CopperFox Metals Inc.

Schaft Creek Project

British Columbia, Canada

Schaft Creek Project 2006 Aquatics Baseline Report

Prepared by:

Rescan Tahltan Environmental Consultants
Vancouver, British Columbia

March 2007

EXECUTIVE SUMMARY

Executive Summary

CopperFox Metals' proposed Schaft Creek Project has mineral claims situated within the Cassiar Iskut-Stikine Land and Resource Management area which encompasses a total of 5.2 million hectares. The mineral claims of interest are situated near the headwaters of Schaft Creek, a tributary of Mess Creek, which flows into the Stikine River downstream of the community of Telegraph Creek. This report presents the results of field studies conducted in 2005 and 2006 on the water quality, sediment quality, and primary and secondary producer communities of the Schaft Creek Project area.

Water quality, sediment quality, and primary and secondary producer communities were assessed in the Schaft Creek Project area. Twenty stream sites, 7 wetland sites and 5 lake sites along Schaft, Mess, Skeeter and Hickman creeks were investigated using a variety of sampling methods.

Several of the general stream water quality samples had variables that were below analytical detection limits. Most variables had values that were greatest in the Schaft Creek Watershed. These peak values typically occurred in July or September. Guidelines were exceeded in one or more samples for total and dissolved aluminum, iron, selenium and zinc, as well as total arsenic and total copper.

All stream sites had sediments that were dominated by sand. Many metals that do not have guidelines had high concentrations in the Mess Creek Watershed. Aluminum, Magnesium, manganese and titanium concentrations were high in Skeeter Lake Watershed stream site sediments.

Stream Primary and Secondary Producer taxonomic data were not available to be included in this report.

Water quality samples collected from wetland sites generally had greater concentrations of total and dissolved metals than those samples collected from lake sites. Sediments from lake and wetland sites were composed primarily of silt and clay. Arsenic, cadmium, chromium, copper, iron, nickel and zinc values exceeded guidelines at one or more wetland or lake site.

The two most dominant phytoplankton taxa in the 5 lakes sampled were Bacillariophyta and Cyanophyta while cyclopoid copepods dominated the zooplankton assemblages at four of the five lake sites. Lake benthic invertebrate taxonomic data were not available to be included in this report.

ACKNOWLEDGEMENTS

Acknowledgements

This report was prepared for CopperFox Metals Inc. by Rescan Environmental Services Ltd. The project was managed by Shane Uren (M.A.Sc., R.P.Bio) of Rescan. The report was written by Allyson Longmuir (M.Sc.). Fieldwork was conducted by Odelia Dennis (B.Sc.), Allyson Longmuir and Mike Stamford (M.Sc.) with assistance from Shana Day, Jordan Hawkins, Melissa Louie and Brandon Marion. Accommodation was provided by CopperFox Metals at the Schaft Creek camp and helicopter support was provided by Quantum Helicopters. Report production was coordinated by Amanda Broda.

TABLE OF CONTENTS

Schaft Creek Project 2006 Aquatics Baseline Report

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

Figure **Page**

LIST OF TABLES

LIST OF PLATES

1. INTRODUCTION

1. Introduction

1.1 Overview

The Schaft Creek property is located in the mountainous terrain of northwestern British Columbia, approximately 1,000 km northwest of Vancouver (Latitude: 130º 58' 48.9", Longitude: 57º22' 4.2" - Figure 1.1-1). The area is located 80 kilometers southwest of Telegraph Creek and approximately 76 kilometers west of the Stewart-Cassiar paved highway (Highway 37). The mineral claims of interest are situated near the headwaters of Schaft Creek, a tributary of Mess Creek, which flows into the Stikine River downstream of the community of Telegraph Creek.

Schaft Creek is located in the coastal climate zone of British Columbia and is characterized by cool summers and cold humid winters. Elevations on the property range from 500 to 2,000 m above sea level. Average annual precipitation (using PRISM data) is estimated to be between 665 mm and 859 mm. Temperatures are strongly influenced by the Coast Mountains and may range from above 20ºC in the summer to below -20ºC in winter.

All mineral claims are contained within the Cassiar Iskut-Stikine Land and Resource

The management area encompasses a total of 5.2 million hectares. The area is part of the Telegraph Creek Community Watershed identified in the Cassiar Iskut-Stikine Land and Resource Management Plan (LRMP).

The Schaft Creek deposit was discovered in 1957, and the site has been subject to periodic exploratory drilling since then. CopperFox Metals began a preliminary feasibility assessment in 2004, and Rescan Tahltan Environmental Consultants (RTEC) were retained in 2005 to begin baseline environmental studies.

1.2 Objectives

This report presents the results of the 2006 baseline aquatics assessment. Aquatic components (water quality, sediment quality, primary producers and secondary producers) were assessed in a variety of aquatic environments; streams, rivers, wetlands and lakes. The objectives of this assessment were to determine the baseline conditions of these aquatic components in the proposed mine receiving environment as well as along the most likely proposed access corridor.

Location Map for Schaft Creek Project

FIGURE 1.1-1

2. MATERIALS AND METHODS

2. Materials and Methods

2.1 Aquatic Resources

2.1.1 Receiving Environment Streams

In this report, a receiving environment stream refers to a stream that is downstream of project activities (pit, infrastructure, roads, etc).

2.1.1.1 Study Design

Two major watersheds were surveyed for aquatic communities in the area surrounding Schaft Creek Project; Schaft Creek and Mess Creek. The confluence of Schaft Creek and Mess Creek is downstream of the proposed mine site. Further north, Mess Creek enters the Stikine River. In 2006, 19 stream sites were assessed for phytoplankton, benthic invertebrates, sediment quality and water quality (Figure 2.1-1).

2.1.1.2 Water Quality

One water sample was collected per site per sampling period using standardized methods (RISC 1997). Water samples were analyzed for general physico-chemical variables, anions, nutrients, total cyanide, total organic carbon (TOC), and total and dissolved metals at the lowest feasible detection limit by ALS Environmental Services of Vancouver.

For each sample, the scientist stood facing upstream and triple-rinsed the bottle and cap prior to filling. Preservatives were added for total metals (ultra-pure nitric acid), TOC (hydrochloric acid), and total cyanides (NaOH). No air bubbles were left in any of the bottles. A list of all routine chemistry parameters is presented along with general method detection limits (MDL) in Table 2.1-1.

Table 2.1-1
Water Quality Parameters and Method Detection Limits, 2006

Parameter	Detection Limit (mg/L)
Physical/Dissolved Anions	
Colour (Cu)	5
Conductivity (µmhos/cm)	2
pH (pH units)	0.01
Total Suspended Solids	3
Turbidity (NTU)	0.1
Total Organic Carbon	0.5
Total Dissolved Solids	1
Hardness	0.50
Total Alkalinity (as CaCO3)	1
Acidity	1
Bromide	0.05
Chloride	0.5

(continued)

Table 2.1-1
Water Quality Parameters and Method Detection Limits, 2006 (continued)

Parameter	Detection Limit (mg/L)
Fluoride	0.02
Sulphate	0.5
Nutrients	
Ammonia Nitrogen	0.005
Nitrate	0.005
Nitrite	0.001
Total Kjeldahl Nitrogen	0.05
Total Nitrogen	0.02
Total Phosphorus	0.002
Cyanides	
Total Cyanide	0.005
Total and Dissolved Metals	
Aluminium	0.001
Antimony	0.0001
Arsenic	0.0001
Barium	0.00005
Beryllium	0.0005
Bismuth	0.0005
Boron	0.01
Cadmium	0.00005
Calcium	0.02
Chromium	0.0005
Cobalt	0.0001
Copper	0.0001
Iron	0.03
Lead	0.00005
Lithium	0.005
Magnesium	0.005
Manganese	0.00005
Mercury	0.00001
Molybdenum	0.00005
Nickel	0.0005
Phosphorous	0.3
Potassium	0.05
Selenium	0.001
Silicon	0.05
Silver	0.00001
Sodium	2
Strontium	0.0001

(continued)

Table 2.1-1
Water Quality Parameters and Method Detection Limits, 2006 (completed)

Parameter	Detection Limit (mg/L)
Thallium	0.0001
Tin	0.0001
Titanium	0.01
Uranium	0.00001
Vanadium	0.001
Zinc	0.001

All raw data are presented in appendices (listed in Section 3.1) and variables thought to be most relevant to potential water quality issues within the Schaft Creek Project area have been presented graphically. The analyzed data were then summarized for each parameter by site and grouped by watershed. Some variables could not be measured reliably below a specified detection limit and are reported by the analytical laboratory as below that detection limit. When required for the purpose of statistical analyses and graphical presentation, these values (called non-detects) were replaced with half of the detection limit.

A summary table showing the mean, minimum and maximum value for the total metals of interest is presented in Section 3.1 with all available CCME and B.C. water quality guidelines (CCME, 2003; BCMWLAP, 2001, 2005).

Monthly Water Quality Data

Where possible, water quality samples were collected on a monthly basis during 2006. Most sites (except MC-7) also had data available from October and/or November 2005. Data for each site were compared to the CCME and B.C. water quality guidelines. Results are plotted with sites grouped as follows: Mess Creek and tributaries (MC-1, MC-2, MC-3, MC-4, MC-5, MC-7 and WC-1); Skeeter Lake (SKC-1, SKC-2 and SKC-3); Hickman Creek (HC-1) and Schaft Creek (SC-1, SC-2, SC-3, SC-4 and SC-5).

Quality Assurance and Quality Control (QA/QC)

A separate set of bottles for field and travel blanks were included as part of the field QA/QC program. The travel blank bottles were filled with distilled deionised water in the lab and remained closed throughout the field trip. This allowed assessment of contamination associated with the lab procedures. The field blank bottles were also filled with distilled deionised water, but were opened in the field and preserved as required for certain analyses. This allowed assessment of contamination associated with field sampling (airborne contamination, contamination of the lid/bottle, *etc.*) and preservation procedures. All data for field and travel QA/QC are reported in appendices. The frequency of detection of a concentration for a water quality parameter above the method detection limit (MDL) was noted for both travel and field blanks, indicating possible contamination.

For quality assurance/quality control (QA/QC) purposes, a minimum of 10% of the water samples were randomly collected in duplicate in order to assess the magnitude and potential causes of variability between samples. For each pair of QA/QC field duplicate water samples, the relative percent differences (RPD) were calculated,

where: $$RPD = 100 \mid rep1 - rep2 \mid /[(rep1 + rep2)/2]$$

The RPD between the duplicates is a measure of the variability inherent in field sampling (environmental heterogeneity, sampler handling leading to contamination). Water quality variables where one or both values were less than five times the MDL were not included in the RPD calculations because variability near the MDL is too high, according to the BC Field Sampling Manual (BCMWLAP, 2003). Also, RPD values less than 20% were not considered notable. The B.C. provincial government suggests that any field duplicates with RPD values exceeding 20% should be noted and data should be interpreted accordingly. The results of RPD calculations were examined in order to detect patterns of high variation for multiple parameters within sample pairs, indicating possible contamination during field sampling.

Analyses were conducted utilizing the lowest possible detection limit. For some samples, detection limits were greater due to interference from high conductivity, high TSS, or a high metal value. These samples must be diluted and the result is a higher detection limit.

2.1.1.3 Sediment Quality

Sediment was collected at 19 stream sites in late August, 2006 (Figure 2.1-1). Three composite samples were collected at each site. Methods for stream sediment sampling were standardized (RISC 1998) and involved the use of a stainless steel bowl and spoon to collect multiple grab samples within or alongside streams stations. Sediment was spooned from the top 5 cm at three to four points along the river. It was pooled (excess water drained off) and manually homogenized for one minute in the mixing bowl. Sediment was then carefully spooned into clean, pre-labelled Whirl-Pak bags, sealed (no air bubbles), and kept cool in the dark until analysis by ALS Environmental Services of Vancouver. This was done 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.

All sediment samples were analyzed for moisture, particle size, nutrients, TOC, total cyanide, and total metals using the lowest feasible detection limit. A list of sediment test parameters is presented in Table 2.1-2. Non-detects were replaced by half of the detection limit. Data are summarized by site and watershed, and compared to CCME and B.C. sediment quality guidelines (BCMWLAP, 2001; CCME, 2003). B.C. guidelines include both the Lowest Effect Level (LEL) and Severe Effect Level (SEL), whereas the CCME guidelines include the Interim Sediment Quality Guideline (ISQG) and the Probable Effect Level (PEL).

Table 2.1-2
Sediment Quality Variables and Detection Limits for Schaft Creek Project, 2006

Parameter		Detection Limit (mg/kg dry weight)
Physical Tests		
Moisture		0.10%
Particle Size		0.10%
Nutrients		
Available Phosphorus		1
Total Nitrogen	(%)	0.01
Total Metals		
Aluminum	T-Al	50
Antimony	T-Sb	20
Arsenic	T-As	0.5
Barium	T-Ba	1
Beryllium	T-Be	0.5
Bismuth	T-Bi	20
Cadmium	T-Cd	0.1
Calcium	T-Ca	50
Chromium	T-Cr	2
Cobalt	T-Co	2
Copper	T-Cu	1
Iron	T-Fe	50
Lead	T-Pb	2
Lithium	T-Li	2
Magnesium	T-Mg	50
Manganese	T-Mn	1
Mercury	T-Hg	0.005
Molybdenum	T-Mo	4
Nickel	T-Ni	5
Phosphorus	T-P	50
Potassium	T-K	200
Selenium	T-Se	50
Silver	T-Ag	2.0 *
Sodium	T-Na	200
Strontium	T-Sr	0.5
Thallium	T-Tl	50
Tin	T-Sn	10
Titanium	T-Ti	1
Vanadium	T-V	2
Zinc	T-Zn	1
Organic Parameters		
Total Organic Carbon	**(%)**	**0.05**

2.1.1.4 Primary and Secondary Producers

Periphyton

Periphyton sampling was conducted at the 19 stream sites and the one wetland site (WL-8) in late August 2006 when sediment and biological surveys were scheduled (Figure 2.1-1). Samples were collected from three separate rocks or macrophytes per site using a razor to gently scrape a known surface area, assisted by a brush and rinse bottle. Multiple areas were scraped from each rock to accurately characterize the periphyton coverage and community composition. When discrete samples were not available from rocks or woody debris, qualitative samples for taxonomic identification and determination of dominant taxa were scooped from the sediment bottom using a stainless steel spoon.

For each sample, half was used for a taxonomic identification and enumeration, and the other half for measurement of chlorophyll *a* biomass. Taxonomic samples were stored in 250 mL plastic bottles and preserved in Lugol's iodine solution. Taxonomic identification and enumeration was conducted by Biologica Environmental Services (Victoria, B.C.). For each sample, genus richness, and diversity (as Shannon-Weiner and Simpson diversity indices) were calculated and mean and standard error by site was determined and graphed.

Chlorophyll *a* samples were prepared by filtering the remaining half sample through a 0.45 µm filter, folding it in half and wrapping it in tinfoil, and labelling and freezing it until analysis by ALS Environmental Services of Vancouver. Biomass (mean ± SE) was plotted on graphs by site.

Benthic Invertebrates

Benthic macroinvertebrate communities were sampled at all stream sites and WL-8 concurrently with primary producer surveys in August, 2006. Stream benthic samples were collected using a Hess sampler with a surface area of 0.096 m^2 and a mesh size of 500 µm. WL-8 was also sampled in this way since the site more resembled a stream than a wetland at the time of sampling. Five composite replicates were collected at each site associated with potential mine effects. Each composite was comprised of three pooled grab samples taken five to 10 m apart or located on separate braids of the stream.

For each stream subsample, the Hess sampler was driven 10 cm into the sediment of an undisturbed riffle zone, facing upstream with the cod-end trailing downstream. Larger gravel and rocks inside the sampler were carefully cleaned of dirt and debris (washed into the sampler area water) and thrown away. The sediment was then stirred, scrubbed, and raised up and dropped inside the Hess sampler for one minute, allowing the stream current to wash benthos into the cod end. The mesh of the sampler was carefully washed and rinsed into the cod-end to capture all benthos contained in the sampler area. The cod-end was then rinsed into a 500 µm mesh sieve bucket. Once the three subsamples were collected and transferred to the sieve bucket, all contents were then carefully transferred to a clean 500 mL, pre-labelled plastic jar which was then filled with 10% buffered formalin. Replicate samples were preserved separately in plastic jars. Taxonomic identification and enumeration was conducted by Applied Technical Services of Victoria, B.C. Invertebrates were sorted and identified to the lowest possible taxonomic level (usually genus). Genus richness, Shannon-Weiner and Simpson's diversity

indices were calculated for each sample. Richness of Ephemeroptera/Plecoptera/Trichoptera (EPT), which are three important taxonomic groups usually associated with pristine stream environments, was also calculated for stream sites. Their constant exposure to substrate and potential contaminants make benthic invertebrates important indicators of aquatic impacts and are therefore an important feature of aquatic environmental effects monitoring programs (Environment Canada 2001).

2.1.2 Wetlands and Lakes

2.1.2.1 Study Design

In 2006, a total of five lake and eight wetland sites were assessed for phytoplankton, benthic invertebrates, sediment quality and water quality (Figure 2.1-1). Sampling occurred in August, with the objective to quantify aquatic communities and habitat in receiving environment that will be directly impacted, or potentially receive discharge during mine operations.

2.1.2.2 Water Quality

Water samples from wetlands and lakes were collected once (in August) at each site during 2006. Preservation and analyses of water samples was identical to that done for stream water samples. All raw data are presented in appendices (listed in Section 3.1) and variables thought to be most relevant to potential water quality issues within the Schaft Creek Project area have been presented graphically. As with stream water quality samples, field and travel blanks were collected and RPD duplicate samples were analyzed.

2.1.2.3 Physical Limnology

Physical limnology parameters were measured at five lakes (L-1, L-2, L-3, L-4 and L-5). These parameters included Secchi depth, surface pH and dissolved oxygen/conductivity/salinity/temperature depth profiles measured at the deepest point in the lake.

Secchi depth, a measure of water transparency, was determined using a standard 20 cm black and white Secchi disk. Using a metered line, the weighted Secchi disk was lowered over the shaded side of the boat until it was no longer visible in the water column. The disk was then slowly raised until it once again became visible, and the depth was recorded to the nearest 10 cm.

Depth profiles were measured using a YSI Model 85 meter and probe to determine the degree and position of stratification, if present. Both before and after conducting a profile, the membrane of the probe was checked for air bubbles. If air bubbles were present, the membrane was replaced and the profile was redone. After initial calibration, measurements were taken just below the surface and at 1m intervals. The probe was lowered to a depth of 1 m above the sediment-water interface (as indicated by the depth sounder).

2.1.2.4 Sediment Quality

Sediment was collected at five lake and seven wetland sites in late August, 2006 (Figure 2.1-1). Three composite samples were collected at each site. At lake and wetland sites, an Ekman sampler was used to collect bottom sediment. Three distinct zones were sampled at each lake or wetland, encompassing shallow, medium and deep zones. At each zone, three separate grabs were collected a minimum of 5 m apart from an inflatable zodiac boat, and sediment was then

pooled into one composite. Sediment was first photographed and physical appearance (organics, homogeneity, and organisms) noted. Sediment was then spooned off the top 4 cm of the Ekman grab sample and deposited into a clean stainless steel bowl. The top layer contents of three separate grabs were then homogenized using a stainless steel spoon for one minute, and sediment was then spooned into clean, pre-labelled Whirl-Pak bags, sealed (no air bubbles), and kept cool in the dark until analysis by ALS Environmental Services of Vancouver.

Wetland and lake samples were analyzed for the same variables (nutrients, total metals, cyanides, TOC, particle size) as done for stream sediment samples (Table 2.1-2). Procedures for sample handling, transport and comparison of data to guidelines were identical to those described for stream samples (see Section 2.1.1.3).

2.1.2.5 Primary and Secondary Producers

Periphyton

Periphyton was sampled for biomass and taxonomy at each wetland site in 2006 (Figure 2.1-1). Procedures for sample handling, preservation, transport and analysis were identical to those described for stream periphyton samples (see Section 2.1.1.4). Samples were assessed for relative abundance and diversity (as genus richness and Shannon and Simpson diversity indices). No quantitative biomass or density data were calculated because a substrate (*i.e.*, rocks or logs) was not available for scraping, and community samples were collected by simply rinsing macrophytes at each site. Therefore, only qualitative taxonomic data are presented.

Phytoplankton

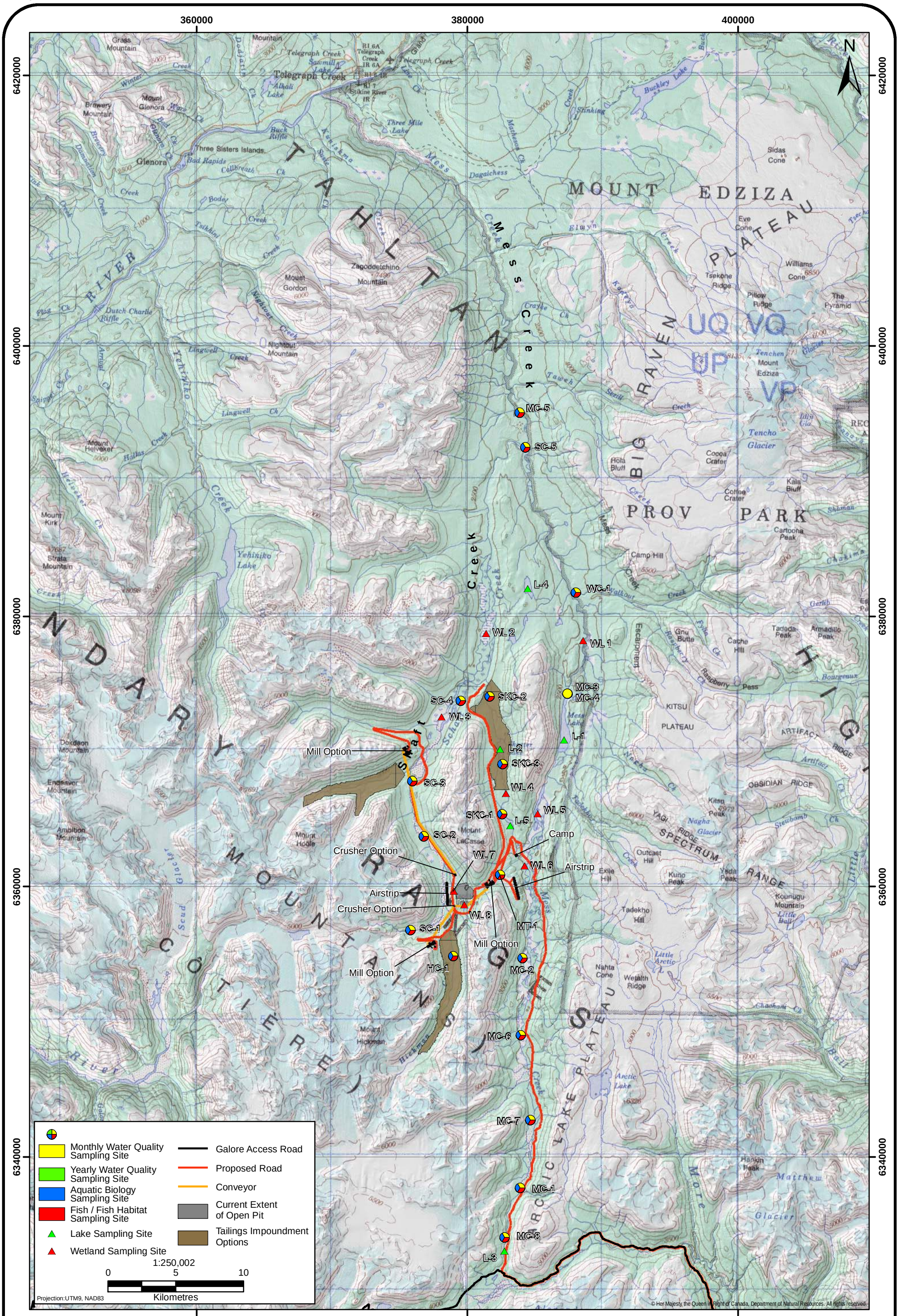
At five lakes communities were sampled for biomass (chlorophyll *a*) as well as taxonomic composition and enumeration in August, 2006 (Figure 2.1-1). A replicate consisting of a pair of 1 L pre-labeled plastic bottles were filled with surface water. Samples were collected by immersing the pre-labeled 1 L clear plastic sample bottles just below surface. One bottle from each replicate pair was used for determination of chlorophyll *a* biomass, and the other was used to determine taxonomic composition and enumeration.

The samples were kept cool and dark and transported back to camp. Known volumes of the 1 L samples for biomass determination were filtered onto 47 mm membrane filters using a hand pump and filter apparatus. The filters (with 0.45 µm pore size) were carefully folded in half, wrapped in aluminum foil, labeled with sampling information and frozen. Samples were kept frozen and transported to ALS Environmental Services in Vancouver for analyses.

Samples for taxonomic identification were preserved with Lugol's iodine solution, kept cool and dark and transported to Fraser Environmental Services of Surrey, B.C., for taxonomic identification and enumeration.

Benthic Invertebrates

Benthic macroinvertebrate communities were sampled at five lake and seven wetland sites concurrently with primary producer surveys (Figure 2.1-1). A sample replicate was collected with a standard Ekman grab at each zone within the site. Each replicate was composed of three grabs pooled together to form a composite sample. Each Ekman grab was brought to the surface



Aquatic Sampling Sites in the Schaft Creek Project Area, 2006

FIGURE 2.1-1

and contents were released into a 500 µm mesh sieve bucket. The bucket was one third submersed in the water while sieving and spinning continued until no silt clouds were produced in surrounding water. Residual contents containing benthos from three successful grabs were rinsed into a clean, pre-labeled 500 ml jar. Procedures for sample handling, preservation, transport and analysis were identical to those described for receiving environment stream samples (see Section 2.1.1.4).

Zooplankton

Zooplankton communities were sampled for taxonomic composition and enumeration only at the five lake sites (Figure 2.1-1). As with other sampling, three separate zones were identified to provide three composite replicates per site. Each replicate sample was made up of the contents of three separate zooplankton hauls using a 0.3 m diameter (118 µm mesh) net. For each haul, the net was lowered to a known depth using a metered cable line. The net was then raised to the surface at a constant speed of approximately 0.5 m/s. Each time the net was brought to the surface, the contents of the cod end were transferred into the same pre-labelled, clean, 500 ml wide mouth plastic jar. Buffered formalin was added to a final concentration of 5% by volume. Sample jars were closed, agitated gently, and kept cool and dark during storage and transport to Applied Technical Services of Victoria, B.C., for taxonomic identification and enumeration. Data were analyzed for density, relative abundance, genus richness, and diversity. Zooplankton densities were normalized to number of organisms/m^3 by calculating the volume of water the zooplankton net screened.

2.1.3 Data Analysis

The number of organisms per sample was converted to density (organisms/m^2 for benthos and cells/cm^2 for periphyton) by dividing the each sample by the area sampled and calculating the mean of all replicates. All graphically represented data and the calculation of means and standard errors were produced using SigmaPlot software (SYSTAT 2006). Means and standard errors were graphically represented Generic richness and diversity (Shannon-Weiner and Simpson's diversity indices) were calculated using COMM statistics software (Piepenburg and Piatkowski, 1992). Richness is defined as the number of separate genera present in a sample. In assessing genus richness multiple species of the same genus were pooled together. For sites where the only data available occurred at a higher taxonomic level (*e.g.* Family or Order), a single genus was considered to be present in the sample. 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 Index 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.

Simpson's Index ranges from 0 (no diversity) to 1 (maximum diversity). The use of both Shannon-Wiener and Simpson's diversity indices takes into account dominance, the number of species, and relative degree of distribution of each species (evenness).

2.1.4 Quality Assurance and Quality Control

For wetland and lake water samples, the same QA/QC measures used for stream water sampling were applied, including 20% replication of samples, and the use of field and travel blanks to monitor for contamination during sampling and transport (see Section 2.1.1.2). Triplicate phytoplankton or periphyton samples were collected at each lake station, and three replicates (composites) were taken for sediment, zooplankton and benthos sampling. Additionally, at 20% of the wetland and lake, one sediment replicate sample was split for QA/QC purposes to ensure that sample homogenization was thorough. The Relative Percent Difference (RPD) statistic was used to assess the degree of homogenization.

Although analyses the lowest analytical detection limit was always

3. RESULTS AND DISCUSSION

3. Results and Discussion

3.1 Aquatic Resources

3.1.1 Receiving Environment Streams

3.1.1.1 Water Quality

General Variables and Nutrients

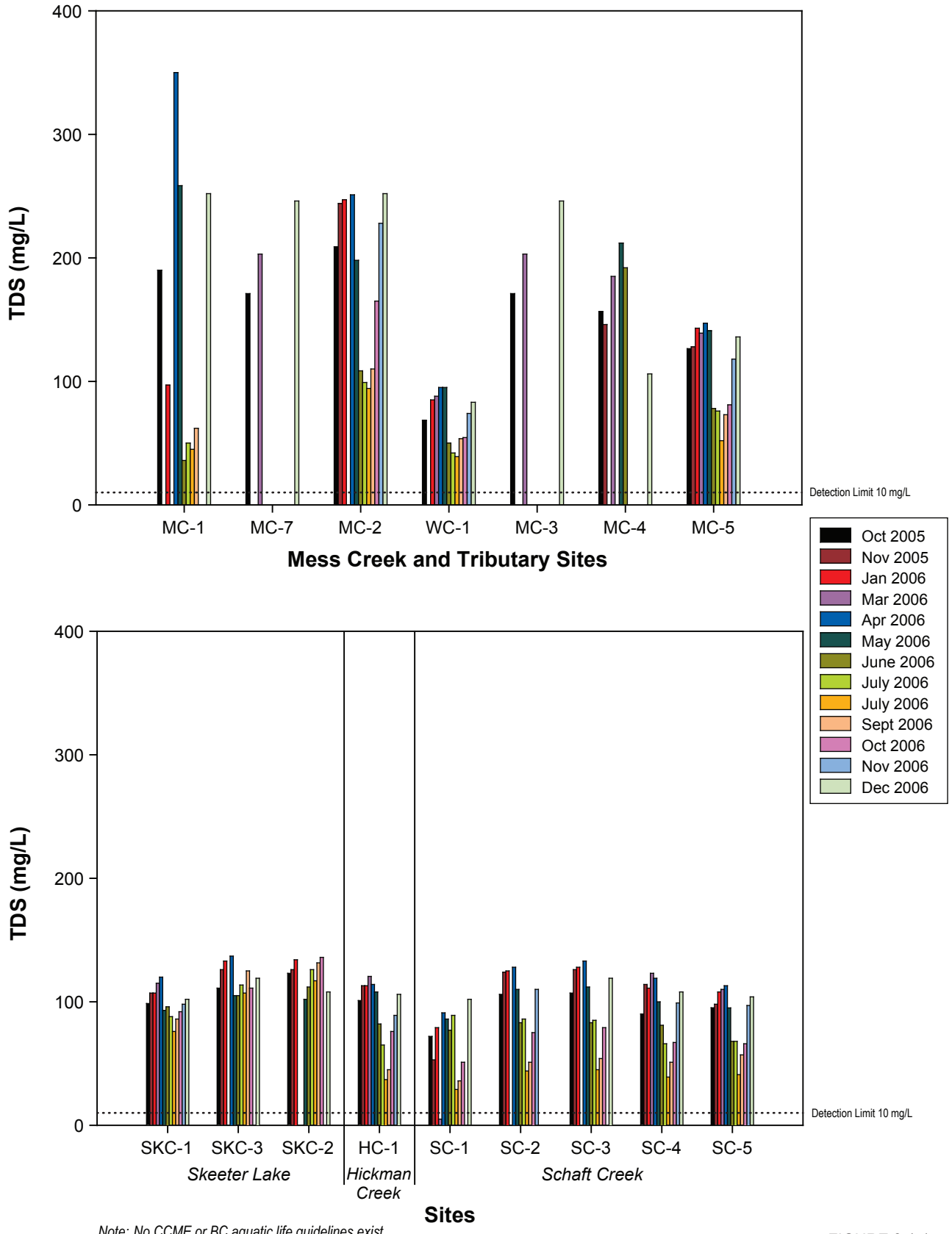
All raw data for receiving environment stream water quality are provided in Appendix 3.1-1. Key variables (total dissolved solids, hardness, pH, total suspended solids, turbidity, sulphate, nitrate, ammonia, total nitrogen and total phosphate) are presented graphically and discussed below. Within each figure, sites are shown from upstream to downstream, and are grouped by watersheds. If available, CCME and B.C. guidelines are indicated. When the 2006 Workplan was completed, it was determined that the Hickman Creek site (HC-1), SC-1 within Schaft Creek and WC-1 (a tributary to Mess Creek) are upstream from the potential mine and road activities and were considered reference stream sites for monitoring potentially adverse effects.

Total dissolved solids (TDS) showed highest values within the Mess Creek Watershed with most sites having concentrations greater than 150 mg/L, while other sites (including HC-1) had TDS values below 150 mg/L (Figure 3.1-1). TDS ranged from below the detection limit (SC-1, March 2006) to 350 mg/L (MC-1, April 2006). TDS concentrations often began decreasing during May, most likely as a result of melt water diluting the stream and reducing TDS values. There are no guidelines for TDS.

Similar to TDS, water hardness was generally higher within the Mess Creek Watershed than at other sites (Figure 3.1-2). Throughout the sampling season the lowest hardness values were found at the reference sites SC-1 and WC-1 and the highest values were found in the upstream Mess Creek sites (MC-1, MC-7 and MC-2). Hardness concentrations typically started to decrease in May and June and increase again in late fall and winter, relating to freshet snowmelt diluting dissolved ions. There are no guidelines for water hardness.

Streams within the Schaft Creek project area had similar pH values which ranged from 6.65 to 8.31 (Figures 3.1-3). Clear seasonal patterns were not obvious in these streams. All samples were within the CCME and B.C. guidelines for the protection of aquatic life (6.5 to 9.0).

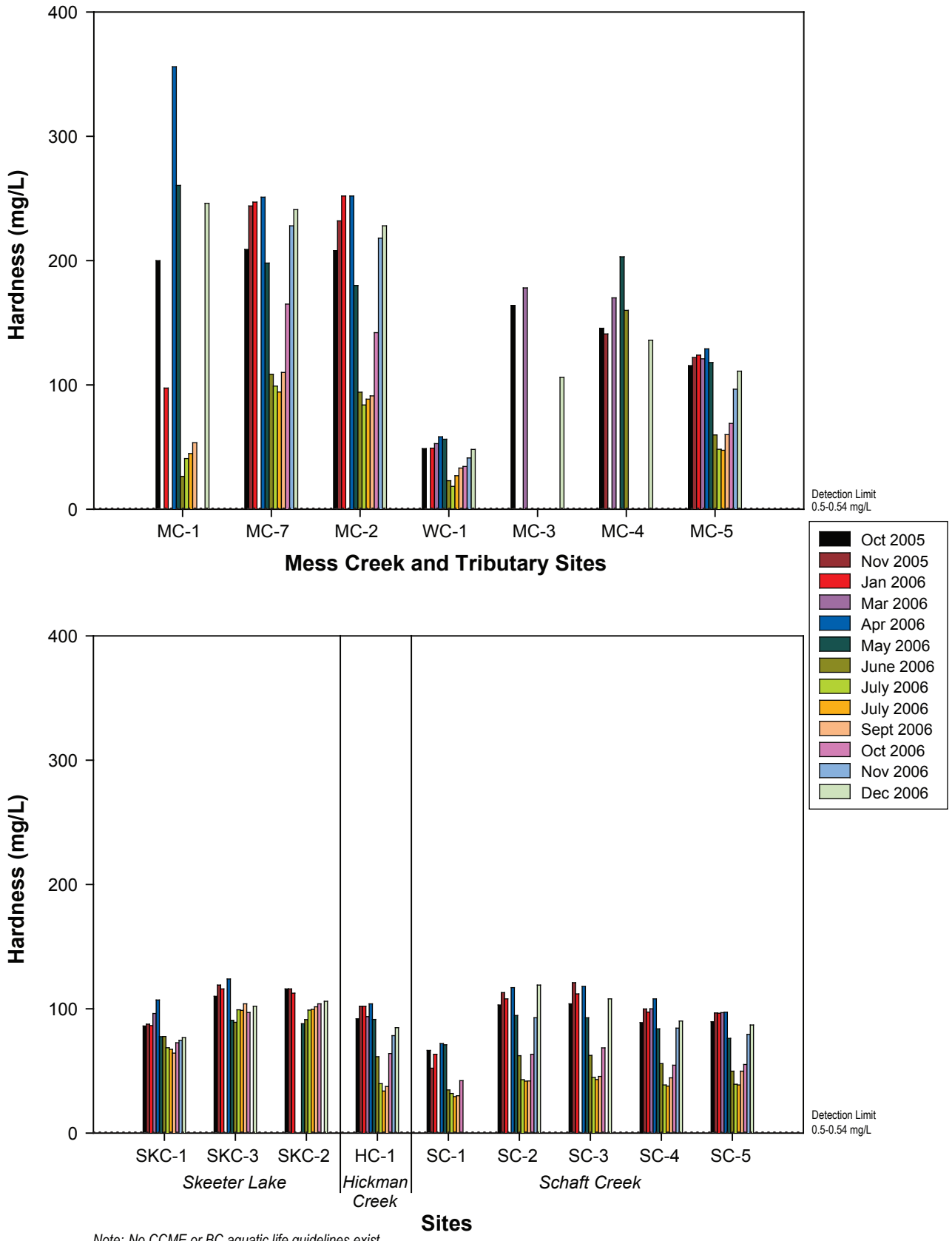
At sites where total suspended solids (TSS) were detected, values started increasing after freshet (June and July) and were often highest in late July and September (Figures 3.1-4). Schaft Creek sites (SC-1 to SC-5) were generally higher than other watersheds with SC-1 (September 2006) more than three times higher than other sites. Guidelines for TSS are based on changes from background values, therefore they are not currently applicable.



Note: No CCME or BC aquatic life guidelines exist.
Dotted line denotes analytical detection limit.

FIGURE 3.1-1

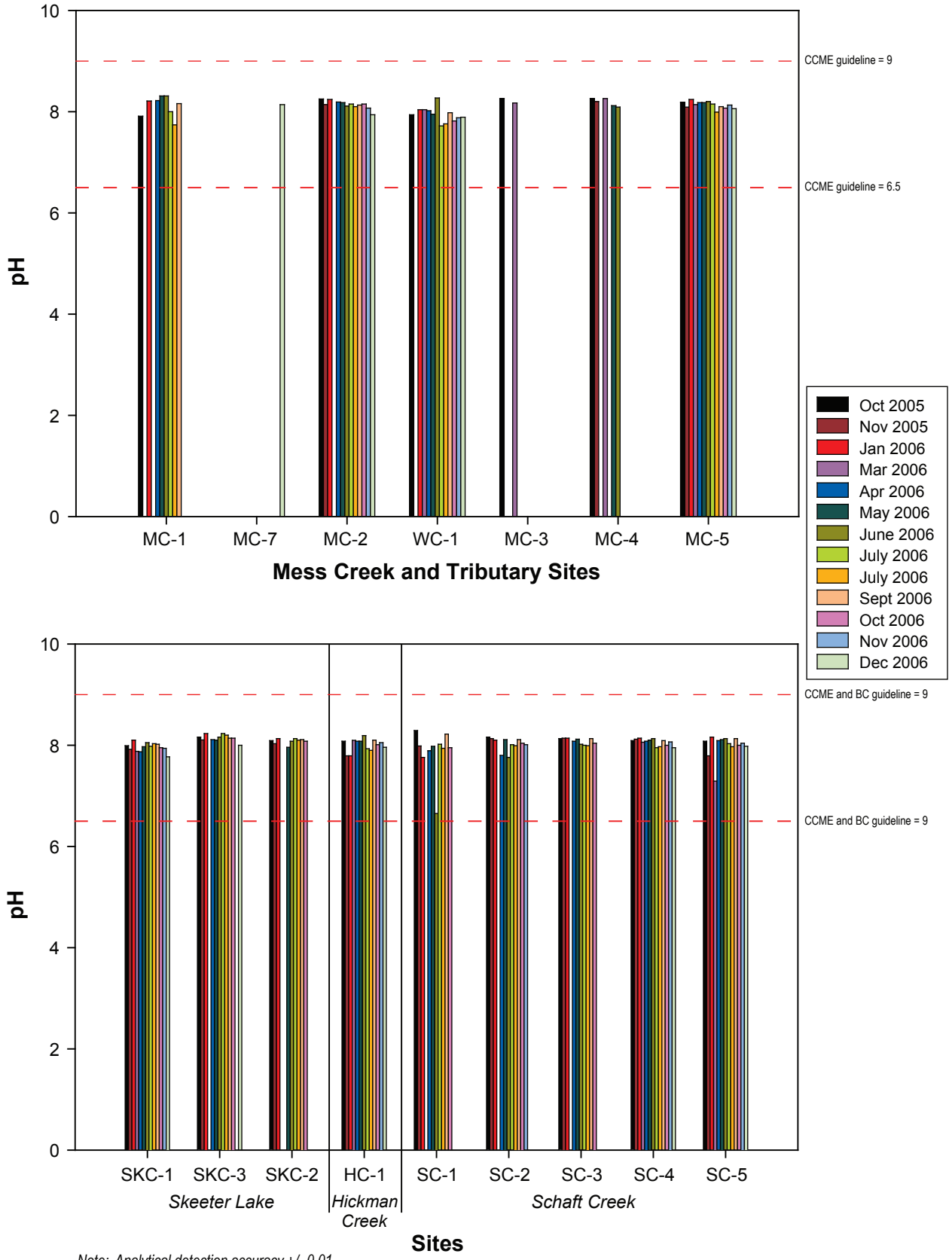
Total Dissolved Solids (TDS) Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: No CCME or BC aquatic life guidelines exist.
Dotted line denotes analytical detection limit.

FIGURE 3.1-2

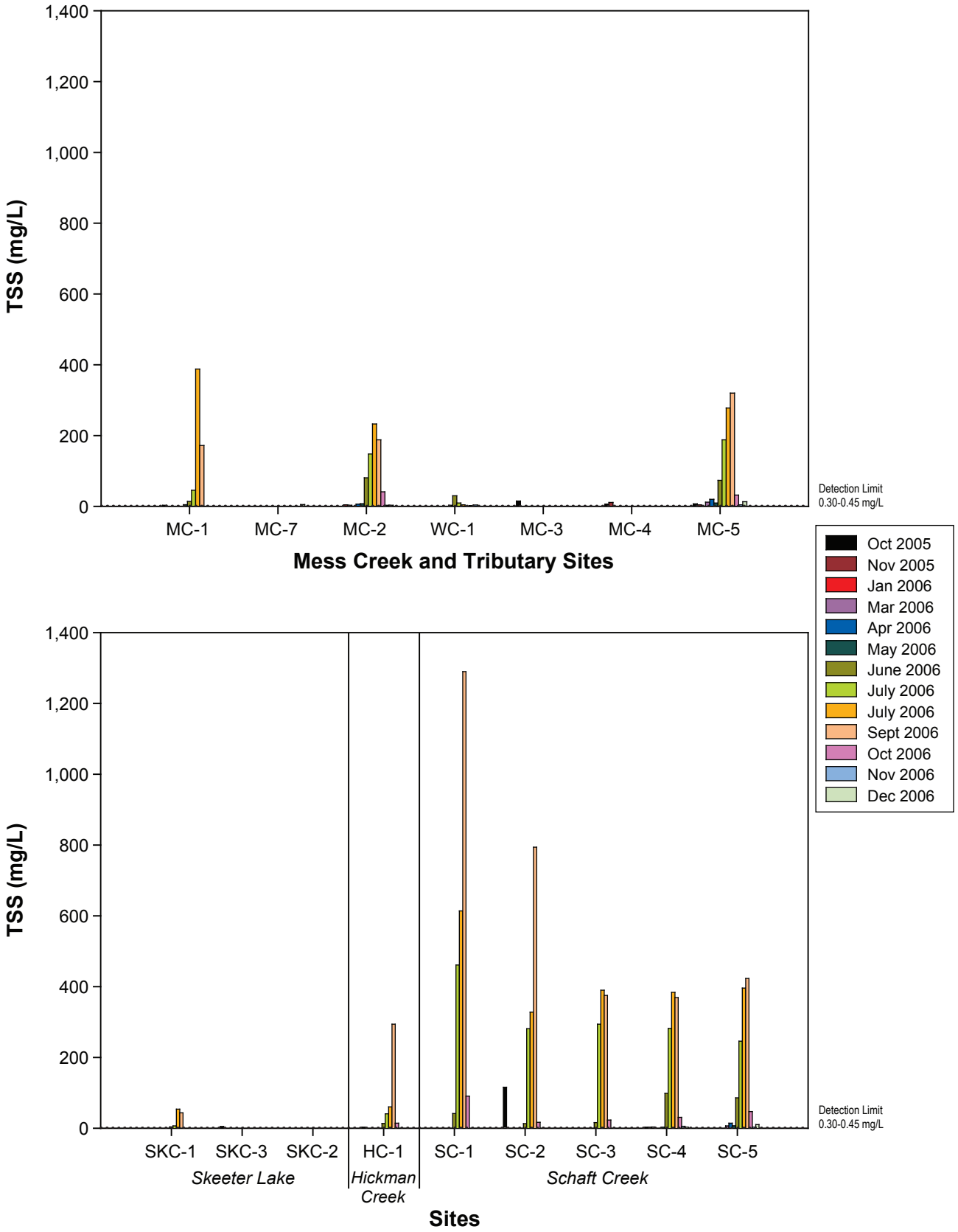
Hardness Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: Analytical detection accuracy +/- 0.01
Red dashed line indicates guideline value, where available.
CCME and BC 30-d Mean guidelines 6.5 to 9.0

FIGURE 3.1-3

pH values in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: BC guidelines depend on background; CCME guideline is 25 mg/l above background
Dotted line represents analytical detection limit.

FIGURE 3.1-4

Total Suspended Solids (TSS) Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006

Turbidity mirrored TSS patterns both spatially and temporally with concentrations peaking in September and the highest value, almost double the concentrations found at other sites, seen at SC-1 (Figure 3.1-5). Turbidity ranged from below detection levels at several sites (MC-7, SKC-2 and SKC-3) to 770 NTU at SC-1. Most sites showed turbidity levels below 400 NTU. Guidelines for turbidity are based on changes from background, therefore they are not currently applicable.

Sulphate concentrations ranged from below detection (March 2006) at SC-1 to 75.7 mg/L (April 2006) at MC-1 all sites (Figures 3.1-6). Freshet was again related to lower concentrations in June and July. In both Schaft Creek and Mess Creek sites sulphate concentrations tended to decrease as one moved downstream. There is no CCME WQ guideline for sulphate. The BC Max guideline (100 mg/L) was not exceeded at any site.

Nitrate concentrations ranged from below detection (WC-1 and HC-1) to 0.23 mg/L at SKC-3 (Figures 3.1-7). Nitrate concentrations were below 0.15 mg/L at all sites except SKC-3. No samples had nitrate concentrations exceeding either CCME (2.93 mg/L), BC Max (200 mg/L), or BC 30-d Mean (40mg/L) guidelines.

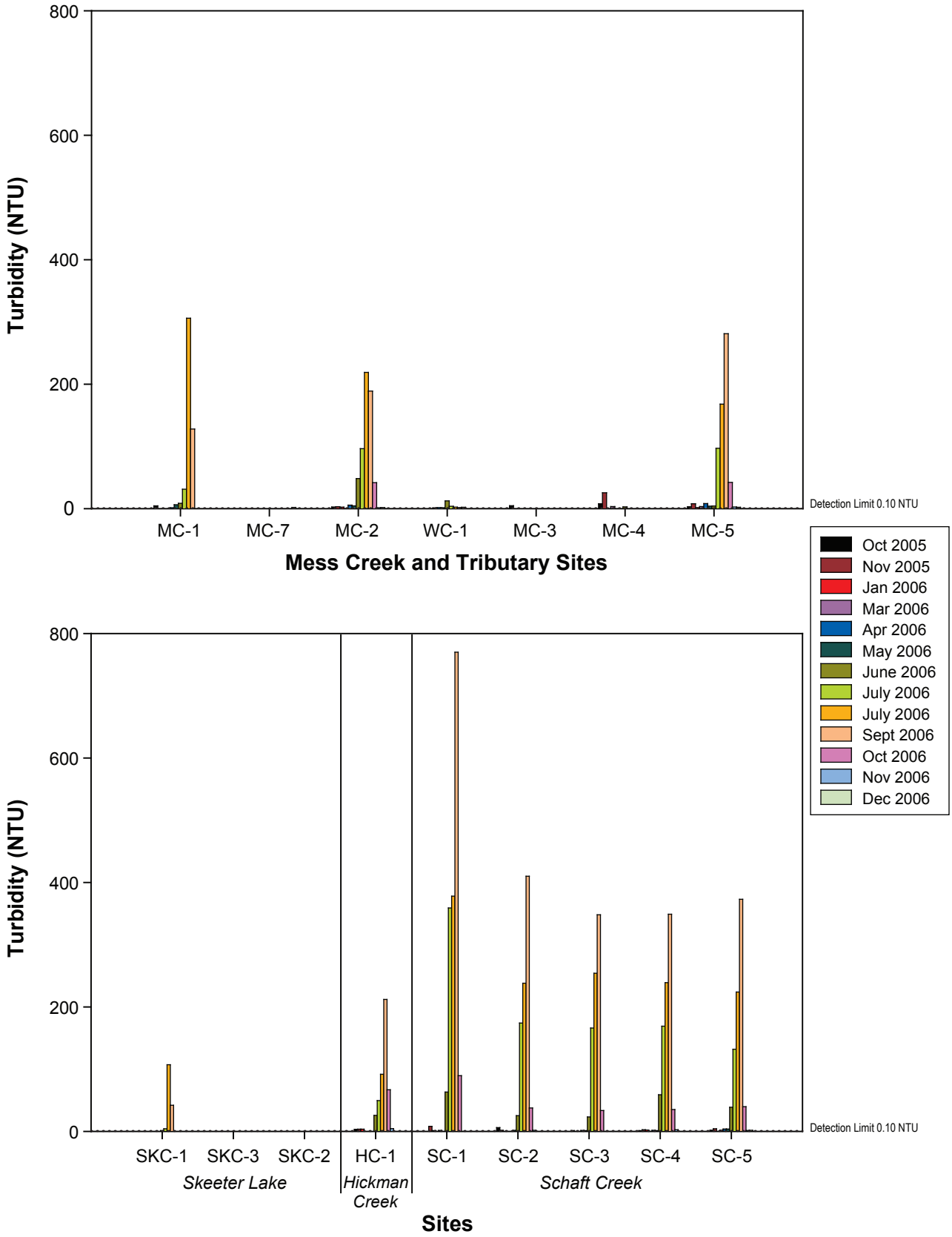
Total ammonia concentrations were often below detection limits (0.005 mg/L), with most samples showing concentrations less than 0.02 mg/L (Figure 3.1-8). Only MC-1, SKC-3 and SC-2 had samples greater than 0.02 mg/L. The highest concentration was found at SKC-3 (0.05 mg/L). The CCME guideline for total ammonia with a water pH of 8.0 and temperature between 5 and 10^{o}C (average field values), is 1.04 to 1.54 mg/L. The BC Max guideline for total ammonia with pH 8.0 and temperature 2 to 12^{o}C is between 3.69 and 8.98 mg/L. The 30-d Mean guideline for total ammonia with pH 8.0 and temperature between 2 and 12^{o}C is between 0.71 and 1.73 mg/L. Therefore, all samples were well below the BC or CCME guidelines for total ammonia.

Most total nitrogen (TN) concentrations were below 0.4 mg/L (Figure 3.1-9). TN ranged from below detection limit at several sites to 0.95 mg/L at SKC-1 (March 2006). SC-5 also had a relatively high TN concentration occurring in March (0.91 mg/L). There are no guidelines for TN.

Total phosphate concentrations ranged from below the detection limit of 0.002 mg/L to 1.13 mg/L in July at SC-1 (Figures 3.1-10). At most sites, concentrations dramatically peaked in July or September relative to other months. Schaft Creek sites had greater total phosphate concentrations compared to Mess Creek sites. There are no guidelines for phosphate in streams and rivers.

