29.8	32.5	2.4	7.4	16.5	7.5	27.0	2.5	21.9	2.3	25.7	25.7	18.1
EUR2-MOE	22.8	25.4	31.3	1.6	5.2	12.0	7.6	23.1	1.7	16.5	2.6	22.0	23.2	15.4
SUNR MED	44.4	31.5	20.5	15.5	43.4	75.5	23.3	33.1	21.4	53.6	23.5	39.1	39.3	13.3
SCR MED	79.5	53.0	37.7	8.7	38.4	56.6	33.5	59.7	12.2	61.9	13.0	56.6	59.5	27.1

Note: SCR-MED and SUNR-MED are median abundance values of all replicates for reference sites SCR and SUNR.

(continued)

Appendix 9.2.5I
Bray-Curtis Similarity Matrix, Mean Benthic Invertebrate Data for KSM Project Study Area Streams, 2008 (completed)

	SUNR-MOE	SCR-MOE	NTR2-MOE	STE2-MOE	MC1-MOE	UNK2-MOE	EUR2-MOE	EUR2-MOE	SUNR MED	SCR MED
SC1										
SC2										
SC3										
TRC1										
TRC2										
TRC3										
UR1										
UR1A										
UNK1										
UNK2										
NRT1										
NTR2										
SNO1										
SNO2										
SCR										
TEC1										
TEC2										
MC1										
MCTR										
SUNR										
STE1										
STE2										
SCT										
ECM8										
CC1										
EUR2										
URO										
HLO										
SUNR-MOE										
SCR-MOE	69.3									
NTR2-MOE	53.4	63.7								
STE2-MOE	35.0	44.4	50.0							
MC1-MOE	13.2	12.4	4.9	4.9						
UNK2-MOE	40.7	53.1	54.2	47.7	6.0					
EUR2-MOE	53.8	63.3	62.5	53.5	6.4	45.7				
EUR2-MOE	41.5	55.3	54.9	62.4	4.2	50.0	67.1			
SUNR MED	28.5	21.0	15.5	8.6	7.0	14.4	15.3	10.5		
SCR MED	39.6	36.6	23.9	15.1	4.2	20.0	27.9	19.8	56.8	

Note: SCR-MED and SUNR-MED are median abundance values of all replicates for reference sites SCR and SUNR.

APPENDIX 9.2.5J
COEFFICENT OF VARIATION SUMMARY FOR 5 VS 3 HESS SAMPLE REPLICATES, KSM PROJECT STUDY AREA STREAMS, 2008

Appendix 9.2.5J
Coefficent of Variation Summary for 5 vs 3 Hess Sample Replicates, KSM Project Study Area Streams, 2008

	5 Hess Replicates					3 Hess Replicates			
	Richness	Density	Shannon	Simpson		Richness	Density	Shannon	Simpson
Max	0.592123	1.216304	0.574553	0.56482	**Max**	1.523032	1.95839	3.47404	2.56064
Min	0.11907	0.101594	0.047423	0.022664	**Min**	0.071603	0.115524	0.064545	0.009952
Mean	0.294702	0.579463	0.193986	0.13812	**Mean**	0.416694	0.659897	0.663994	0.569496

APPENDIX 9.3.5A
OXYGEN AND TEMPERATURE PROFILE DATA COLLECTED FOR KSM PROJECT STUDY AREA LAKES, 2008

Appendix 9.3.5A
Oxygen and Temperature Profile Data collected for KSM Project Study Area Lakes, 2008

Site: LAL
Secchi Depth = 6m

Zone: Deep				Mid				Shallow			
Depth (m)	**Temperature (ºC)**	**DO (mg/L)**	**DO (% sat.)**	**Depth (m)**	**Temperature (ºC)**	**DO (mg/L)**	**DO (% sat.)**	**Depth (m)**	**Temperature (ºC)**	**DO (mg/L)**	**DO (% sat.)**
0	13.3	10.4	98.3	**0**	12.2	9.88	94.5	**0**	13.4	9.74	92.6
1	13.4	9.89	94.4	**1**	13.3	9.69	9.69	**1**	13.4	9.42	89.9
2	13.4	9.9	94.6	**2**	13.3	9.56	9.56	**2**	13.3	9.21	87.8
3	13.3	9.81	94	**3**	13.3	9.58	9.58	**3**			
4	13.3	9.79	93.7	**4**	13.3	9.51	9.51	**4**			
5	13.3	9.26	93	**5**	13.3	9.55	9.55	**5**			
6	13	10.19	96.8	**6**	12.8	8.02	8.02	**6**			
7	11.5	12.73	115.9	**7**				**7**			
8	8.8	14.39	123.6	**8**				**8**			
9	6.8	14.1	111.6	**9**				**9**			
10	6.5	0.17	1.1	**10**				**10**			