Total and Dissolved Metals

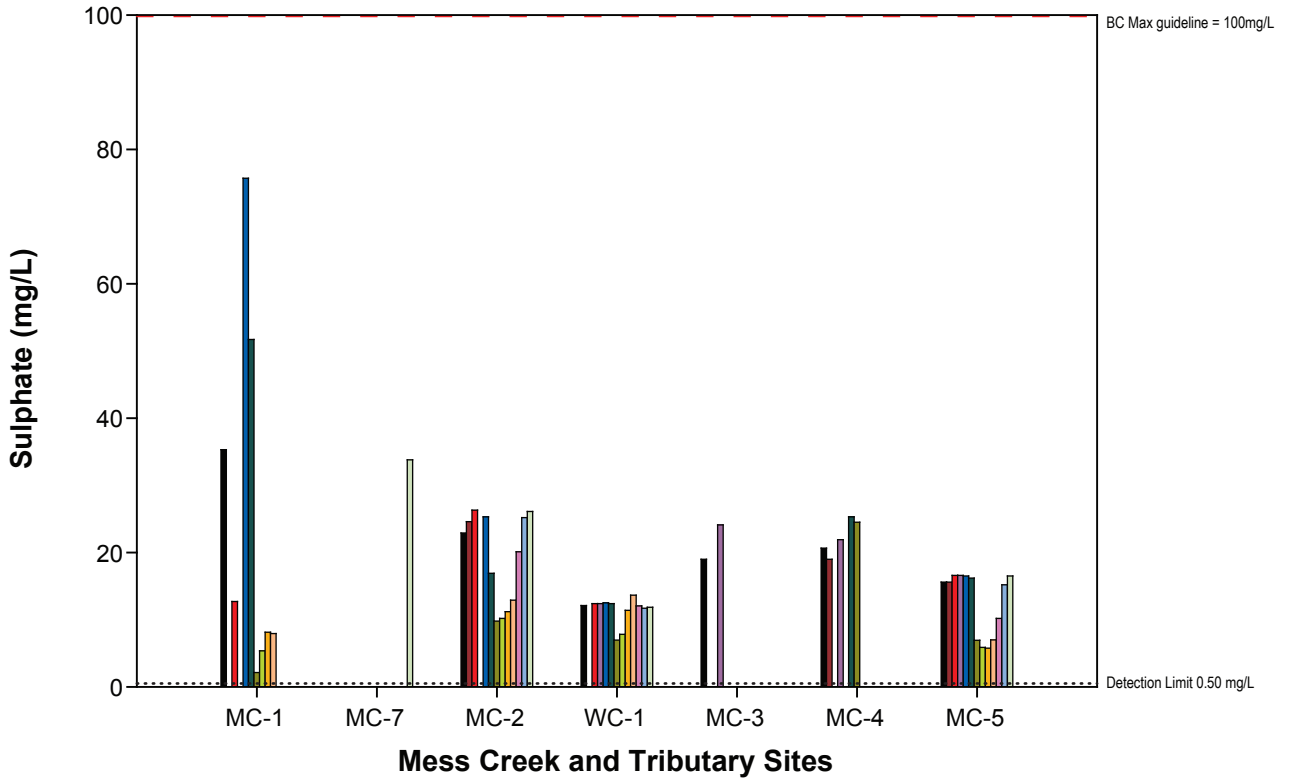
All raw data for receiving environment stream water quality are provided in Appendix 3.1-1. Key variables (aluminium, arsenic, cadmium, copper, iron, manganese, molybdenum, nickel, selenium and zinc) are presented graphically and discussed below. Within each figure sites are shown from upstream to downstream, and are grouped by watersheds. CCME and B.C. guidelines for total metals were used to screen both total and dissolved metal concentrations, except for dissolved aluminium which has specific B.C. guidelines. Total metals data were also summarized (mean, minimum, maximum) by variable for each site in Table 3.1-1. This summary table also indicates mean values that exceed CCME and B.C. guidelines (mean hardness and pH values for each site were used when required).

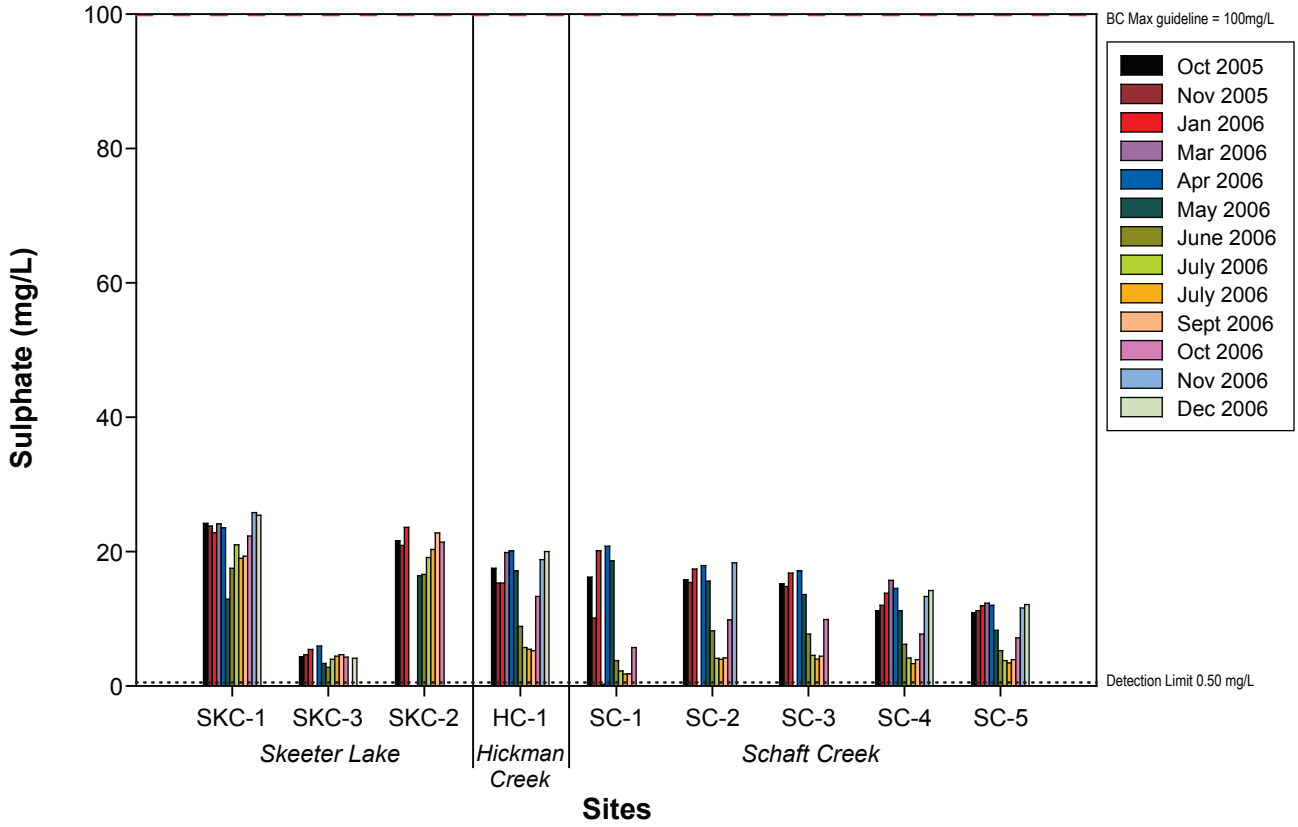


Note: CCME or BC guidelines depend on background and max 10% increase when turbidity exceeds 80 NTU
Dotted line represents analytical detection limit.

FIGURE 3.1-5

Turbidity Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006

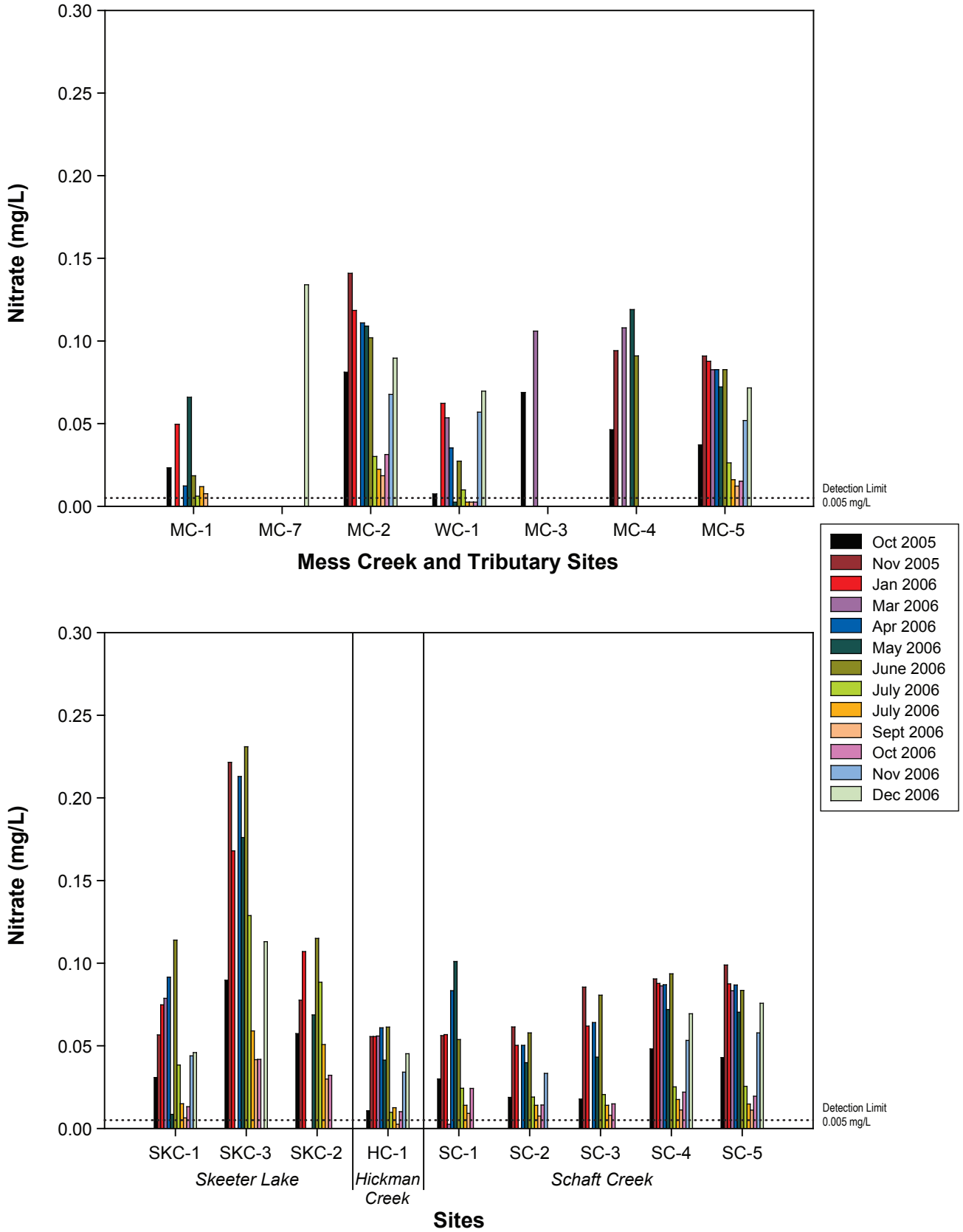




Note: No CCME aquatic life guidelines exist.
Dotted line represents analytical detection limit.
Red dashed line indicates BC MAX guideline 100 mg/L

FIGURE 3.1-6

Sulphate Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME = 2.93mg/L; BC Max = 200mg/L; BC 30-d = 40mg/L
Dotted line represents analytical detection limit.

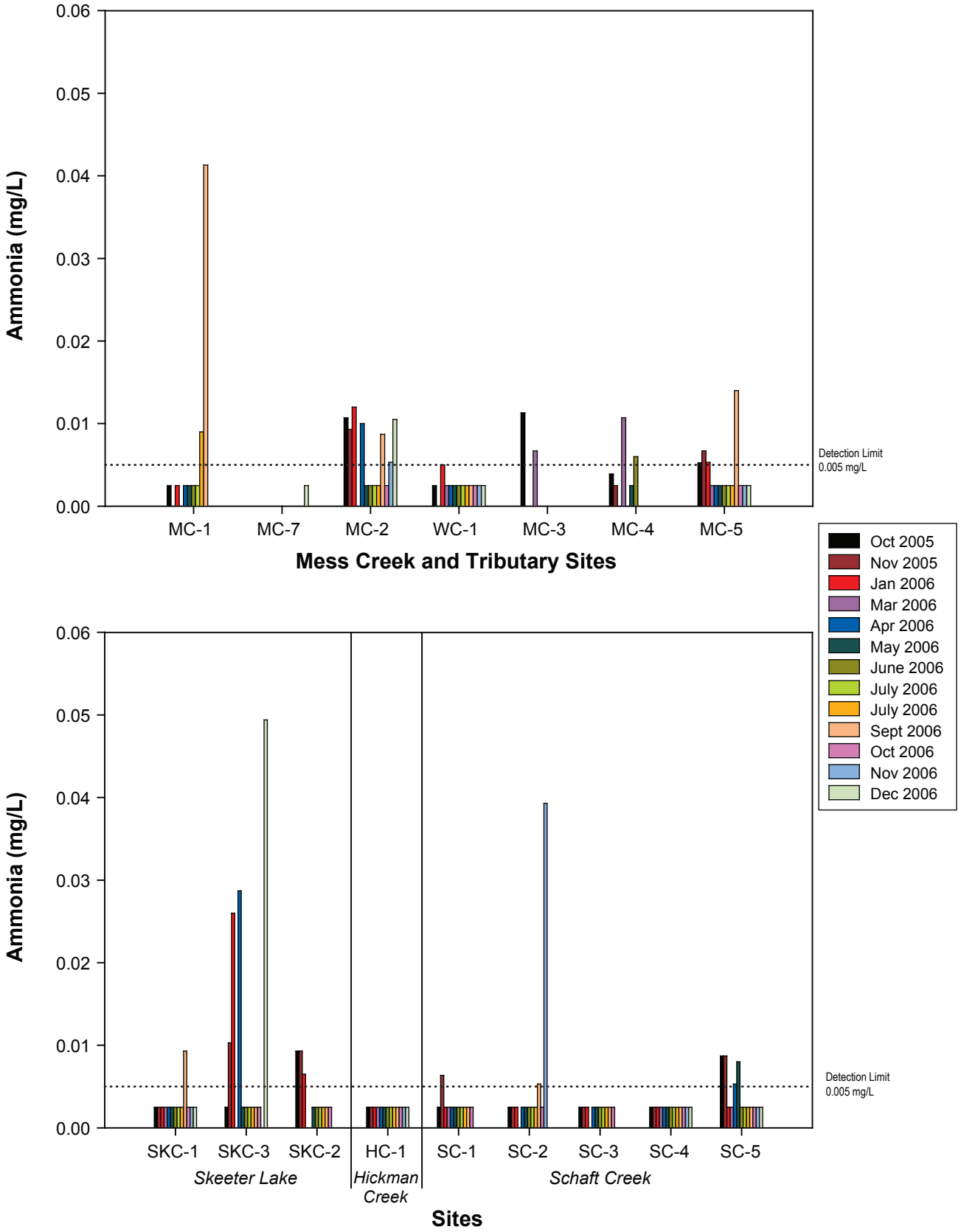
FIGURE 3.1-7

Nitrate Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006

copper FOX metals inc.

Rescan™

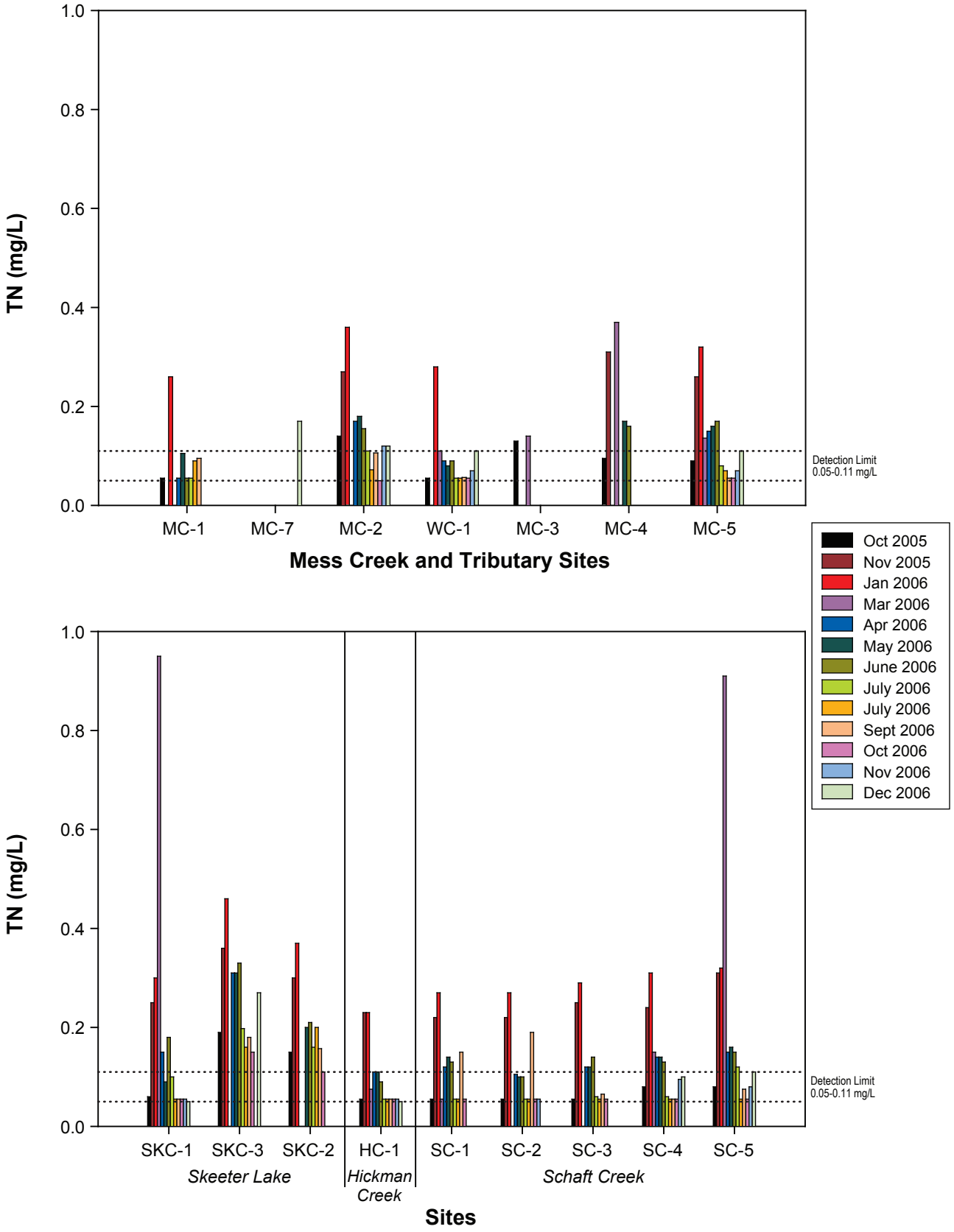
RTEC



Note: CCME and BC guidelines depend on pH and temperature
Dotted line represents analytical detection limit.

FIGURE 3.1-8

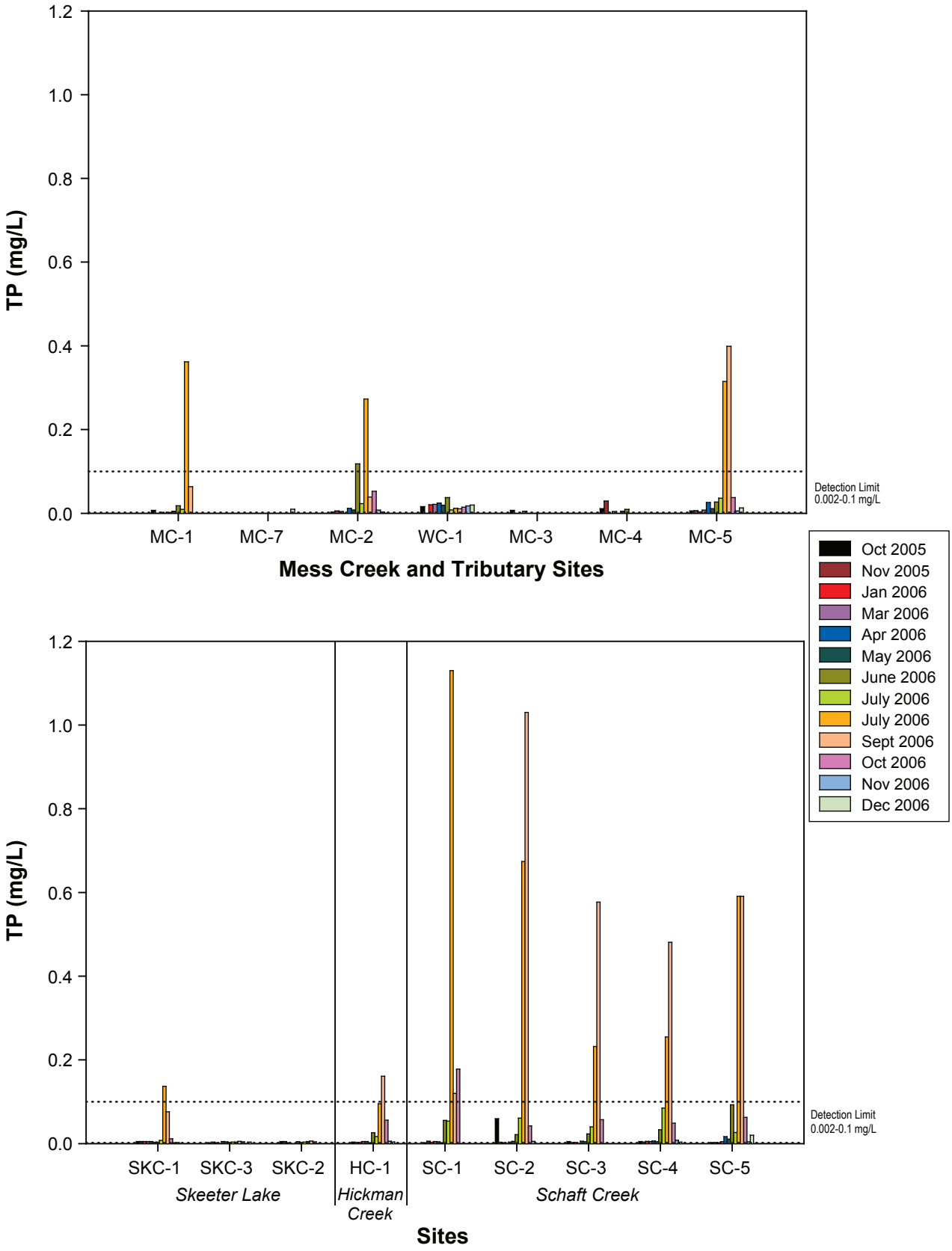
Ammonia Concentrations in Schaft Creek
Project Receiving Environment Streams, 2005/2006



Note: No CCME or BC aquatic life guidelines exist.
Dotted line represents analytical detection limit.

FIGURE 3.1-9

Total Nitrogen Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: No CCME or BC aquatic life guidelines exist.
Dotted line represents analytical detection limit.

FIGURE 3.1-10

Total Phosphate Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006

Table 3.1-1
Total Metal Summary Indicating Mean Concentrations that Exceed Guidelines

	MC-1 n=8			MC-2 n=12			MC-3 n=2			MC-4 n=5			MC-5 n=13		
Variable	**mean**	**min**	**max**	**mean**	**min**	**max**	**mean**	**min**	**max**	**mean**	**min**	**max**	**mean**	**min**	**max**
Aluminum	**1.87**	0.01	10.20	**1.16**	0.01	5.97	0.04	0.02	0.07	**0.21**	0.01	0.89	**1.59**	0.03	8.66
Arsenic	0.00249	0.00005	0.01190	0.00295	0.00047	0.01150	0.00099	0.00058	0.00139	0.00112	0.00062	0.00195	0.00114	0.00034	0.00341
Cadmium	0.000023	0.000010	0.000082	0.000041	0.000010	0.000261	0.000018	0.000010	0.000025	0.000012	0.000010	0.000018	0.000028	0.000010	0.000073
Copper	**0.004**	0.000	0.013	**0.004**	0.000	0.014	0.001	0.000	0.001	0.001	0.000	0.003	**0.005**	0.001	0.027
Iron	**2.291**	0.015	10.800	**1.971**	0.101	6.300	0.289	0.042	0.535	**0.323**	0.047	0.892	**1.742**	0.108	9.050
Manganese	0.076	0.001	0.352	0.118	0.064	0.247	0.039	0.026	0.051	0.036	0.026	0.046	0.089	0.026	0.333
Molybdenum	0.00071	0.00014	0.00121	0.00106	0.00041	0.00190	0.00118	0.00102	0.00133	0.00118	0.00083	0.00137	0.00235	0.00116	0.00335
Nickel	0.00704	0.00025	0.02730	0.00669	0.00286	0.01535	0.00161	0.00144	0.00178	0.00182	0.00121	0.00320	0.00245	0.00003	0.00836
Selenium	0.00057	0.00025	0.00173	0.00058	0.00003	0.00190	0.00038	0.00025	0.00050	0.00060	0.00025	0.00090	0.00033	0.00003	0.00066
Zinc	0.0044	0.0005	0.0195	0.0057	0.0005	0.0306	0.0012	0.0005	0.0018	0.0008	0.0005	0.0014	0.0149	0.0005	0.1340

	MC-7 n=1			HC-1 n=13			SC-1 n=11			SC-2 n=11			BC guidelines		CCME
Variable	**mean**	**min**	**max**	**mean**	**min**	**max**	**mean**	**min**	**max**	**mean**	**min**	**max**	**max**	**30-d mean**	**guideline**
Aluminum	0.01	0.01	0.01	**0.92**	0.02	5.03	**4.72**	0.00	23.00	**2.95**	0.02	15.60			**0.1A**
Arsenic	0.00061	0.00061	0.00061	0.00172	0.00118	0.00391	0.00156	0.00005	0.00689	0.00177	0.00057	0.00667	0.005B		**0.005**
Cadmium	0.000010	0.000010	0.000010	0.000019	0.000010	0.000066	0.000039	0.000010	0.000132	0.000034	0.000010	0.000130	A,B		**A**
Copper	0.000	0.000	0.000	**0.093**	0.001	0.129	**0.017**	0.000	0.083	**0.012**	0.001	0.059	C	C	**A**
Iron	0.290	0.290	0.290	**1.031**	0.015	6.650	**4.712**	0.015	24.300	**3.225**	0.067	18.900	0.3B		**0.3**
Manganese	0.031	0.031	0.031	0.033	0.001	0.197	0.190	0.000	0.931	0.139	0.015	0.693	D	D	
Molybdenum	0.00043	0.00043	0.00043	0.00060	0.00025	0.00080	0.00557	0.00003	0.01260	0.00610	0.00112	0.01200	2	1	**0.073**
Nickel	0.00075	0.00075	0.00075	0.00304	0.00003	0.02080	0.00304	0.00025	0.01460	0.00350	0.00025	0.01950	A,B		**A**
Selenium	0.00062	0.00062	0.00062	0.00032	0.00003	0.00061	0.00080	0.00025	0.00551	0.00069	0.00025	0.00389		0.002	**0.001**
Zinc	0.0005	0.0005	0.0005	0.0031	0.0005	0.0180	0.0128	0.0005	0.0637	0.0096	0.0005	0.0445	E	E	**0.03**

Results are expressed as milligrams per litre.

(continued)

Outline - BC Max; Grey - BC 30-d; Bold - CCME indicates guidelines exceeded

A: depends on background, CCME guideline:

for aluminum: pH>6.5

for cadium guideline = 0.001 *10{0.86[log(hardness)] - 3.2} mg/L

for copper: CCME = 0.002 mg/L at 0-120 mg/L [CaCO3], 0.003mg/L at 120 - 180 mg/L [CaCO3], 0.004 mg/L at >180 mg/L [CaCO3]

B: Working BC guideline

C: Max. Cu guideline of (0.094(hardness)+2) µg/L. The 30-d mean Cu guideline is≤2 µg/Lfor hardness ≤ 50 mg/L, and guideline is ≤ 0.04*(mean hardness) µg/L for hardness > 50mg/L.

D: BC Max Mn guideline 0.01102(hardness)+0.54 mg/L; 30-day mean Mn guideline 0.0044(mean hardness)+0.605 mg/L.

E: Max Zn guideline = [33 + 0.75*(hardness - 90)] ug/L, minimum of 33 ug/L. 30-day mean Zn guideline = [7.5 + 0.75*(hardness - 90)] ug/L, min of 7.5 ug/L

Table 3.1-1
Total Metal Summary Indicating Mean Concentrations that Exceed Guidelines (completed)

	SC-3 n=10			SC-4 n=13			SC-5 n=13			SKC-1 n=13			SKC-2 n=9		
Variable	**mean**	**min**	**max**	**mean**	**min**	**max**	**mean**	**min**	**max**	**mean**	**min**	**max**	**mean**	**min**	**max**
Aluminum	**2.55**	0.02	10.40	**2.23**	0.02	12.10	**1.91**	0.02	11.80	**0.38**	0.00	2.36	0.01	0.00	0.02
Arsenic	0.00156	0.00052	0.00376	0.00127	0.00040	0.00424	0.00103	0.00029	0.00350	0.00103	0.00016	0.00519	0.00030	0.00024	0.00039
Cadmium	0.000033	0.000010	0.000078	0.000035	0.000010	0.000085	0.000023	0.000010	0.000079	0.000032	0.000010	0.000184	0.000012	0.000010	0.000025
Copper	**0.011**	0.001	0.041	**0.009**	0.001	0.046	**0.007**	0.001	0.036	**0.003**	0.000	0.014	0.001	0.000	0.001
Iron	**2.679**	0.052	11.100	**2.222**	0.053	12.500	**2.106**	0.089	12.100	**0.797**	0.015	5.600	0.099	0.047	0.212
Manganese	0.124	0.032	0.400	0.096	0.016	0.450	0.109	0.046	0.419	0.037	0.004	0.212	0.015	0.007	0.029
Molybdenum	0.00575	0.00119	0.01110	0.00635	0.00170	0.00987	0.00380	0.00137	0.00546	0.00083	0.00057	0.00101	0.00070	0.00065	0.00076
Nickel	0.00478	0.00025	0.02380	0.00258	0.00003	0.01330	0.00218	0.00003	0.01150	0.00096	0.00003	0.00557	0.00051	0.00025	0.00088
Selenium	0.00066	0.00025	0.00409	0.00077	0.00003	0.00588	0.00077	0.00003	0.00565	0.00090	0.00025	0.00376	0.00087	0.00025	0.00313
Zinc	0.0092	0.0005	0.0272	0.0063	0.0005	0.0334	0.0054	0.0005	0.0320	0.0045	0.0005	0.0299	0.0005	0.0005	0.0009

	SKC-3 n=11			WC-1 n=12			BC guidelines		CCME
Variable	**mean**	**min**	**max**	**mean**	**min**	**max**	**max**	**30-d mean**	**guideline**
Aluminum	0.01	0.01	0.03	**0.19**	0.05	0.89			**0.1A**
Arsenic	0.00009	0.00005	0.00015	0.00018	0.00012	0.00042	0.005B		**0.005**
Cadmium	0.000011	0.000010	0.000025	0.000027	0.000010	0.000060	A,B		**A**
Copper	0.000	0.000	0.001	0.000	0.000	0.001	C	C	**A**
Iron	0.070	0.015	0.144	0.196	0.050	1.290	0.3B		**0.3**
Manganese	0.007	0.002	0.012	0.043	0.007	0.105	D	D	
Molybdenum	0.00040	0.00028	0.00052	0.00069	0.00029	0.00099	2	1	**0.073**
Nickel	0.00028	0.00003	0.00077	0.00034	0.00003	0.00140	A,B		**A**
Selenium	0.00050	0.00003	0.00232	0.00027	0.00003	0.00050		0.002	**0.001**
Zinc	0.0013	0.0005	0.0054	0.0048	0.0014	0.0132	E	E	**0.03**

Results are expressed as milligrams per litre.

Outline - BC Max; Grey - BC 30-d; Bold - CCME indicates guidelines exceeded

A: depends on background, CCME guideline:

for aluminum: pH>6.5

for cadium guideline = 0.001 *10{0.86[log(hardness)] - 3.2} mg/L

for copper: CCME = 0.002 mg/L at 0-120 mg/L [CaCO3], 0.003mg/L at 120 - 180 mg/L [CaCO3], 0.004 mg/L at >180 mg/L [CaCO3]

B: Working BC guideline

C: Max. Cu guideline of (0.094(hardness)+2) µg/L. The 30-d mean Cu guideline is≤2 µg/Lfor hardness ≤ 50 mg/L, and guideline is ≤ 0.04*(mean hardness) µg/L for hardness > 50mg/L.

D: BC Max Mn guideline 0.01102(hardness)+0.54 mg/L; 30-day mean Mn guideline 0.0044(mean hardness)+0.605 mg/L.

E: Max Zn guideline = [33 + 0.75*(hardness - 90)] ug/L, minimum of 33 ug/L. 30-day mean Zn guideline = [7.5 + 0.75*(hardness - 90)] ug/L, min of 7.5 ug/L

Total aluminium (T-Al) concentrations ranged from 0.01 (SC-1, January) to 23 mg/L (SC-1, September) (Figure 3.1-11). Concentrations of dissolved aluminium (D-Al) ranged from below the analytical detection limit (0.001-0.009 mg/L) to 0.62 mg/L (SC-1, September) (Figure 3.1-12). Most sites had their highest T-Al concentrations in late July and September. Schaft Creek sites are noticeably higher in T-Al than other sites with concentrations decreasing from the spike at SC-1 to gradually lower concentrations at downstream sites. The pattern of D-Al concentrations mirrored T-Al concentrations with Schaft Creek sites having the highest values. However, the highest D-Al concentrations occurred in early July rather than September indicating an increase in particulate bound aluminum later in the summer.

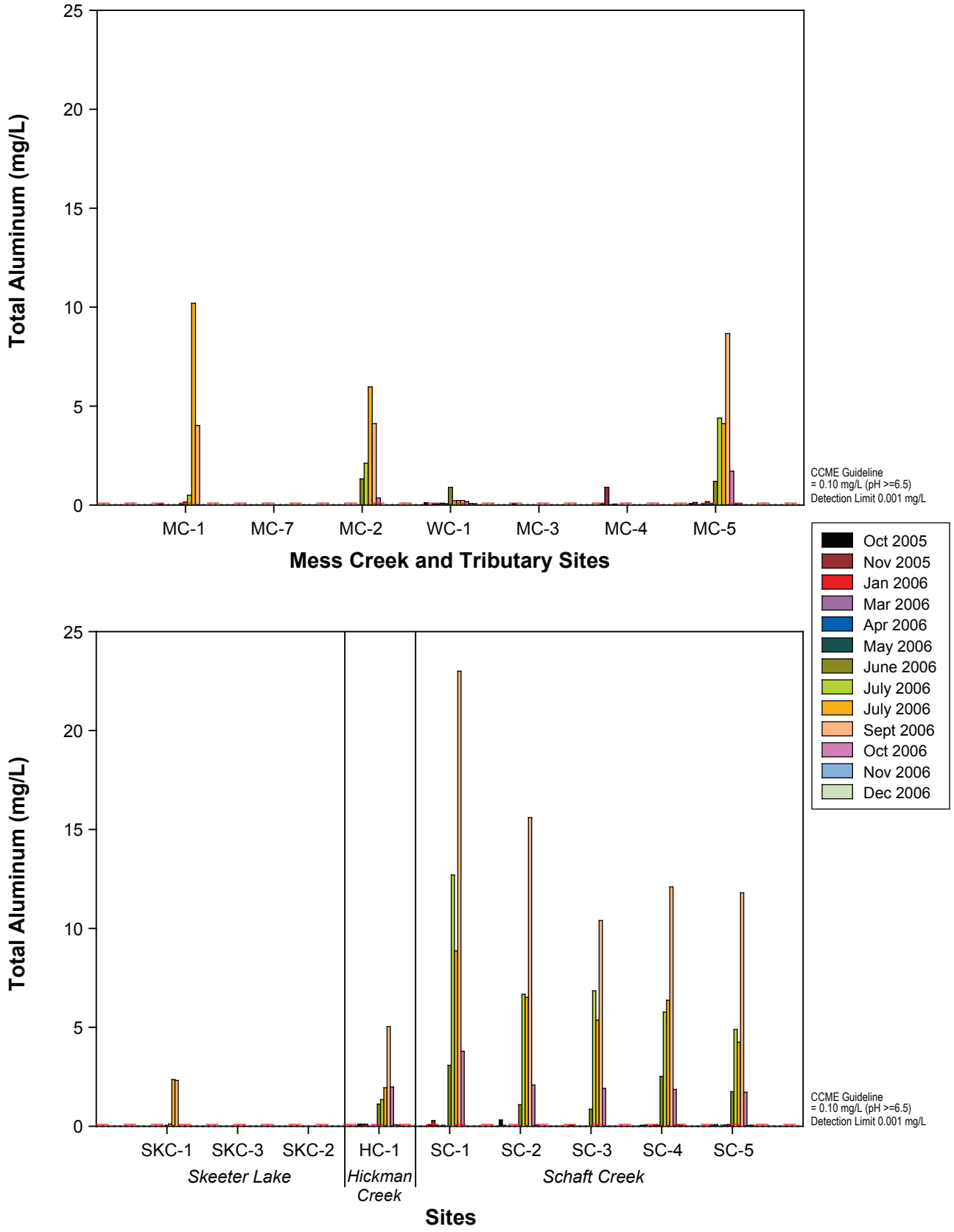
The CCME guideline for T-Al (0.1 mg/L for pH $\geq$ 6.5) was exceeded at most sites (except MC-7, MC-3, SKC-2 and SKC-3) primarily from June to September. No B.C. guideline exists for T-Al. D-Al also exceeded guidelines (BC 30-d mean and Max) at several sites, with the exceptions of MC-7, MC-3, MC-4, SKC-2 and SKC-3. MC-2 and WC-1 only exceeded the BC 30-d mean guideline (0.05 mg/L), while the remaining sites exceeded this guideline and the BC Max guideline (0.1 mg/L). At many sites the BC Max guideline was only exceeded from July to September. No CCME guidelines exist for D-Al.

Concentrations of total arsenic (T-As) ranged from below the analytical detection limit (0.0001-0.0002 mg/L) to 0.012 mg/L (MC-1, late July) (Figure 3.1-13). Concentrations of dissolved arsenic (D-As) ranged from below the analytical detection limit (0.00010 mg/L) to 0.00154 mg/L (HC-1, early July) (Figure 3.1-14). HC-1 consistently had the highest D-As concentrations over the entire sampling period. MC-1, MC2, SKC-1, SC-1 and SC-2 exceeded the CCME or B.C. guideline (0.005 mg/L) for total arsenic. No sites exceeded the CCME or BC guideline for dissolved arsenic.

Many samples of total cadmium (T-Cd) and dissolved cadmium (D-Cd) were below their respective detection limits (Figure 3.1-15 and Figure 3.1-16). The highest concentration of T-Cd was 0.00026 mg/L at MC-1. Sites with T-Cd concentrations above detection limits occurred in July to September. D-Cd was above detection limits at MC-2, WC-1, SKC-1, SC-2, SC-3 and SC-4 with the highest concentration of 0.000053 mg/L at SKC-1. CCME and B.C. Max guidelines (both hardness dependent) for both T-Cd and D-Cd were not exceeded at any site.

Concentrations of total copper (T-Cu) ranged from below detection limits to 0.129 mg/L (HC-1, November 2005 and January 2006) (Figure 3.1-17). Concentrations of dissolved copper (D-Cu) ranged from below detection limits to 0.015 mg/L (SC-1, September) (Figure 3.1-18). HC-1 had the highest T-Cu concentrations over all months except September (SC-1). Total copper guidelines (CCME and BC Max and 30-d) were all exceeded at SC-1. SKC-1 exceeded the CCME guideline and HC-1, SC-2 and SC-3 exceeded the B.C. Max for T-Cu. All remaining sites except MC-7, WC-1, MC-3, MC-4, SKC-3 and SKC-2 exceeded the CCME guideline. No site exceeded D-Cu guidelines.

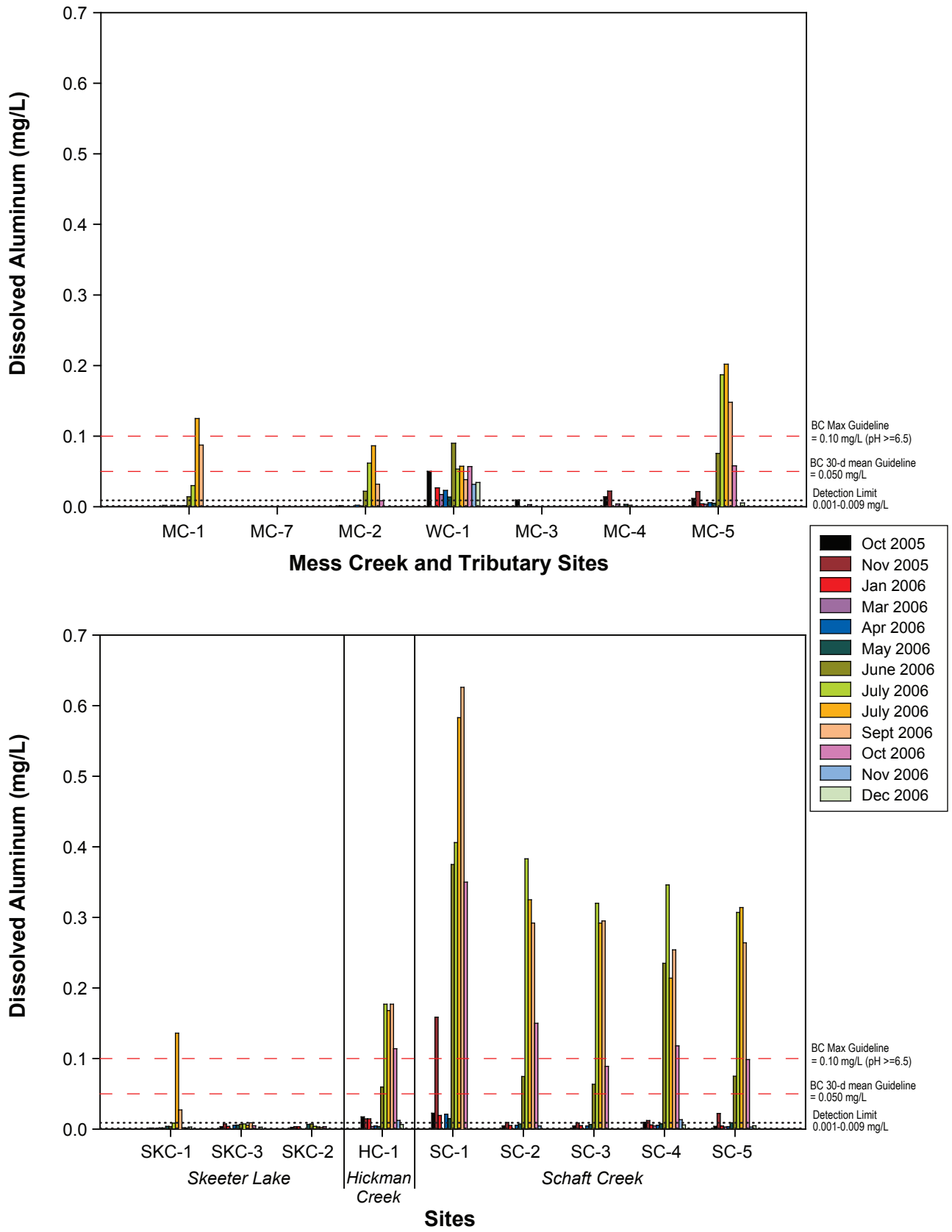
Concentrations of total iron (T-Fe) ranged from below detection limits to 24.3 mg/L (SC-1, September) (Figure 3.1-19). Concentrations of dissolved iron (D-Fe) ranged from below detection limits to 0.037 mg/L (SC-1, September) (Figure 3.1-20). As seen with several other



Note: No BC aquatic life guideline exist.
Dotted line represents analytical detection limit.
Red dashed line indicates guideline value, where available.

FIGURE 3.1-11

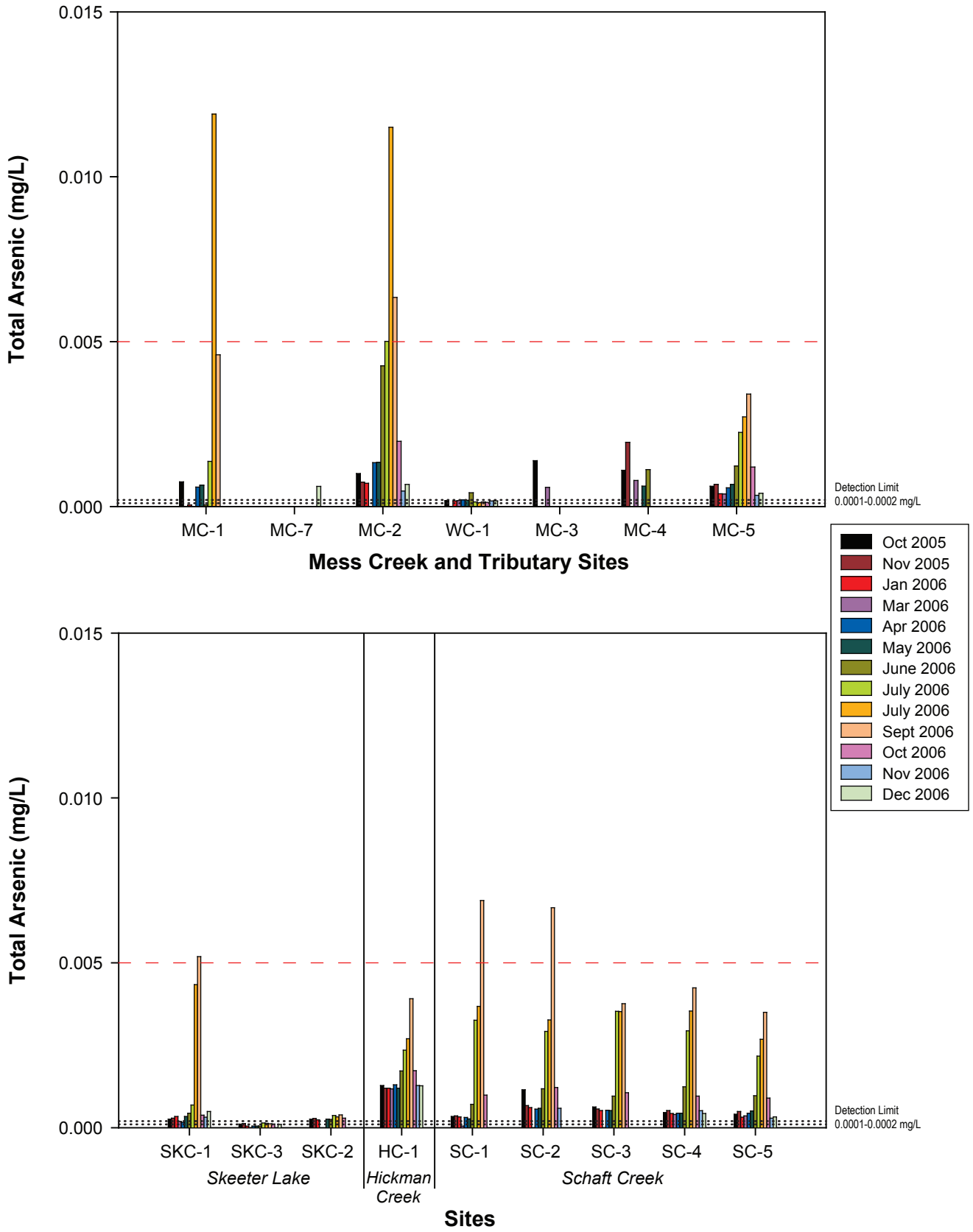
Total Aluminum Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: Dotted line represents analytical detection limit.
Red dashed line indicates guideline value, where available.

FIGURE 3.1-12

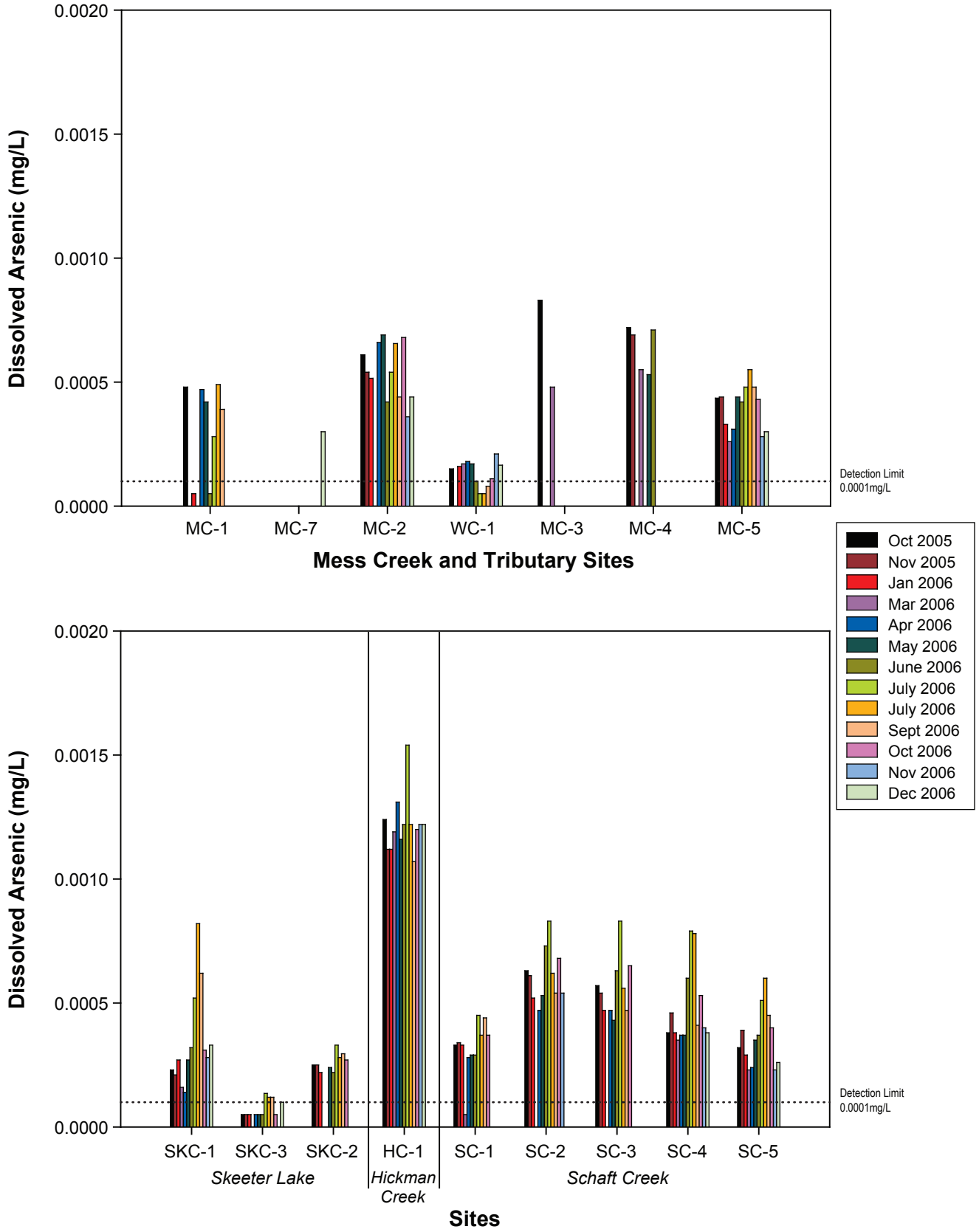
Dissolved Aluminum Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME and BC-Max guideline is 0.0050 mg/L.
Dotted line represents analytical detection limit.
Red dashed line indicates guideline value, where available.

FIGURE 3.1-13

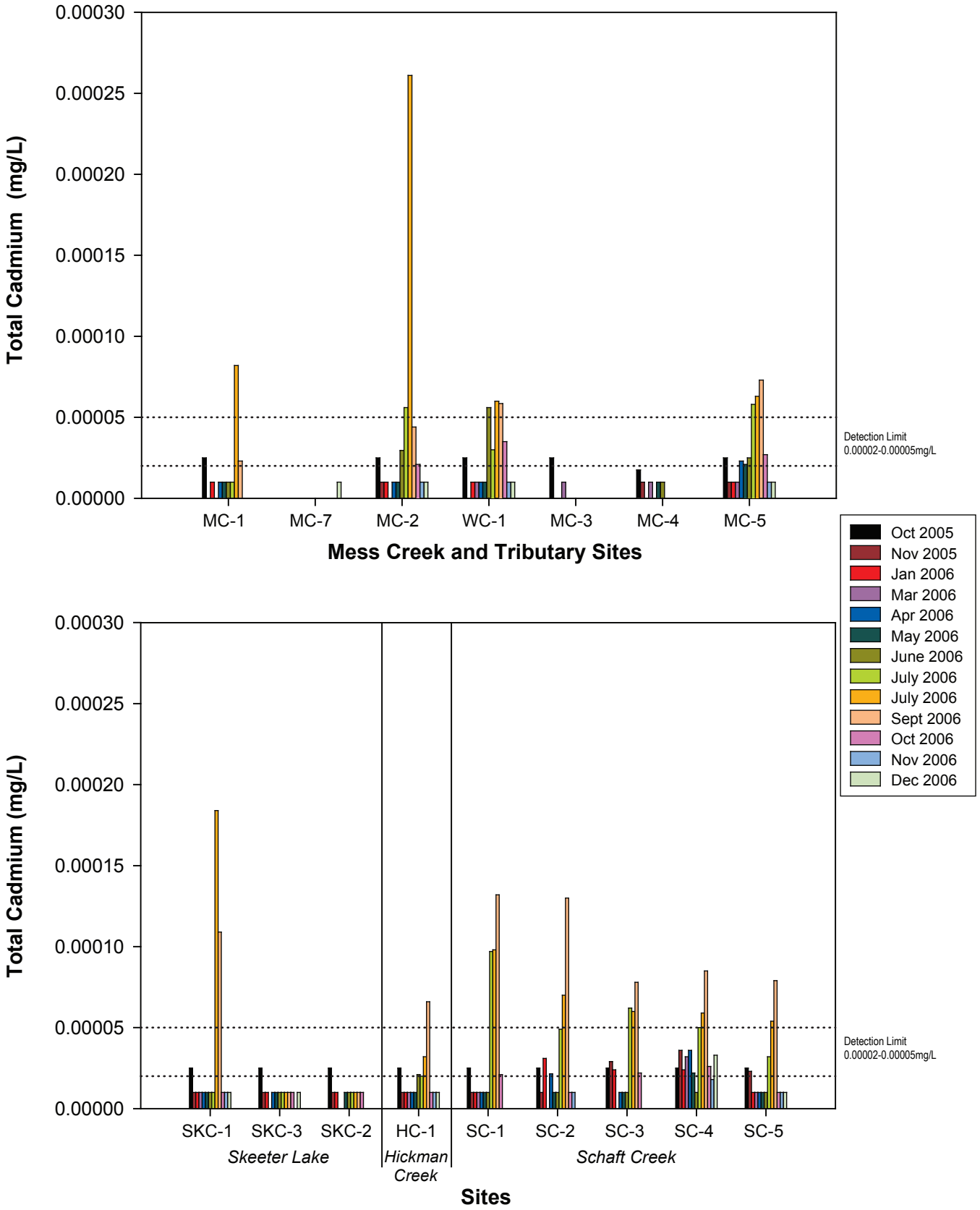
Total Arsenic Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME and BC-Max guideline is 0.0050 mg/L.
Dotted line represents analytical detection limit.

FIGURE 3.1-14

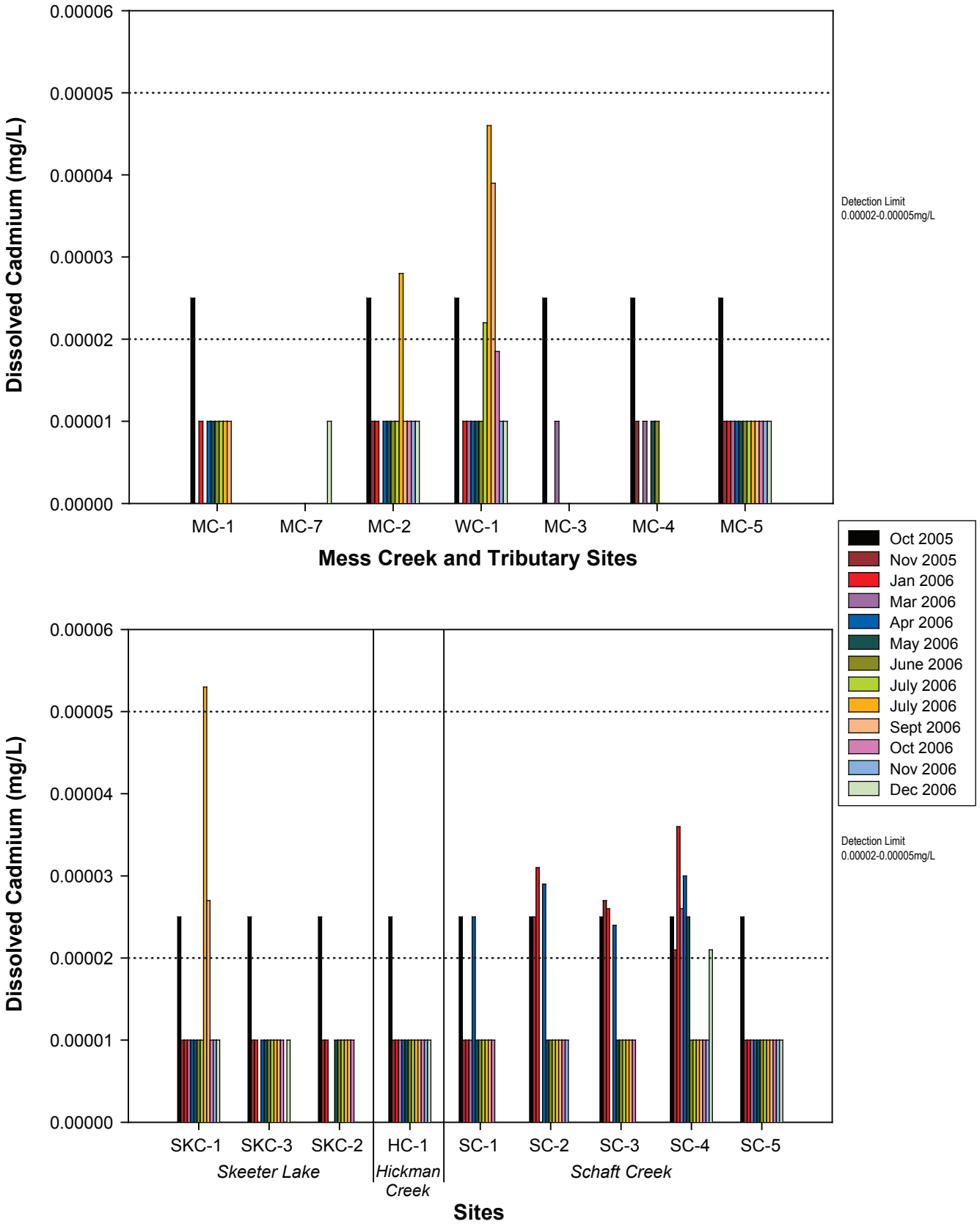
Dissolved Arsenic Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME and BC-Max guidelines are hardness dependent.
Dotted line represents analytical detection limit.

FIGURE 3.1-15

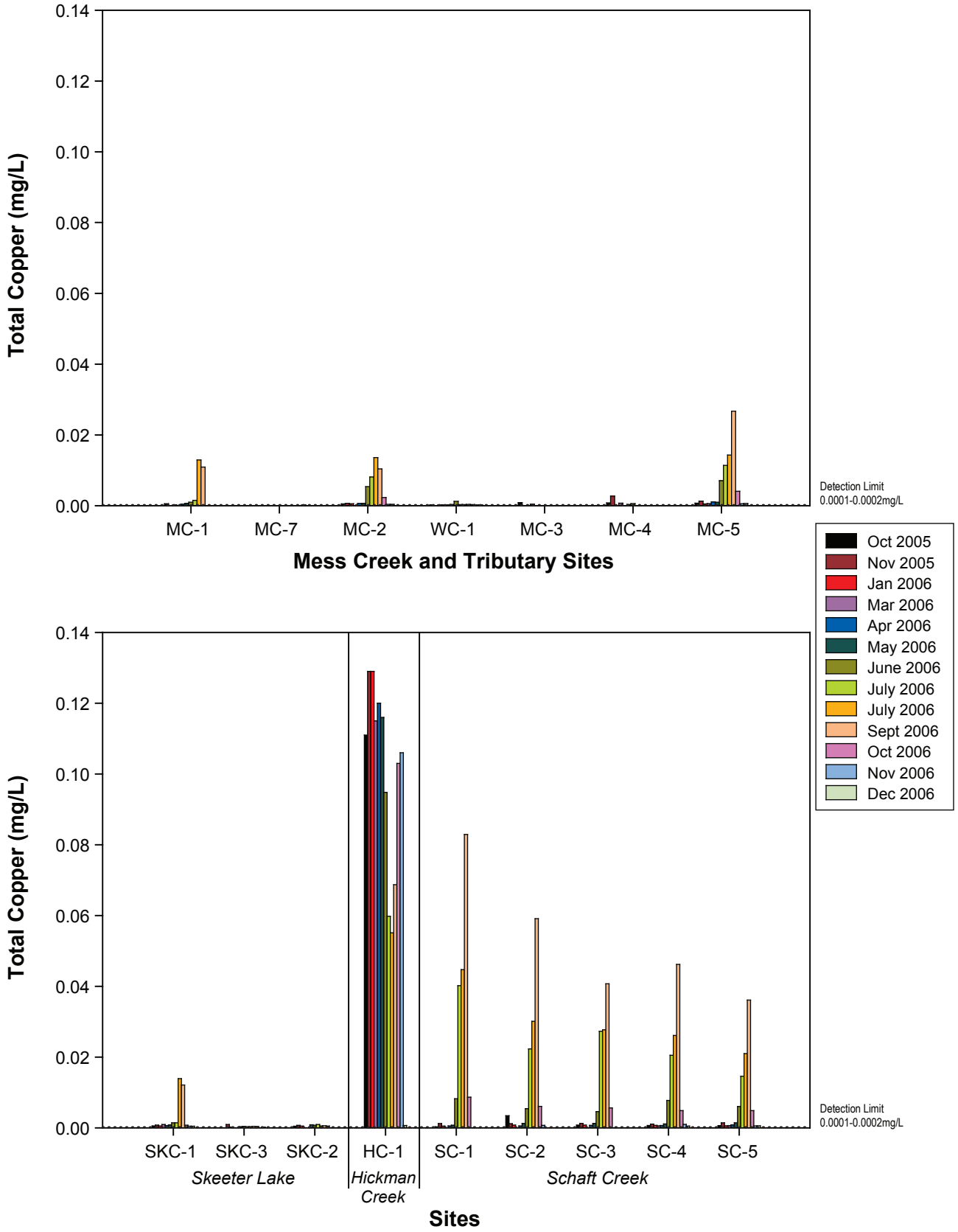
Total Cadmium Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME and BC-Max guidelines are hardness dependent.
Dotted line represents analytical detection limit.

FIGURE 3.1-16

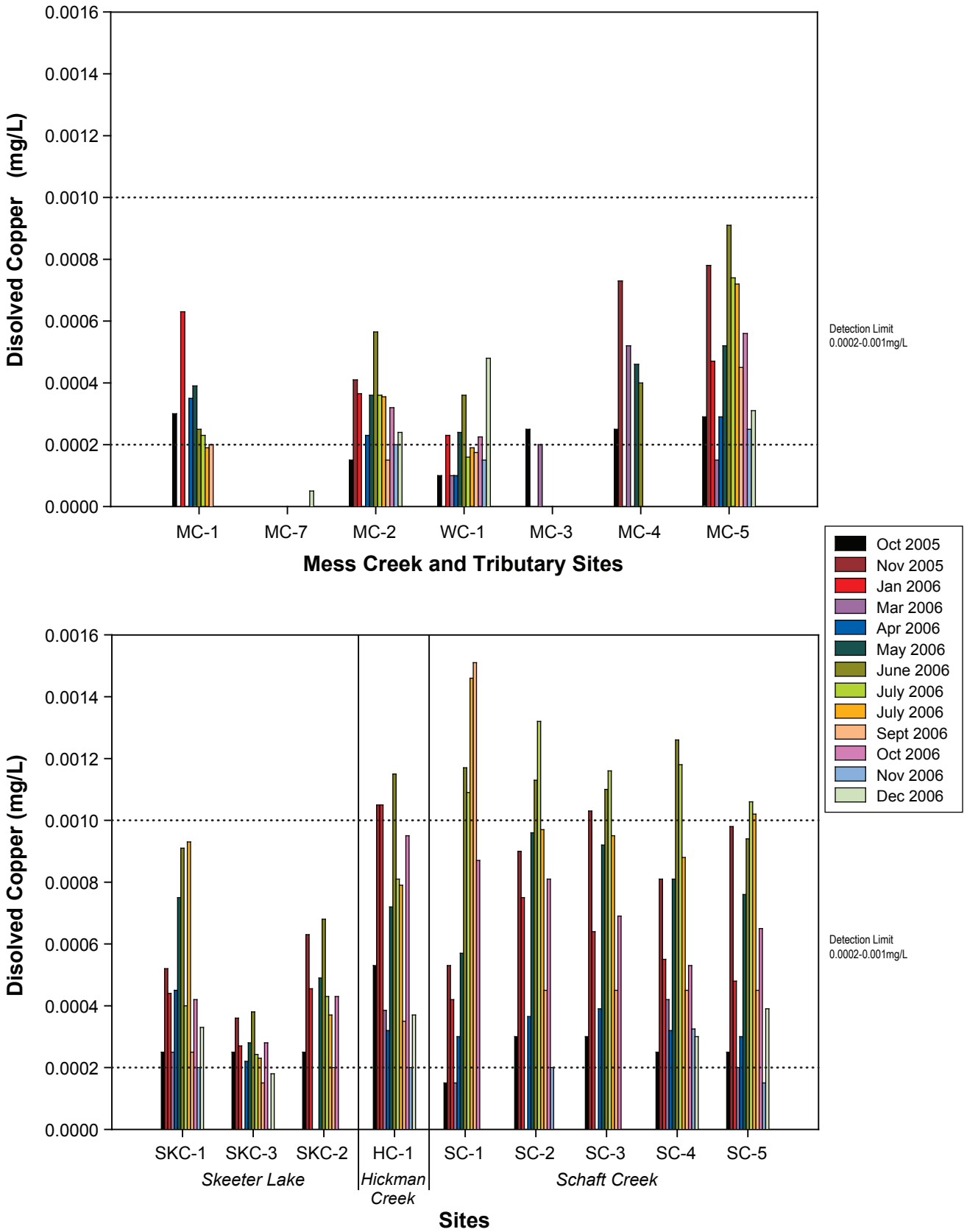
Dissolved Cadmium Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME, BC Max and 30-d Mean guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-17

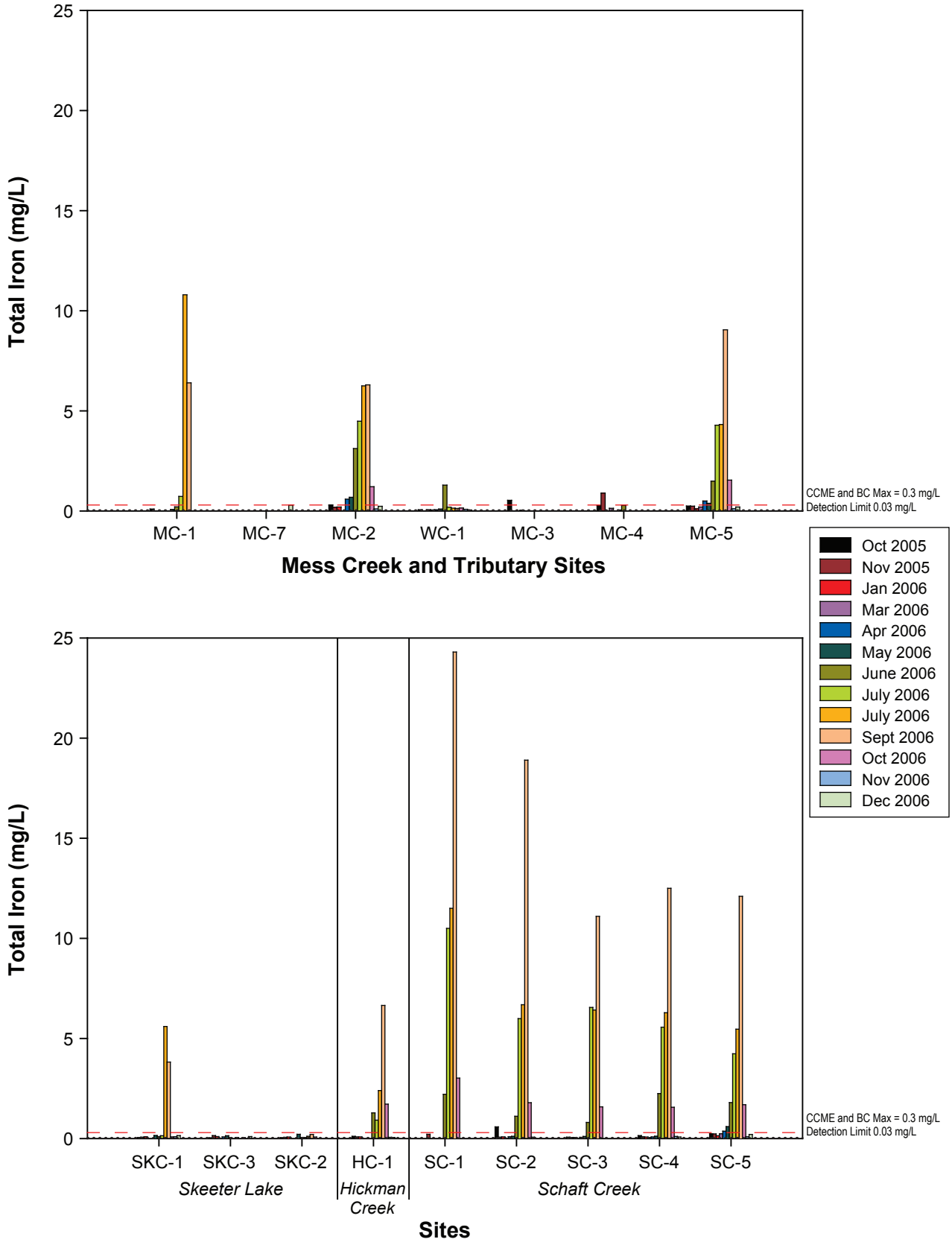
Total Copper Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME, BC Max and 30-d Mean guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-18

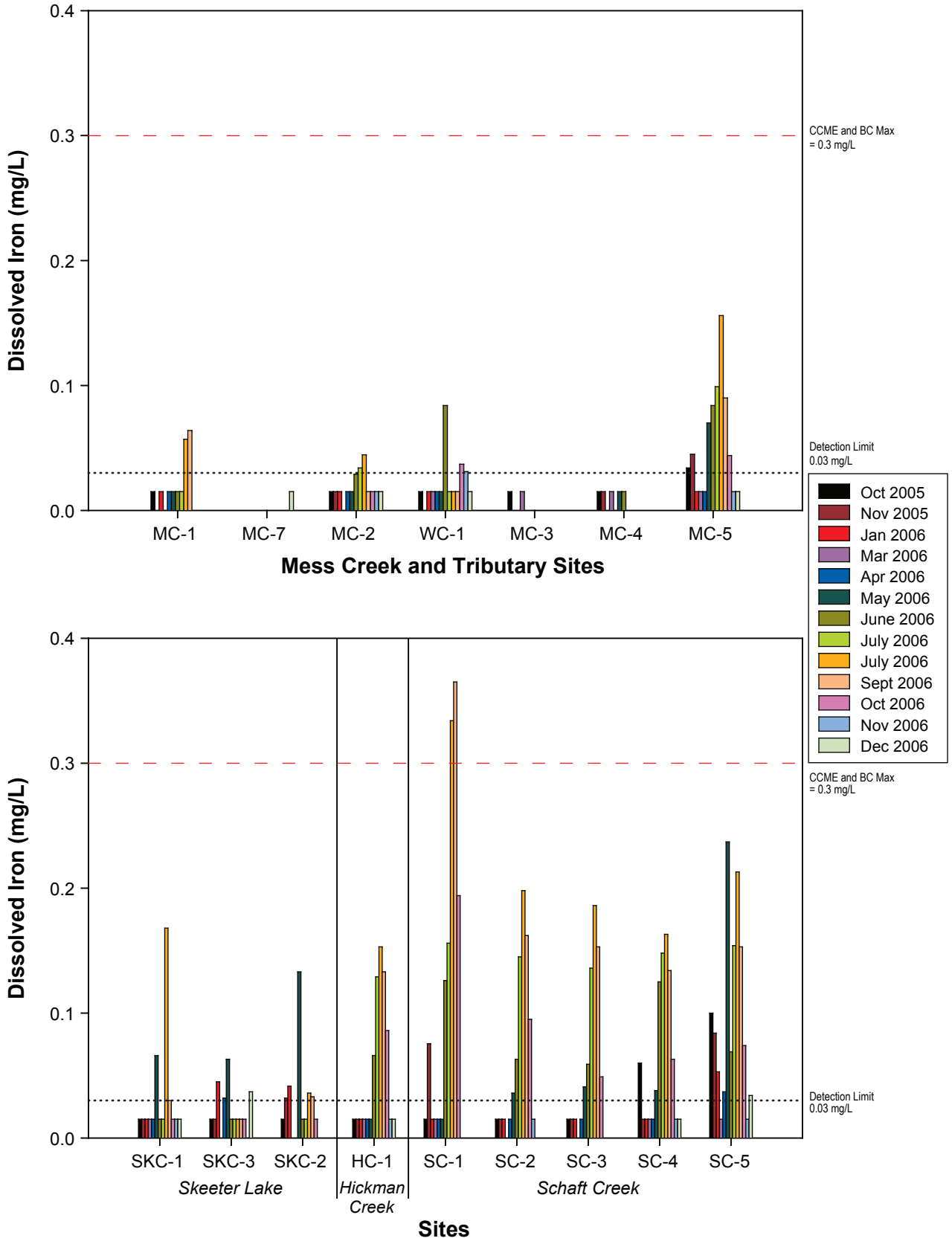
Dissolved Copper Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: Dotted line represents analytical detection limit.
Red dashed line indicates guideline value, where available.

FIGURE 3.1-19

Total Iron Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: Dotted line represents analytical detection limit.
Red dashed line indicates guideline value, where available.

FIGURE 3.1-20

Dissolved Iron Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006

metals, Schaft Creek sites had the highest T-Fe concentrations. Most sites (except MC-7, SKC-3 and SLC-2) exceeded the CCME and BC Max guidelines (0.3 mg/L) for T-Fe. Only SC-1 (July and September) exceeded the CCME and BC Max guidelines (0.3 mg/L) for D-Fe.

Concentrations of total manganese (T-Mn) ranged from below the detection limit (0.0001 mg/L) to 0.93 mg/L (SC-1, September) (Figure 3.1-21). Dissolved manganese (D-Mn) concentrations ranged from below the analytical detection limit (0.0001 mg/L) to 0.09 mg/L (MC-2, April) (Figure 3.1-22). As with several other metals, T-Mn concentrations peaked at SC-1 (July and September) and gradually decreased at downstream sites. No CCME guideline exists for manganese. No sites exceeded BC Max or 30-d Mean guidelines (both hardness dependent).

Concentrations of total molybdenum (T-Mo) ranged from 0.00014 (MC-1, June) to 0.0126 mg/L (SC-1, April) (Figure 3.1-23). Dissolved molybdenum (D-Mo) concentrations ranged from 0.00022 (MC-1, June) to 0.0127 mg/L (SC-1, April) (Figure 3.1-24). T-Mo and D-Mo concentrations were almost identical for all sites, indicating a lack of particulate-bound molybdenum. Concentrations tended to be highest in April and May within the Schaft Creek sites. No sites exceeded CCME or B.C. guidelines for T-Mo or D-Mo.

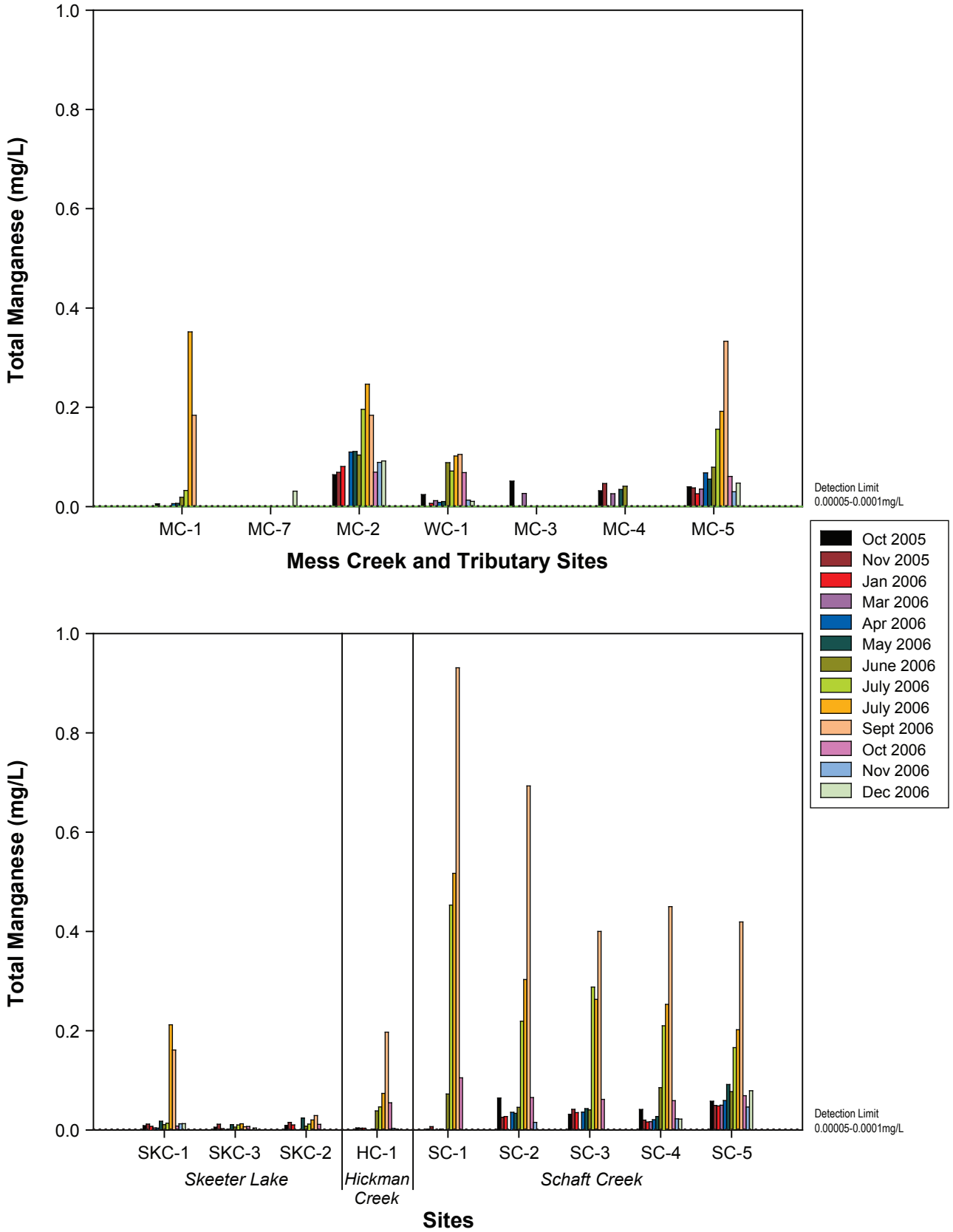
Concentrations of total nickel (T-Ni) ranged from below the detection limit to 0.027 mg/L (MC-1, late July) (Figure 3.1-25). Most of the dissolved nickel (D-Ni) samples were below detection limits. MC-2 was most consistently above detection limits and had the highest D-Ni concentration in April (0.0044 mg/L) (Figure 3.1-26). Hickman Creek and the Schaft Creek sites had the highest T-Ni concentrations. The CCME and B.C. guidelines for T-Ni and D-Ni (hardness dependent) were not exceeded at any sites.

Concentrations of total selenium (T-Se) ranged from below detection limits to 0.0058 mg/L (SC-4, June) (Figure 3.1-27). Dissolved selenium (D-Se) data ranged from below the detection limit to 0.004 mg/L (SC-1, June) (Figure 3.1-28). Concentrations of D-Se were similar to T-Ni in many cases with highest concentrations often occurring in June. The CCME guideline (0.001 mg/L) and BC 30-d guidelines (0.002 mg/L) were exceeded by all Skeeter Lake and Schaft Creek sites. MC-1 and MC-2 exceeded the CCME guideline.

Concentrations of total zinc (T-Zn) ranged from below detection limits to 0.134 mg/L (MC-5, early July) (Figure 3.1-29). Dissolved zinc (D-Zn) data ranged from below the detection limit to 0.004 mg/L (WC-1, late July) (Figure 3.1-30). Schaft Creek sites had relatively high T-Zn concentrations in September. However, the spike in T-Zn at MC-5 was almost three times greater than concentrations from most samples. No sites exceeded the CCME guideline (0.03 mg/L). B.C. guidelines (hardness dependent) were exceeded for mean T-Zn at SC-1 and WC-1 (BC Max) and at MC-5, HC-1, SC-1, SC-2, SC-3, SC-4, SC-5, SKC-1 and WC-1 (BC 30-d). B.C. guidelines for mean D-Zn were exceeded at SC-1 and WC-1 (BC Max) and at SC-1, SC-2, SC-3, SC-5, SKC-1 and WC-1 (BC 30-d).

Quality Assurance and Quality Control (QA/QC)

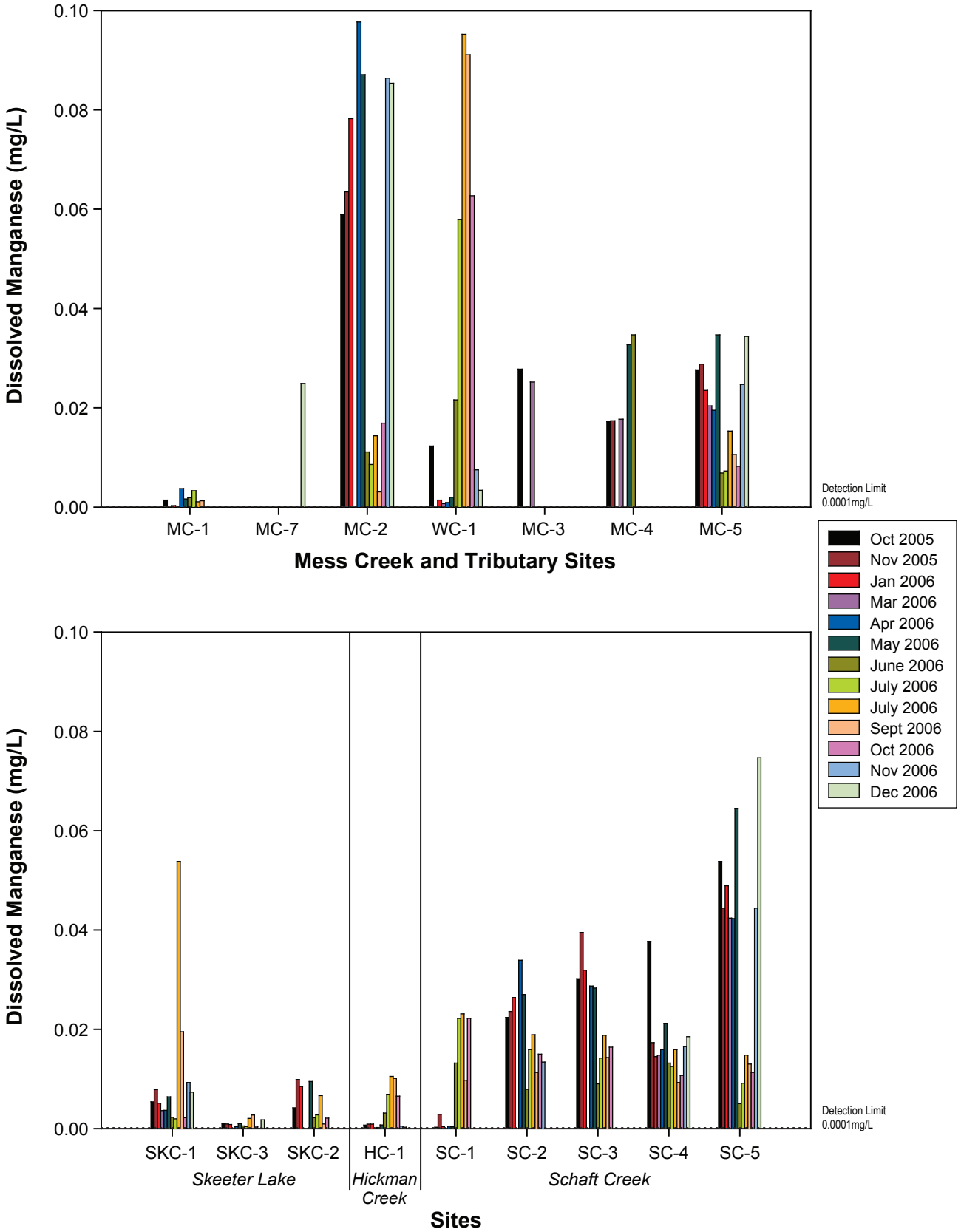
Field and travel blank data are presented in Appendix 3.1-1. Field blank data were all below MDL values, with the exception of total organic carbon (TOC) in 3 of 12 field blanks and total phosphorus (TP) in 1 of 12 field blanks, where values were < 2 times the MDL.



Note: No CCME guideline. BC guideline depends on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-21

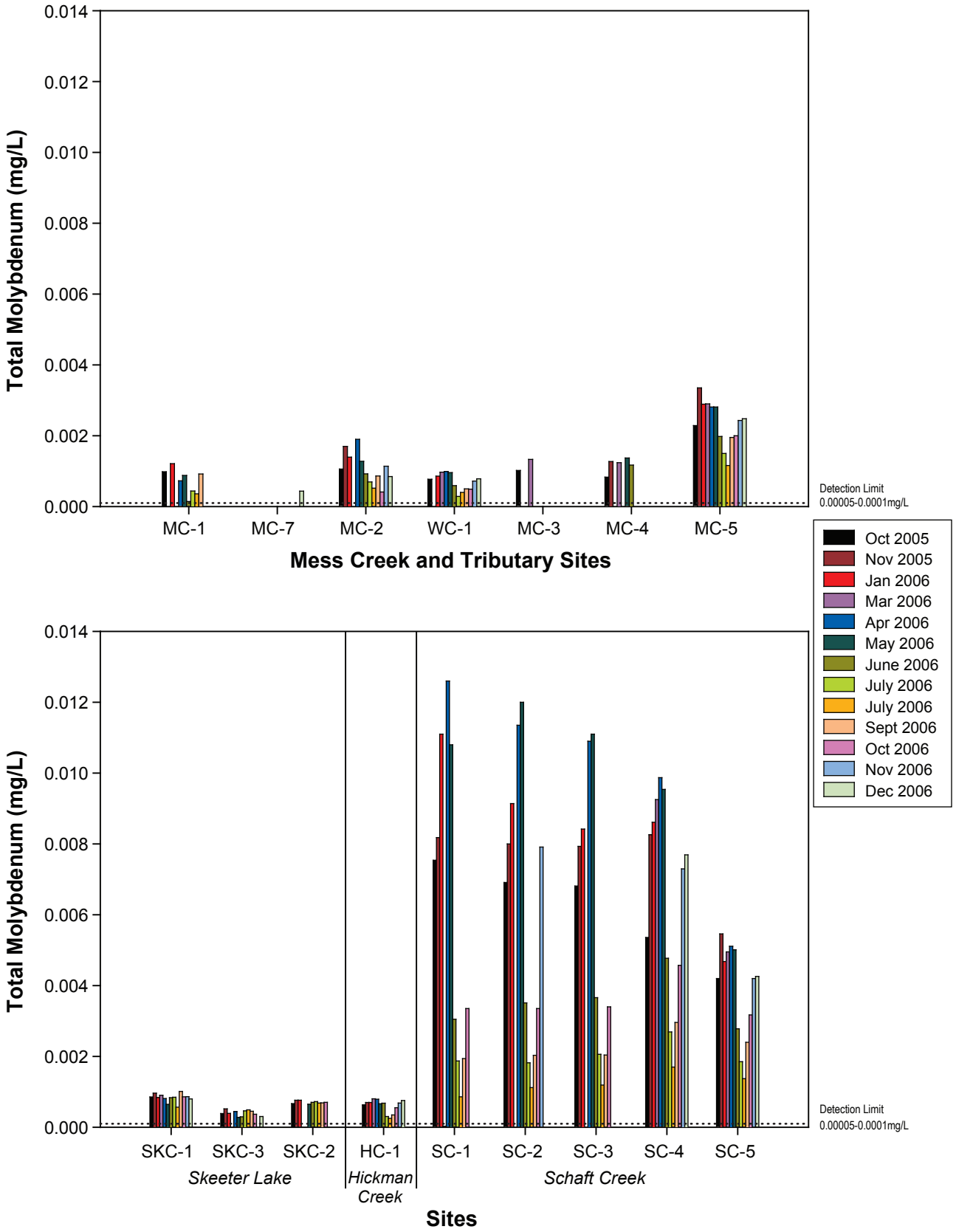
Total Manganese Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: No CCME guideline. BC guideline depends on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-22

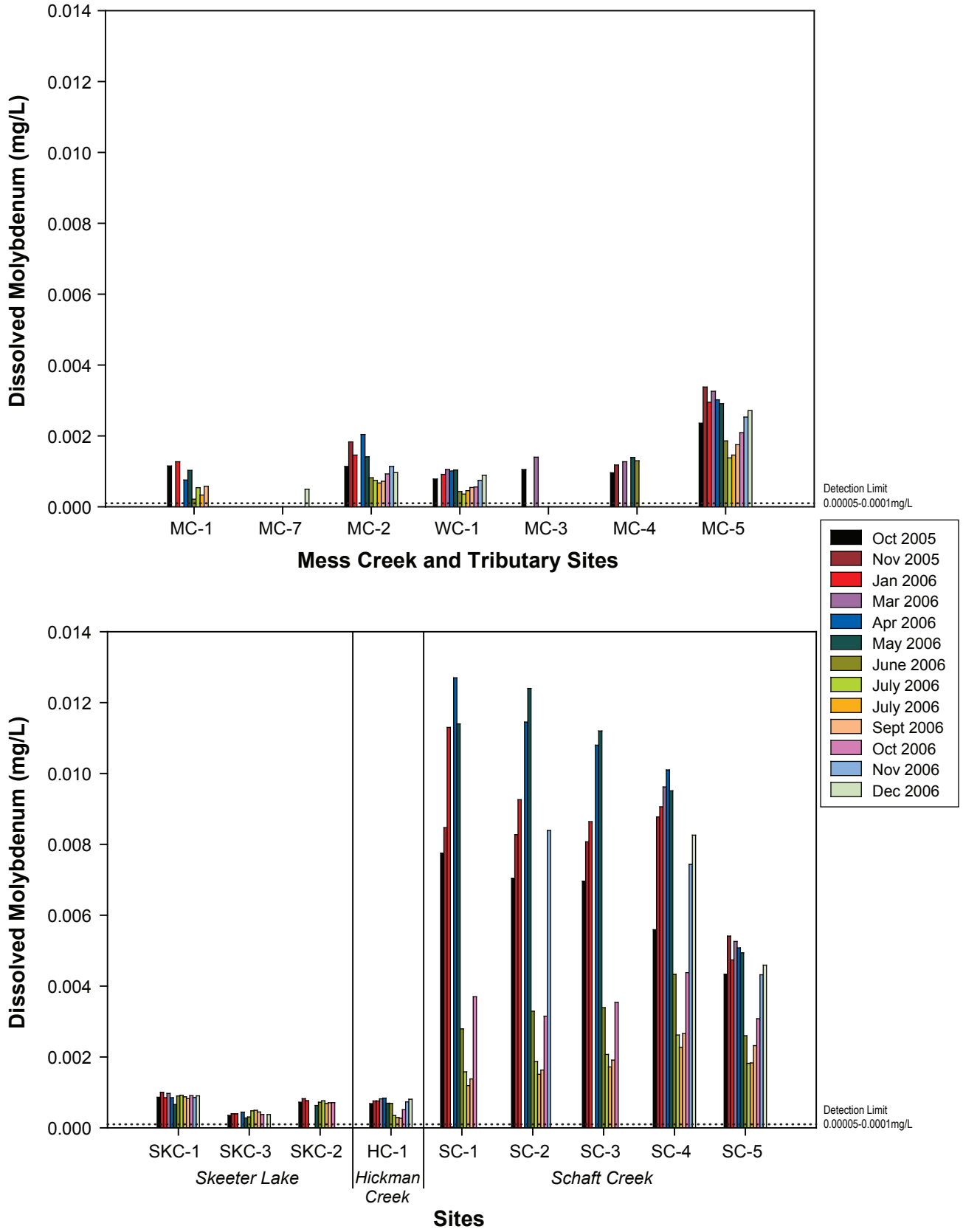
Dissolved Manganese Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME guideline is 0.07300 mg/L; BC guideline is 2 mg/L (Max) and 1 mg/L (30-d Mean).
Dotted line represents analytical detection limit.

FIGURE 3.1-23

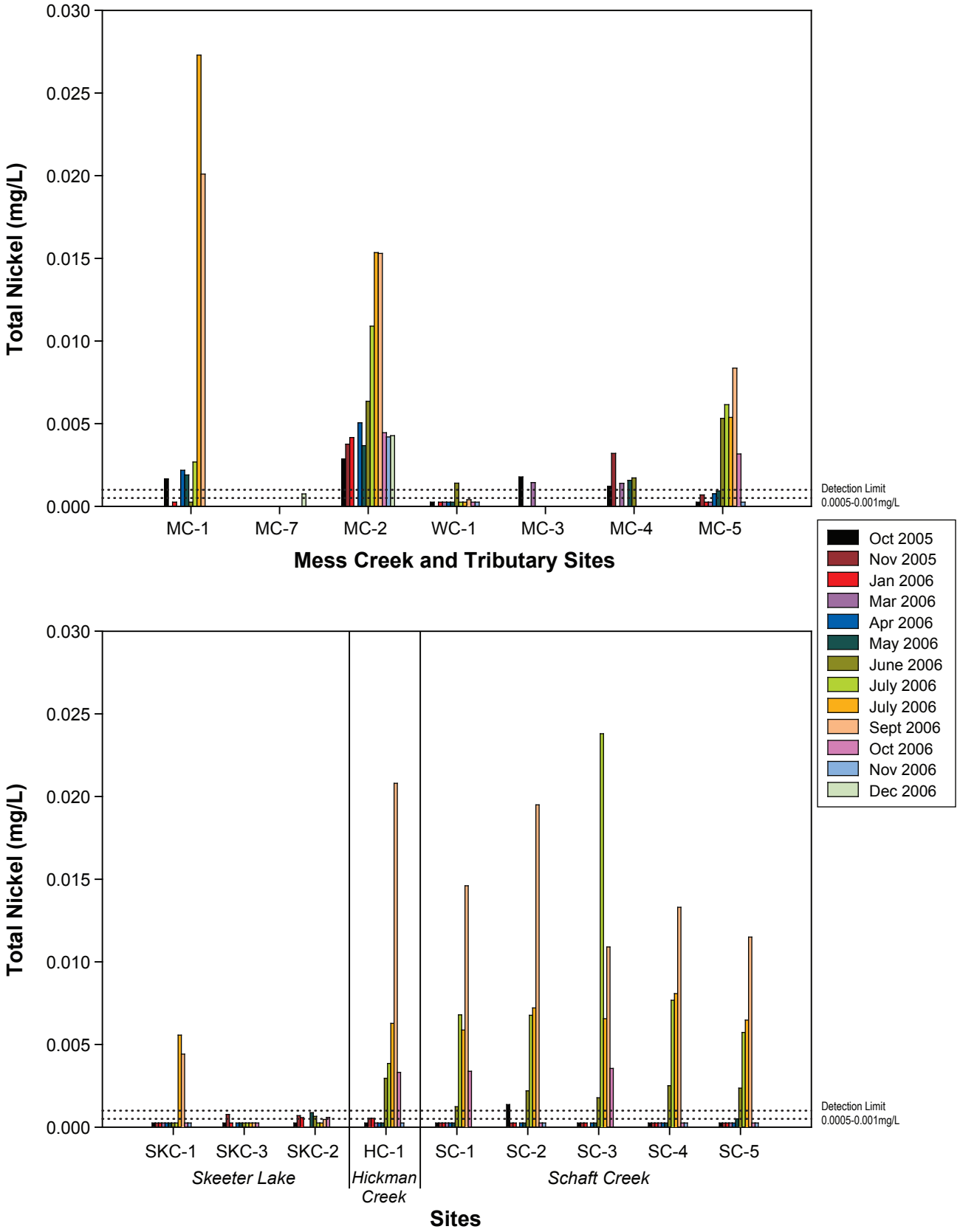
Total Molybdenum Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME guideline is 0.07300 mg/L; BC guideline is 2 mg/L (Max) and 1 mg/L (30-d Mean).
Dotted line represents analytical detection limit.

FIGURE 3.1-24

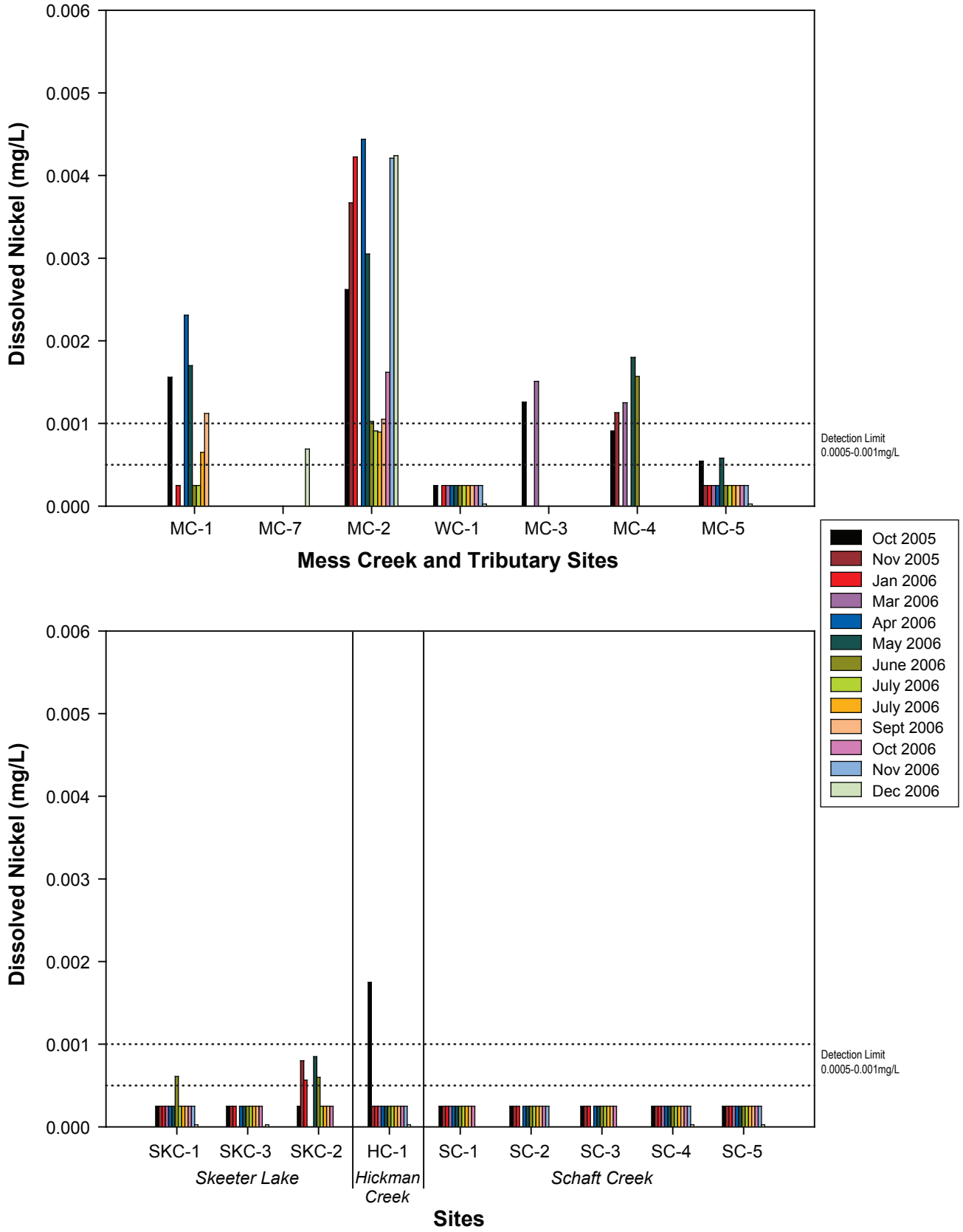
Dissolved Molybdenum Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME and BC guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-25

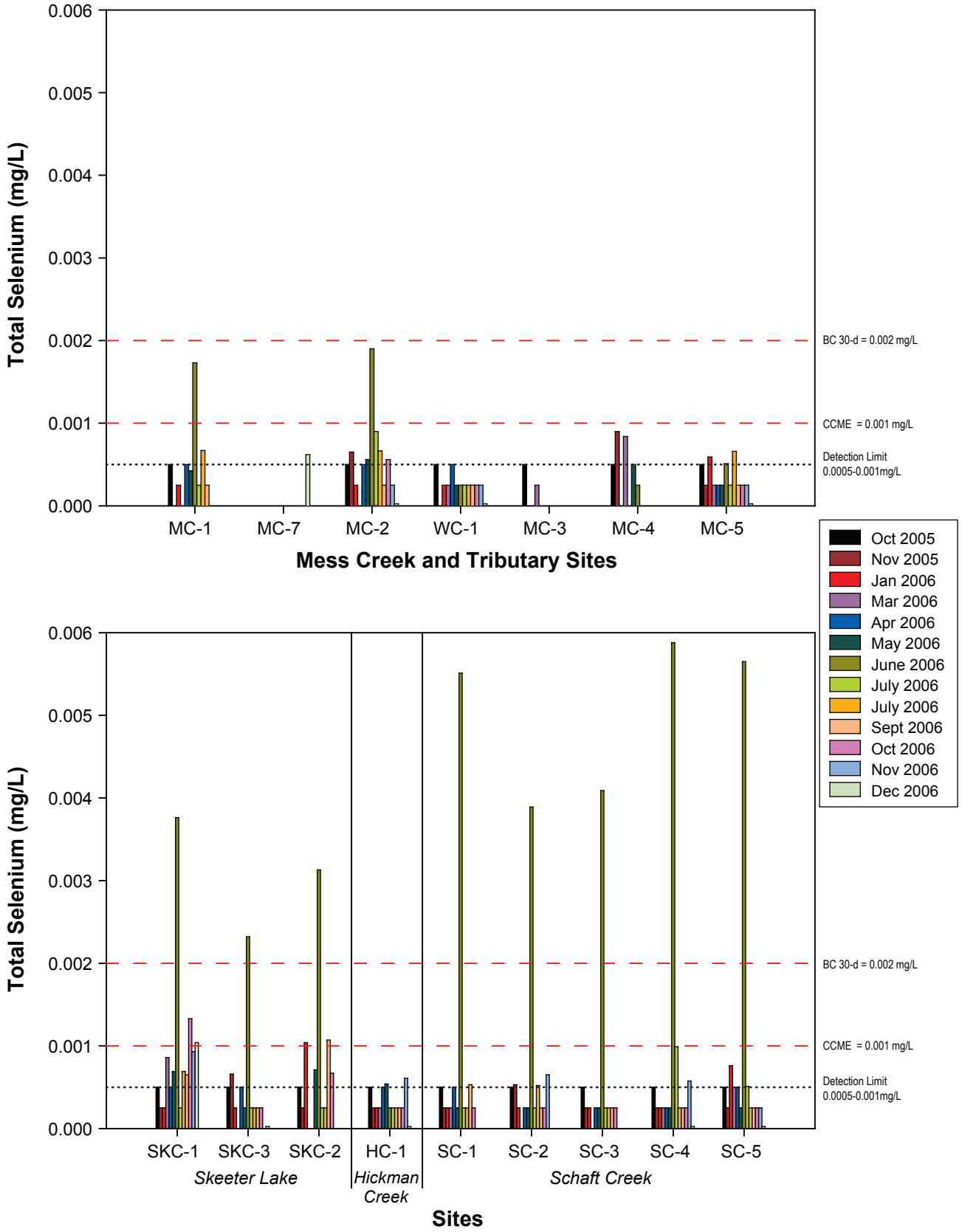
Total Nickel Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME and BC guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-26

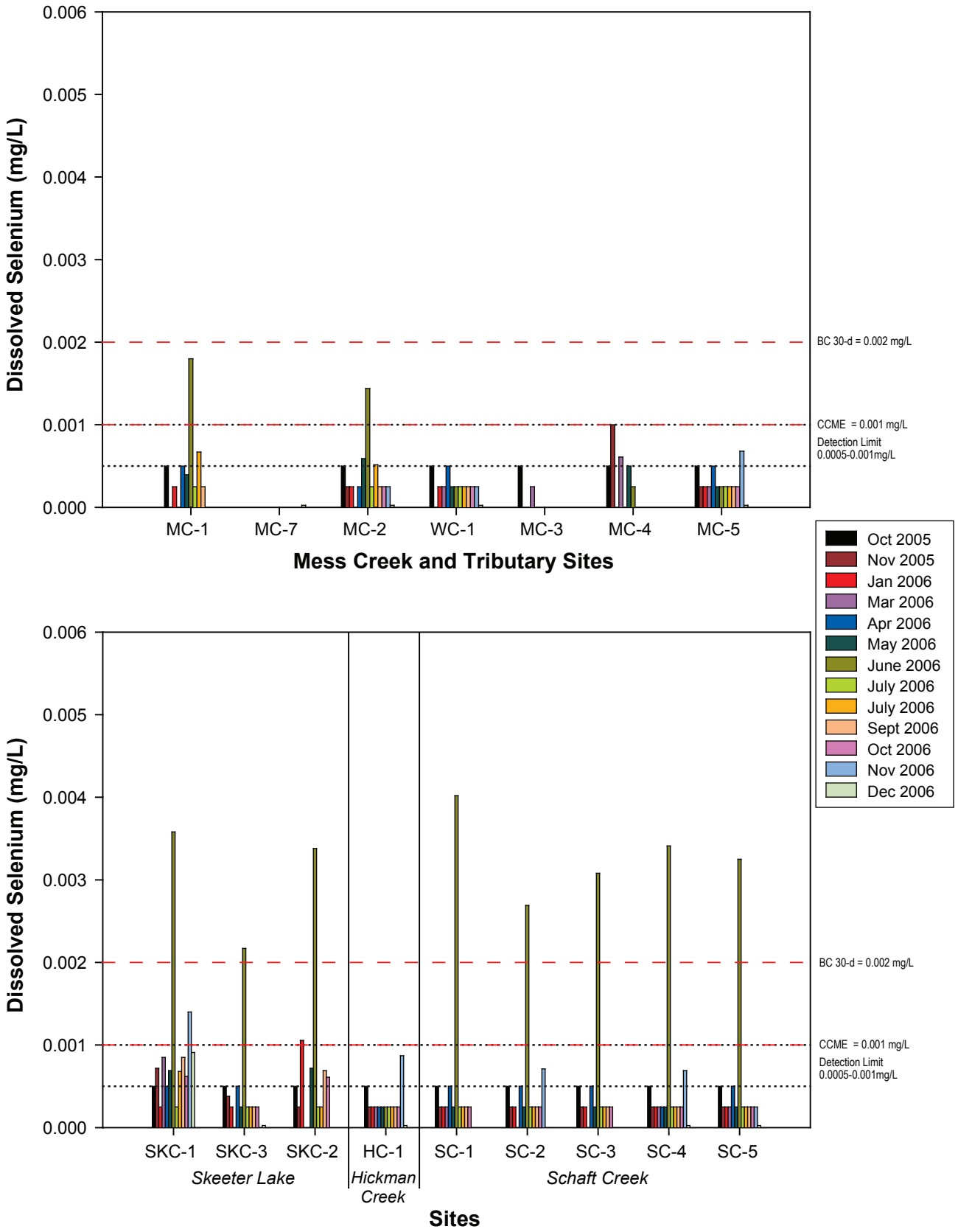
Dissolved Nickel Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME guideline = 0.01 mg/L; and BC 30-d mean = 0.002 mg/L.
Dotted line represents analytical detection limit.