Site: SUL
Secchi Depth = surface (turbid)

Zone:Deep				Mid				Shallow			
Depth (m)	**Temperature (ºC)**	**DO (mg/L)**	**DO (% sat.)**	**Depth (m)**	**Temperature (ºC)**	**DO (mg/L)**	**DO (% sat.)**	**Depth (m)**	**Temperature (ºC)**	**DO (mg/L)**	**DO (% sat.)**
0	0.5	14.77	103	**0**	0.6	15.57	108.4	**0**	0.3	14.98	104.4
1	0.4	14.96	103.5	**1**	0.5	15.22	105.7	**1**	0.6	14.49	101.7
2	0.4	14.97	103.6	**2**	0.4	15.05	104.2	**2**			
3	0.4	14.95	103.1	**3**	0.5	15.08	104.6	**3**			
4	0.6	15.1	104.9	**4**				**4**			
5	0.6	14.89	103.3	**5**				**5**			
6	0.6	14.6	101.8	**6**				**6**			
7	0.6	0.74	4.7	**7**				**7**			

Site: KGL
Secchi Depth = surface (turbid)

Zone: Deep				Mid				Shallow			
Depth (m)	**Temperature (ºC)**	**DO (mg/L)**	**DO (% sat.)**	**Depth (m)**	**Temperature (ºC)**	**DO (mg/L)**	**DO (% sat.)**	**Depth (m)**	**Temperature (ºC)**	**DO (mg/L)**	**DO (% sat.)**
0	7.8	10.83	90.8	**0**	6.3	11.19	90.8	**0**	4.7	12.3	95.2
1	7	11.13	91.5	**1**	6.2	11.21	90.6	**1**	4.6	11.3	88.7
2	6.4	11.25	91	**2**	5.9	11.41	91.1	**2**	4.6	11.48	89.6
3	5.7	11.47	91.4	**3**	5.6	11.53	91.3	**3**			
4	4.9	11.74	91.6	**4**	5	11.67	91.4	**4**			
5	4.7	11.78	91.2	**5**	5.1	11.59	91	**5**			
6	4.8	11.66	90.9	**6**	5	11.66	91	**6**			
7	4.7	11.73	91	**7**	4.9	11.69	90.3	**7**			
8	4.5	11.75	91.1	**8**	4.5	11.58	90.3	**8**			
9	4.4	11.85	91.2	**9**	4.3	11.75	90.4	**9**			
10	4.3	11.85	91.2	**10**				**10**			
11	4.2	11.8	90.6	**11**				**11**			
12	4.1	11.86	90.8	**12**				**12**			
13	4	11.95	91.1	**13**				**13**			
14	4	11.89	90.7	**14**				**14**			

DO = Dissolved Oxygen

APPENDIX 9.3.5B
ANALYTICAL DATA AND DETECTION LIMITS FOR LAKE SEDIMENTS, KSM 2008

Appendix 9.3-5B
Analytical Data and Detection Limits for Lake Sediments, KSM 2008