FIGURE 3.1-27

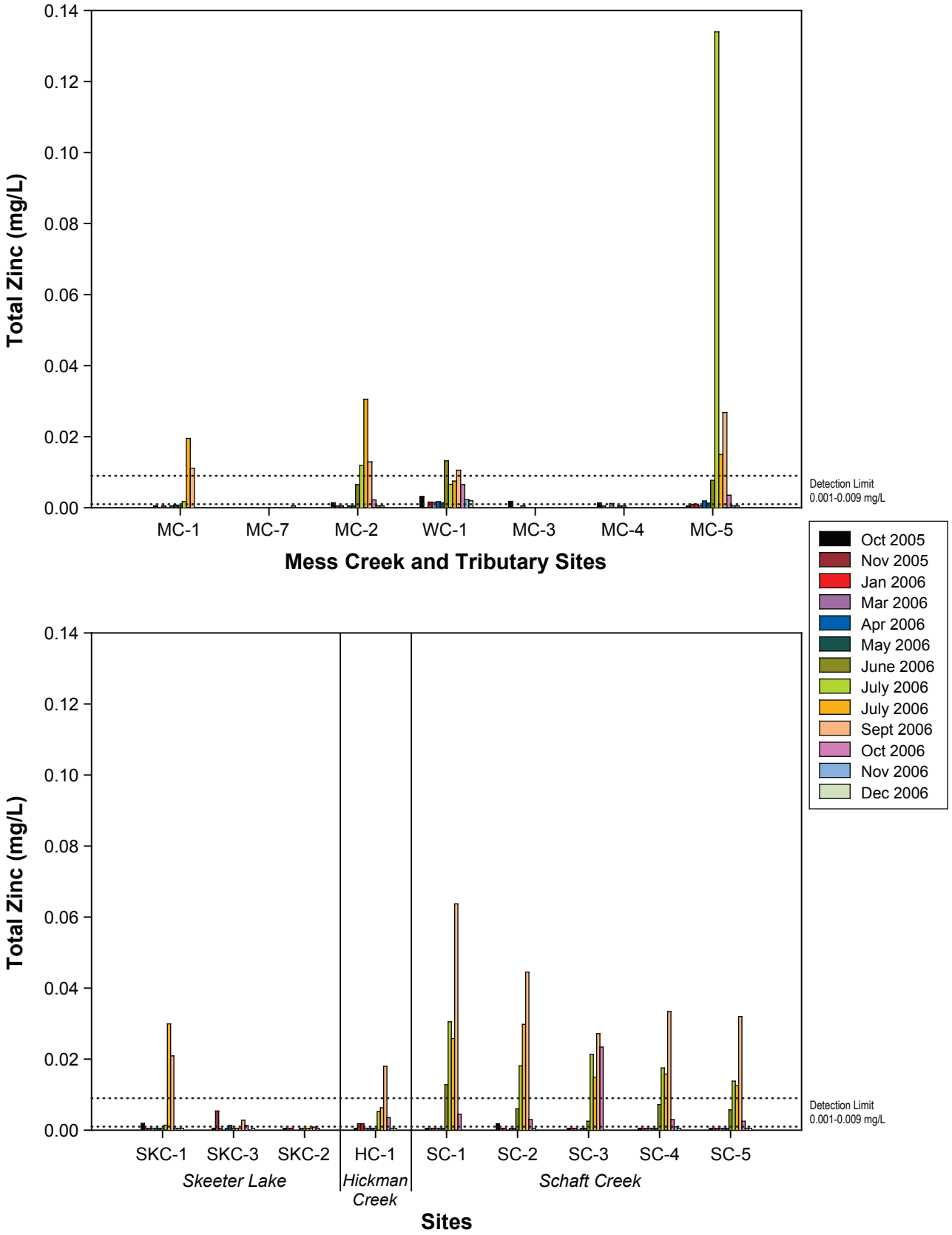
Total Selenium Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME guideline = 0.01 mg/L; and BC 30-d mean = 0.002 mg/L.
Dotted line represents analytical detection limit.

FIGURE 3.1-28

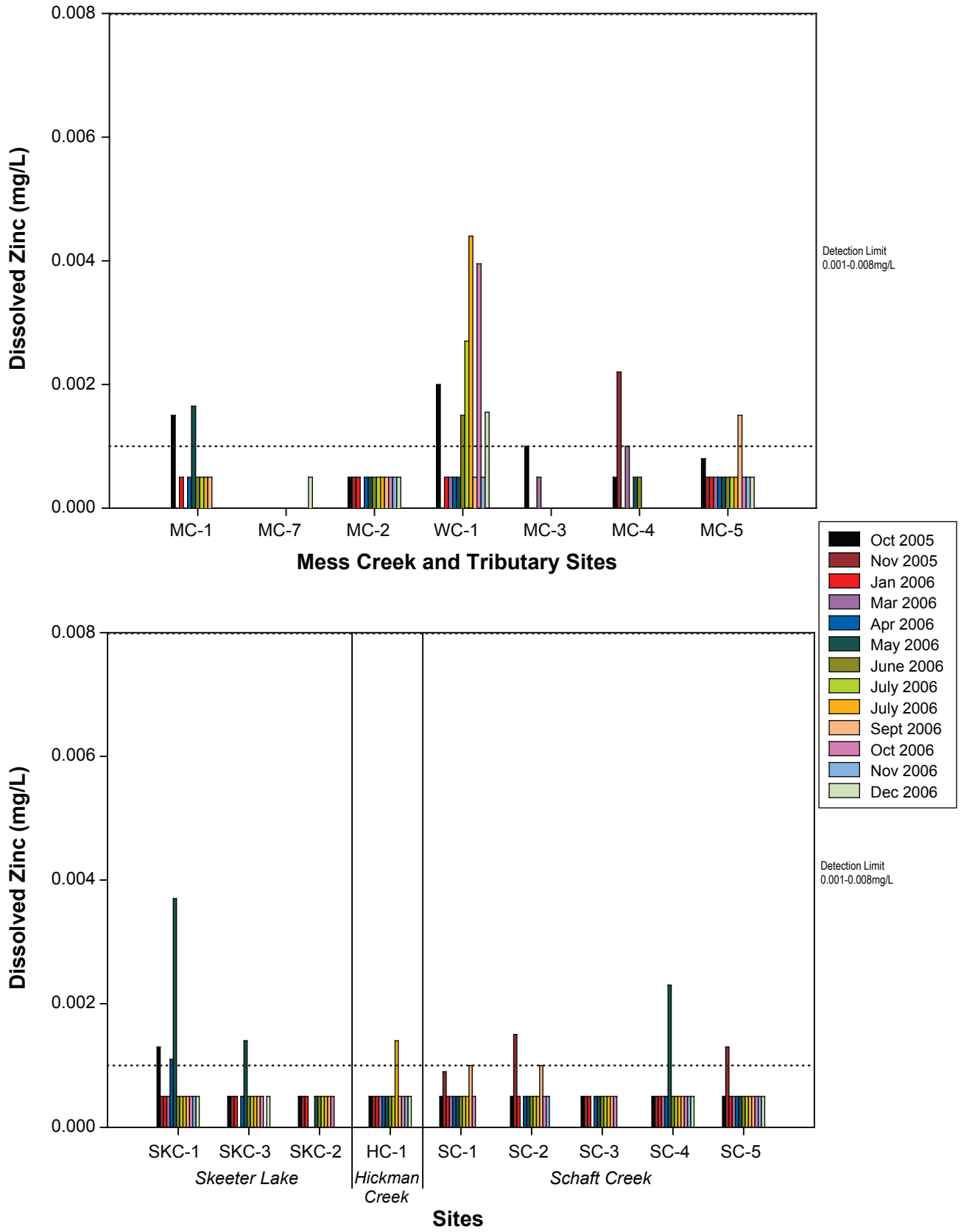
Dissolved Manganese Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME guideline = 0.03mg/L; BC Max and 30-d Mean guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-29

Total Zinc Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006



Note: CCME guideline = 0.03mg/L; BC Max and 30-d Mean guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-30

Dissolved Zinc Concentrations in Schaft Creek Project Receiving Environment Streams, 2005/2006

Travel blank data were all below MDL values, with the exception of TOC in 1 of 12 travel blanks (< 2 times the MDL), TP in 1 of 12 travel blanks (<2 times the MDL), total aluminium in 1 of 12 travel blanks (<2 times the MDL), total calcium in 1 of 12 travel blanks (<2 times the MDL), total iron in 1 of 12 travel blanks (<4 times the MDL), and total zinc in 1 of 12 travel blanks (<2 times the MDL).

The RPD analysis of QA/QC field duplicate data for receiving environment streams are reported in Appendix 3.1-2.

In summary, 17 duplicate pairs of samples were compared for each variable, using the RPD between the replicates as a measure of the variability inherent in field sampling (environmental heterogeneity, sampler handling leading to contamination). Approximately 56% of analytical results were below the method detection limit (MDL), and therefore RPD values were not calculated. Of the remaining results, 5% (33 of 639 RPD calculations) were greater than the threshold of 20% indicated by provincial guidance. A total of 14 of the 33 higher RPD values were from duplicates taken in October, November and December. These elevated RPD values were taken during periods of precipitation which can add variation to surface flow inputs.

3.1.1.2 Sediment Quality

Sediment quality was assessed at 19 stream sites by collecting triplicate sediment samples in late August 2006 (Figure 2.1-1). All raw data, including highlighted samples that exceed guidelines, are shown in Appendix 3.1-3.

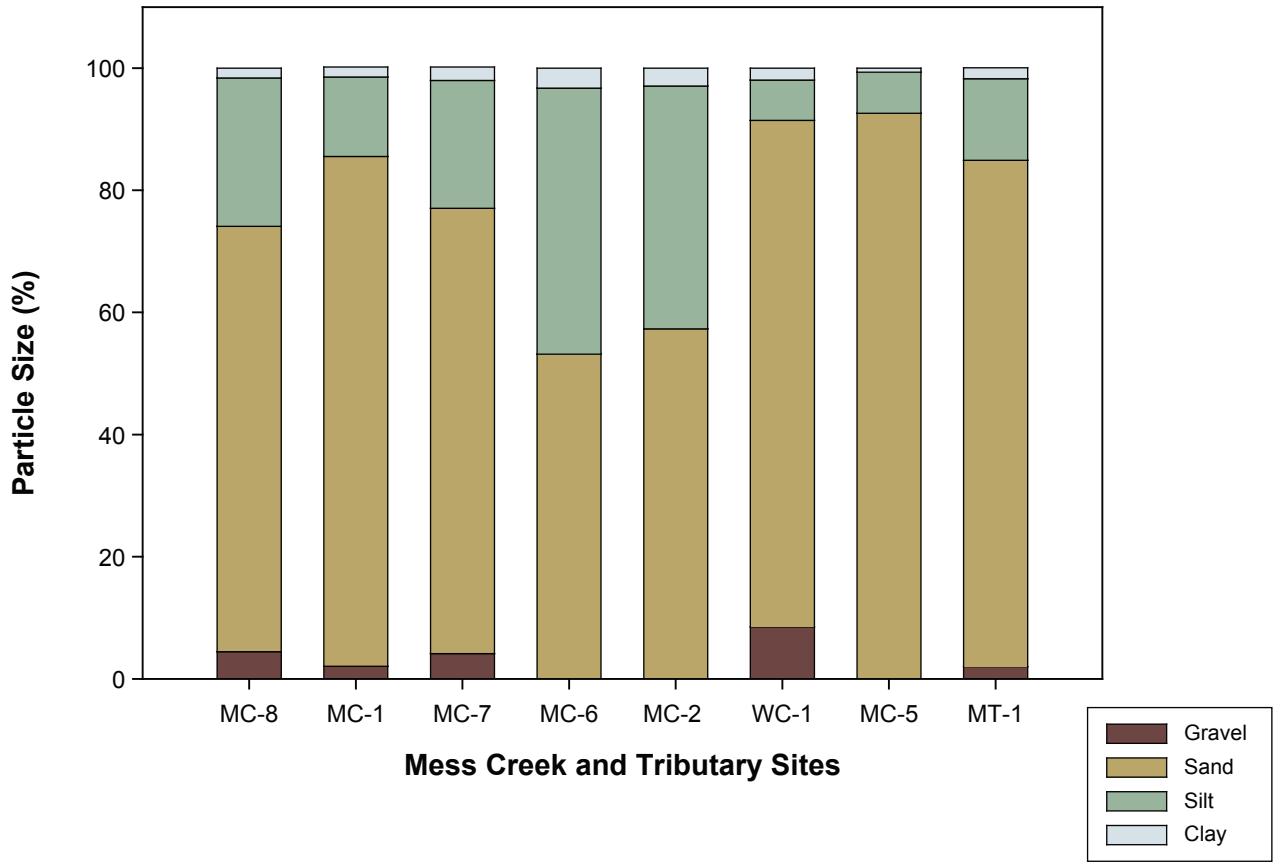
Particle Size

Analysis of particle size distributions indicated that all stream sites were dominated by sand (53 to 93%), with smaller proportions of silt (3 to 44%), gravel (0 to 10%), and clay (0.5 to 5.3%) (Figure 3.1-31). 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 and Cyanides

In most cases, nutrient concentrations (available phosphorus and total nitrogen) were below detection limits. Average available phosphorus concentrations were only above the detection limit (1 mg/kg) at WC-1 (3 mg/kg) (Figure 3.1-32). One replicate at SC-1 had a concentration of 13 mg/kg, but it is possible this was a contaminated sample considering the other two replicates for this site were below the detection limit. Average nitrogen concentrations were above the detection limit (0.02%) at MC-1 (0.03%) and WC-1 (0.04%) in the Mess Creek Watershed and SK-3 (0.19%) and SK-2 (0.06%) in the Skeeter Lake Watershed (Figure 3.1-33).

The average total organic carbon (TOC) values were relatively low and in many cases, below the detection limit of 0.05% (Figure 3.1-34). As was seen with total nitrogen concentrations, comparatively high TOC values were found at SK-3 (4.3%) and SK-2 (2.1%).



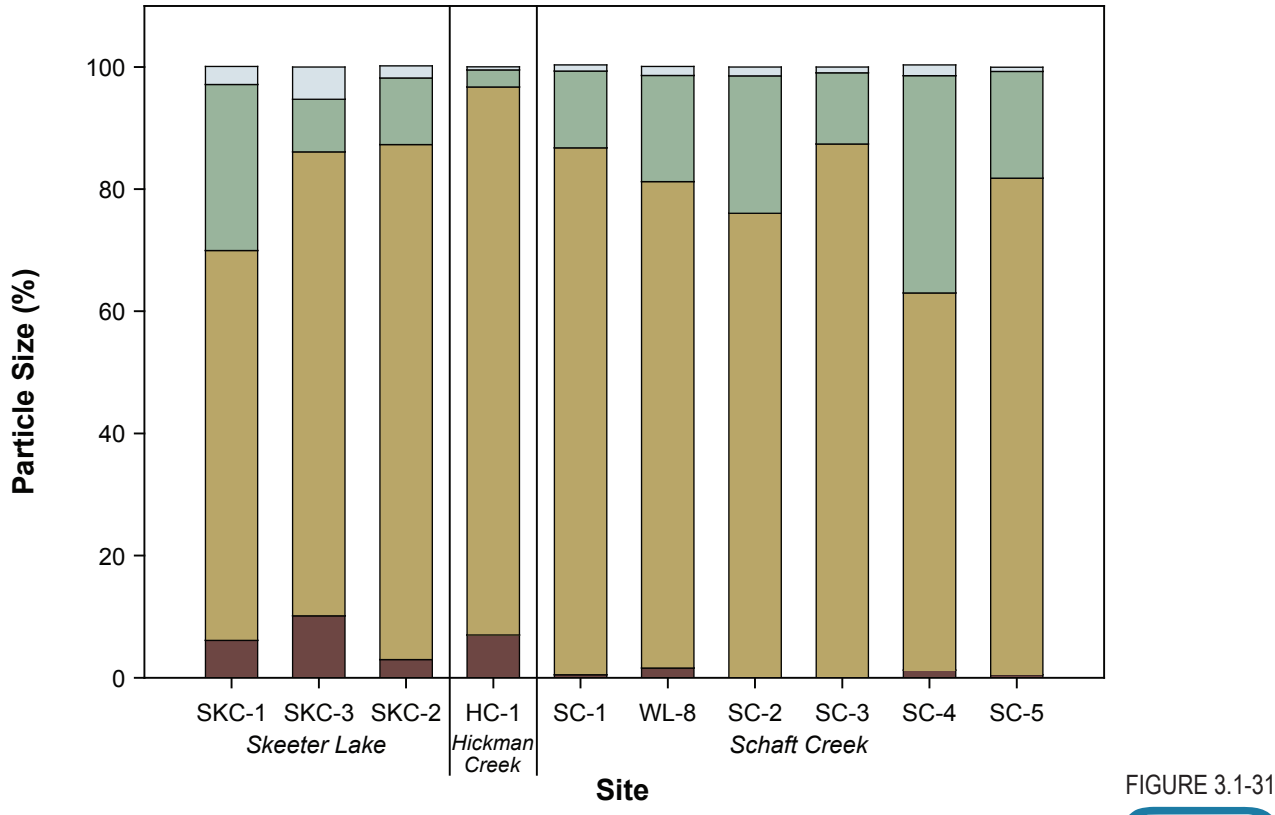
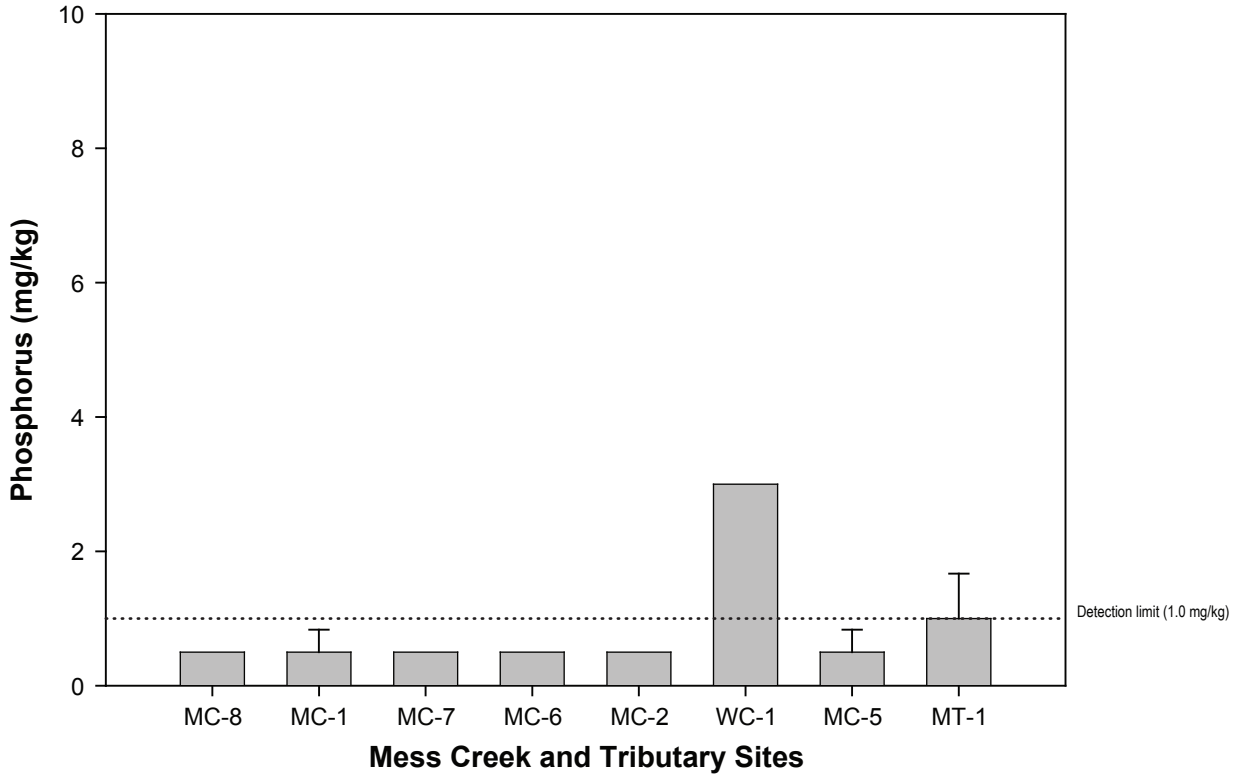
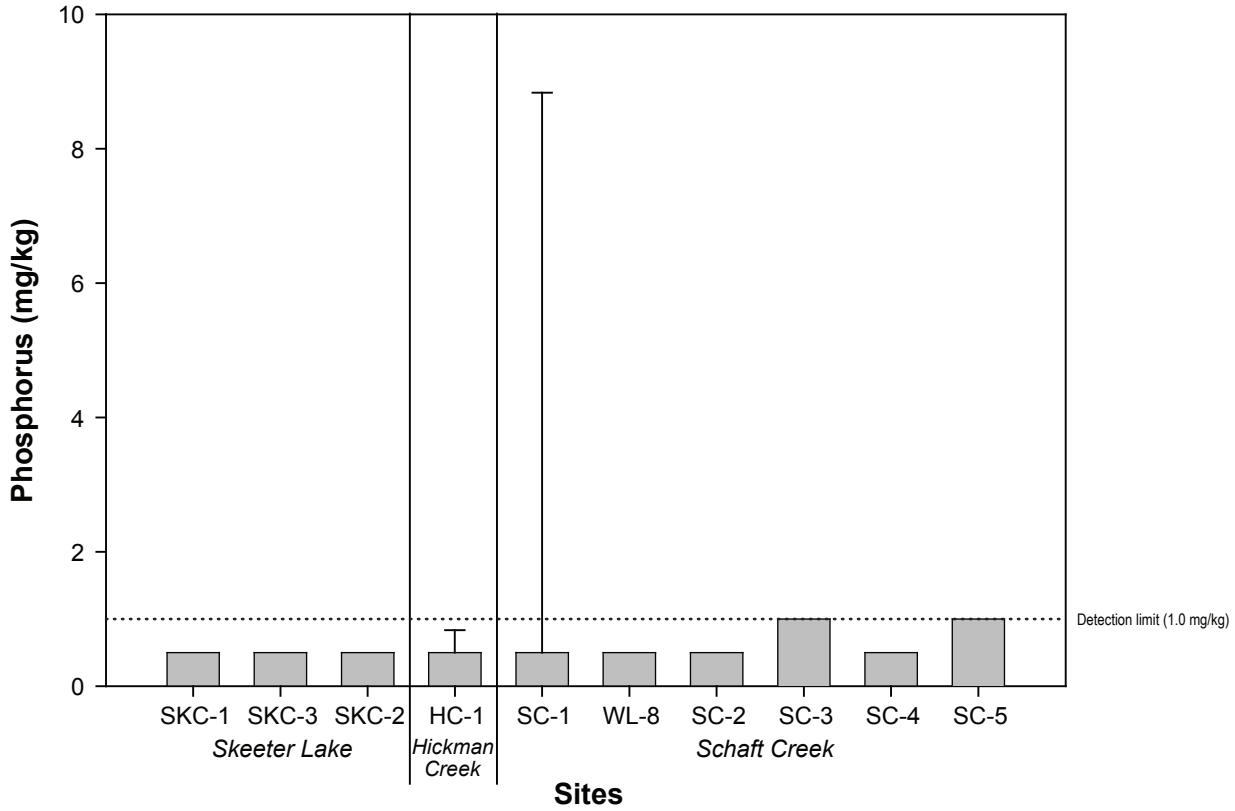


FIGURE 3.1-31

Particle Size Distributions in Schaft Creek Project Stream Sediments, August 2006

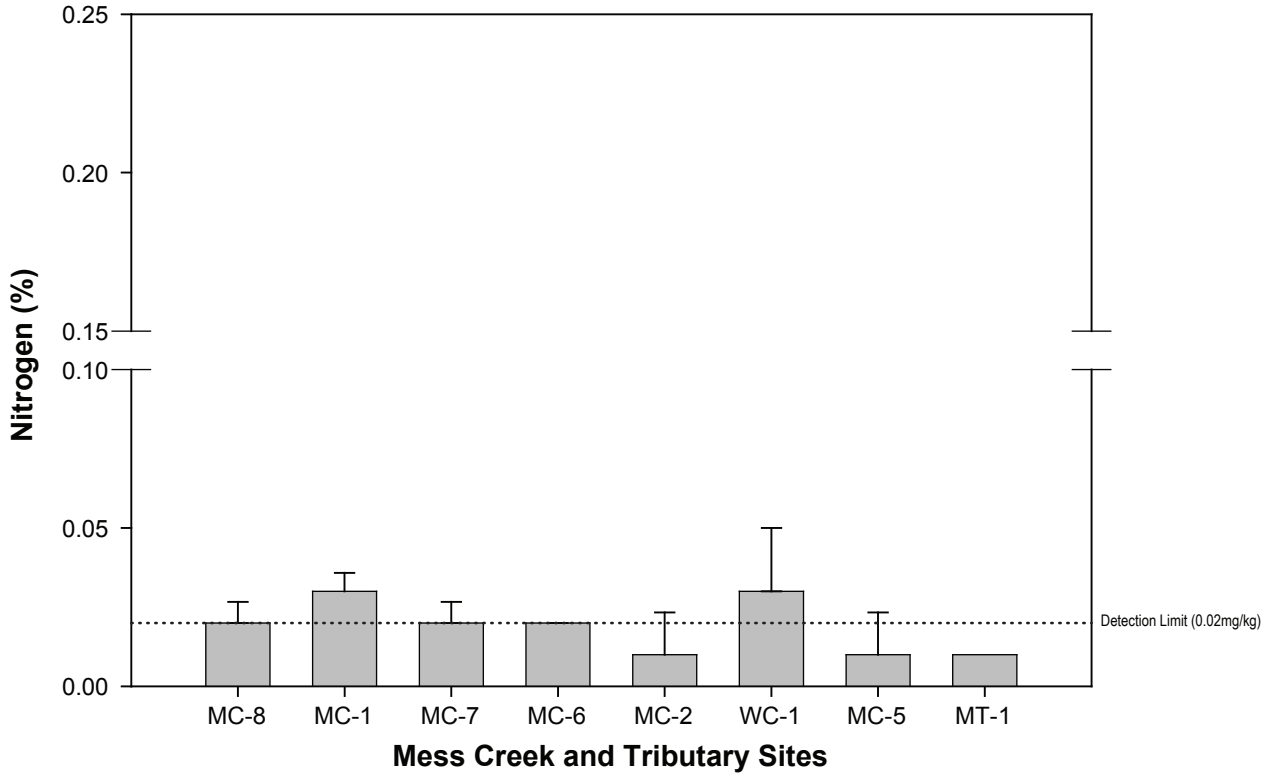


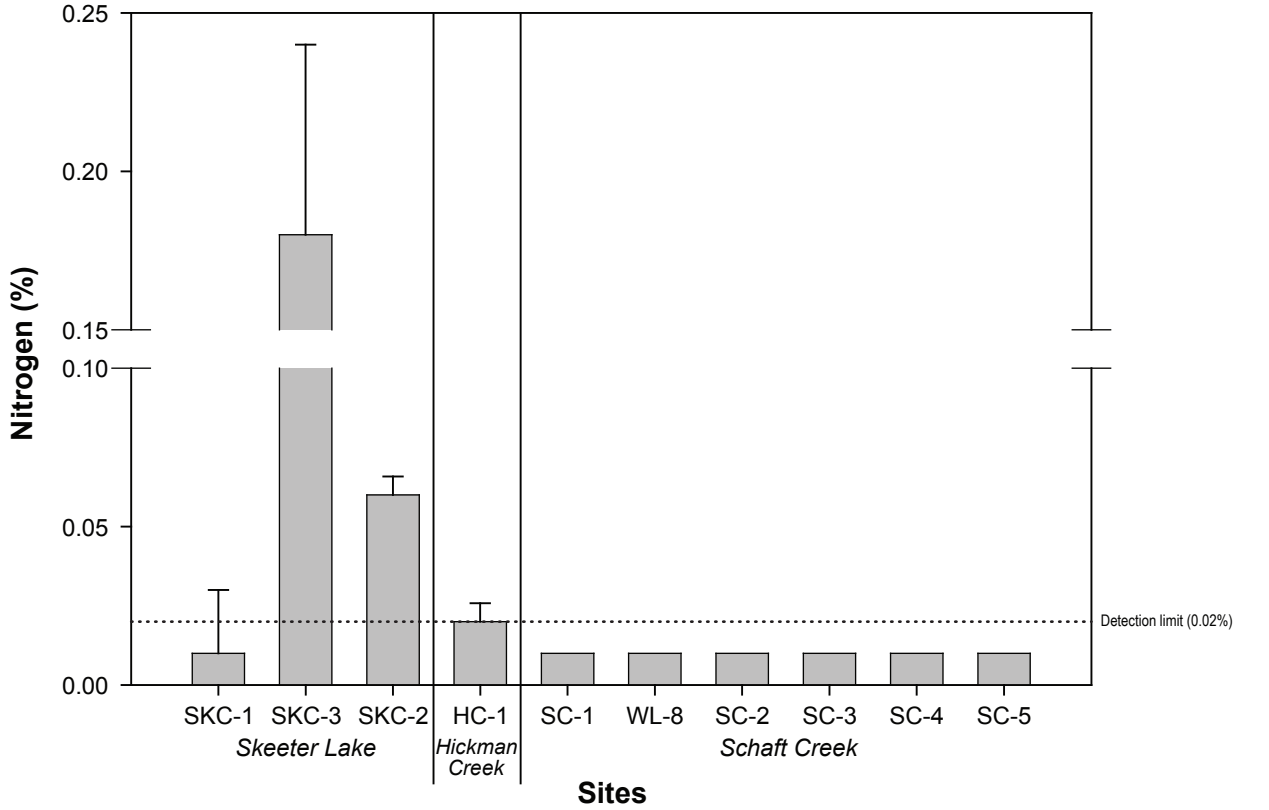


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-32

Available Phosphorus Concentrations in Schaft Creek Project Stream Sediments, August 2006

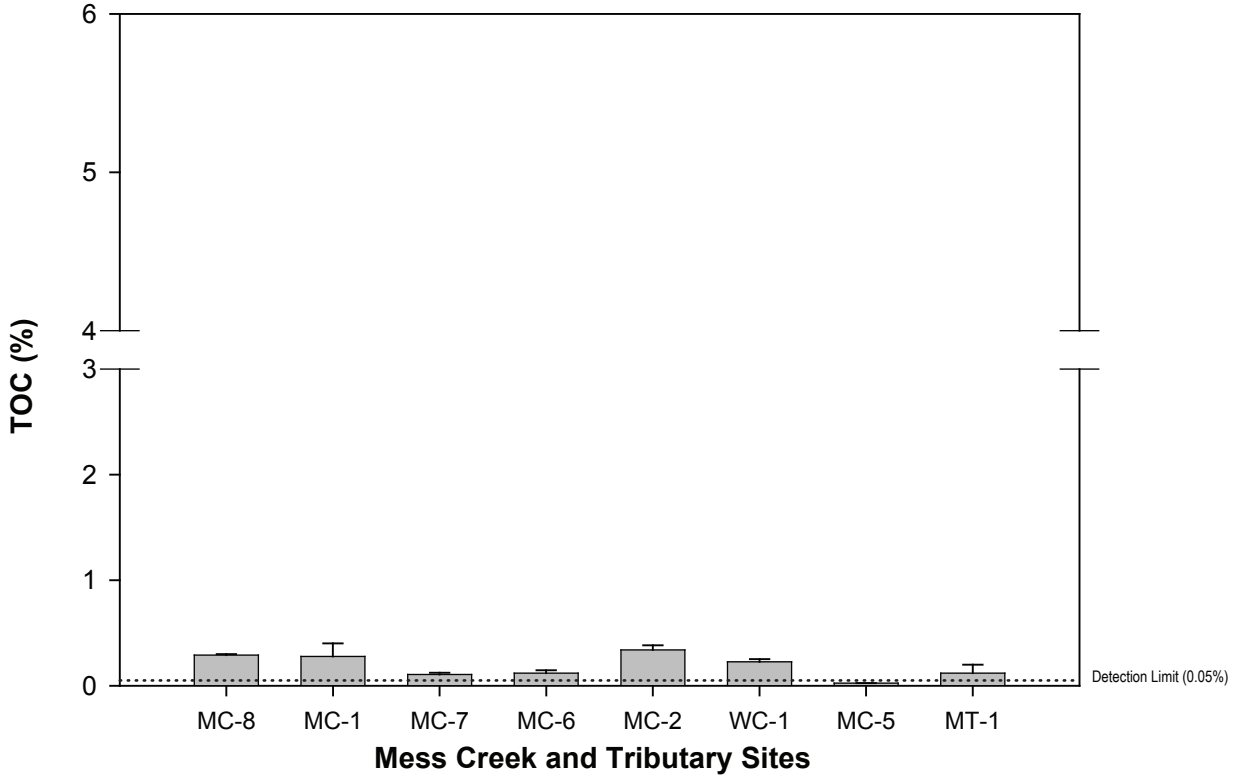


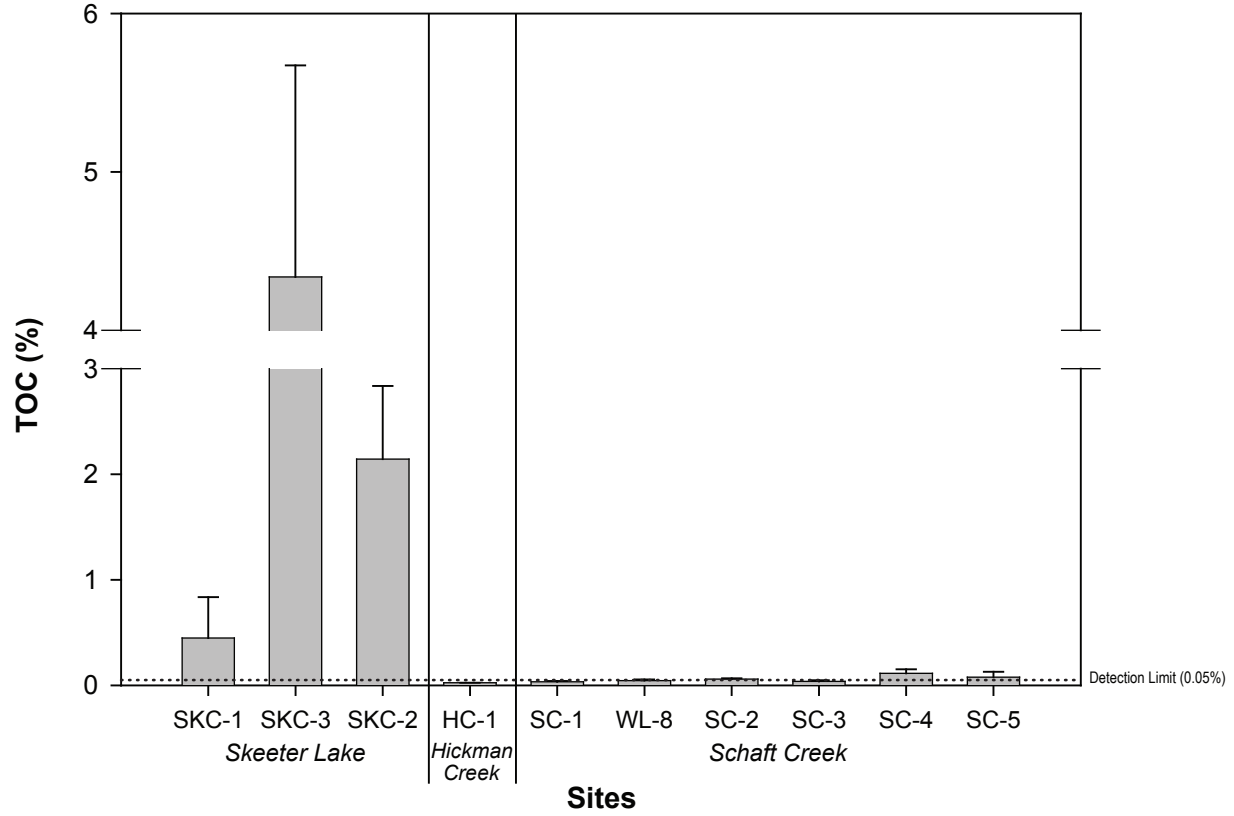


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-33

Total Nitrogen Concentrations in Schaft Creek Project Stream Sediments, August 2006





Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-34

Total Organic Carbon (TOC) Concentrations in Schaft Creek Project Stream Sediments, August 2006

Total cyanide values were below analytical detection limits (3 mg/kg) in all stream sediment samples and are not plotted.

Total Metals

Of the metals analyzed antimony, beryllium, bismuth, molybdenum, selenium, silver, thallium and tin were not detected in more than 80% of samples in stream sites and were not analyzed further (Appendix 3.1-3).

Several of the analyzed metals do not have provincial or federal guidelines and are discussed below prior to those metals with guidelines. Even though these metals have no guidelines, they are presented graphically to facilitate comparison between sites (Figures 3.1-35 to 3.1-44). The concentrations of many metals (without guidelines) are generally high in the Mess Creek Watershed including barium, cobalt, lithium, magnesium, potassium and vanadium. The Skeeter Lake Watershed also shows relatively high concentrations of some metals including aluminum, magnesium, manganese and titanium. Since the Hickman Creek site (HC-1), SC-1 within Schaft Creek and WC-1 (a tributary to Mess Creek) are upstream from the potential mine and road activities they are considered reference stream sites for monitoring potentially adverse effects. These sites generally have low metal concentrations, although HC-1 shows relatively high concentrations of cobalt and magnesium.

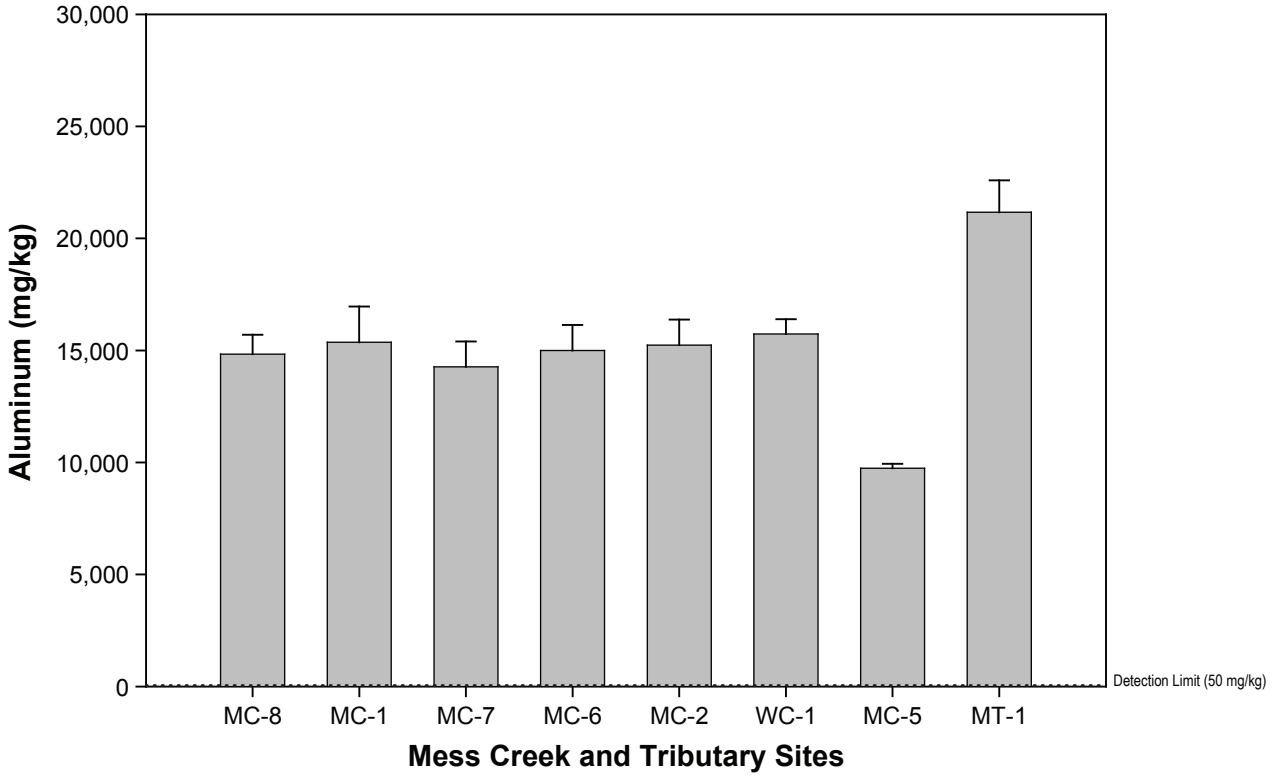
Metal concentrations for which guidelines exist are presented graphically below. Of the nine metals that have guidelines, eight exceeded guidelines at one or more sites.

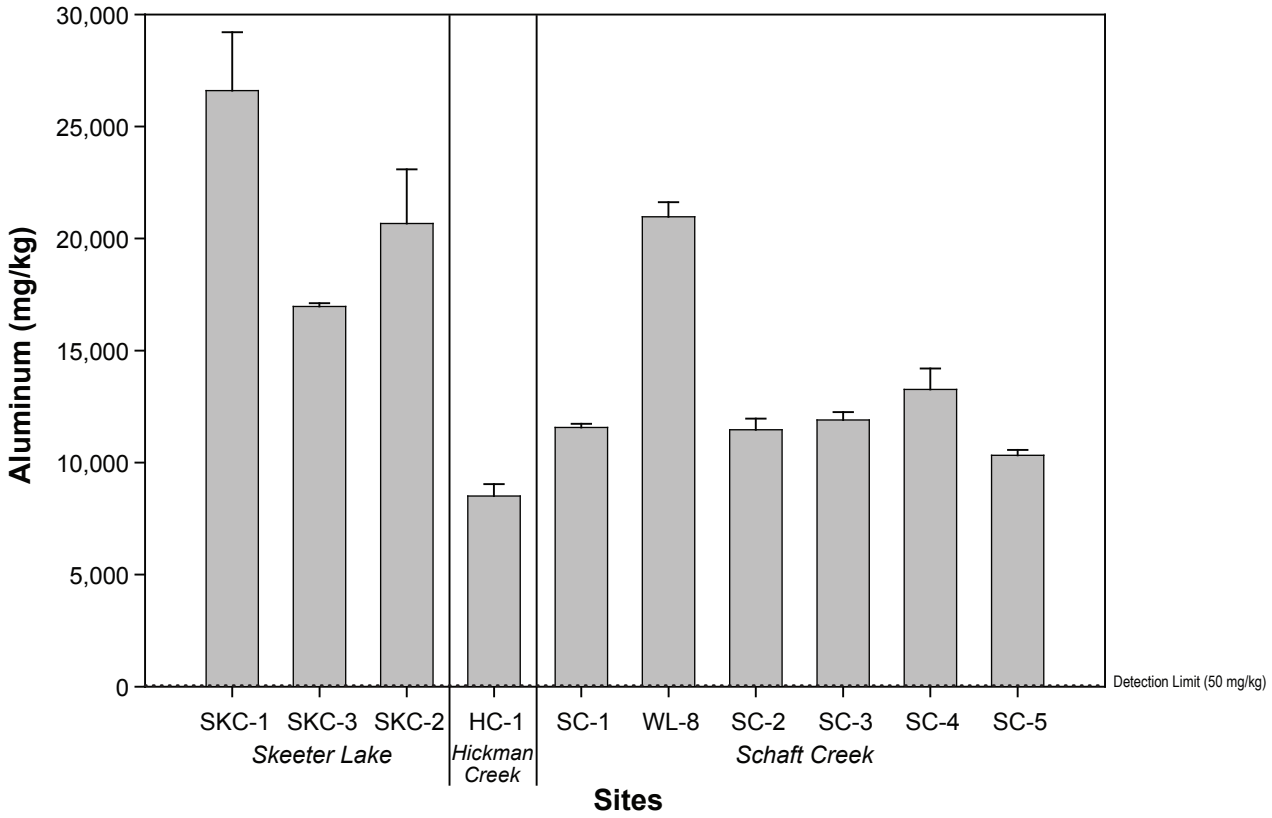
Average arsenic concentrations ranged from 0.4 (MT-1) to 48.4 mg/kg (MC-7) (Figure 3.1-45). B.C. LEL and CCME ISQG guidelines (6.0 and 5.9 mg/kg, respectively), as well as the CCME PEL guideline (17 mg/kg) were exceeded by all but three sites (WC-1, MC-5 and MT-1) in the Mess Creek Watershed. B.C. LEL and CCME ISQG guidelines were also exceeded in at least one sample at all Skeeter Lake Watershed sites and SKC-1 had one sample that exceeded the PEL guideline.

Fifty percent of stream sites had cadmium concentrations below detection limits (Figure 3.1-46). The highest concentrations of cadmium were found at WC-1 (0.6 mg/kg) in the Mess Creek Watershed and in the SKC-1 (0.7 mg/kg) Skeeter Lake Watershed, which are equal to and exceed the B.C. LEL and CCME ISQG guidelines (0.6 mg/kg).

Average chromium concentrations ranged from 19 mg/kg at WC-1 to 355 mg/kg at HC-1 (Figure 3.1-47). All stream sites, except WC-1, exceeded the B.C. LEL (26 mg/kg) and CCME ISQG (37.3 mg/kg) guidelines, although the reference site SC-1 only had one sample that exceeded the ISQG guideline. The average chromium concentration at HC-1 is almost three times that recorded at most other sites.

All stream sites, except WC-1, exceeded the B.C. LEL (16 mg/kg) guideline for copper (Figure 3.1-48). Average copper concentrations exceeded the CCME ISQG (35.7 mg/kg) guideline at SKC-1, SC-1, WL-8, SC-4 and most Mess Creek Watershed sites except WC-1 and MC-5. Average copper concentrations ranged from 11.2 (WC-1) to 111.6 mg/kg (SKC-1). Copper concentrations at SKC-1 are considerably higher than other sites. The only other sites with average concentrations greater than 70 mg/kg were WL-8 and MT-1.

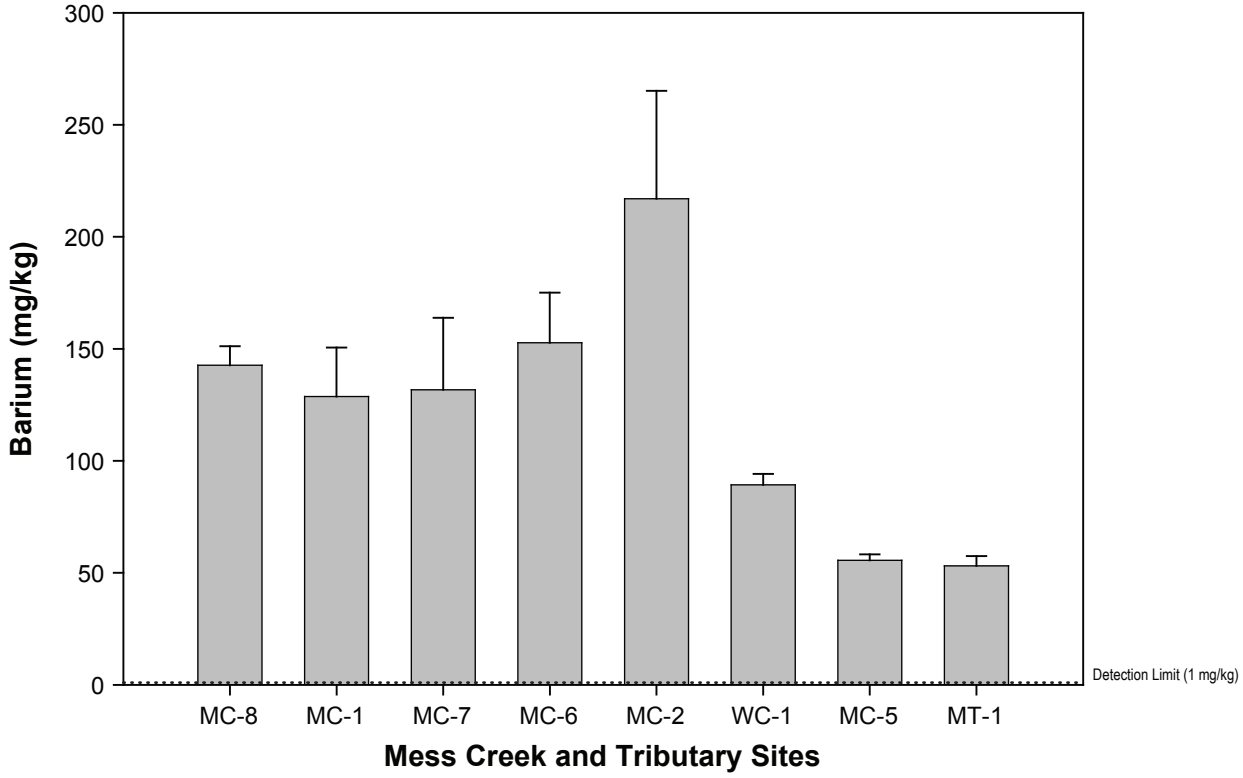


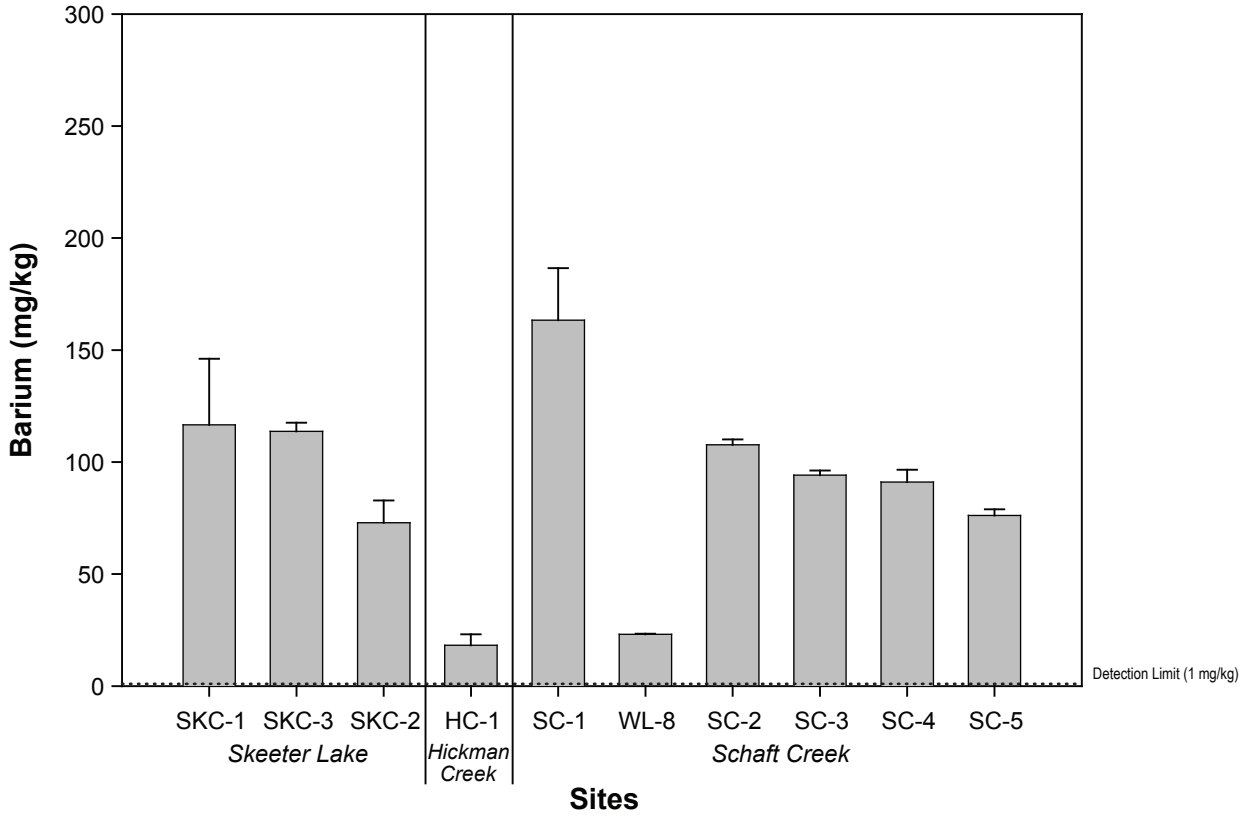


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-35

Aluminum Concentrations in Schaft Creek Project Stream Sediments, August 2006

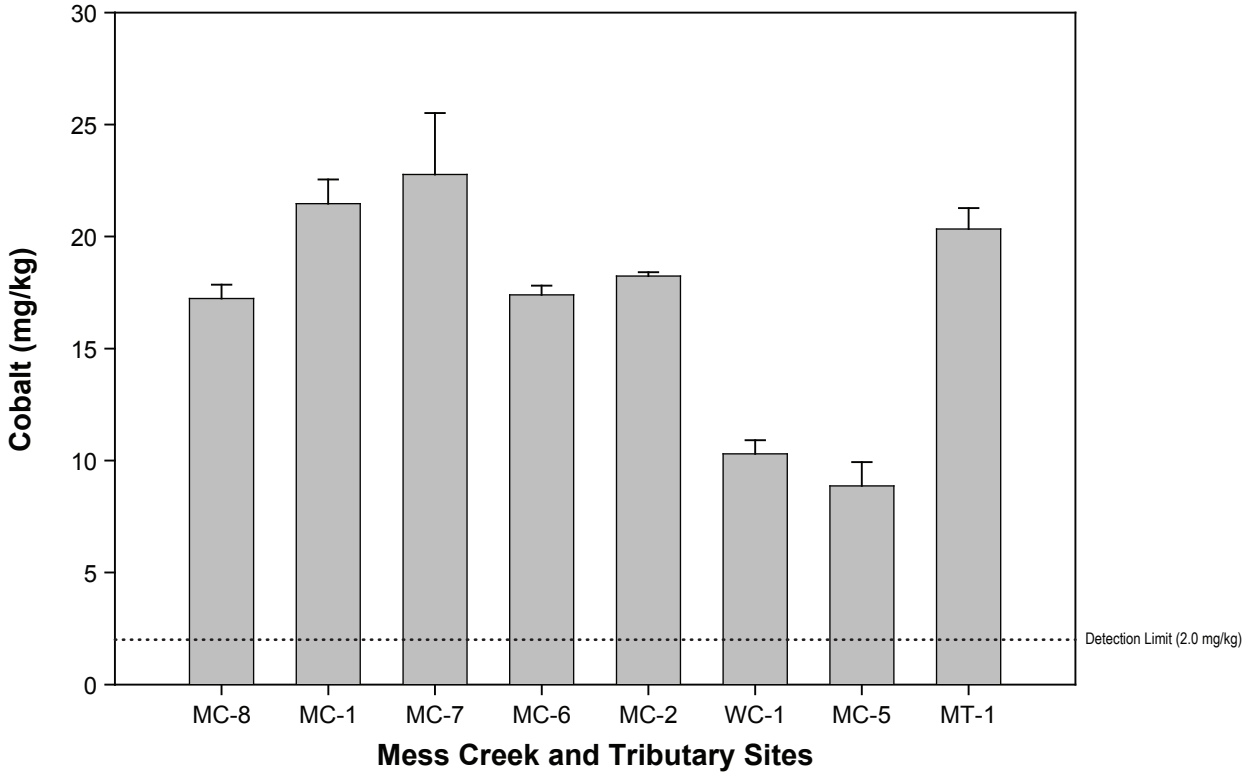


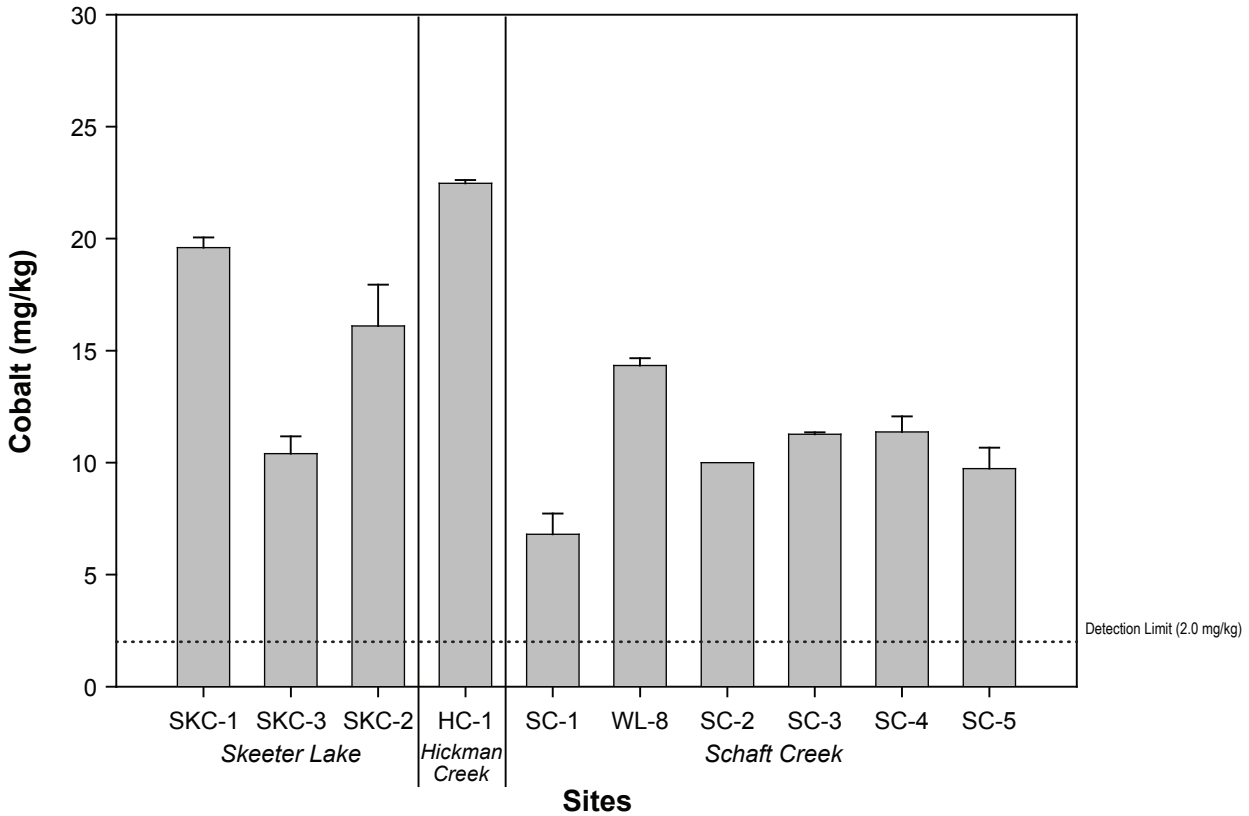


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-36

Barium Concentrations in Schaft Creek Project Stream Sediments, August 2006

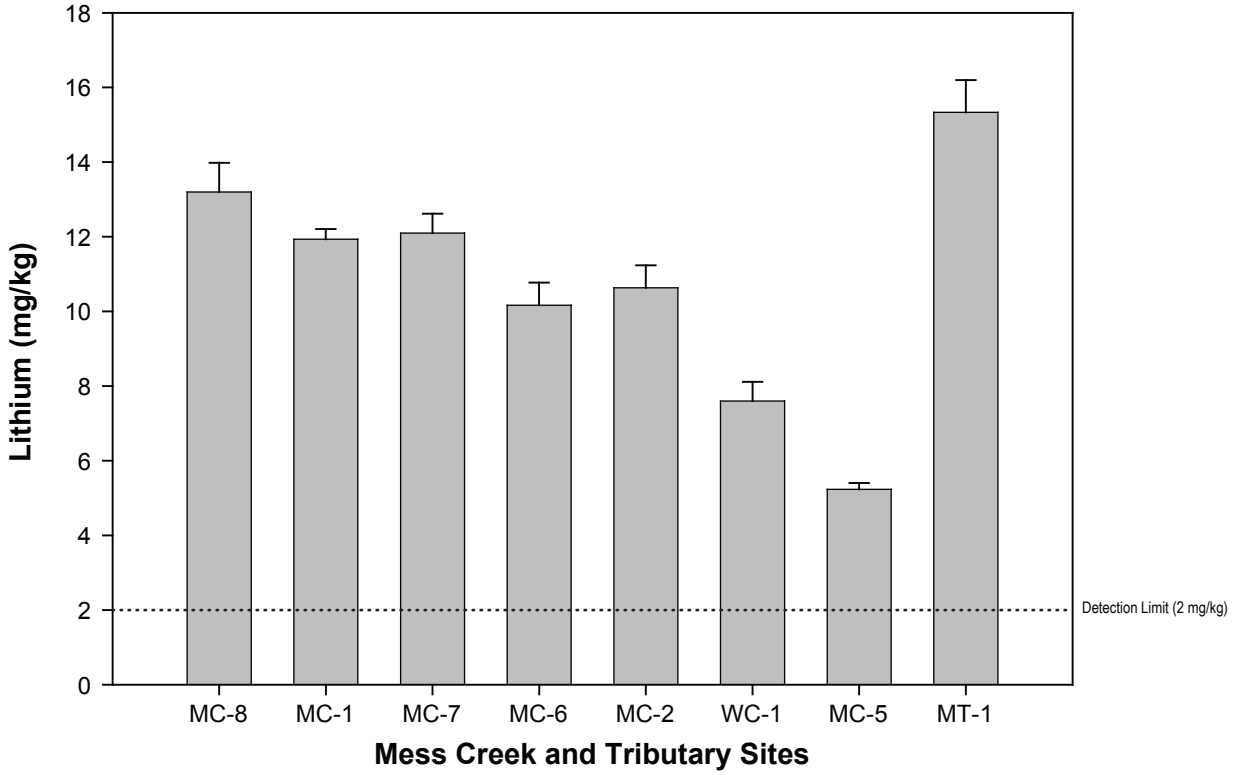


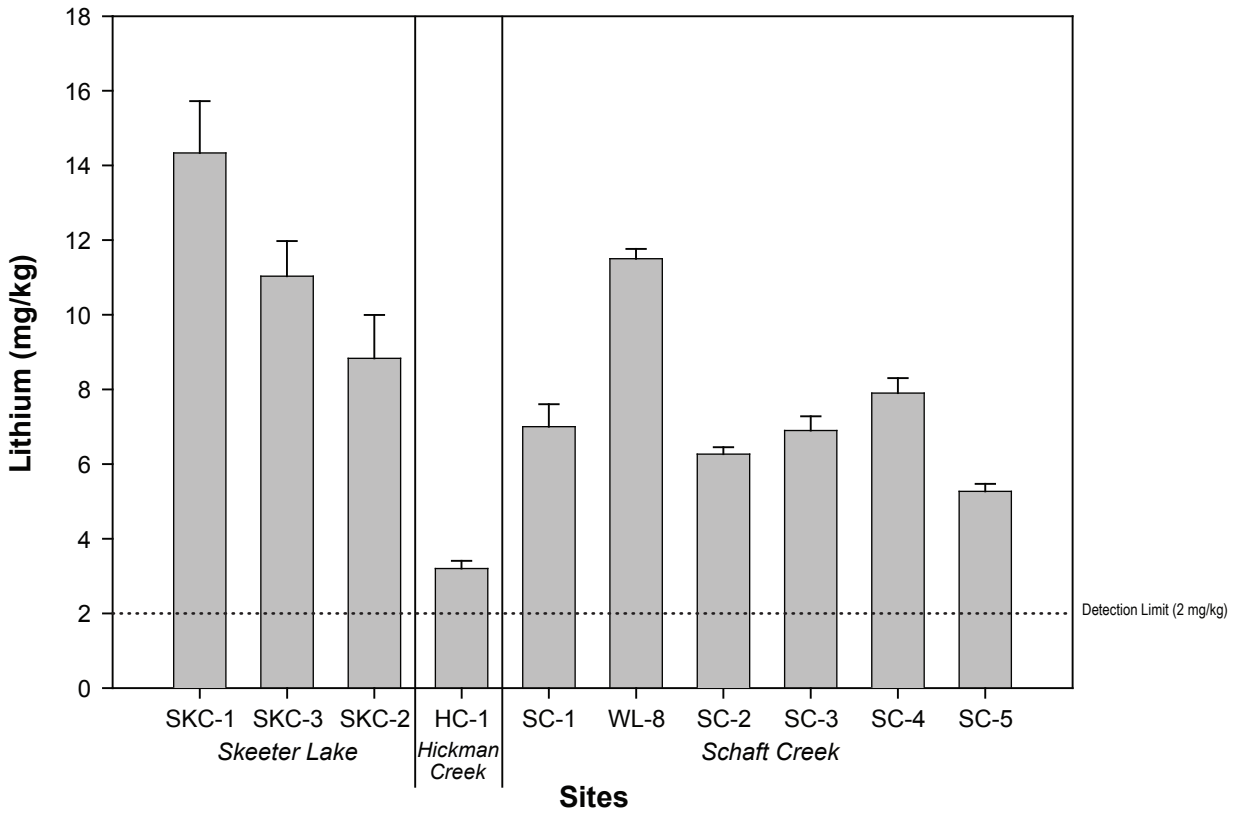


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-37

Cobalt Concentrations in Schaft Creek Project Stream Sediments, August 2006

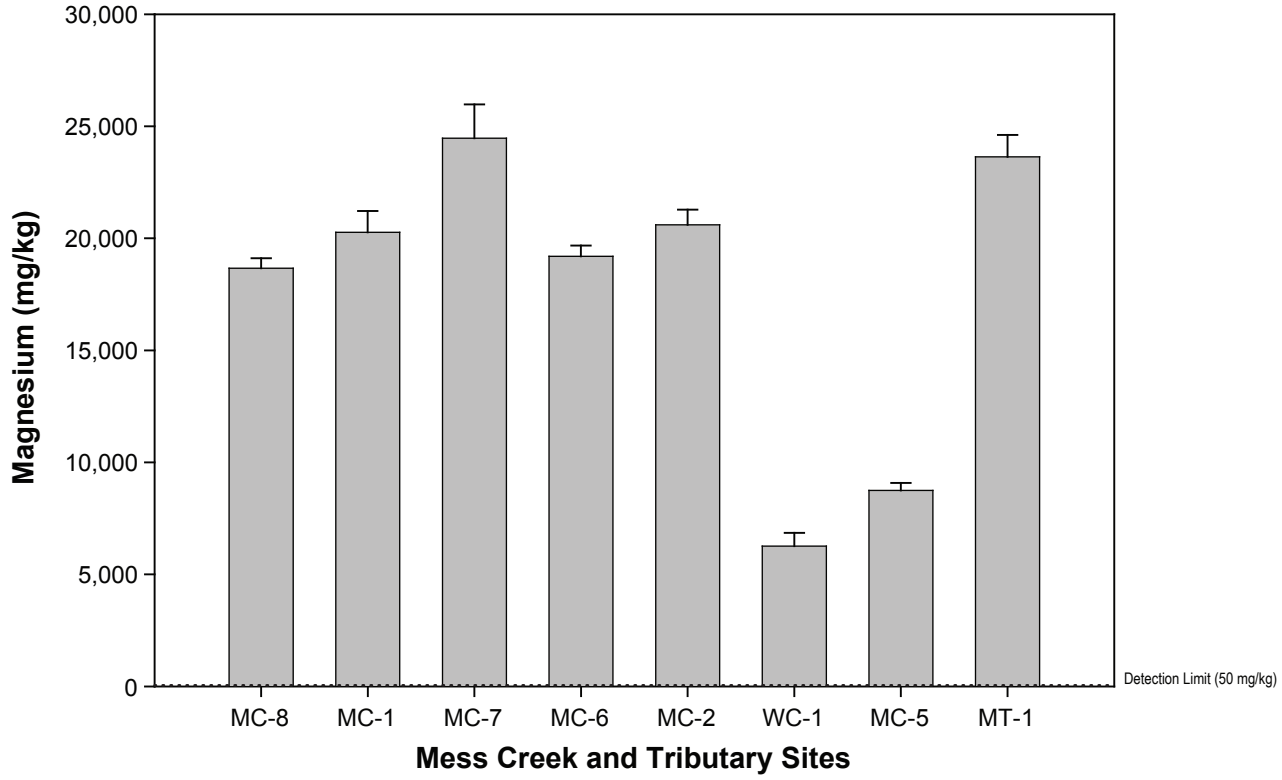


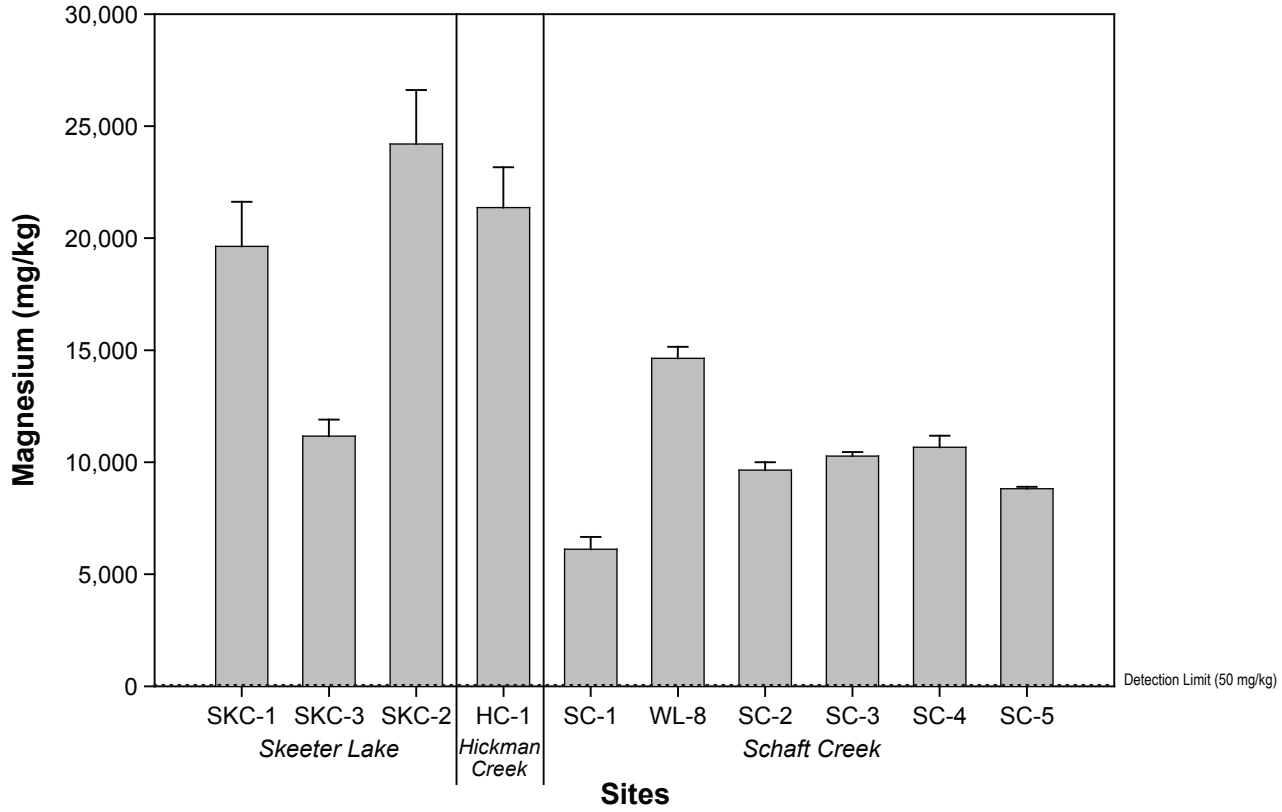


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-38

Lithium Concentrations in Schaft Creek Project Stream Sediments, August 2006

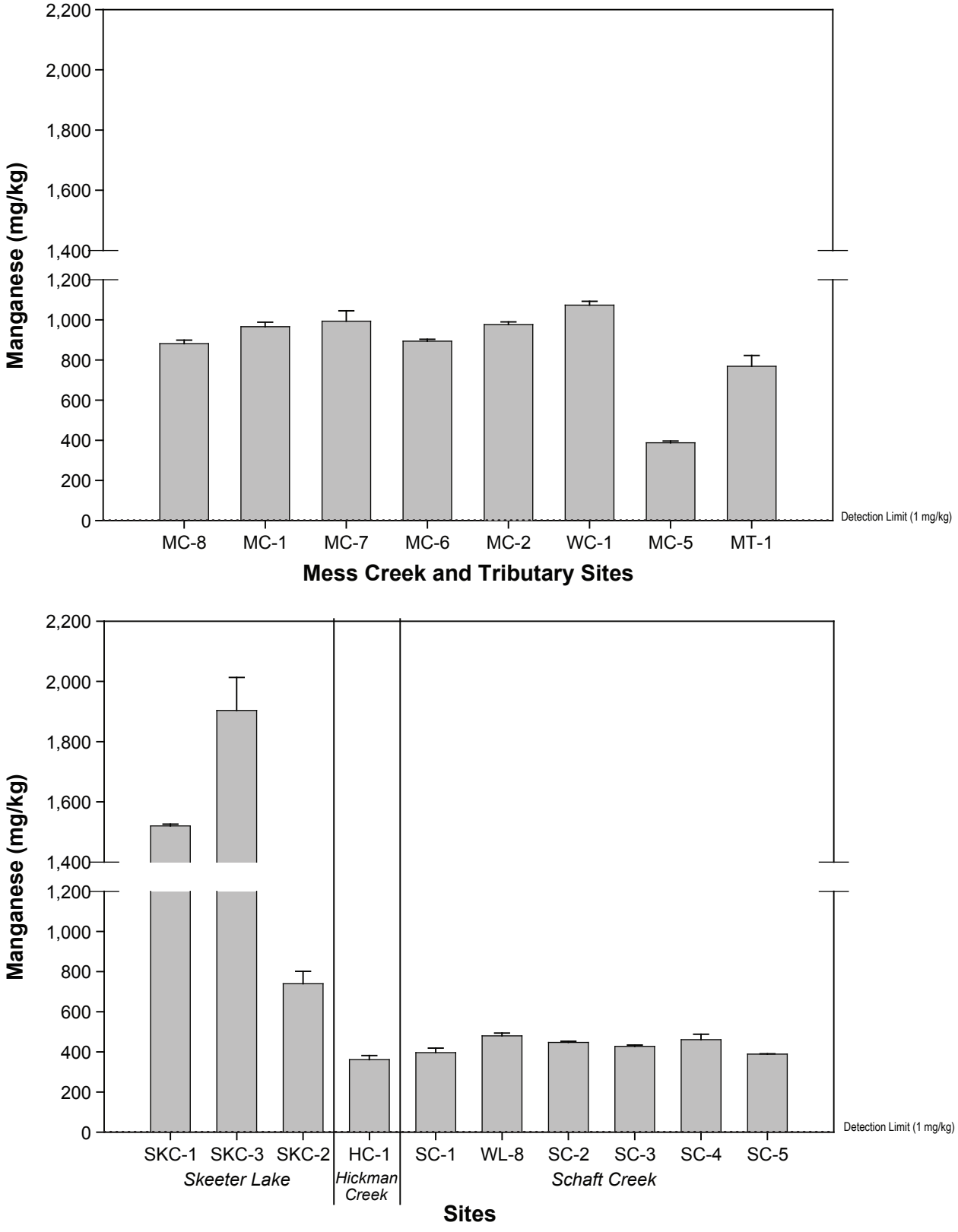




Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-39

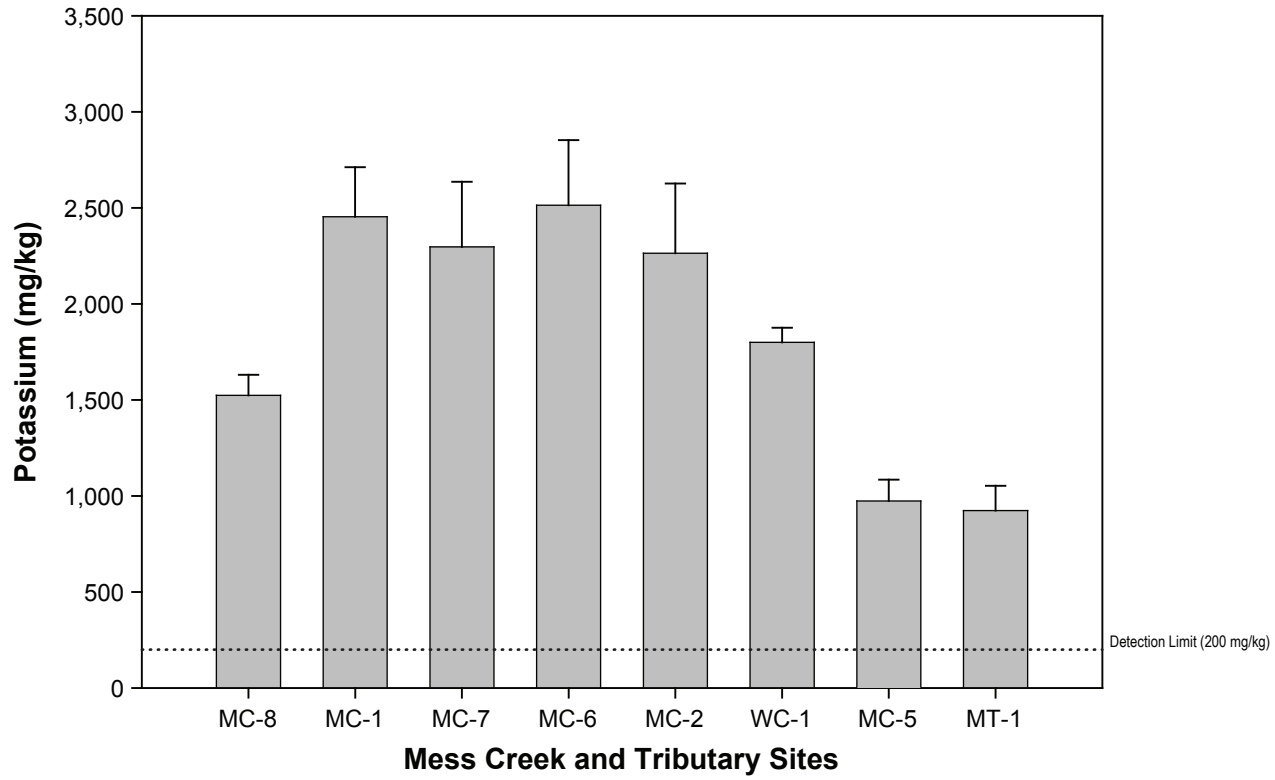
Magnesium Concentrations in Schaft Creek Project Stream Sediments, August 2006

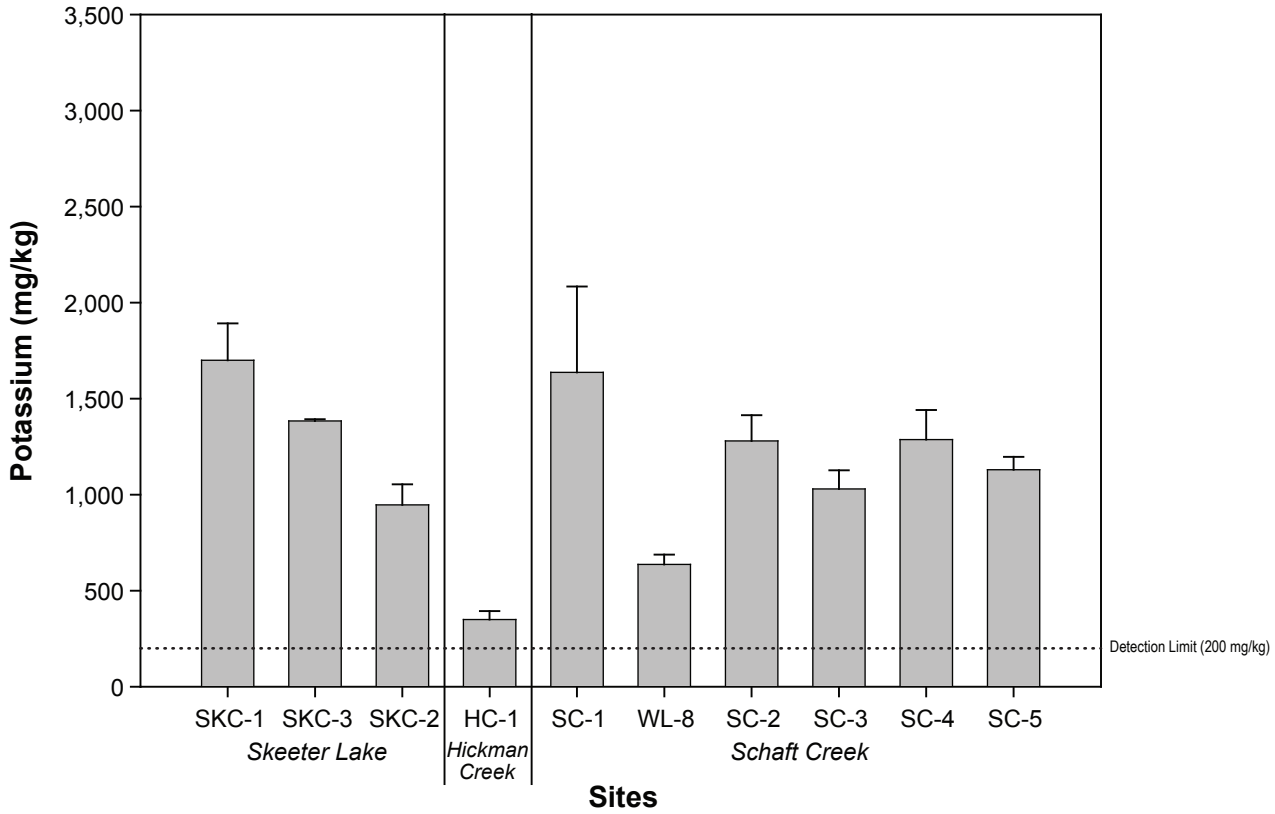


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-40

Manganese Concentrations in Schaft Creek Project Stream Sediments, August 2006

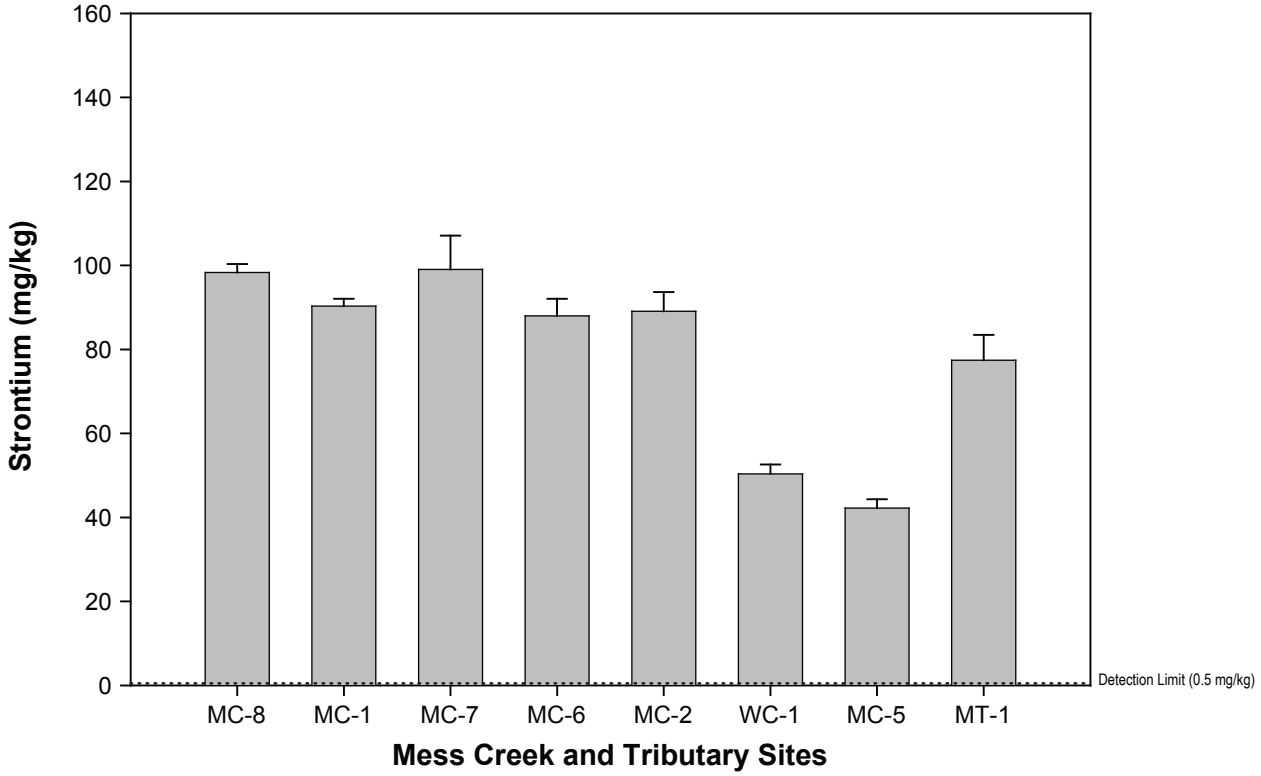


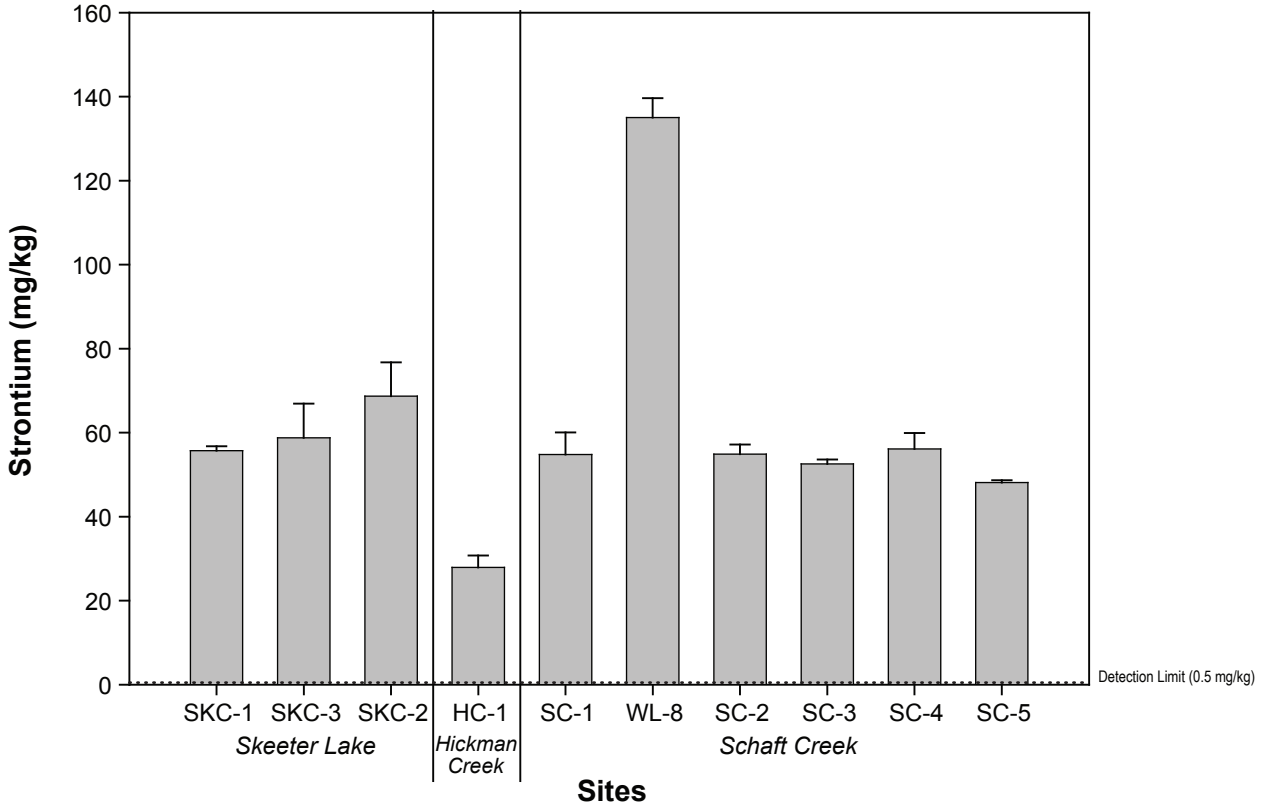


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-41

Potassium Concentrations in Schaft Creek Project Stream Sediments, August 2006

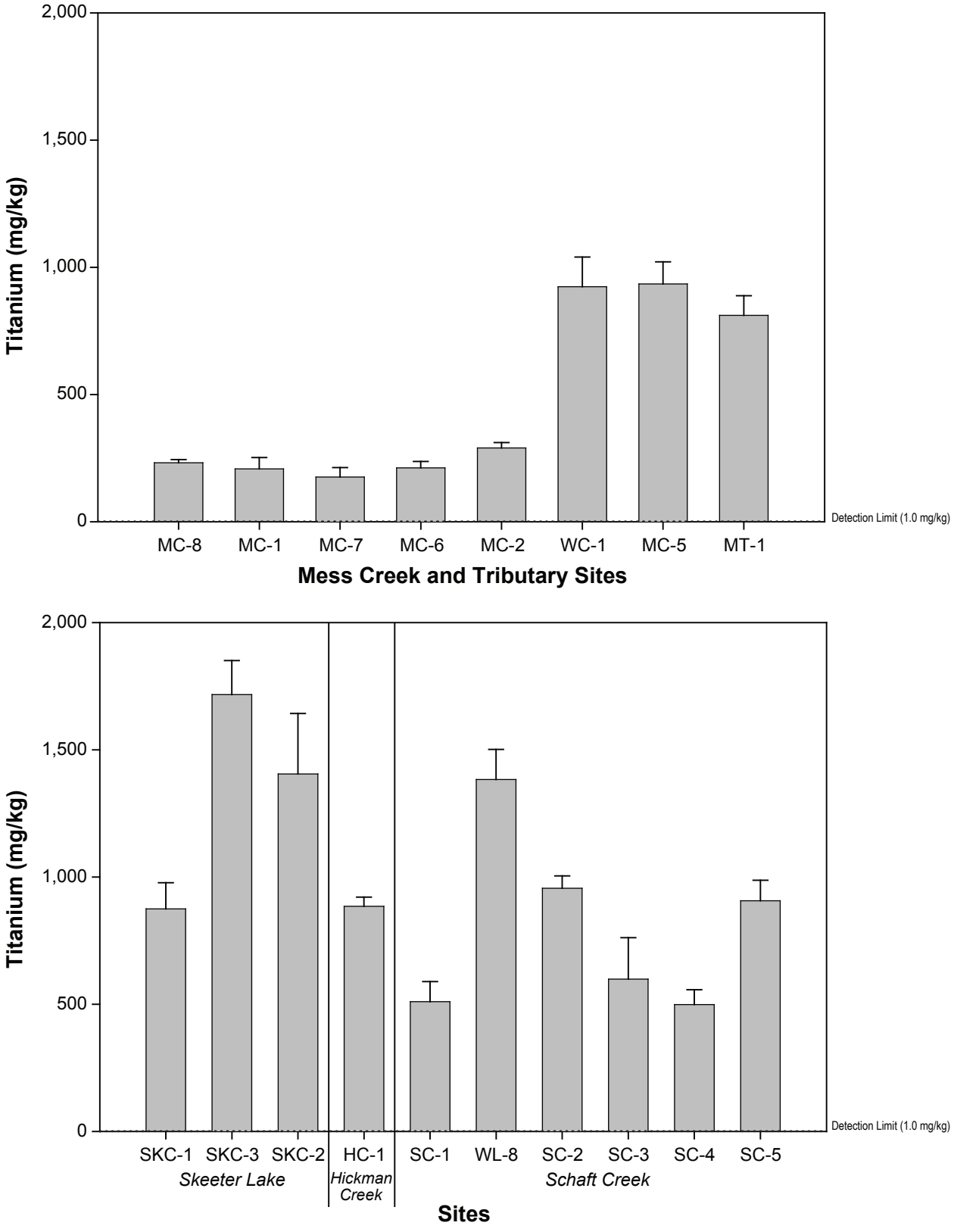




Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-42

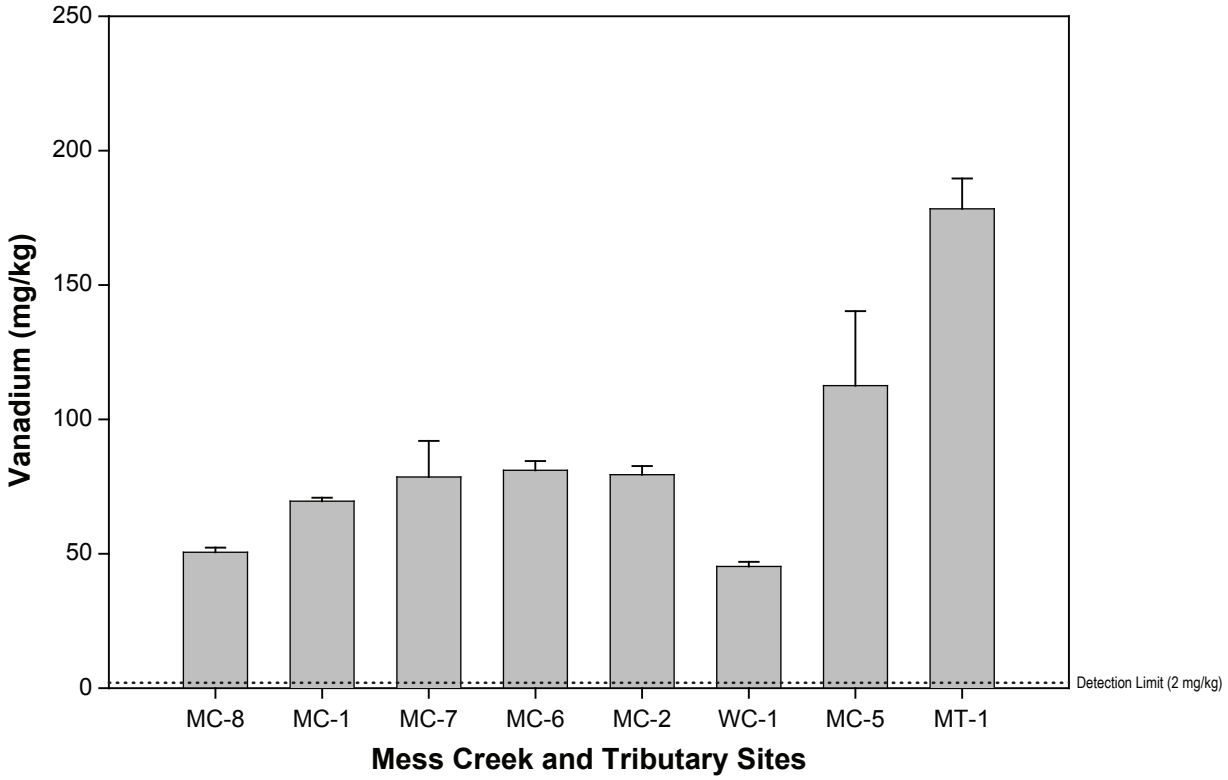
Strontium Concentrations in Schaft Creek Project Stream Sediments, August 2006