ANALYTICAL DATA									
Sample ID	SUL-1	SUL-2	SUL-3	KGL-1	KGL-2	KGL-3	LAL-1	LAL-2	LAL-3
Date Sampled	22-AUG-08	22-AUG-08	22-AUG-08	23-AUG-08	23-AUG-08	23-AUG-08	24-AUG-08	24-AUG-08	24-AUG-08
ALS Sample ID	L676344-82	L676344-83	L676344-84	L676344-85	L676344-86	L676344-87	L676344-91	L676344-92	L676344-93
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Physical Tests									
% Moisture	36.2	35.6	12	49.2	48.7	36.6	50.4	52.7	71.3
pH	7.53	7.65	7.58	7.98	7.91	8.04	6.66	6.75	6.11
Particle Size									
% Gravel (>2mm)	**0.5**	1	37	**0.5**	**0.5**	**0.5**	**0.5**	38	36
% Sand (2.0mm - 0.063mm)	3	9	58	**0.5**	**0.5**	**0.5**	3	12	22
% Silt (0.063mm - 4um)	50	48	5	32	30	37	51	30	31
% Clay (<4um)	47	42	1	68	70	63	47	21	12
Leachable Anions & Nutrients									
Total Nitrogen by LECO	0.05	0.05	0.04	0.03	0.07	**0.01**	0.13	0.31	0.4
Cyanides									
Cyanide, Total	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Organic / Inorganic Carbon									
Total Organic Carbon	0.4	0.3	0.1	0.2	**0.05**	**0.05**	1.5	2.5	4.2
Plant Available Nutrients									
Available Phosphate-P	1	**0.5**	**0.5**	1	1	1	6	3	**0.5**
Metals									
Aluminum (Al)	21100	21400	13000	23900	24400	20300	34700	28700	17300
Antimony (Sb)	13	13	**5**	**5**	**5**	**5**	**5**	**5**	**5**
Arsenic (As)	106	112	69.2	63	33.8	33.7	21.7	20	9.1
Barium (Ba)	401	379	85.2	672	676	654	184	177	132
Beryllium (Be)	0.51	0.54	**0.25**	0.72	0.61	0.5	0.87	0.78	**0.25**
Bismuth (Bi)	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**
Cadmium (Cd)	1.15	1.10	**0.25**	0.64	**0.25**	**0.25**	**0.25**	0.50	**0.25**
Calcium (Ca)	25800	23500	12800	15500	16300	21500	4370	5170	5230
Chromium (Cr)	20.1	20.6	15	8.1	7.6	5.8	137	109	58.5
Cobalt (Co)	20.1	20	11.5	20	18.3	16.7	52	43.9	13.5
Copper (Cu)	286	280	118	34.6	31.2	27.7	108	93.9	37.2
Iron (Fe)	49500	49400	35200	49300	47600	44600	63700	61400	28200
Lead (Pb)	51	50	**15**	30	**15**	**15**	**15**	**15**	**15**
Lithium (Li)	24.3	24	17	23.4	22.6	20.1	55.4	53.2	32.5
Magnesium (Mg)	14800	14500	10200	10800	11800	10600	22500	17500	9540
Manganese (Mn)	1870	1830	932	2200	1950	1910	1220	592	374
Mercury (Hg)	0.373	0.351	0.124	0.272	0.173	0.152	0.254	0.221	0.108
Molybdenum (Mo)	**2**	**2**	4.3	**2**	**2**	**2**	**2**	**2**	**2**
Nickel (Ni)	18.1	18.6	9.7	11.9	9.1	7.3	230	187	88.9
Phosphorus (P)	1370	1370	1070	1130	1150	1250	1490	1090	683
Potassium (K)	2230	2520	820	4040	4220	3260	1770	1660	1570
Selenium (Se)	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**4**	**4**
Silver (Ag)	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Sodium (Na)	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	270
Strontium (Sr)	111	102	47.2	49.4	48.2	56.6	62.7	69.8	49.4
Thallium (Tl)	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
Tin (Sn)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Titanium (Ti)	512	603	430	246	366	454	134	55.4	115
Vanadium (V)	80.9	82.6	58.5	55.1	59.4	54.5	71.4	63.3	44.6
Zinc (Zn)	210	208	106	141	134	114	227	202	110

Note: all measurements are mg/kg unless otherwise noted

(continued)

Appendix 9.3-5B
Analytical Data and Detection Limits for Lake Sediments, KSM 2008 (completed)