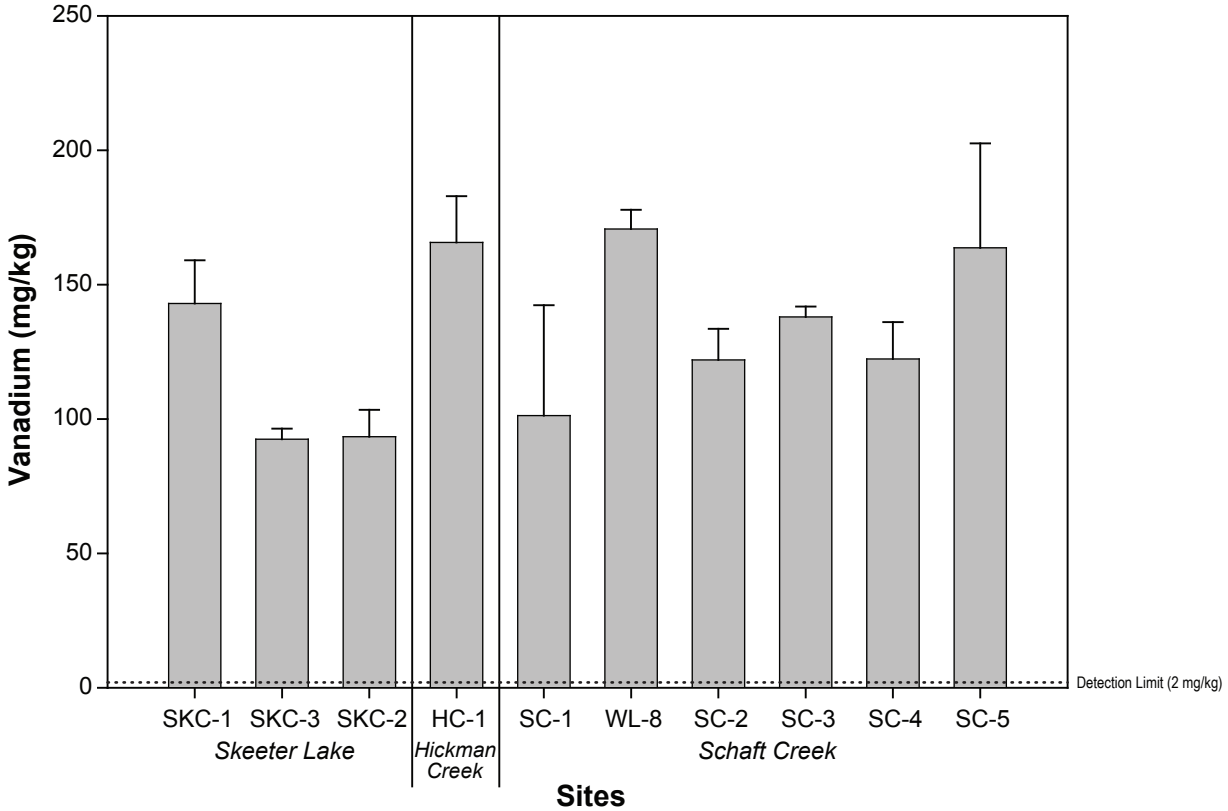


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-43

Titanium Concentrations in Schaft Creek Project Stream Sediments, August 2006

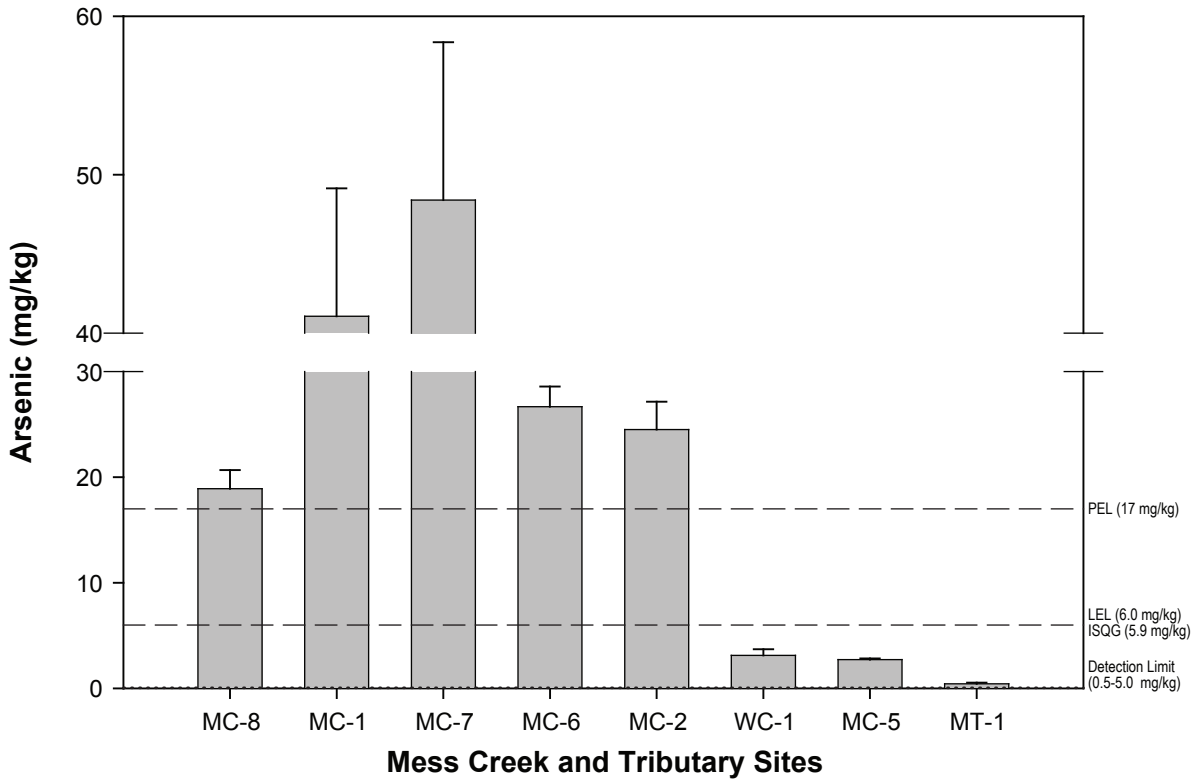


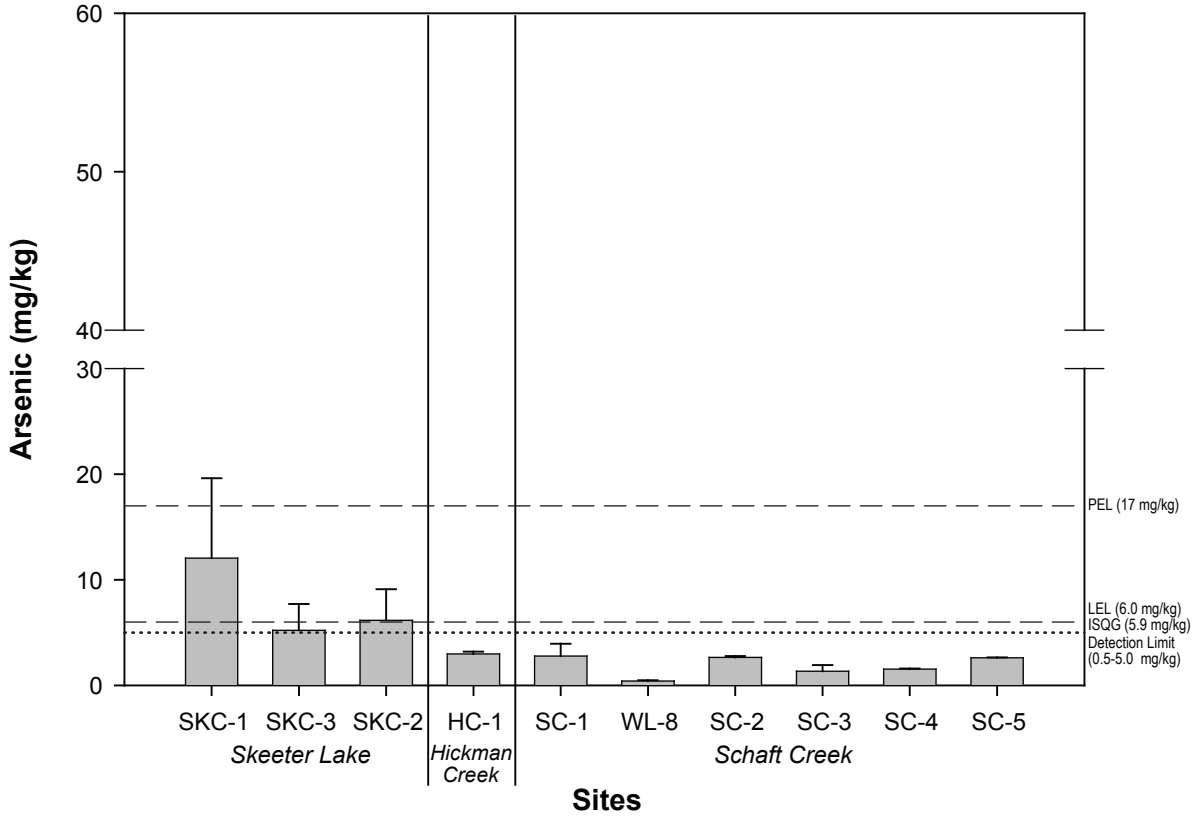


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-44

Vanadium Concentrations in Schaft Creek Project Stream Sediments, August 2006

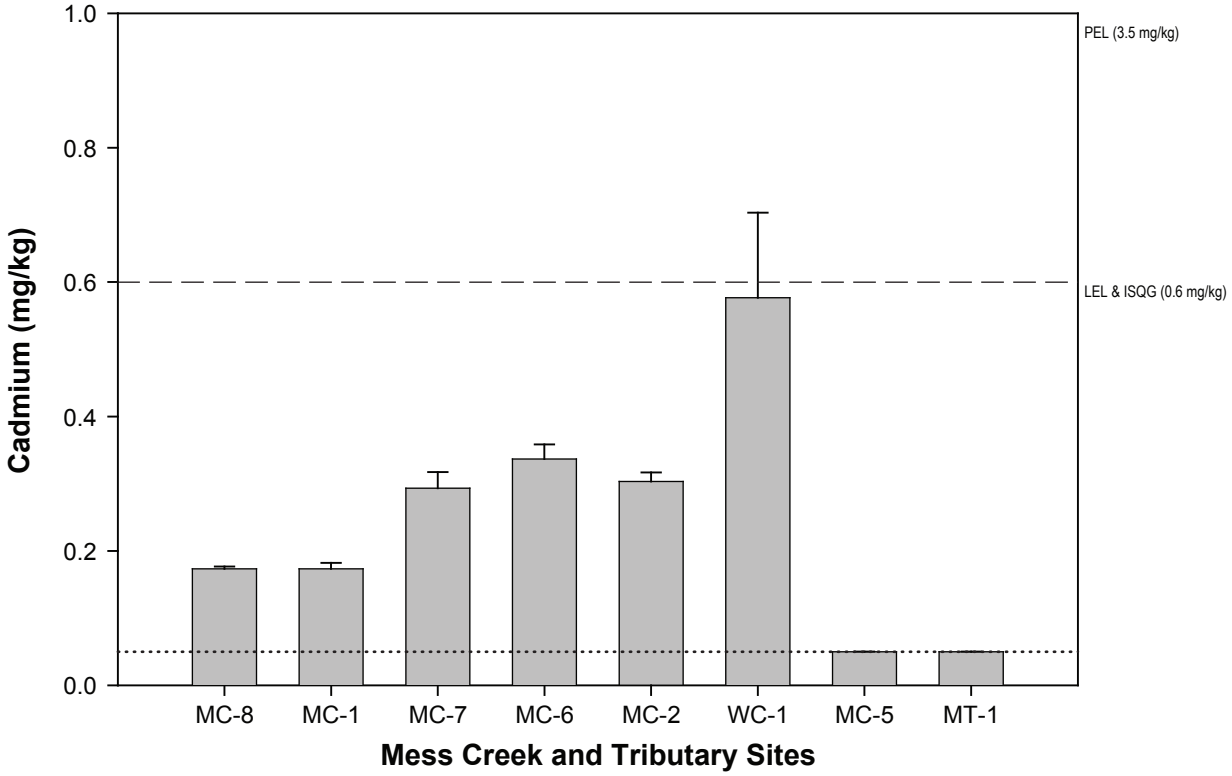


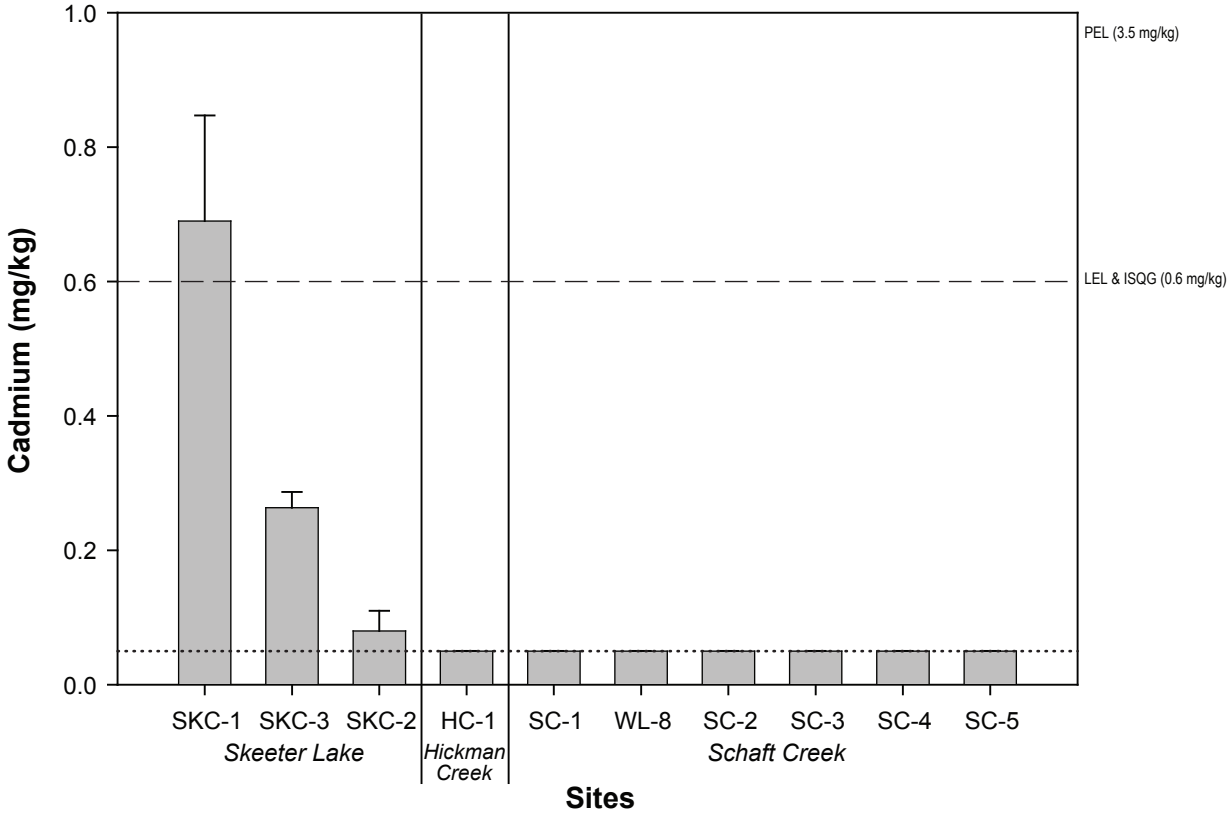


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-45

Arsenic Concentrations in Schaft Creek Project Stream Sediments, August 2006

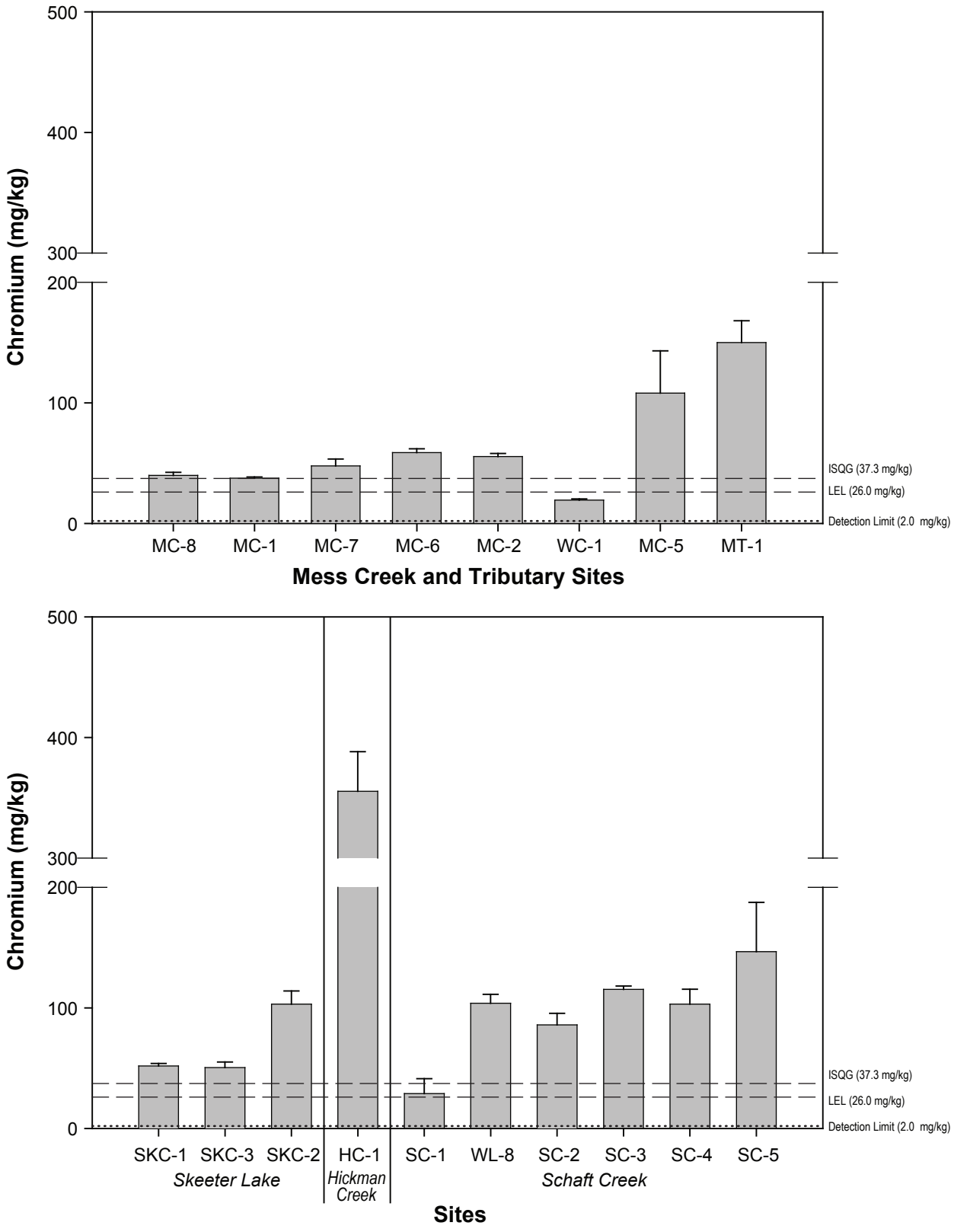




Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-46

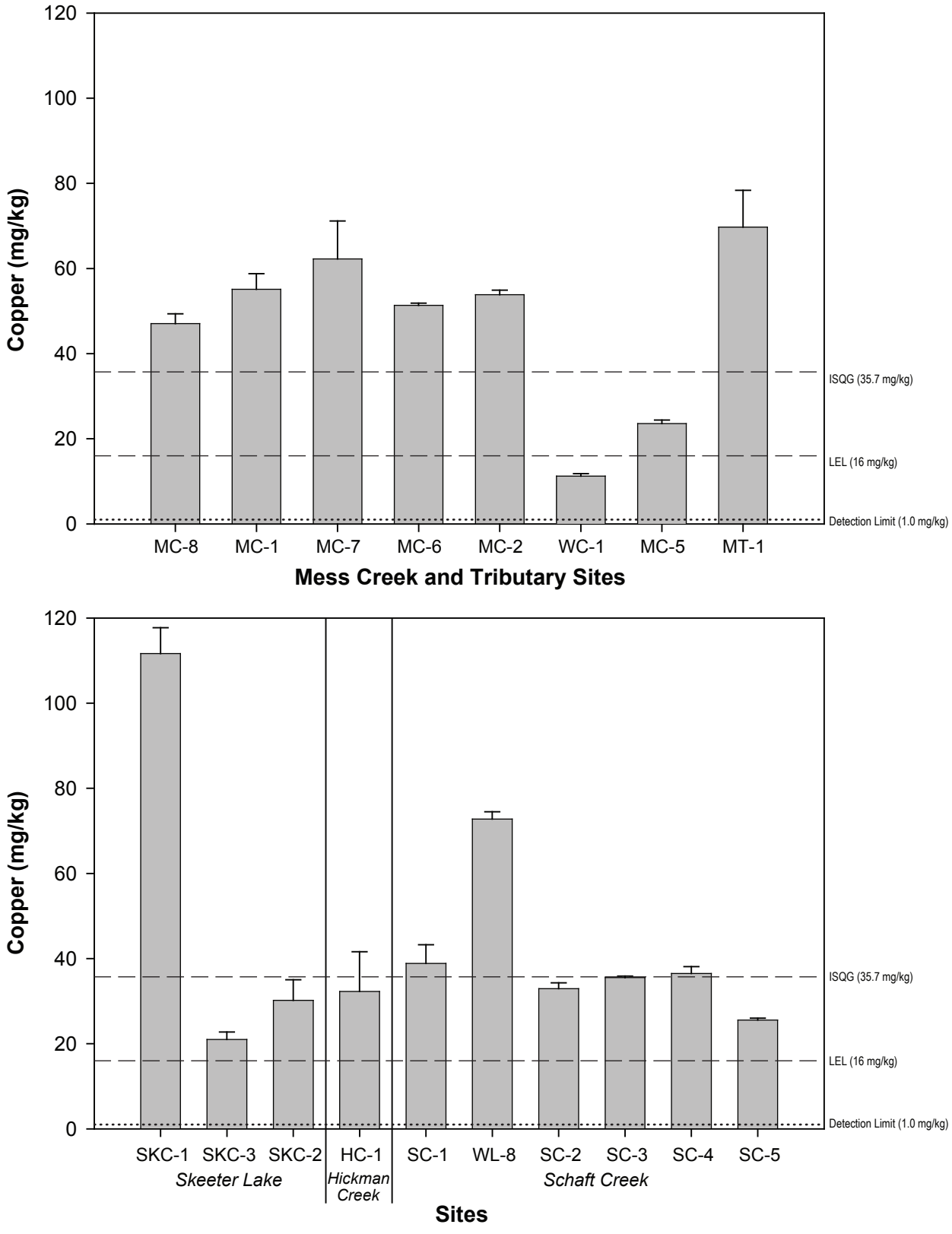
Cadmium Concentrations in Schaft Creek Project Stream Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-47

Chromium Concentrations in Schaft Creek Project Stream Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-48

Copper Concentrations in Schaft Creek Project Stream Sediments, August 2006

Average iron concentrations ranged from 30,600 mg/kg at SC-1 to 58,466 mg/kg at MC-7 (Figure 3.1-49). All stream sites exceeded the B.C. LEL guideline (21,200 mg/kg) and eight sites exceeded the BC SEL (43,766 mg/kg) guideline including the reference site HC-1.

All average lead concentrations were well below the CCME ISQG (35 mg/kg) and PEL (91.3 mg/kg) guidelines (Figure 3.1-50). Lead concentrations ranged from below the detection limit (2 mg/kg) at HC-1 to 8.9 mg/kg at SKC-1. Generally, the average lead concentrations in Mess Creek Watershed sites (<4 mg/kg) were greater than other sites with the exception of SKC-1.

All average mercury concentrations were well below LEL (0.2 mg/kg) and ISQG (0.17 mg/kg) guidelines except MC-1 (0.18 mg/kg), which exceeded the ISQG guideline (Figure 3.1-51). As seen in some other metals, the mercury concentrations in the Mess Creek Watershed were generally higher than other watersheds.

Average nickel concentrations ranged from below the analytical detection limit (5 mg/kg) at SC-1 to 118 at SKC-2 (Figure 3.1-52). The nickel concentration at SKC-2 was almost double that seen at any other site. All sites, except SC-1, exceeded the LEL guidelines of 16 mg/kg and only SKC-2 exceeded the SEL guideline of 75 mg/kg.

Average zinc concentrations ranged from 29 (SC-1) to 144 mg/kg (WC-1) (Figure 3.1-53). Only WC-1 and SKC-1 exceeded the B.C. LEL (120 mg/kg) and CCME ISQG (123 mg/kg) guidelines. All other sites had zinc concentrations below 80 mg/kg.

3.1.1.3 Primary and Secondary Producers

Periphyton

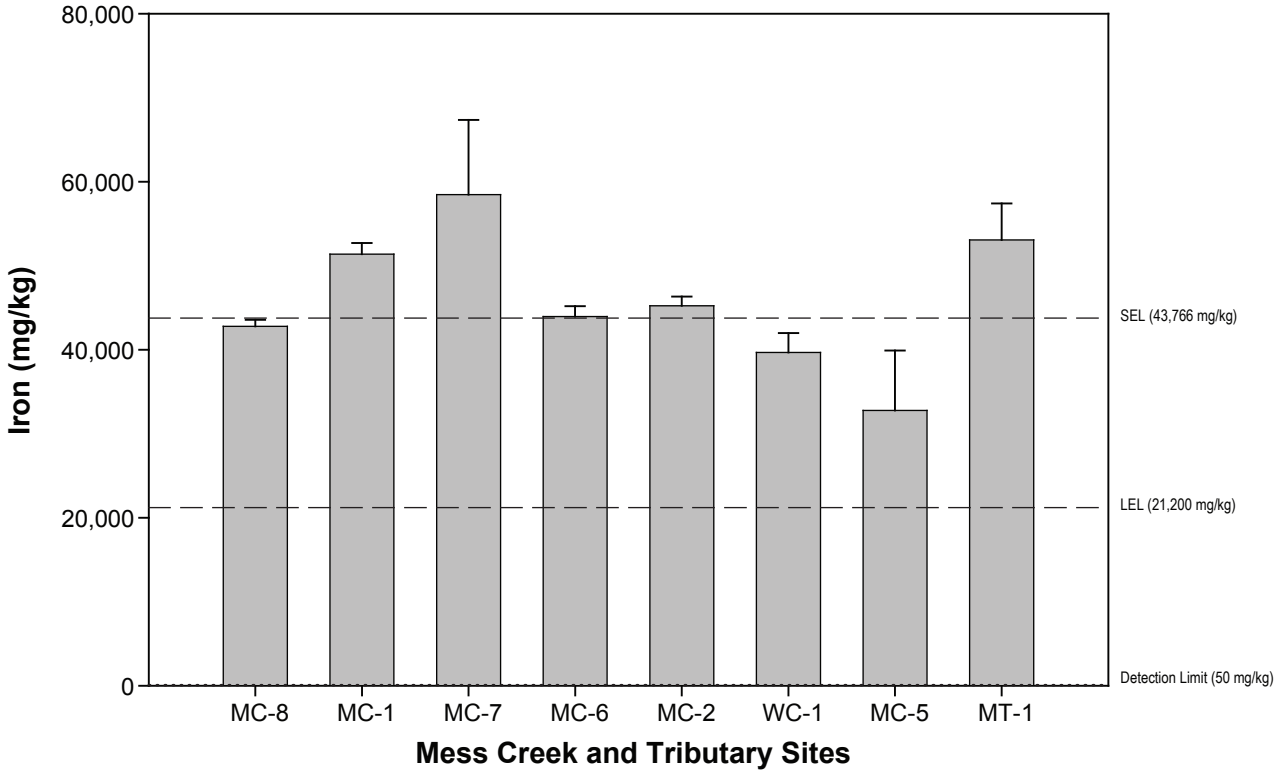
Taxonomic results are unavailable at this time.

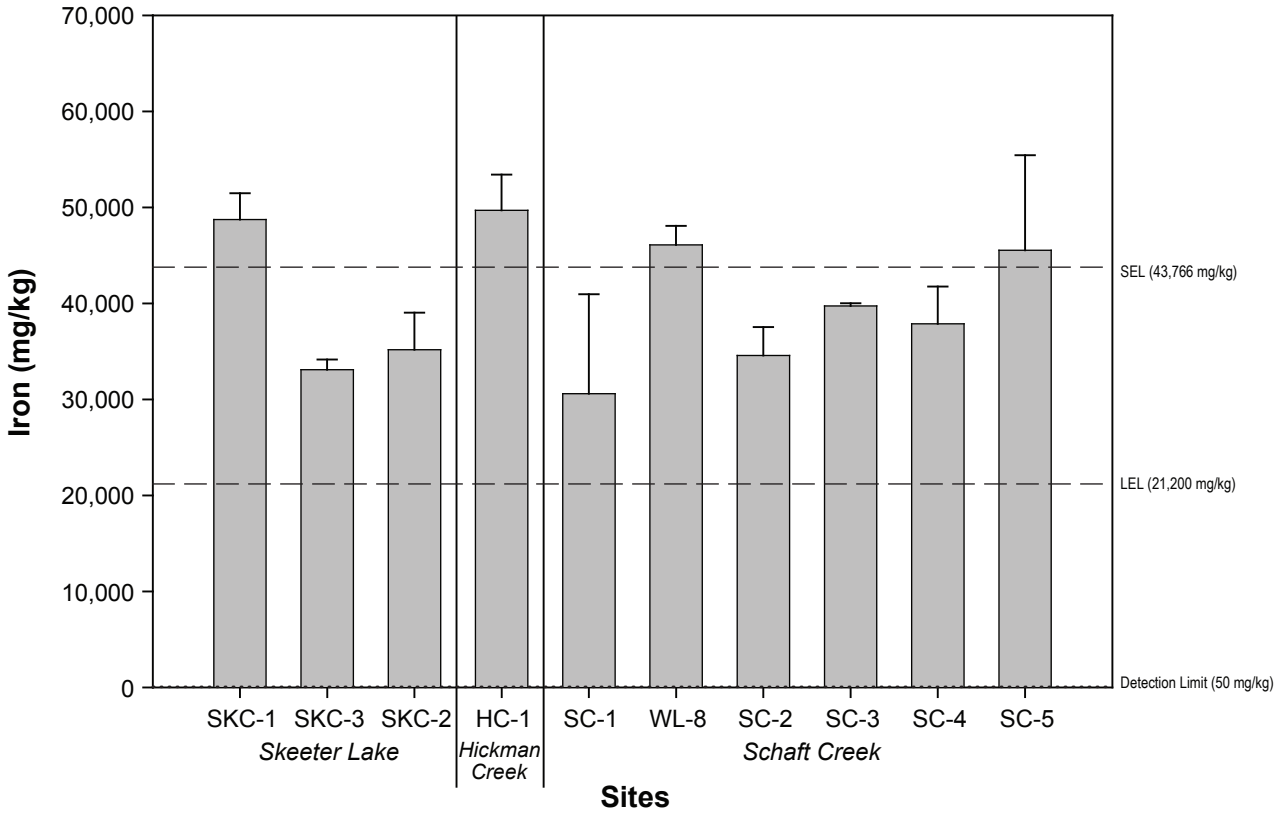
Benthic Invertebrates

Taxonomic results are unavailable at this time.

3.1.2 Wetlands and Lakes

In August of 2006, water and sediment quality, primary and secondary producer samples were collected at five lakes and seven wetlands. Four of the five lakes were within the Mess Creek (L-1 and L-3) and Skeeter Lake (L-2 and L-5) watersheds. A reference lake (L-4; Plate 3.1-1), which is located further north and relatively isolated from project activities, was also sampled to provide a basis for comparison when monitoring for potential adverse effects. Three of the seven wetlands (WL-1, WL-3 and WL-7) were within the Schaft Watershed, three were within the Mess Creek Watershed (WL-2, WL-5 and WL-6) and one was within the Skeeter Lake Watershed (WL-4) just south of Skeeter Lake. WL-1, at the north end of the Schaft Creek Watershed, is the reference site for monitoring potential adverse effects in wetlands (Plate 3.1-2).

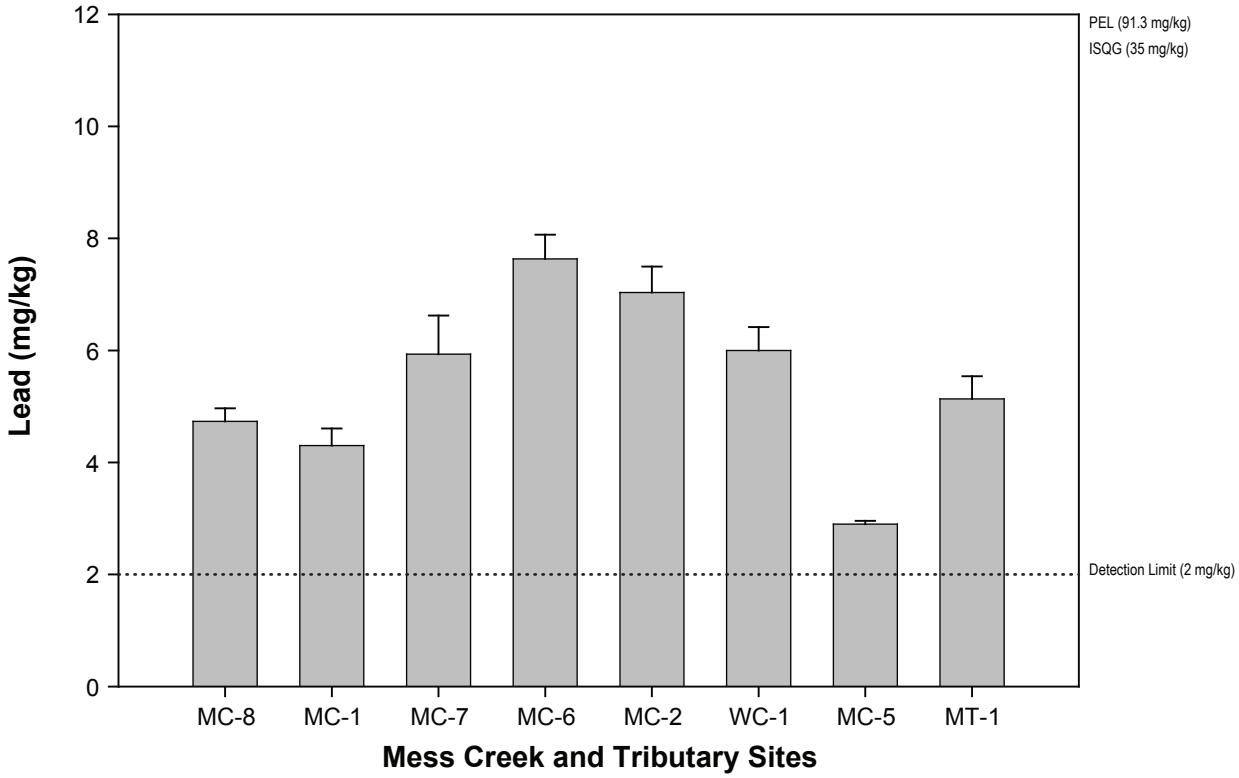


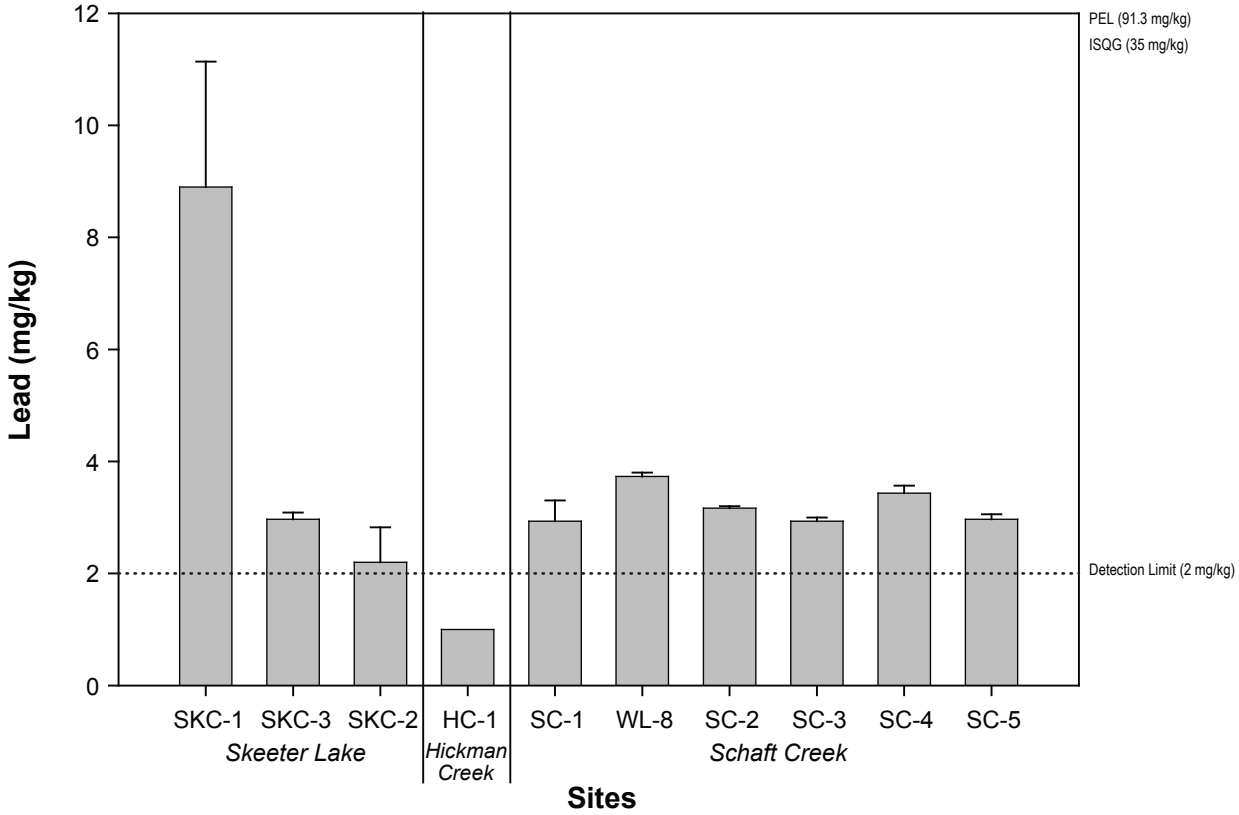


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-49

Iron Concentrations in Schaft Creek Project Stream Sediments, August 2006

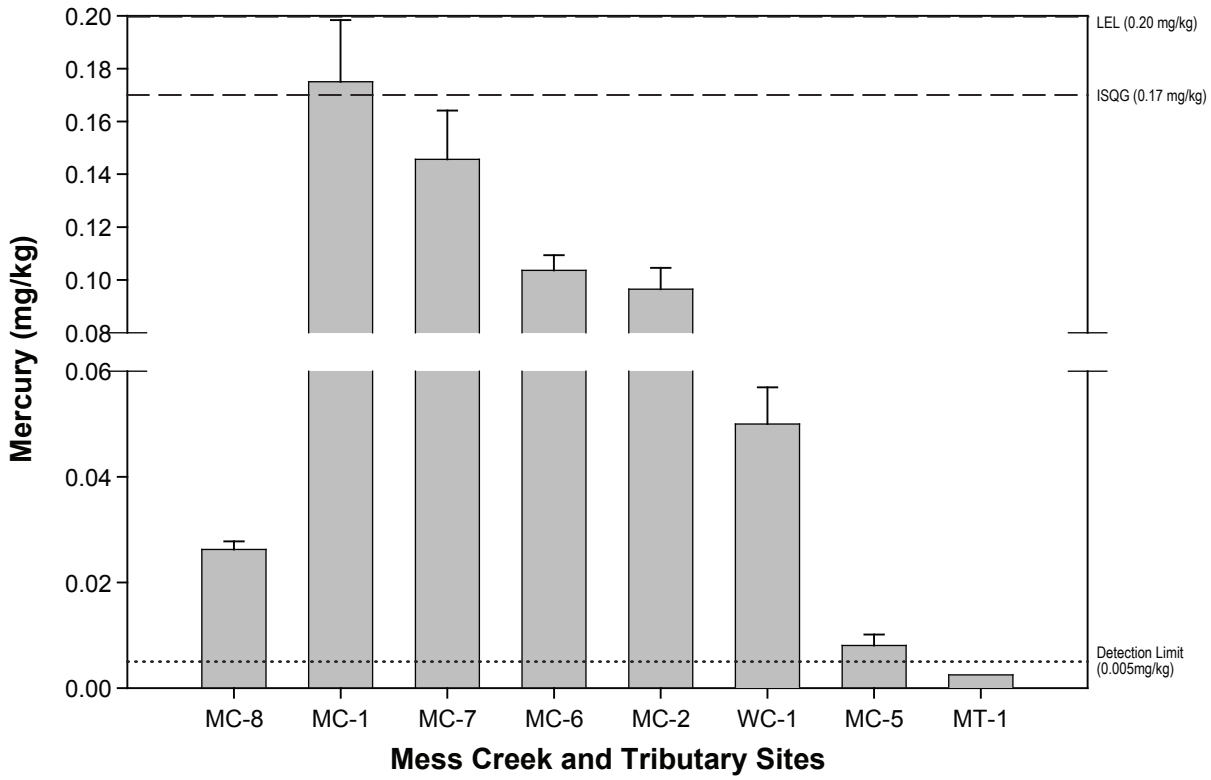


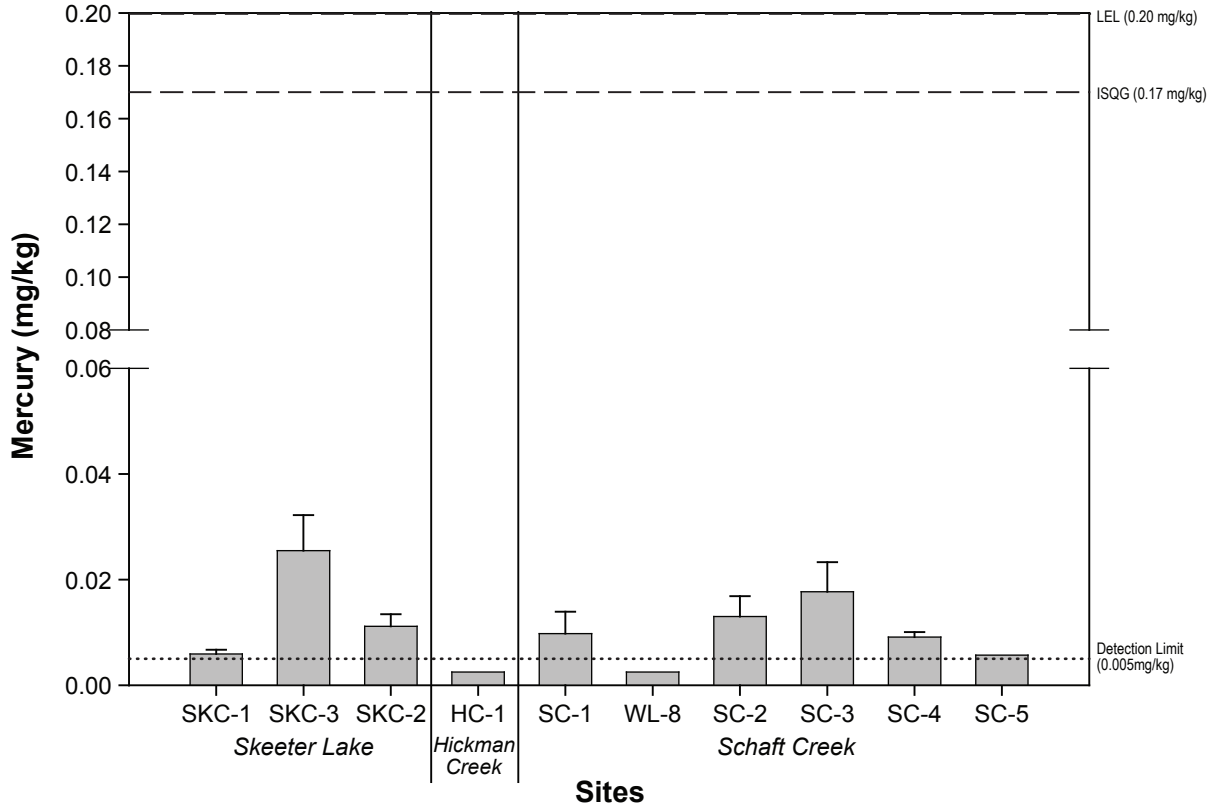


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-50

Lead Concentrations in Schaft Creek Project Stream Sediments, August 2006

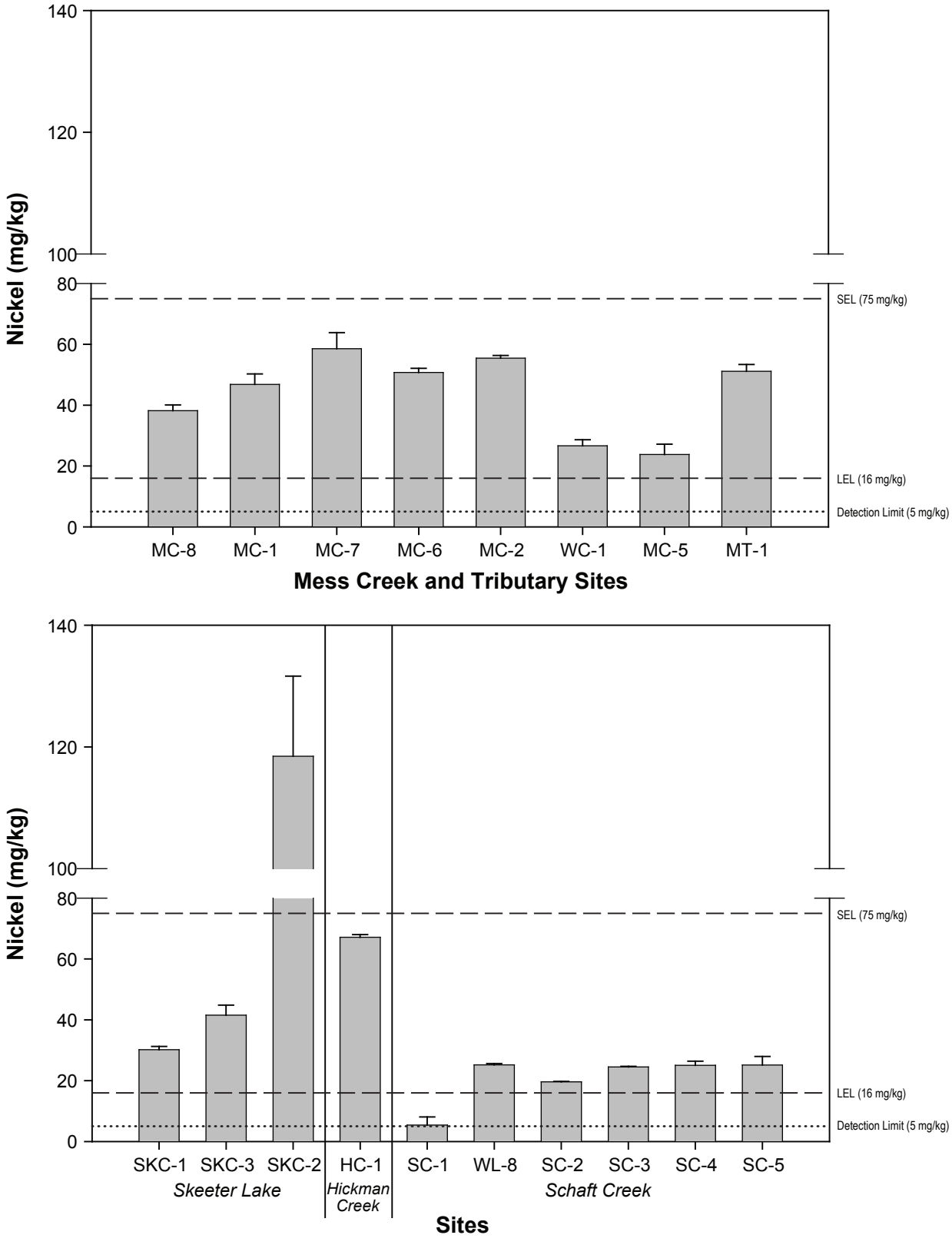




Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-51

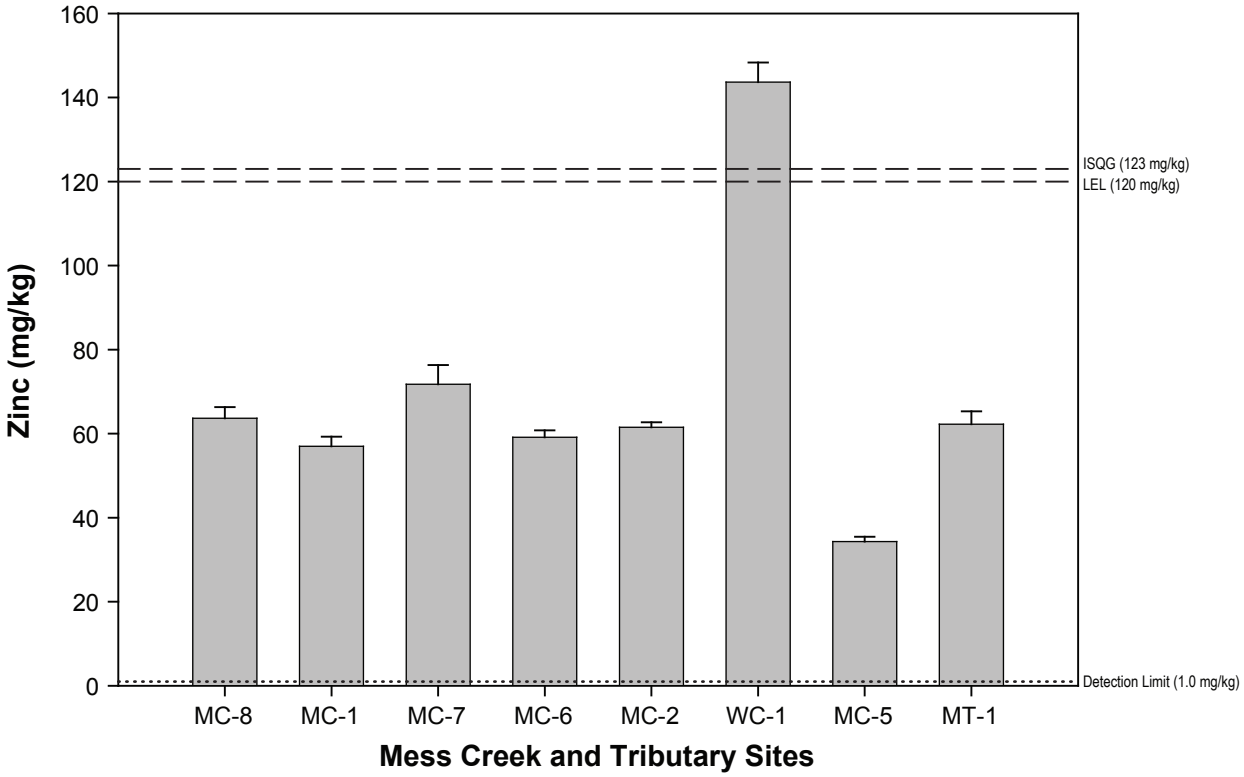
Mercury Concentrations in Schaft Creek Project Stream Sediments, August 2006

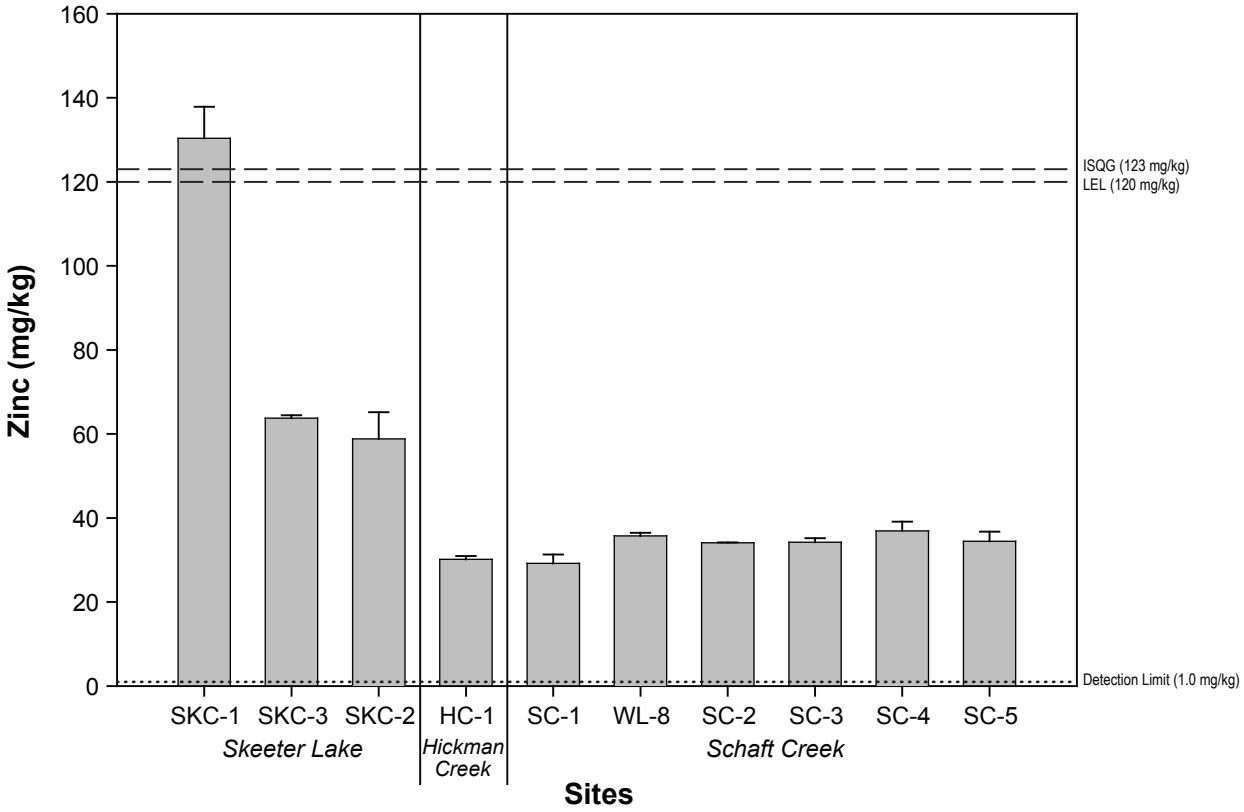


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-52

Nickel Concentrations in Schaft Creek Project Stream Sediments, August 2006





Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-53

Zinc Concentrations in Schaft Creek Project Stream Sediments, August 2006

Plate 3.1-1. Aerial view of reference lake L-4.

Plate 3.1-2. Aerial view of reference wetland WL-1.

3.1.2.1 Water Quality

Annual Water Quality

All raw data for wetland and lake water quality are provided in Appendix 3.1-4. Samples for water quality analyses were collected once from each of the eight wetlands and five lakes in August, 2006.

General Variables and Nutrients

Key variables (total dissolved solids, hardness, pH, total suspended solids, turbidity, sulphate, nitrate, ammonia, total nitrogen and total phosphate) are presented graphically and discussed below. Within each figure, sites are shown from upstream to downstream, and are grouped by watersheds. If available, CCME and B.C. guidelines are indicated. Since L-4 is relatively isolated from the potential mine and road activities it is indicated as the reference lake for monitoring potentially adverse effects.

At most wetland and lake sites concentrations of total dissolved solids (TDS) were below 150 mg/L (Figure 3.1-54). The exception to this was WL-2, which had a TDS concentration almost 18 times that of any other wetland (1760 mg/L). The highest concentration in lakes was found at L-2 (126 mg/L). There are no guidelines for TDS.

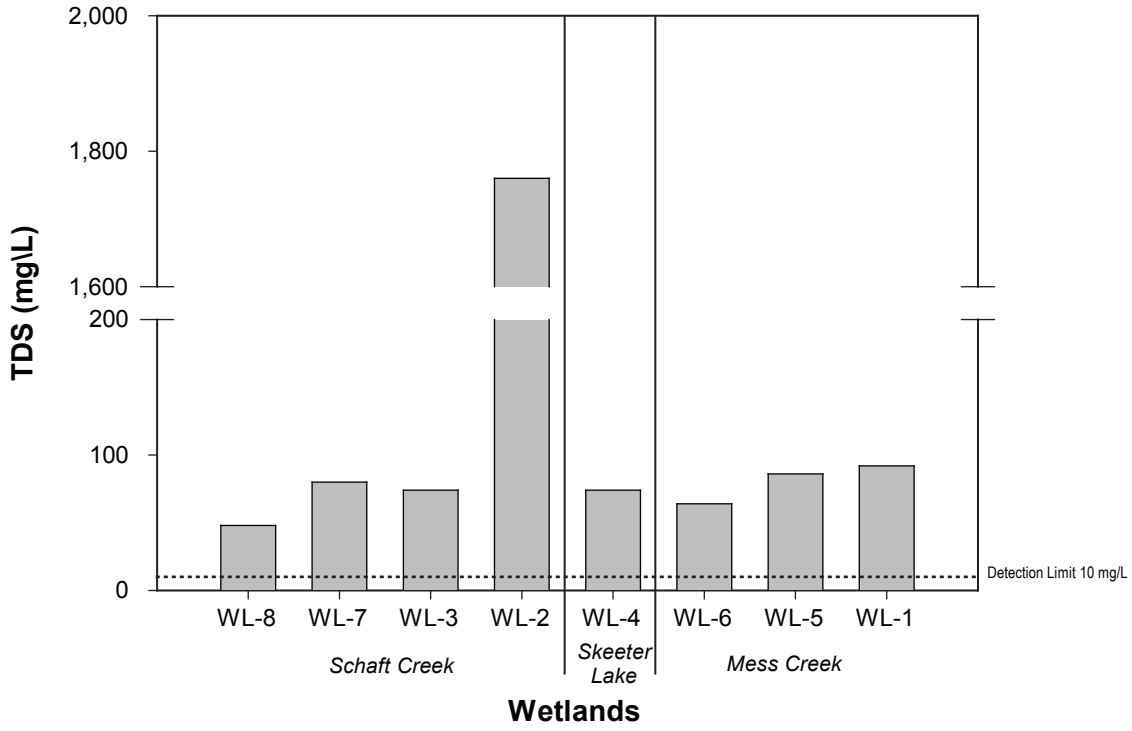
Similar to TDS, water hardness in most wetlands and lakes was below 150 mg/L except WL-2 (Figure 3.1-55). The water hardness at WL-2 was approximately six times that of any other wetland (594 mg/L). The highest concentration in lakes was found at L-3 (106 mg/L). There are no guidelines for water hardness.

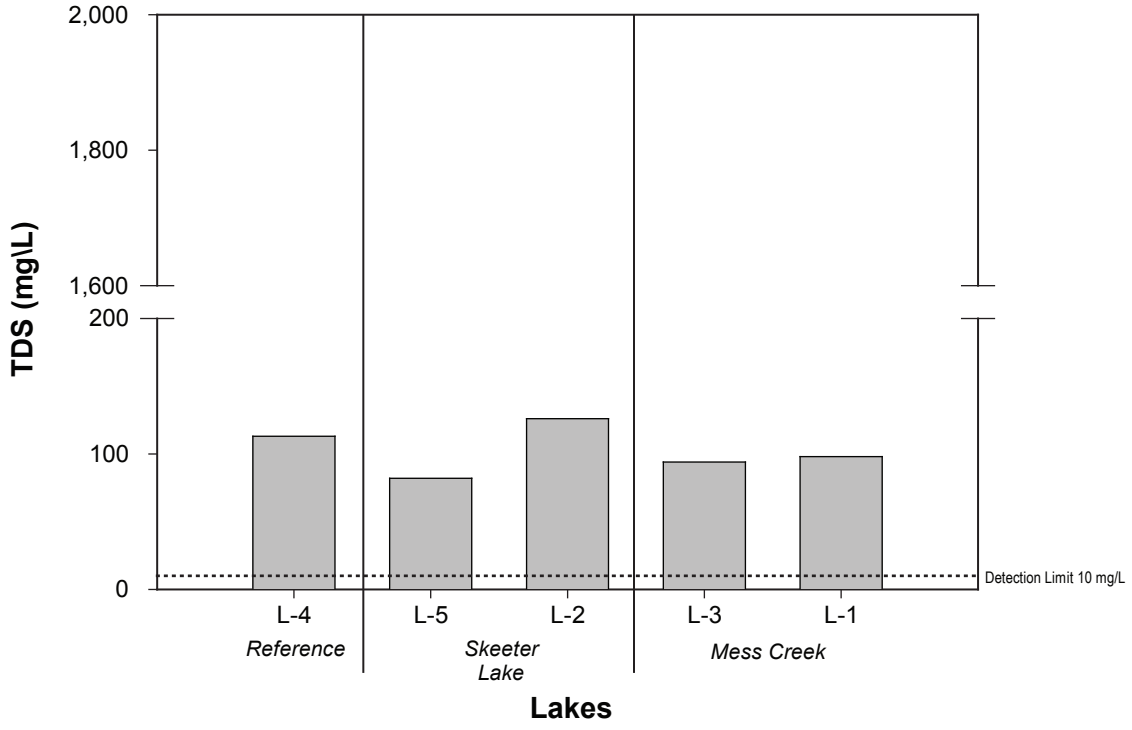
Wetlands and lakes showed little variability in pH between sites (Figures 3.1-56). pH values in wetlands ranged from 7.57 to 8.47 and from 8.01 to 8.16 in lakes. All samples were within the CCME and B.C. guidelines for the protection of aquatic life (6.5 to 9.0).

All lake sites, except L-1, and WL-7 had total suspended solids (TSS) concentrations below detection limits (Figures 3.1-57). TSS at L-1 was 11 mg/L and WL-5 had considerably greater TSS (78.5 mg/L) than other wetlands. Guidelines for TSS are based on changes from background values therefore they are not currently applicable.

Most wetland and lake sites showed turbidity levels below 40 NTU (Figure 3.1-58). Turbidity in wetlands ranged from below 0.7 to 78.5 NTU (WL-5) and from 0.4 to 29.5 NTU (L-1) in lakes. Guidelines for turbidity are based on changes from background therefore they are not currently applicable.

Wetland sulphate concentrations ranged from below detection at WL-3 to 607 mg/L at WL-2 (Figures 3.1-59). As seen with TDS and hardness, the sulphate concentration at WL-2 is considerably greater than other wetlands. Sulphate concentrations in lakes ranged from 4 (L-4) to 20 mg/L (L-2 and L-5). There is no CCME WQ guideline for sulphate. The BC Max guideline (100 mg/L) was exceeded at WL-2.

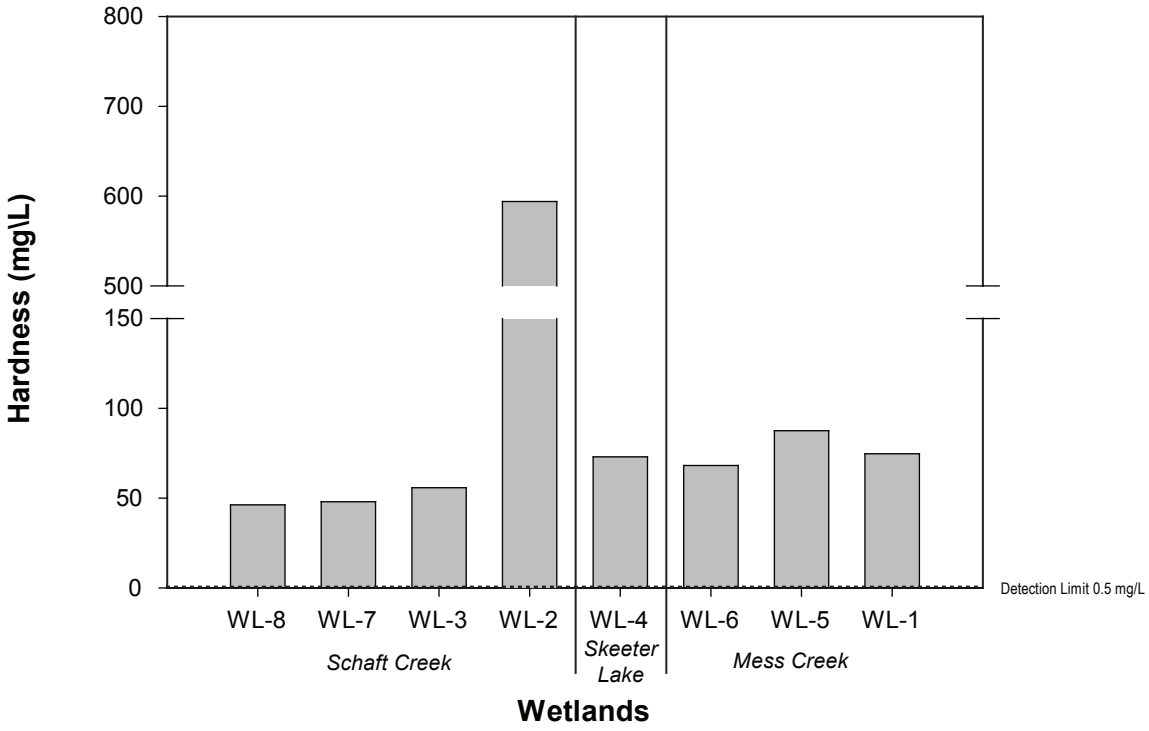


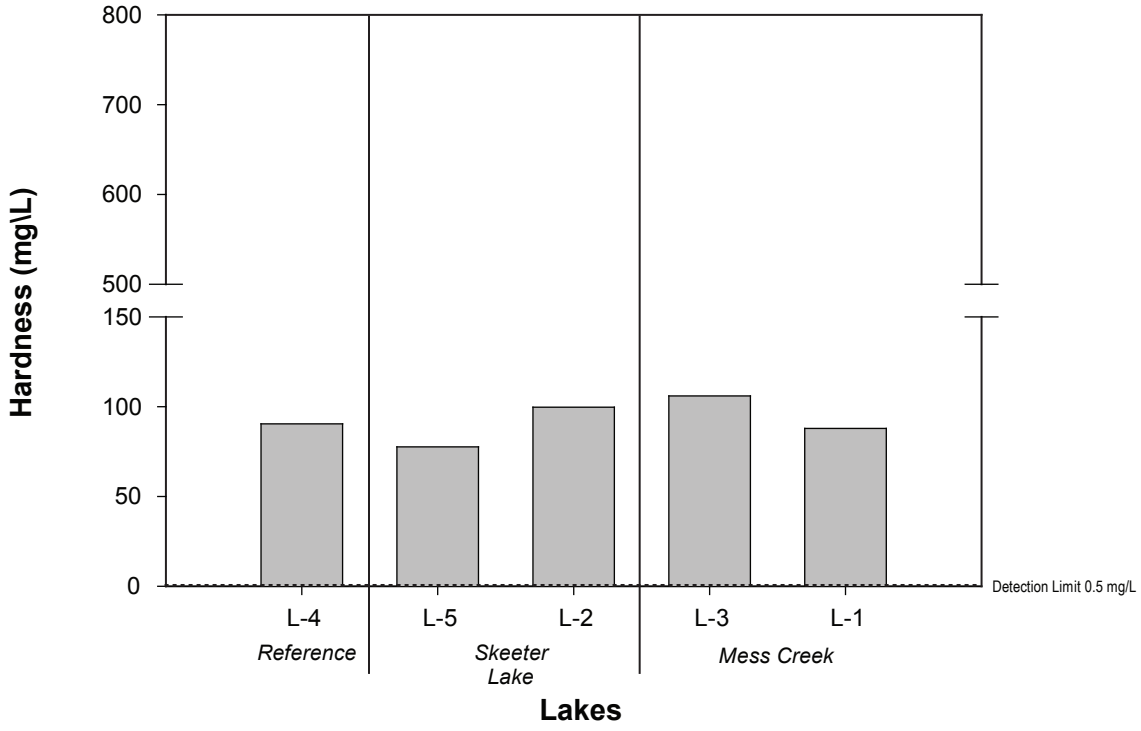


Notes: No CCME or BC aquatic life guidelines exist.
Dotted line represents analytical detection limit.

FIGURE 3.1-54

Total Dissolved Solid (TDS) Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

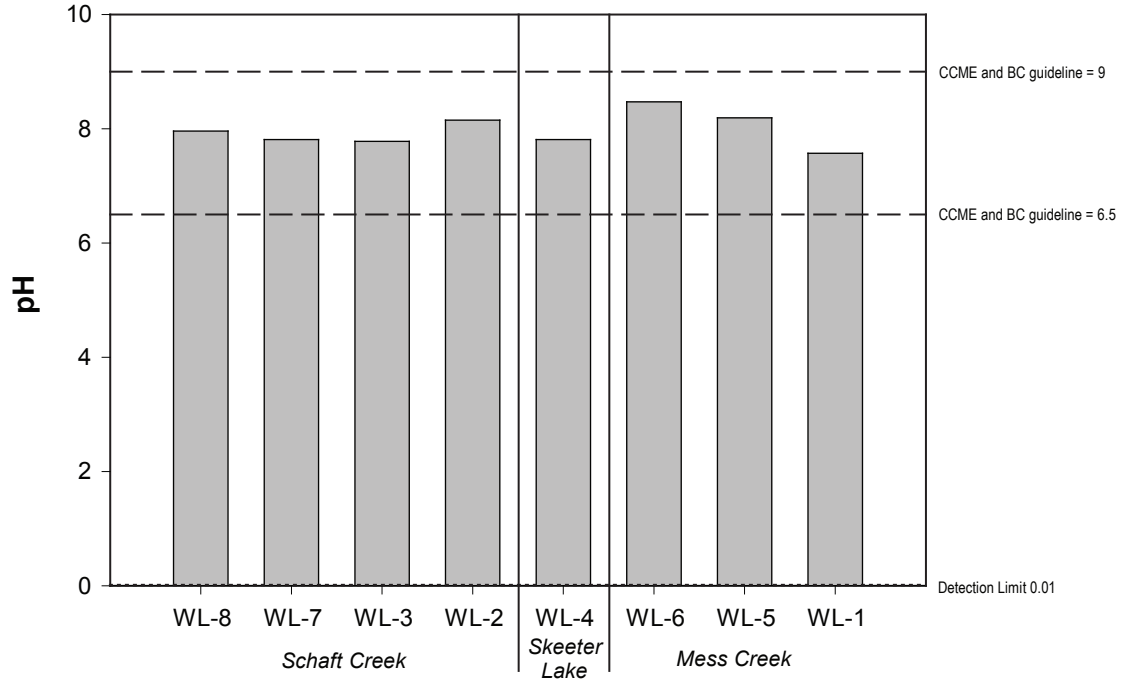


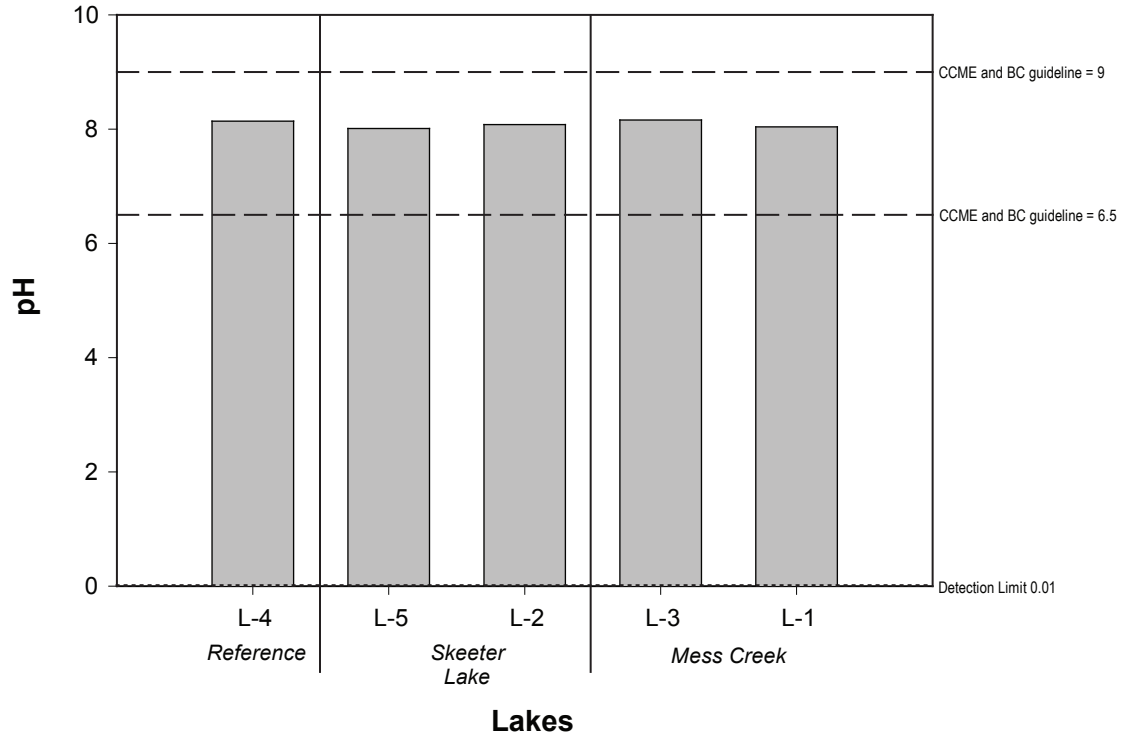


Notes: No CCME or BC aquatic life guidelines exist.
Dotted line represents analytical detection limit.

FIGURE 3.1-55

Hardness Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

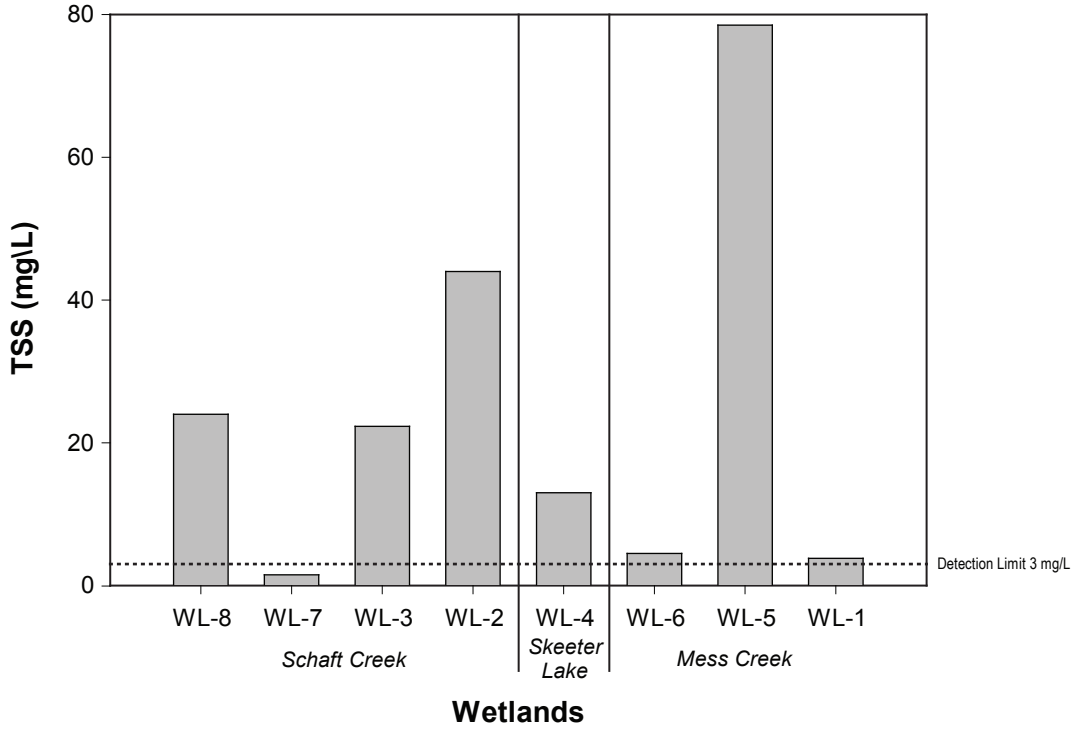


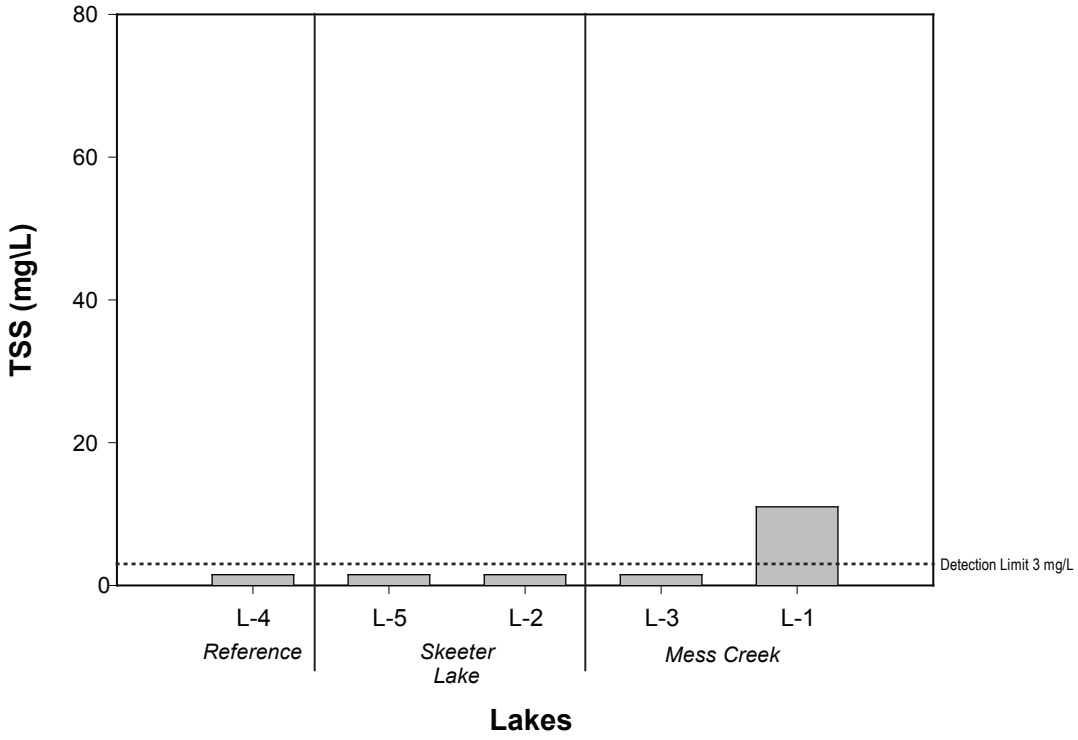


Notes: Analytical detection accuracy +/- 0.01
Dotted line represents analytical detection limit.
Dashed line represents CCME and BC guidelines.

FIGURE 3.1-56

pH Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

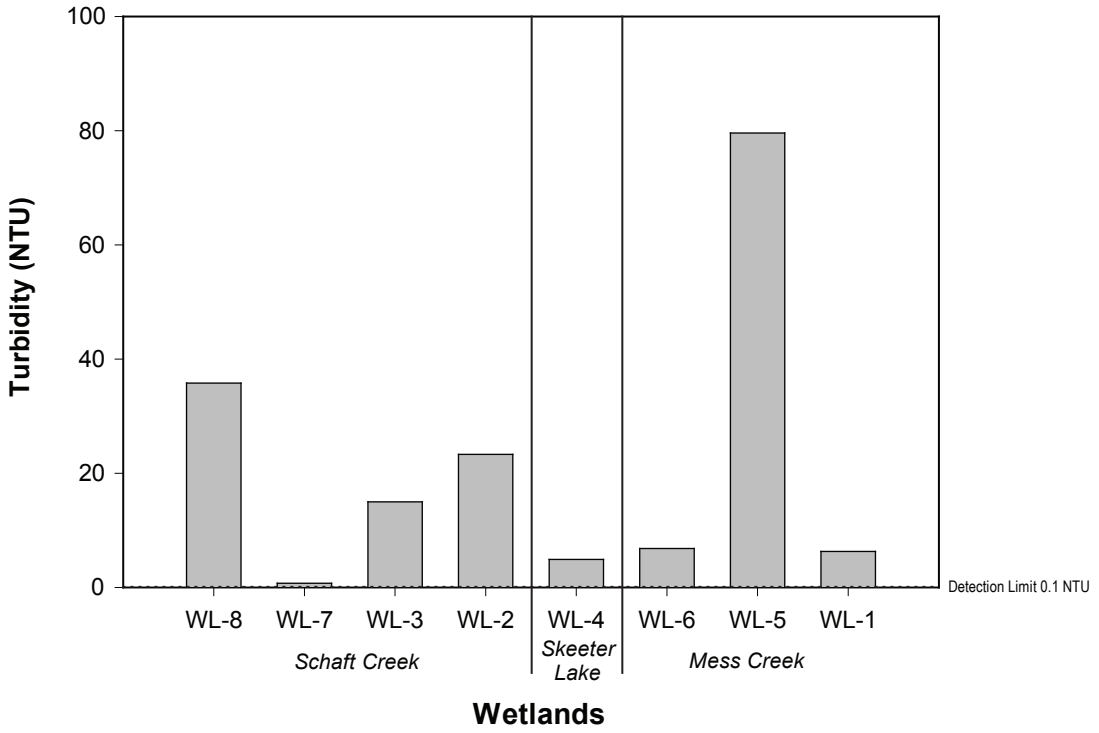


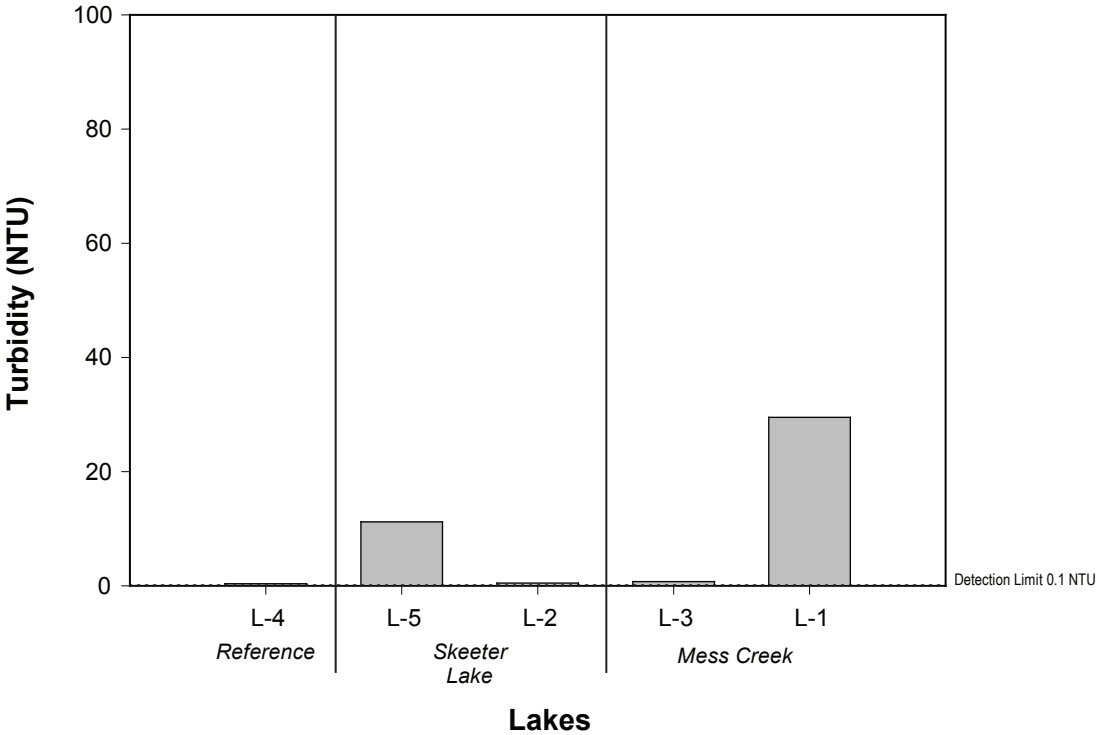


Notes: BC guidelines depend on background; CCME guideline is 25 mg/l above background
Dotted line represents analytical detection limit.

FIGURE 3.1-57

Total Suspended Solid (TSS) Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

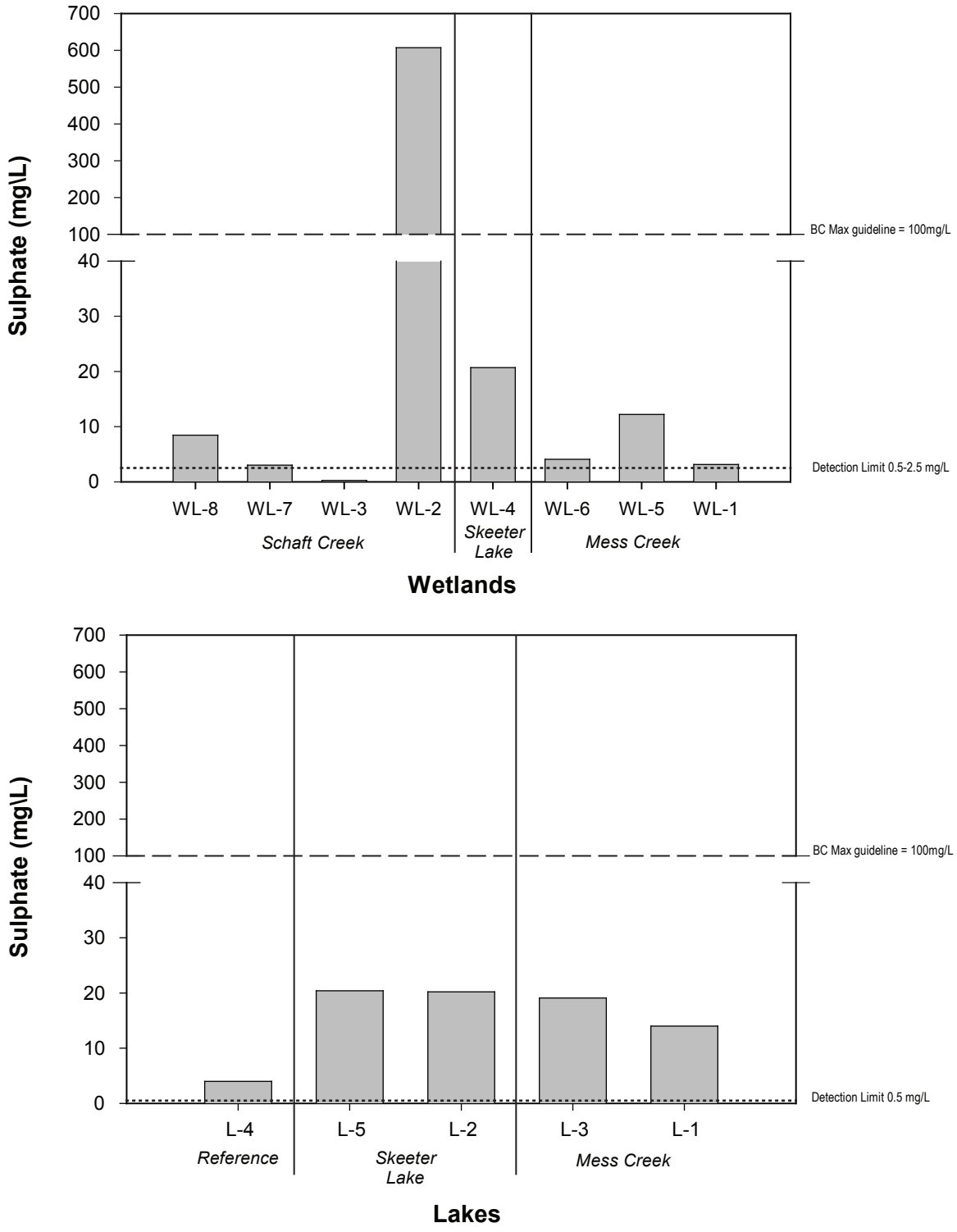




Notes: CCME or BC guidelines depend on background and max 10% increase when turbidity exceeds 80 NTU.
Dotted line represents analytical detection limit.

FIGURE 3.1-58

Turbidity Concentrations in Schaft Creek Project Wetlands and Lakes, 2006



Notes: No CCME aquatic life guidelines exist.
Dotted line represents analytical detection limit.
Dashed line indicates BC MAX guideline 100 mg/L.

FIGURE 3.1-59

Sulphate Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

In wetlands nitrate concentrations ranged from below detection to 0.02 mg/L (WL-5) and 0.06 (L-2) in lakes (Figures 3.1-60). No samples had nitrate concentrations exceeding the CCME (2.93 mg/L), BC Max (200 mg/L), or BC 30-d Mean (40mg/L) guidelines.

Ammonia concentrations were generally greater in wetlands than lakes (Figure 3.1-61). Sites ranged from below detection limits to 0.03 mg/L in wetlands and 0.02 (L-3) in lakes. The CCME guideline for total ammonia with a water pH of 8.0 and temperature between 5 and 10°C (average field values), is 1.04 to 1.54 mg/L. The BC Max guideline for total ammonia with pH 8.0 and temperature 2 to 12°C is between 3.69 and 8.98 mg/L. The 30-d Mean guideline for total ammonia with pH 8.0 and temperature between 2 and 12°C is between 0.71 and 1.73 mg/L. Therefore, all samples were well below the BC or CCME guidelines for total ammonia.

Most wetland and lake total nitrogen (TN) concentrations were below 0.2 mg/L (Figure 3.1-62). TN in wetlands ranged from below detection limits to 0.59 mg/L at WL-2 and 0.24 in lakes. There are no guidelines for TN.

Total phosphate (TP) concentrations were generally greater in wetlands than in lakes (Figures 3.1-63). TP concentrations ranged from the detection limit to 0.068 mg/L in wetlands and 0.013 mg/L in lakes. There are no guidelines for TP.

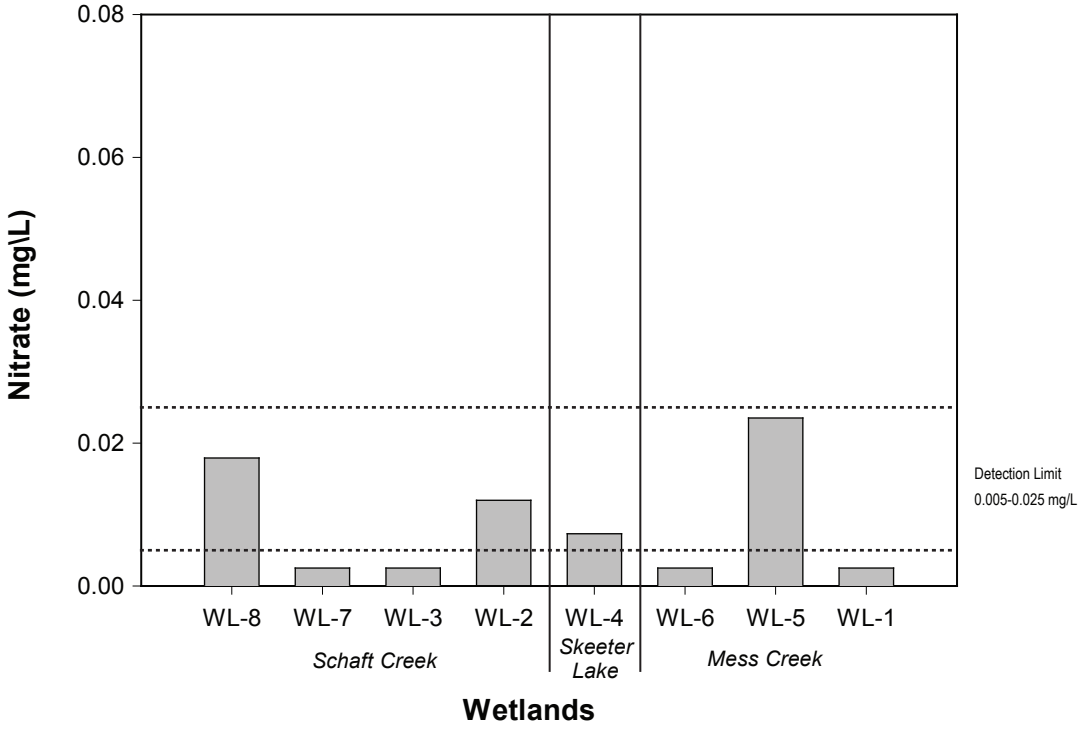
Total and Dissolved Metals

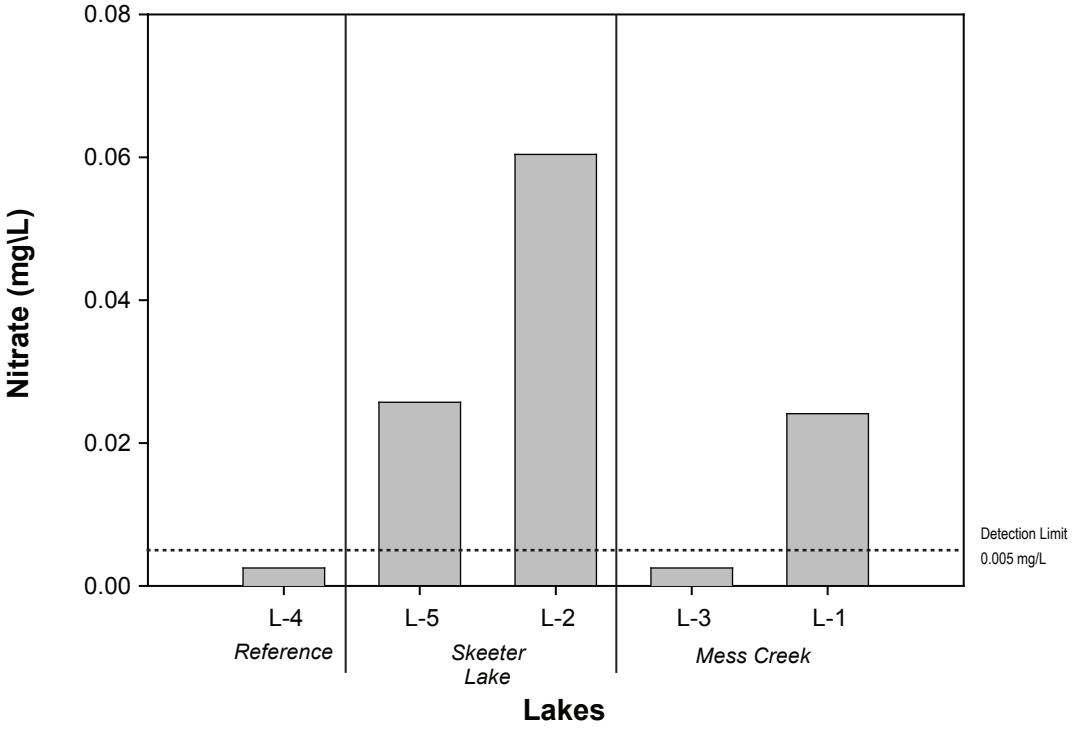
Key variables (aluminium, arsenic, cadmium, copper, iron, manganese, molybdenum, nickel, selenium and zinc) are presented graphically and discussed below. Concentrations of dissolved cadmium and zinc were below detection limits in all samples and are, therefore, not presented. CCME and B.C. guidelines for total metals were used to screen both total and dissolved metal concentrations, except for dissolved aluminium which has specific B.C. guidelines.

Total aluminium (T-Al) concentrations in wetlands and lakes ranged from below the detection limit (L-2 and L-4) to 2.43 mg/L (WL-5) (Figure 3.1-64). Concentrations of dissolved aluminium (D-Al) ranged from below the detection limit at several sites to 0.07 mg/L (WL-8) (Figure 3.1-65). The CCME guideline for T-Al (0.1 mg/L for pH $\geq$ 6.5) was exceeded at most wetland sites (except WL-2 and WL-7) and two (L-1 and L-5) of the five lake sites. No B.C. guideline exists for T-Al. No site exceeded the BC Max guideline for D-Al and 30-d mean guideline was only exceeded by WL-8. No CCME guidelines exist for D-Al.

Concentrations of total arsenic (T-As) ranged from below the detection limits at several sites to 0.0056 mg/L (WL-6) (Figure 3.1-66). Concentrations of dissolved arsenic (D-As) ranged from below the detection limits to 0.0037 mg/L (WL-6) (Figure 3.1-67). Only WL-6 exceeded the CCME or BC guideline (0.005 mg/L) for T-As. No site exceeded the CCME or BC guideline for D-As.

Most samples of total cadmium (T-Cd) were below detection limits (Figure 3.1-68). The highest concentration of T-Cd in wetlands was 0.000037 mg/L at WL-4 and in lakes was 0.000038 mg/L at L-5. CCME and B.C. Max guidelines (both hardness dependent) for T-Cd were not exceeded at any site.

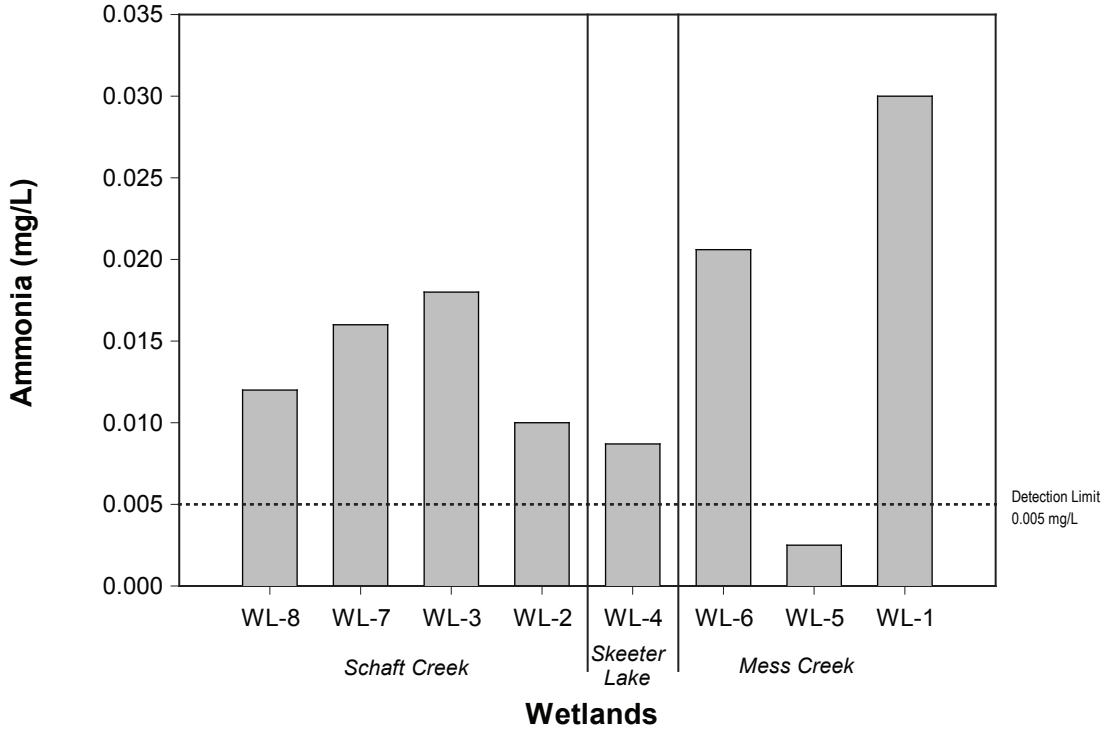


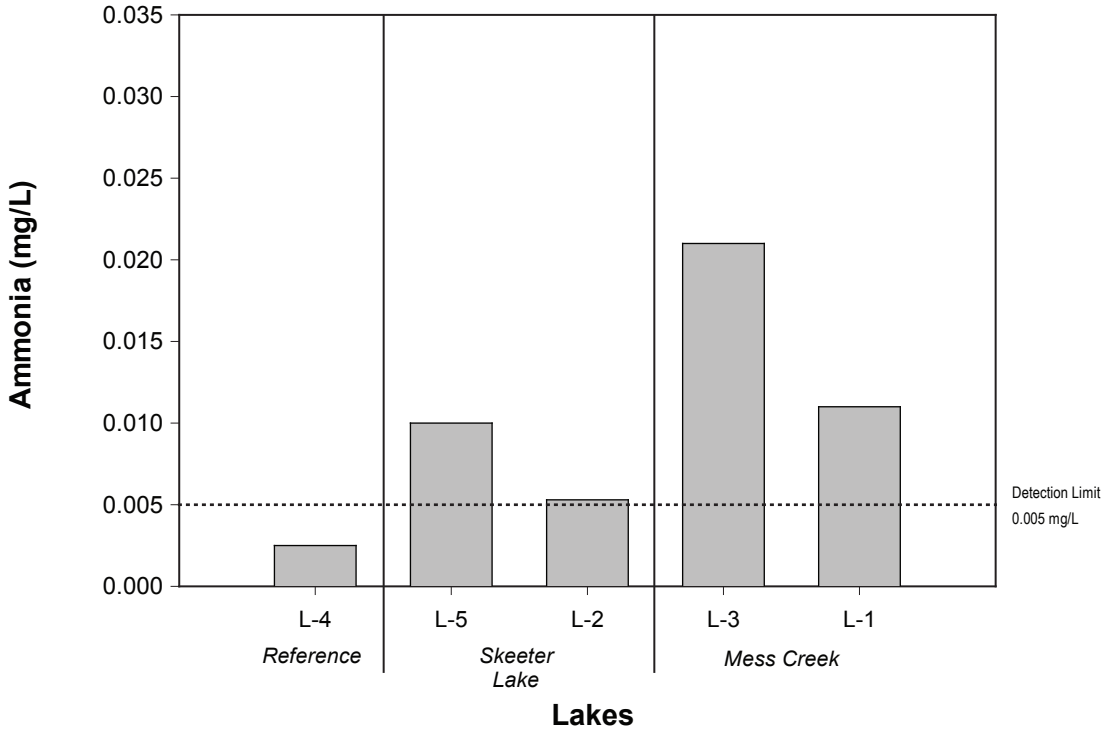


Notes: CCME = 2.93mg/L; BC Max = 200mg/L; BC 30-d = 40mg/L
Dotted line represents analytical detection limit.

FIGURE 3.1-60

Nitrate Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

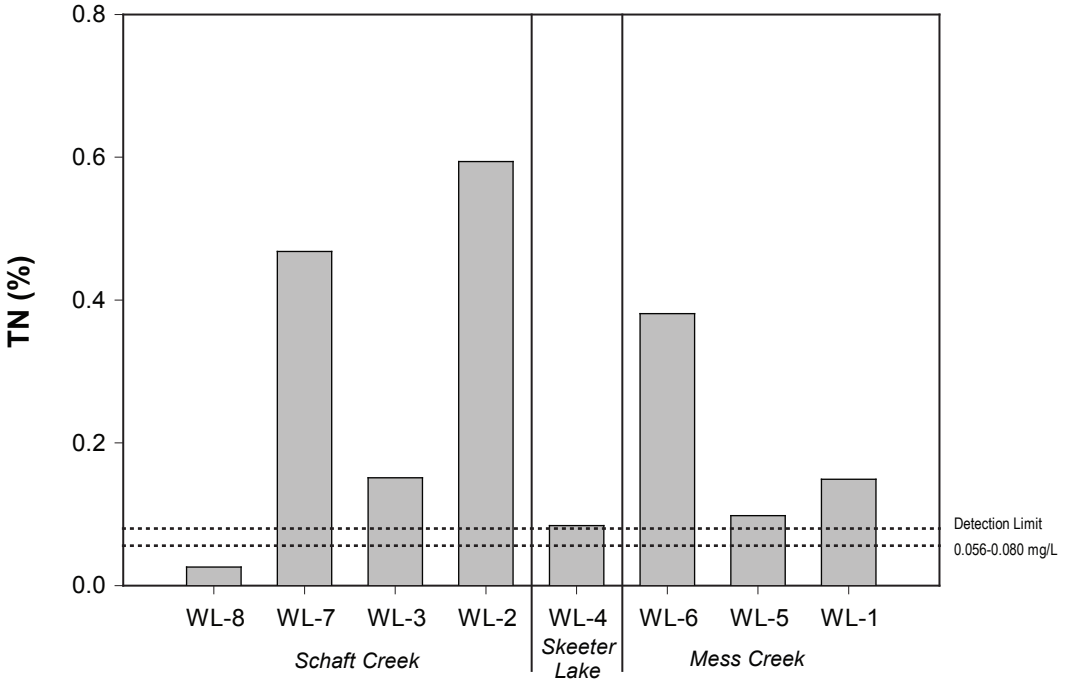


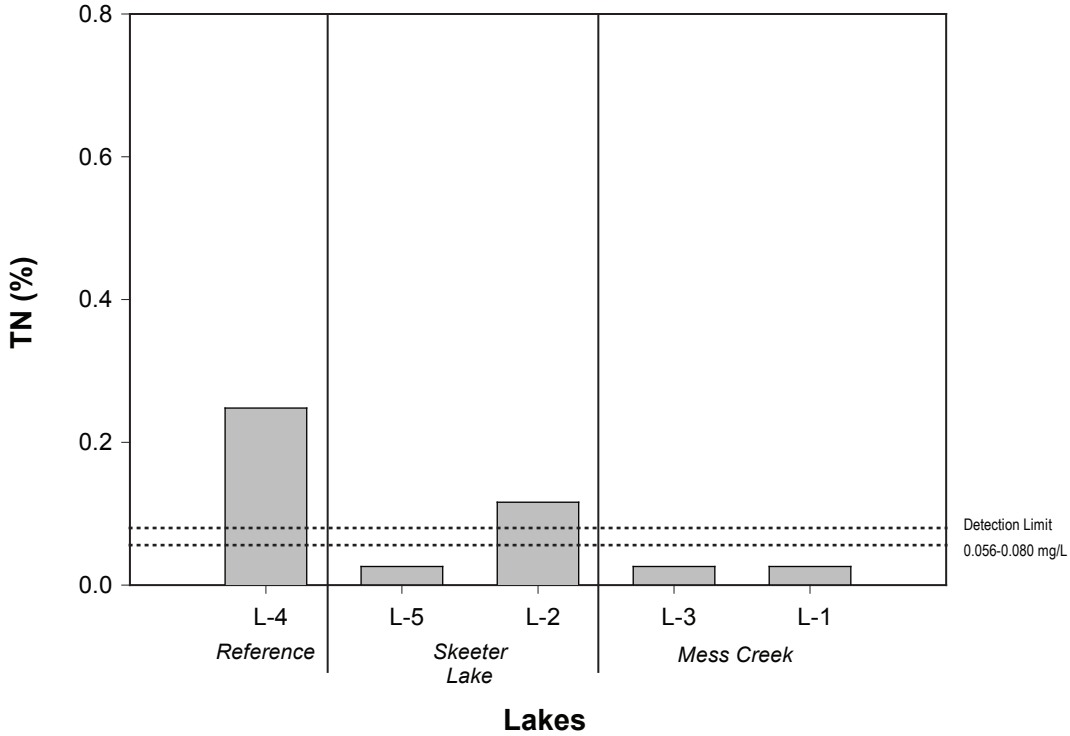


Notes: CCME and BC guidelines depend on pH and temperature
Dotted line represents analytical detection limit.