ANALYTICAL DATA	DETECTION LIMITS								
Sample ID	SUL-1	SUL-2	SUL-3	KGL-1	KGL-2	KGL-3	LAL-1	LAL-2	LAL-3
Date Sampled	22-AUG-08	22-AUG-08	22-AUG-08	23-AUG-08	23-AUG-08	23-AUG-08	24-AUG-08	24-AUG-08	24-AUG-08
ALS Sample ID	L676344-82	L676344-83	L676344-84	L676344-85	L676344-86	L676344-87	L676344-91	L676344-92	L676344-93
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Physical Tests									
% Moisture	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
pH	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Particle Size									
% Gravel (>2mm)	1	1	1	1	1	1	1	1	1
% Sand (2.0mm - 0.063mm)	1	1	1	1	1	1	1	1	1
% Silt (0.063mm - 4um)	1	1	1	1	1	1	1	1	1
% Clay (<4um)	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
Cyanides									
Cyanide, Total	3	3	3	3	3	3	3	3	3
Organic / Inorganic Carbon									
Total Organic Carbon	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Plant Available Nutrients									
Available Phosphate-P	1	1	1	1	1	1	1	1	1
Metals									
Aluminum (Al)	50	50	50	50	50	50	50	50	50
Antimony (Sb)	10	10	10	10	10	10	10	10	10
Arsenic (As)	5	5	5	5	5	5	5	5	5
Barium (Ba)	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
Bismuth (Bi)	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
Calcium (Ca)	50	50	50	50	50	50	50	50	50
Chromium (Cr)	2	2	2	2	2	2	2	2	2
Cobalt (Co)	2	2	2	2	2	2	2	2	2
Copper (Cu)	1	1	1	1	1	1	1	1	1
Iron (Fe)	50	50	50	50	50	50	50	50	50
Lead (Pb)	30	30	30	30	30	30	30	30	30
Lithium (Li)	2	2	2	2	2	2	2	2	2
Magnesium (Mg)	50	50	50	50	50	50	50	50	50
Manganese (Mn)	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
Molybdenum (Mo)	4	4	4	4	4	4	4	4	4
Nickel (Ni)	5	5	5	5	5	5	5	5	5
Phosphorus (P)	50	50	50	50	50	50	50	50	50
Potassium (K)	200	200	200	200	200	200	200	200	200
Selenium (Se)	2	2	2	2	2	2	4	8	8
Silver (Ag)	2	2	2	2	2	2	2	2	2
Sodium (Na)	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
Thallium (Tl)	1	1	1	1	1	1	1	1	1
Tin (Sn)	5	5	5	5	5	5	5	5	5
Titanium (Ti)	1	1	1	1	1	1	1	1	1
Vanadium (V)	2	2	2	2	2	2	2	2	2
Zinc (Zn)	1	1	1	1	1	1	1	1	1

Note: all measurements are mg/kg unless otherwise noted

APPENDIX 9.3.5C
PHYTOPLANKTON BIOMASS (CHLOROPHYLL A) CONCENTRATIONS IN KSM PROJECT STUDY AREA LAKES, 2008

Appendix 9.3-5C
Phytoplankton Biomass (chlorophyll *a*) Concentrations in KSM Project Study Area Lakes, 2008

Sample ID	LAL-SHALLOW	LAL-MID	LAL-DEEP	SUL-SHALLOW	SUL-MID	SUL-DEEP	KGL-SHALLOW	KGL-MID	KGL-DEEP
Date Sampled	24-Aug-08	24-Aug-08	24-Aug-08	22-Aug-08	22-Aug-08	22-Aug-08	23-Aug-08	23-Aug-08	23-Aug-08
ALS Sample ID	L676275-91	L676275-92	L676275-93	L676275-82	L676275-83	L676275-84	L676275-85	L676275-86	L676275-87
Plant Pigments									
Chlorophyll a (ug/L)	0.474	1.08	0.542	0.0691	0.0697	0.024	0.255	0.694	0.386

APPENDIX 9.3.5D
PHYTOPLANKTON TAXONOMIC DATA FOR KSM PROJECT STUDY AREA LAKES, 2008

Appendix 9.3.5D
Phytoplankton Taxonomic Data for KSM Project Study Area Lakes, 2008

Rescan Phytoplankton (KSM)	Sample ID	SUL		SUL		SUL		KGL-1		KGL		KGL	
	Date	22-Aug-08		22-Aug-08		22-Aug-08		23-Aug-08		23-Aug-08		23-Aug-08	
	Replicate	1		2		3		1		2		3	
		Density	Biovolume	Density	Biovolume	Density	Biovolume	Density	Biovolume	Density	Biovolume	Density	Biovolume
Taxa	**Group**	**#/mL**	**um^3/mL**	**#/mL**	**um^3/mL**	**#/mL**	**um^3/mL**	**#/mL**	**um^3/mL**	**#/mL**	**um^3/mL**	**#/mL**	**um^3/mL**
Kephyrion sp.	chrysophyte	2	135										
Unident. alga	Diatom					3	263						
Nitzschia paleacea	Diatom							1	134	4	1276		
Synedra radians	Diatom									1	59	1	426
Achnanthes minutissima	Diatom												
Caloneis ventricosa	Diatom											1	290
Nitzschia palea	Diatom											1	213
	Total	**2**	**135**	**0**	**0**	**3**	**263**	**1**	**135**	**5**	**1336**	**4**	**930**

Note: Highlight indicates no organisms were found in sample.

APPENDIX 9.3.5E
ZOOPLANKTON TAXONOMY DATA FOR KSM PROJECT STUDY AREA LAKES, 2008

Appendix 9.3.5E
Zooplankton Taxonomy Data for KSM Project Study Area Lakes, 2008

Sample ID:	SUL-1	SUL-2	SUL-3	KGL-1	KGL-2	KGL-3	LAL-1	LAL-2	LAL-3
Date:	8/22/2008	8/22/2008	8/22/2008	8/23/2008	8/23/2008	8/23/2008	8/24/2008	8/24/2008	8/24/2008
Replicate:	1	2	3	1	2	3	1	2	3
Taxa									
Phylum Arthropoda									
Sub Order Cladocera									
Daphnia middendorffiana							5	1	2
Subclass Copepoda									
Calanoid copepodid							5	4	7
Cyclopoid copepodid							31	20	27
Epischura nevadensis									2
Leptodiaptomus pribilofensis							9	4	7
Mesocyclops edax							20	6	10
Orthocyclops modestus							6	9	13
Nauplii							107	35	54
Phylum Rotifera									
Class Eurotatoria									
Kellicottia bostoniensis	1								
Kellicottia longispina	10	5					142	237	368
Keratella cochlearis						1			
TOTAL TALLY	11	5	0	1	0	1	325	316	490

APPENDIX 9.3.5F
ZOOPLANKTON TAXONOMY VOLUME FILTERED CALCULATIONS, KSM PROJECT STUDY AREA LAKES, 2008

Appendix 9.3.5F
Zooplankton Taxonomy Volume Filtered Calculations, KSM Project Study Area Lakes, 2008

Lake Site:	KGL			LAL			SUL		
Date:	23-Aug-08			24-Aug-08			22-Aug-08		
Replicate:	1	2	3	1	2	3	1	2	3
	Deep	Mid	Shallow	Deep	Mid	Shallow	Deep	Mid	Shallow
Max. depth of net mouth (m):	14	8	2	9	5	2	5	2	1
Flowmeter In:	0	100	450	680	930	1380	0	100	170
Flowmeter Out:	418	486	790	958	1232	1562	78	156	209
Difference in Counts:	418	386	340	278	302	182	78	56	39
Calculated Distance (in metres):	11.2329	10.373	9.13683	7.4707	8.11565	4.89089	2.0961	1.50489	1.04805
Calculated Volume (in cubic metres):	**0.79361**	**0.73285**	**0.64552**	**0.52781**	**0.57337**	**0.34554**	**0.14809**	**0.10632**	**0.07404**

APPENDIX 9.3.5G
BENTHIC INVERTEBRATE TAXONOMIC DATA COLLECTED USING EKMAN GRAB SAMPLER AT KSM PROJECT STUDY AREA LAKES, 2008

Appendix 9.3.5G
Benthic Invertebrate Taxonomic Data Collected Using Ekman Grab Sampler at KSM Project Study Area Lakes, 2008

				LAL			*SUL*		*KGL*	
				#1	#2	#3	#1	#2	#1	#2
Major Taxon	**Family**	**Subfamily/Tribe**	**Genus/Species**	**Mid**	**Shallow**	**Deep**	**Deep**	**Mid**	**Deep**	**Mid**
Nematoda					4	61				
Oligochaeta	Enchytraeidae					56				
Oligochaeta	Tubificidae			29	8	59				
Gastropoda	Valvatidae		*Valvata sincera*		6	1				
Pelecypoda	Sphaeriidae		*Pisidium*	9	136					
Pelecypoda	Sphaeriidae (d)		*Pisidium/Sphaerium*	4	77	3				
Ostracoda						29				
Copepoda - Calanoida				4						
Copepoda - Cyclopoida				41						
Diptera	Ceratopogonidae	Ceratopogoninae	*Bezzia / Palpomyia*			2				
Diptera	Chironomidae	Chironomini	*Chironomus*	4	14					
Diptera	Chironomidae	Chironomini	*Dicrotendipes*			18				
Diptera	Chironomidae	Chironomini	*Stictochironomus*		5					
Diptera	Chironomidae	Tanytarsini	*Paratanytarsus*			193				
Diptera	Chironomidae	Tanytarsini	*Tanytarsus*	12	92	201				
Diptera	Chironomidae	Orthocladiinae	*Cricotopus/Orthocladius*			8				
Diptera	Chironomidae	Tanypodinae	*Procladius*		4	1				
Diptera	Chironomidae	Diamesinae	*Pseudodiamesa*					1		
Terrestrial							0		0	0
			Total	***103***	***346***	***632***	***0***	***1***	***0***	***0***

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

Genus #1 - this is an undescribed Epidid larva belonging possibly to the new genus

Limnephilidae (d) - possibly early instars of Ecclisomyia