FIGURE 3.1-61

Ammonia Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

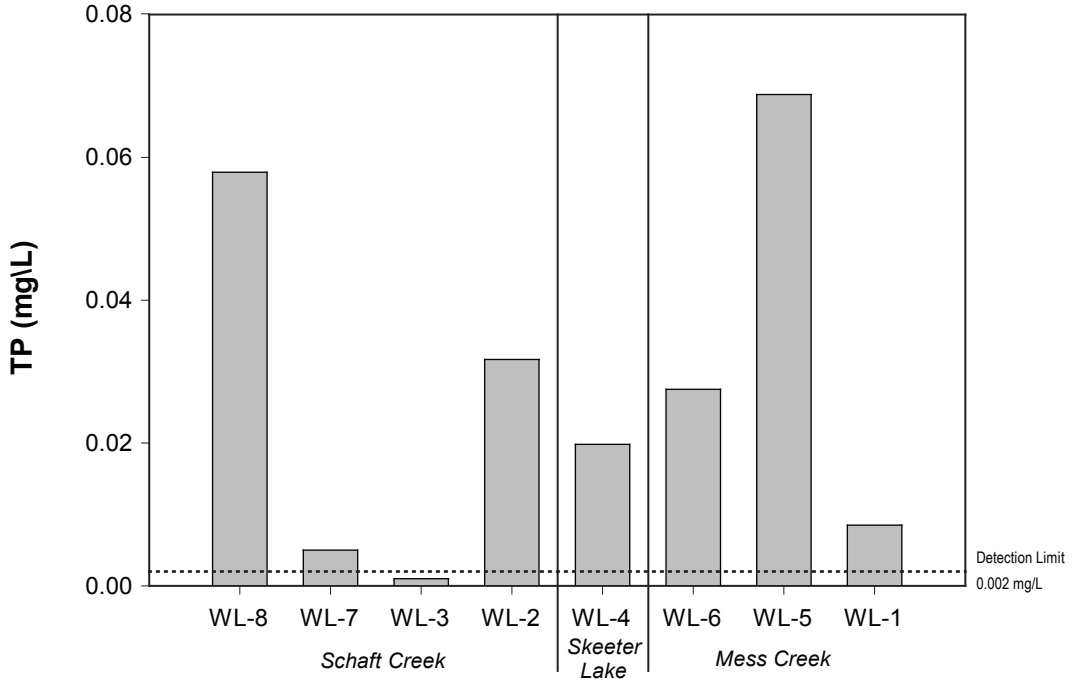


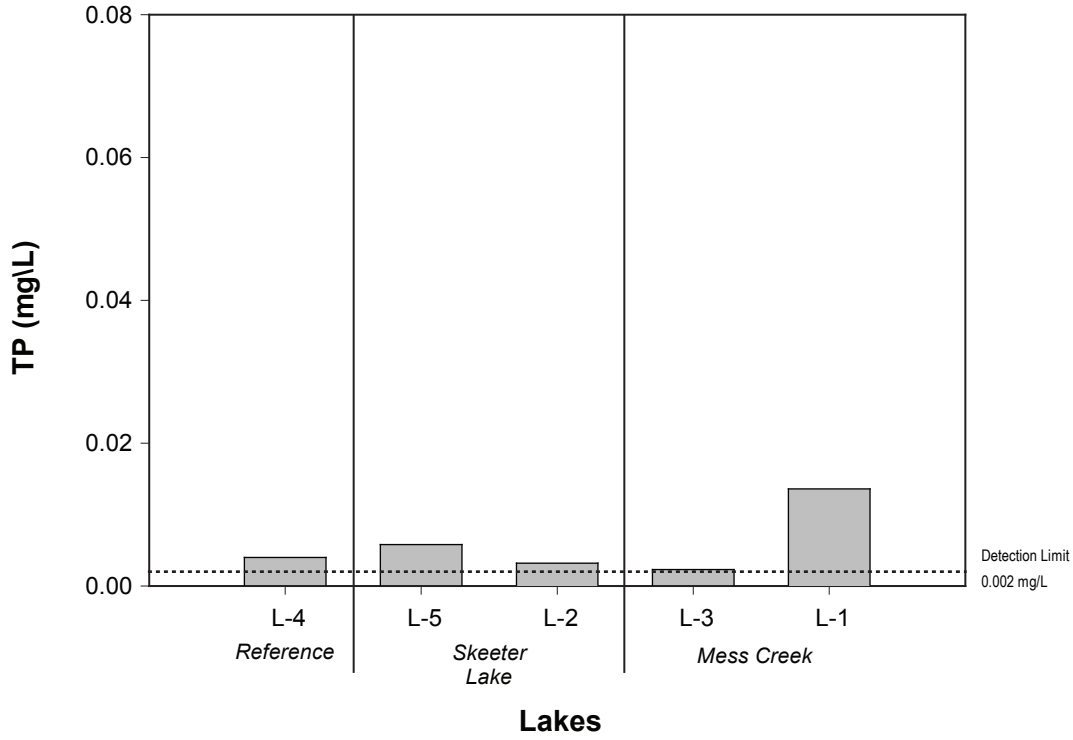


Notes: No CCME or BC aquatic life guidelines exist.
Dotted line represents analytical detection limit.

FIGURE 3.1-62

Total Nitrogen Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

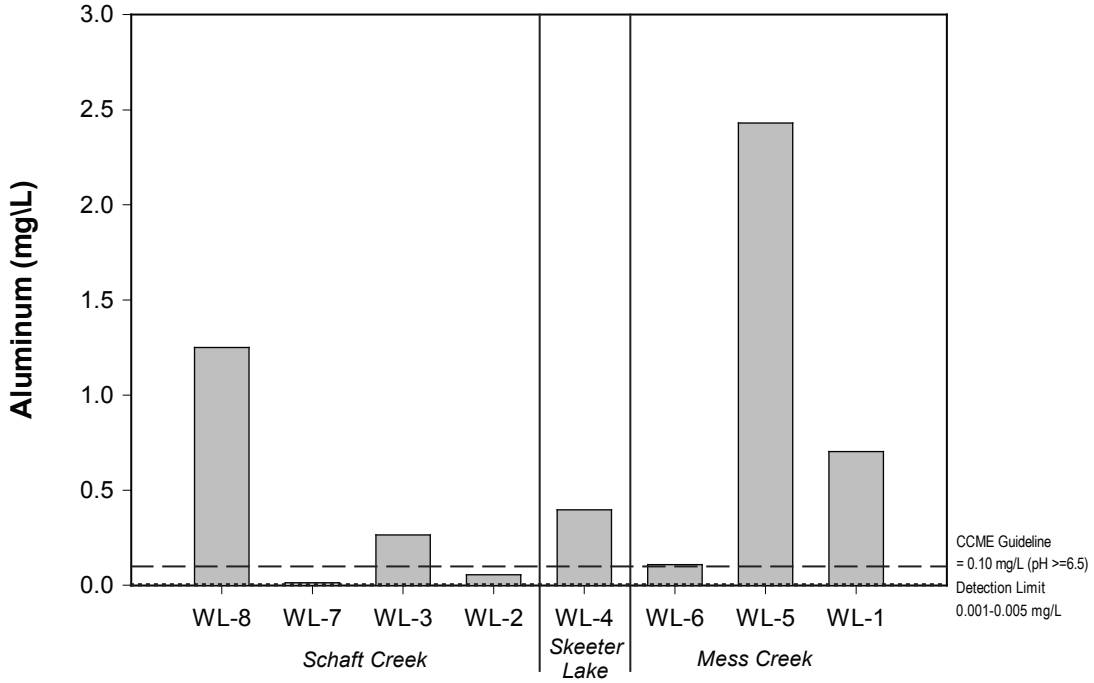


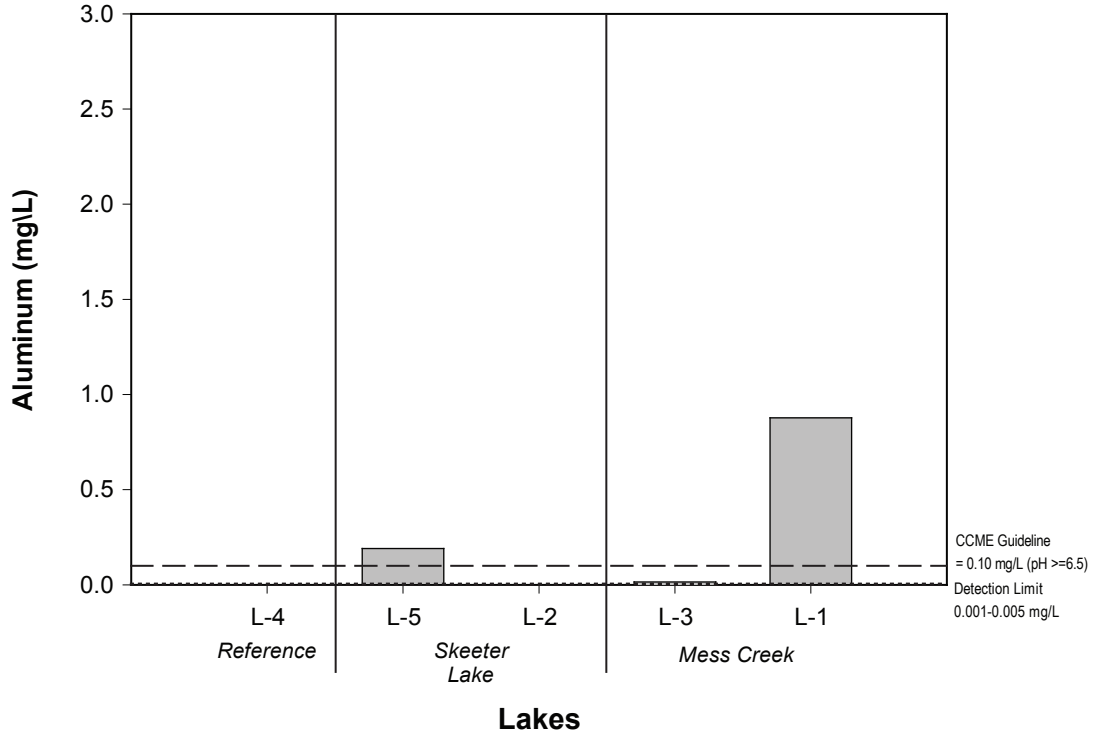


Notes: No CCME or BC aquatic life guidelines exist.
Dotted line represents analytical detection limit.

FIGURE 3.1-63

Total Phosphate Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

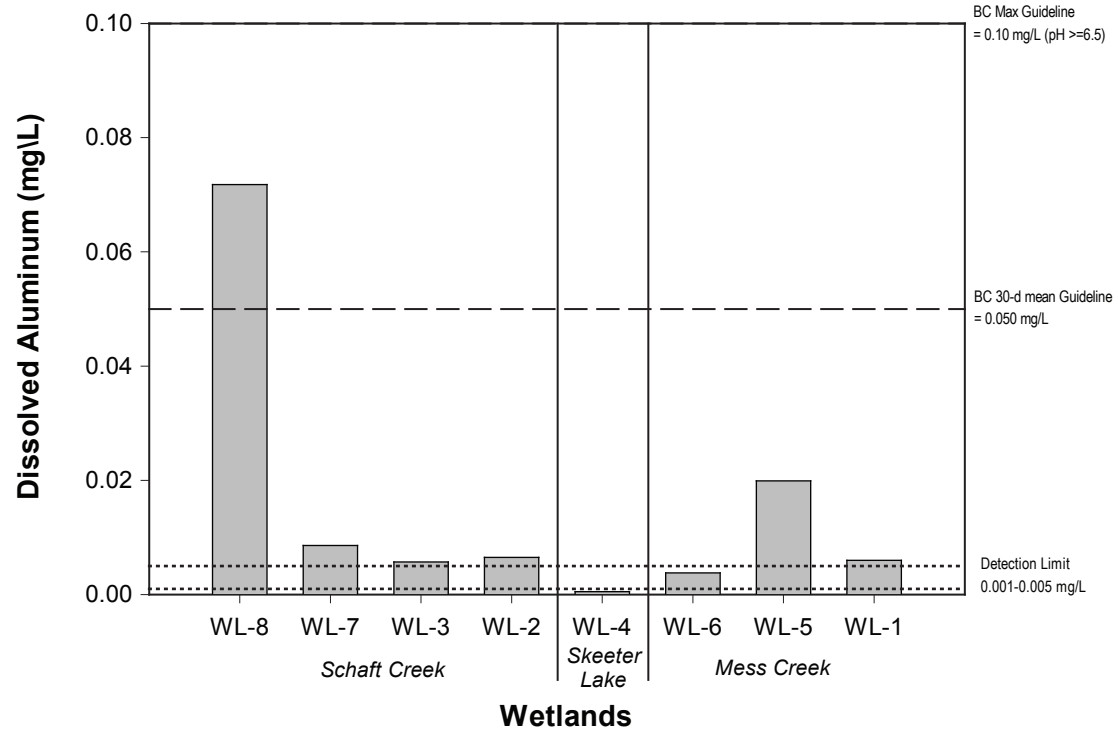


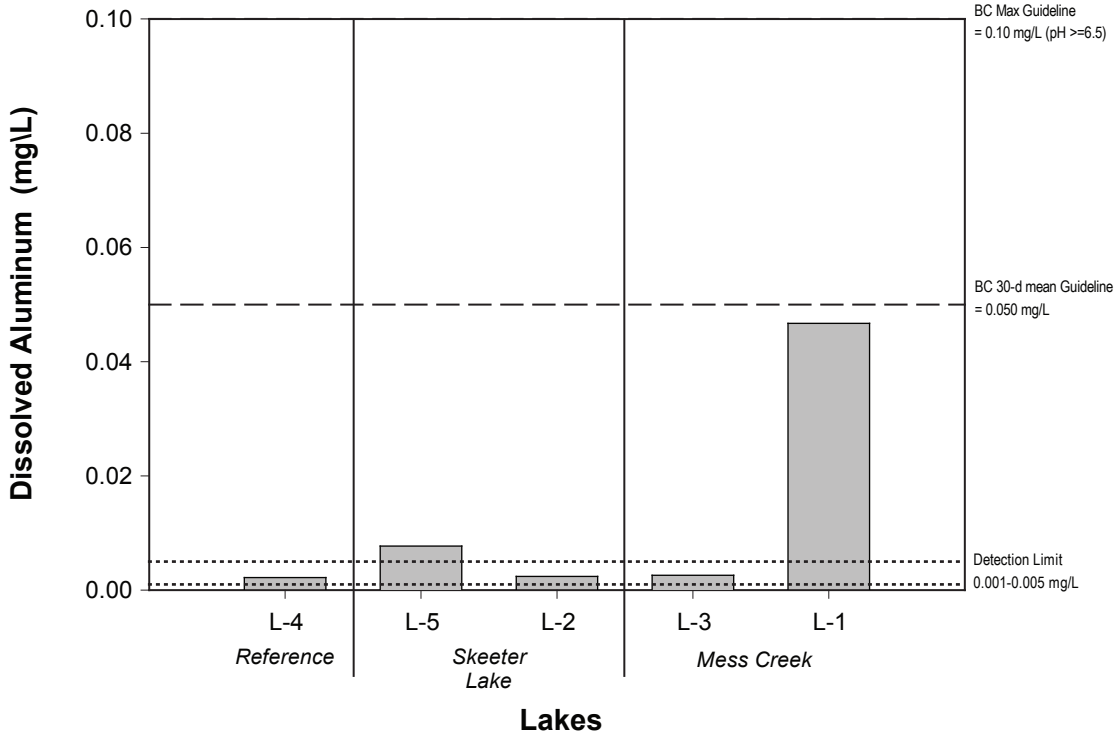


Notes: No BC aquatic life guideline exist.
Dotted line represents analytical detection limit.
Dashed solid line indicates guideline value, where available.

FIGURE 3.1-64

Aluminum Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

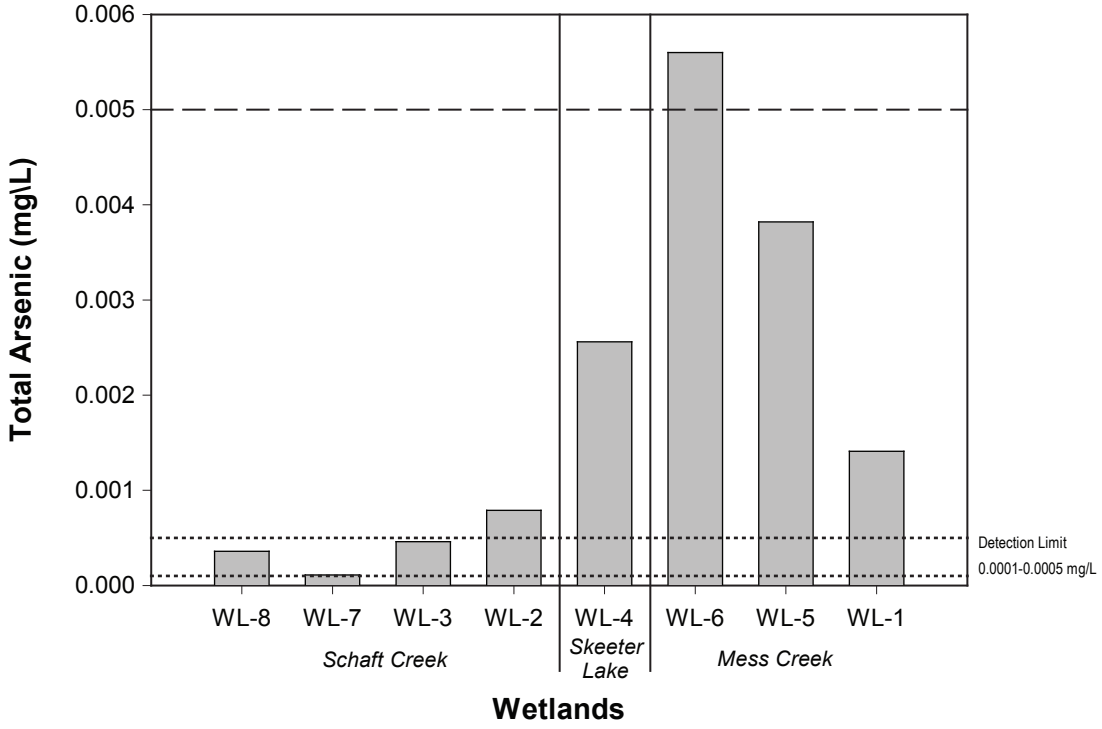


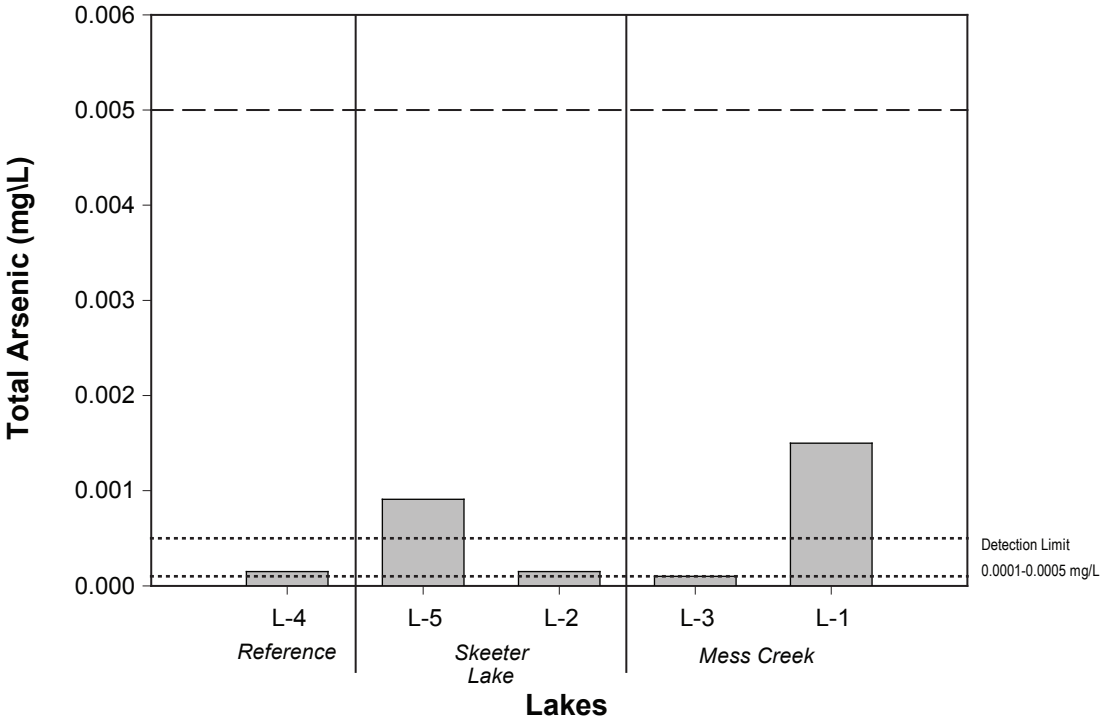


Notes: Dotted line represents analytical detection limit.
Dashed line indicates guideline value, where available.

FIGURE 3.1-65

Dissolved Aluminum Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

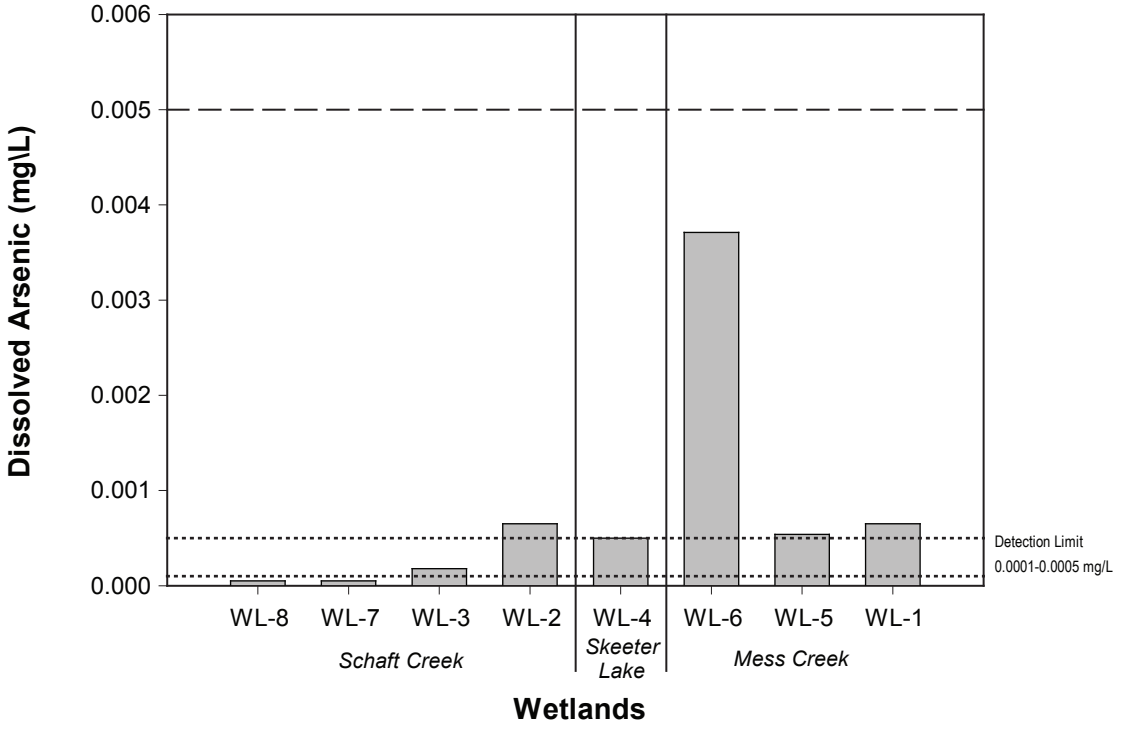


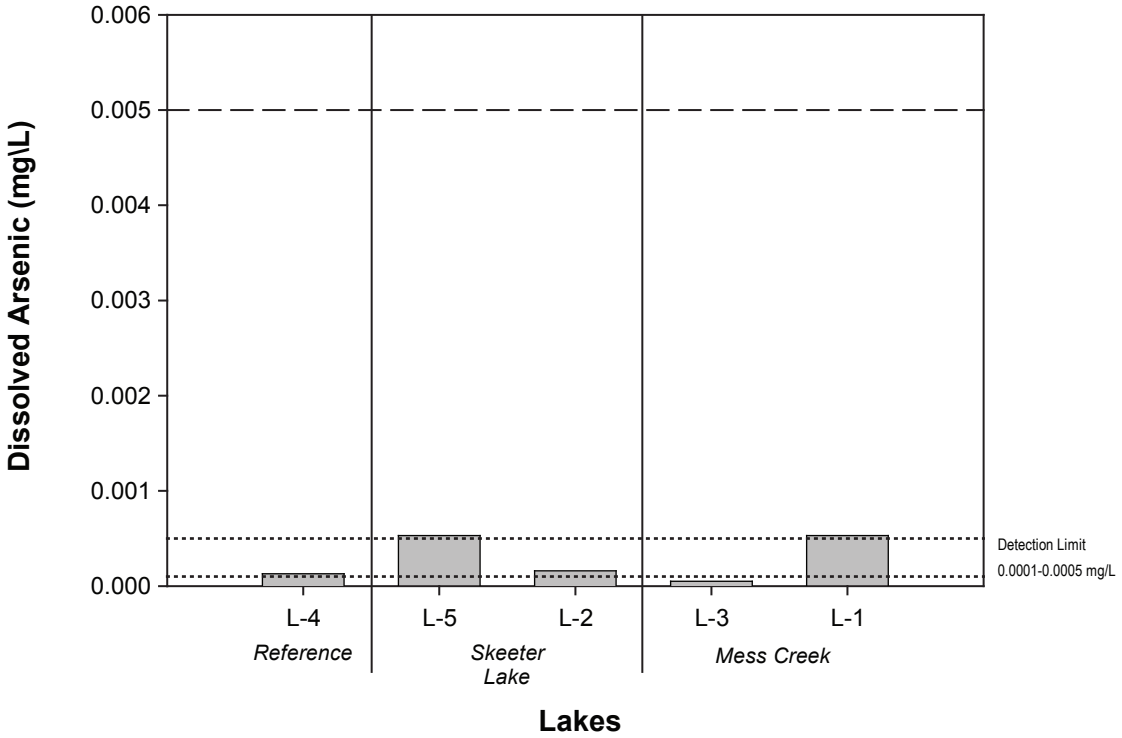


Notes: CCME and BC-Max guideline is 0.0050 mg/L.
Dotted line represents analytical detection limit.
Dashed line indicates guideline value, where available.

FIGURE 3.1-66

Total Arsenic Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

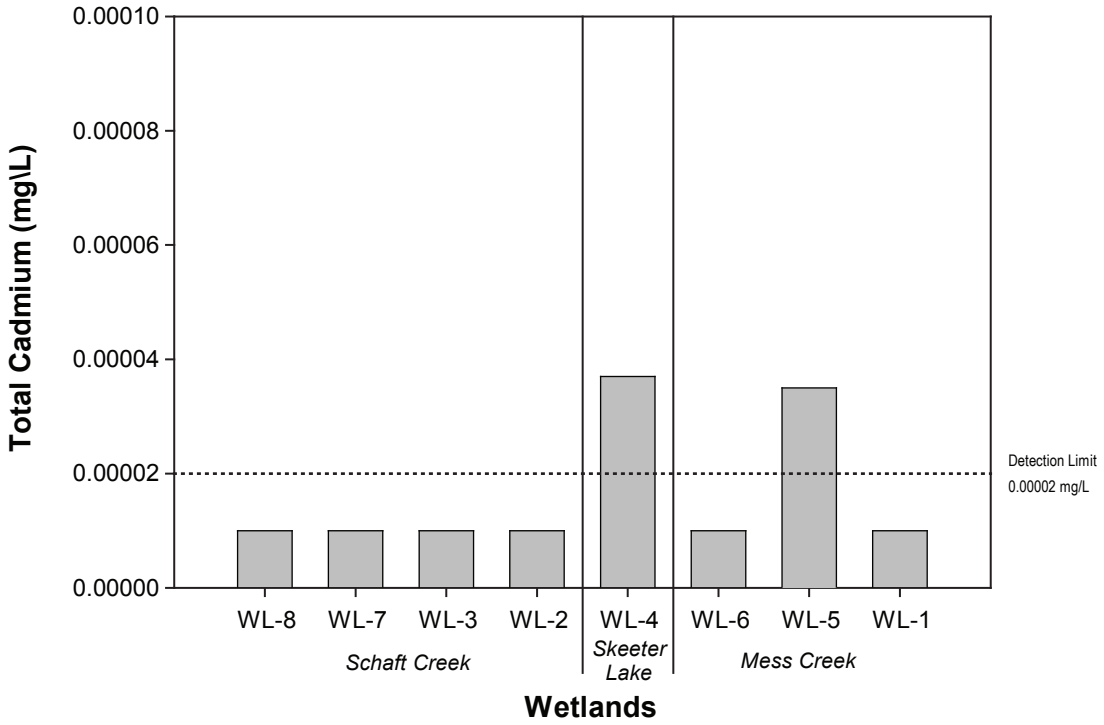


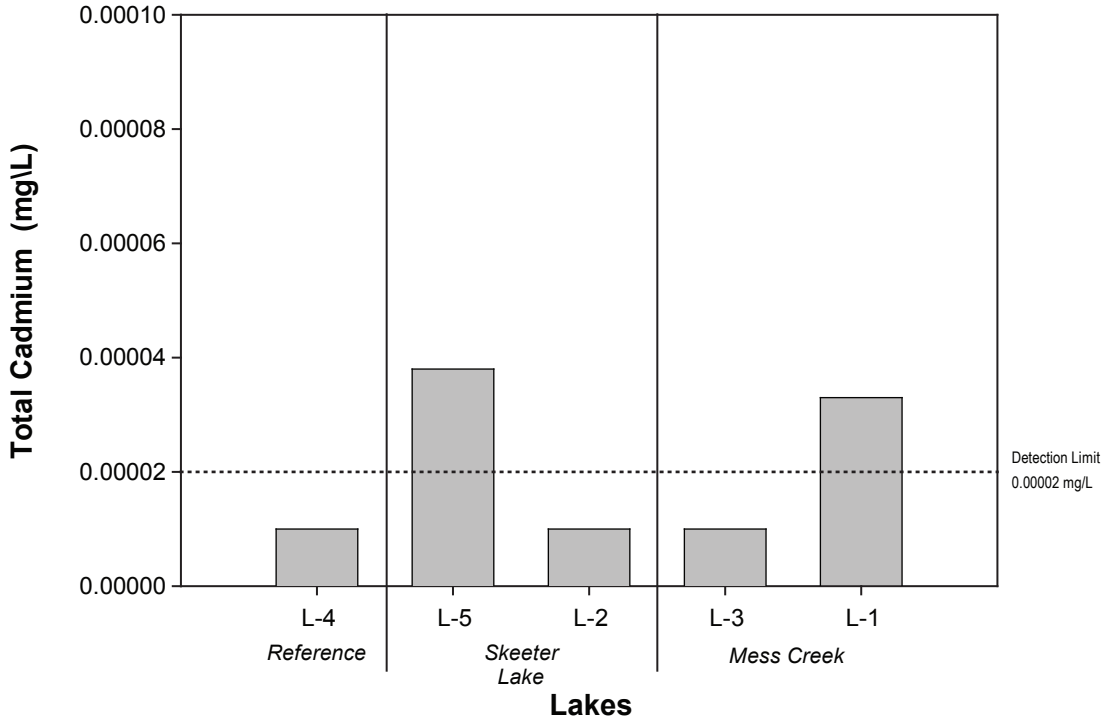


Notes: CCME and BC-Max guideline is 0.0050 mg/L.
Dotted line represents analytical detection limit.
Dashed line indicates guideline value, where available.

FIGURE 3.1-67

Dissolved Arsenic Concentrations in Schaft Creek Project Wetlands and Lakes, 2006





Notes: CCME and BC-Max guidelines are hardness dependent.
Dotted line represents analytical detection limit.

FIGURE 3.1-68

Total Cadmium Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

Concentrations of total copper (T-Cu) ranged from below detection limits to 0.007 mg/L (WL-8) (Figure 3.1-69). Concentrations of dissolved copper (D-Cu) ranged from below detection limits to 0.0016 mg/L (WL-6) (Figure 3.1-70). Total copper guidelines (CCME, BC Max and 30-d) were all exceeded at WL-8. Several sites (WL-1, WL-4, WL-5, WL-6 and L-1) exceeded the CCME guideline. No site exceeded D-Cu guidelines.

Concentrations of total iron (T-Fe) ranged from below detection limits at several lakes to 3.8 mg/L (Wl-5) (Figure 3.1-71). All lakes, WL-4 and WL-5 had concentrations of dissolved iron (D-Fe) below detection limits and the highest concentration was found at WL-3 (0.4 mg/L) (Figure 3.1-72). Most sites (except WL-7, WL-2, L-4, L-2 and L-3) exceeded the CCME and BC Max guidelines (0.3 mg/L) for T-Fe. Only WL-3 exceeded the CCME and BC Max guidelines (0.3 mg/L) for D-Fe.

Wetland and lake concentrations of total manganese (T-Mn) ranged from 0.003 mg/L at L-2 to 0.752 mg/L at WL-3 (Figure 3.1-73). Dissolved manganese (D-Mn) concentrations ranged from 0.0006 at WL-7 to 0.0127 mg/L at WL-3 (Figure 3.1-74). No CCME guideline exists for manganese. No sites exceeded BC Max or 30-d Mean guidelines (both hardness dependent).

Wetland and lake concentrations of total molybdenum (T-Mo) ranged from 0.0006 (WL-7) to 0.0027 mg/L (L-3) (Figure 3.1-75). Dissolved molybdenum (D-Mo) concentrations ranged from 0.0006 at WL-7 and WL-8 to 0.0026 mg/L at L-3 (Figure 3.1-76). T-Mo and D-Mo concentrations were very close for all sites, indicating a lack of particulate-bound molybdenum. No sites exceeded CCME or B.C. guidelines for T-Mo or D-Mo.

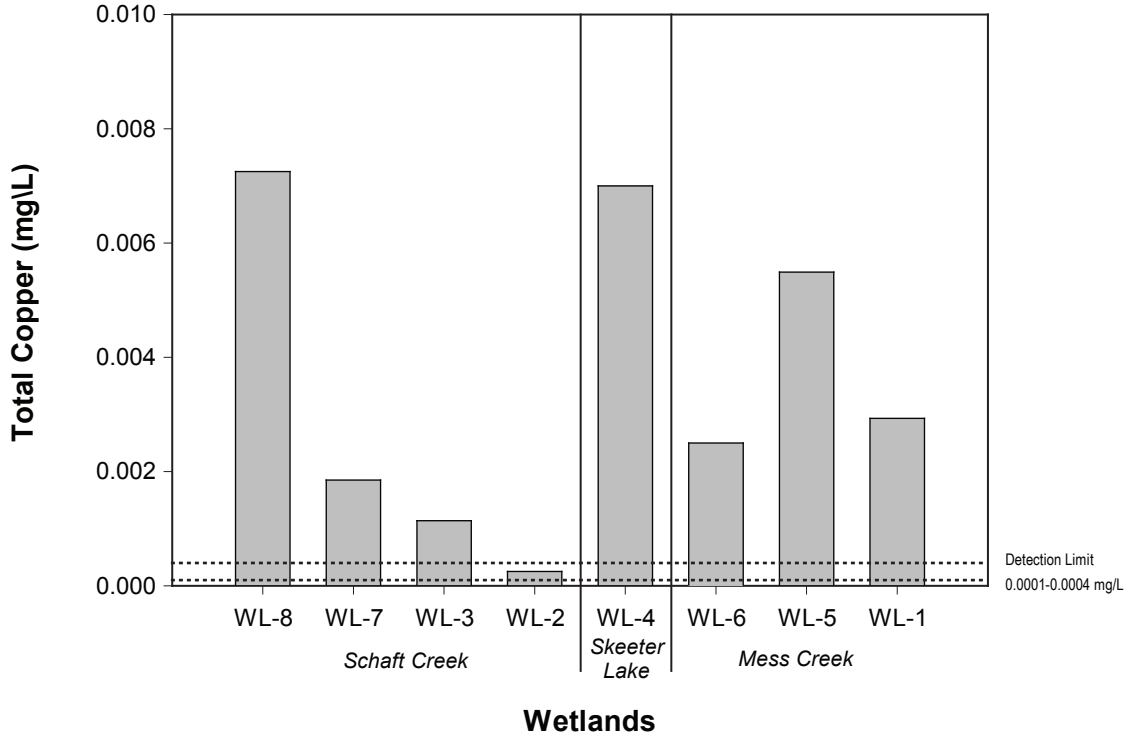
Concentrations of total nickel (T-Ni) ranged from below the detection limits at several sites to 0.0079 mg/L (WL-5) (Figure 3.1-77). Most of the dissolved nickel (D-Ni) samples were below detection limits. WL-7 had the highest D-Ni concentration at 0.0018 mg/L (Figure 3.1-78). The CCME and B.C. guidelines for T-Ni and D-Ni (hardness dependent) were not exceeded at any sites.

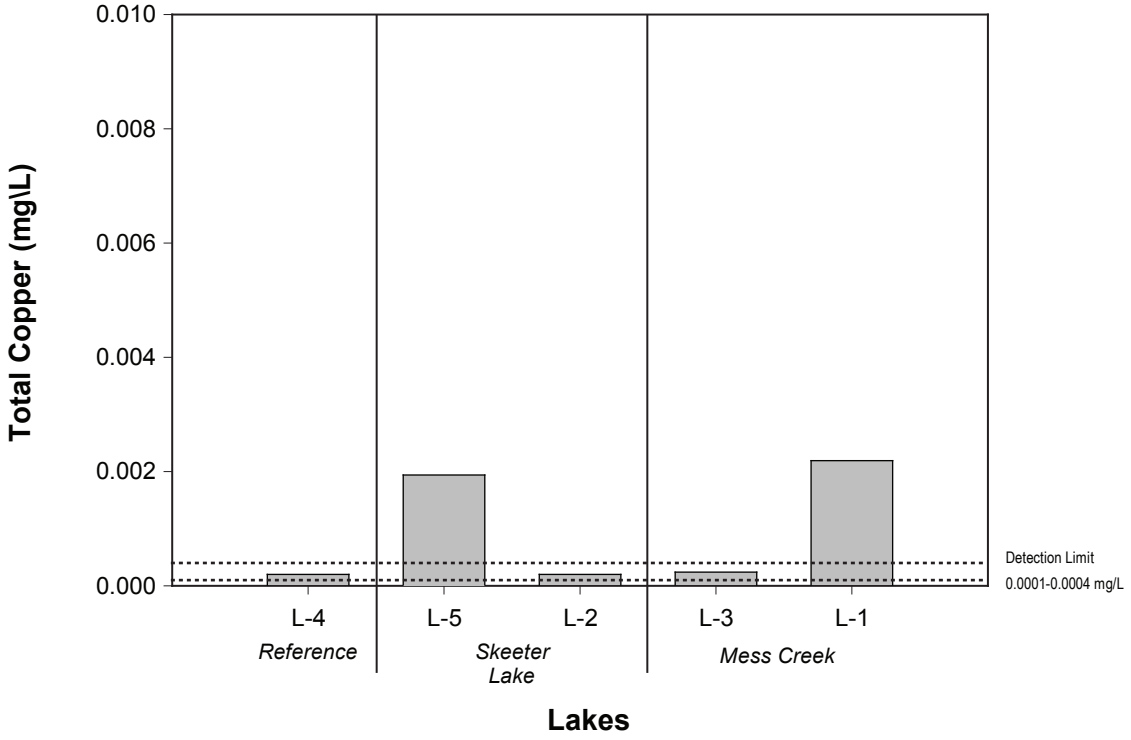
Concentrations of total selenium (T-Se) ranged from below detection limits in most sites to 0.0006 mg/L (WL-5) (Figure 3.1-79). Dissolved selenium (D-Se) data ranged from below the detection limit to 0.0014 mg/L (L-3) (Figure 3.1-80). Concentrations of D-Se were similar to T-Se in many cases. The concentration of D-Se at WL-7 was greater than the T-Se concentration. This is likely due to sample contamination. The CCME guideline for T-Se and D-Se (0.001 mg/L) was exceed at L-3 and the BC 30-day mean guideline for T-Se and D-Se were not exceeded at any sites.

Concentrations of total zinc (T-Zn) ranged from below detection limits to 0.011 mg/L (WL-5) (Figure 3.1-81). No sites exceeded the CCME guideline (0.03 mg/L) or the BC Max (hardness dependent). BC 30-d guideline (hardness dependent) was exceeded by WL-5.

Quality Assurance and Quality Control (QA/QC)

Field and travel blank data are presented in Appendix 3.1-4. Field blank and travel blank data were all below MDL values, with the exception of total phosphate (TP) where the duplicate result was < 2 times the MDL.

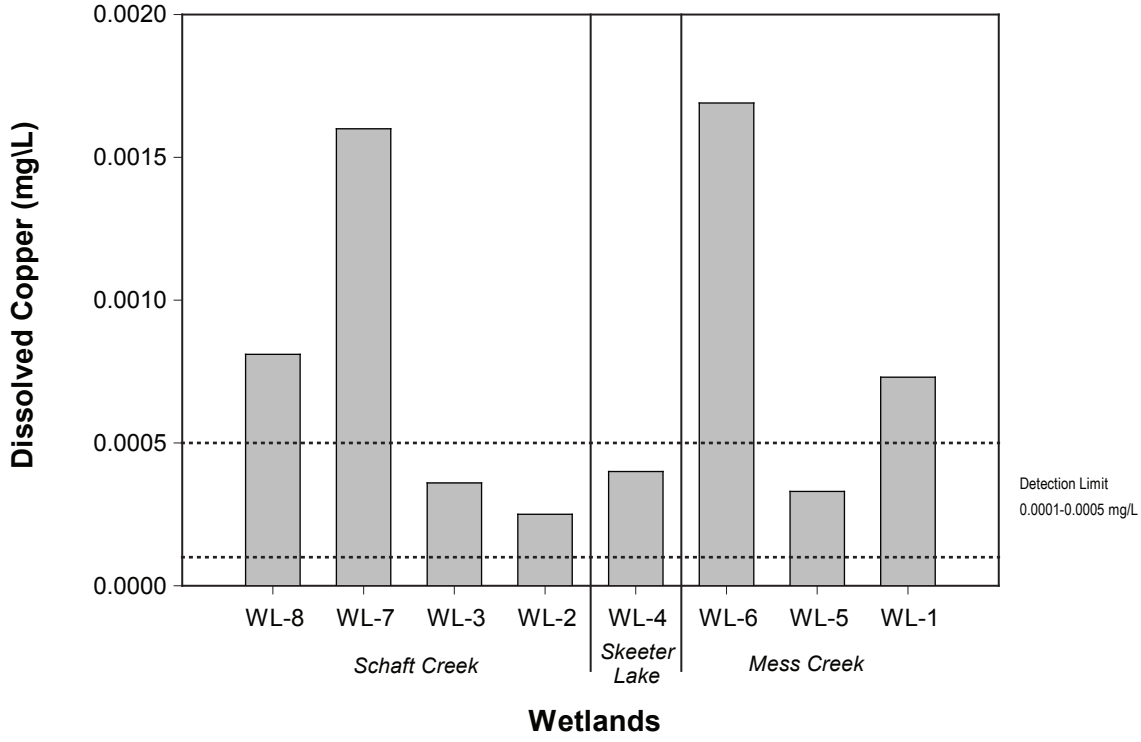


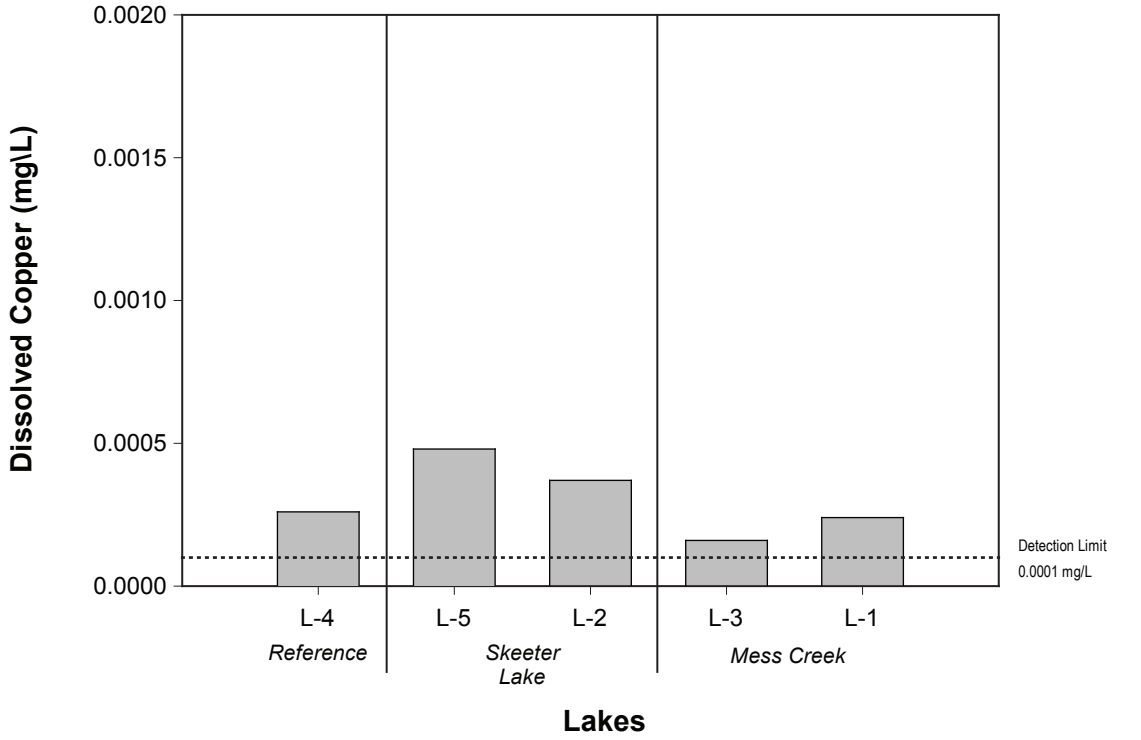


Notes: CCME, BC Max and 30-d Mean guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-69

Total Copper Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

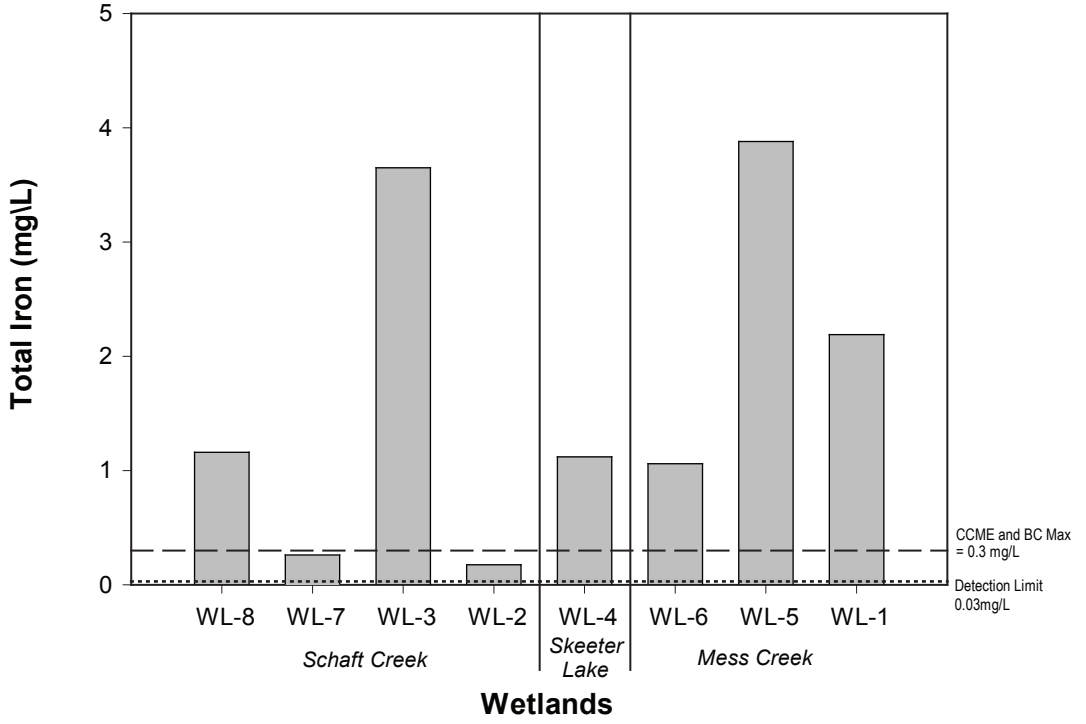


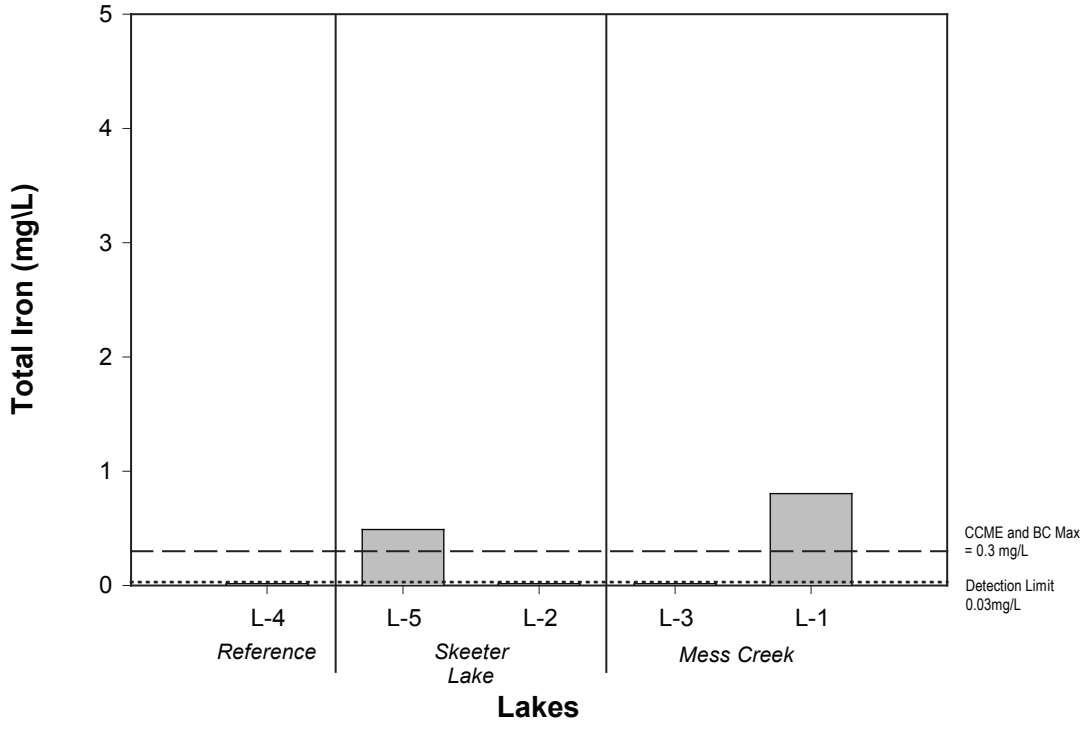


Notes: CCME, BC Max and 30-d Mean guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-70

Dissolved Copper Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

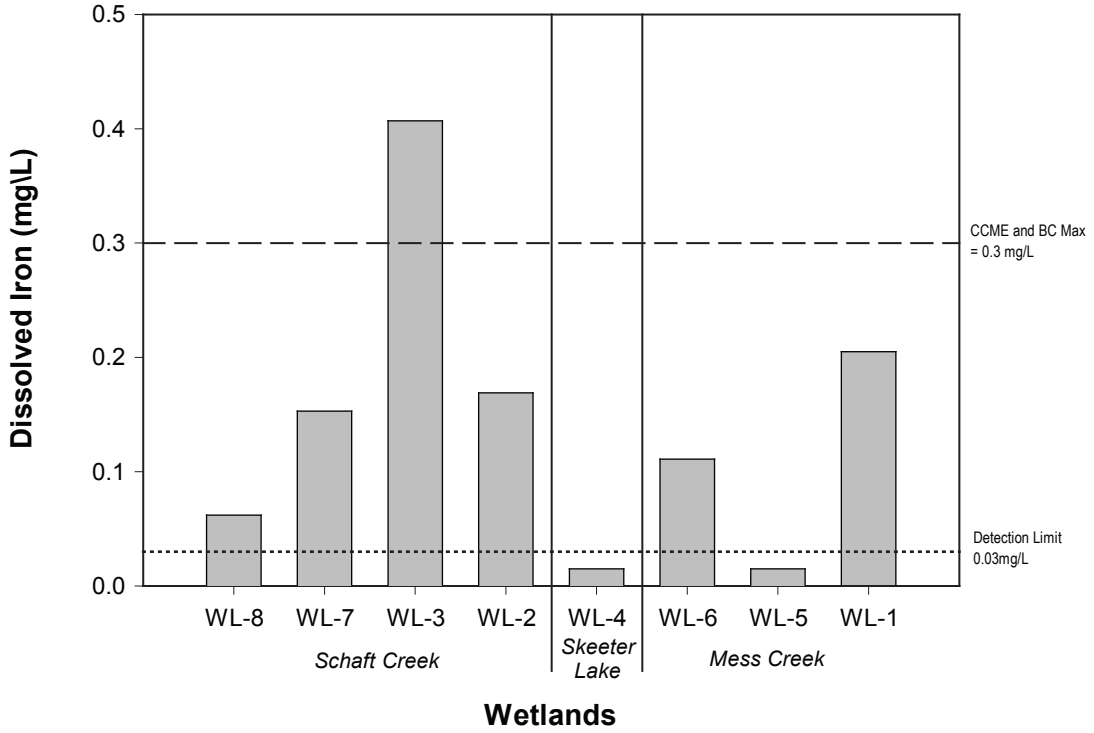


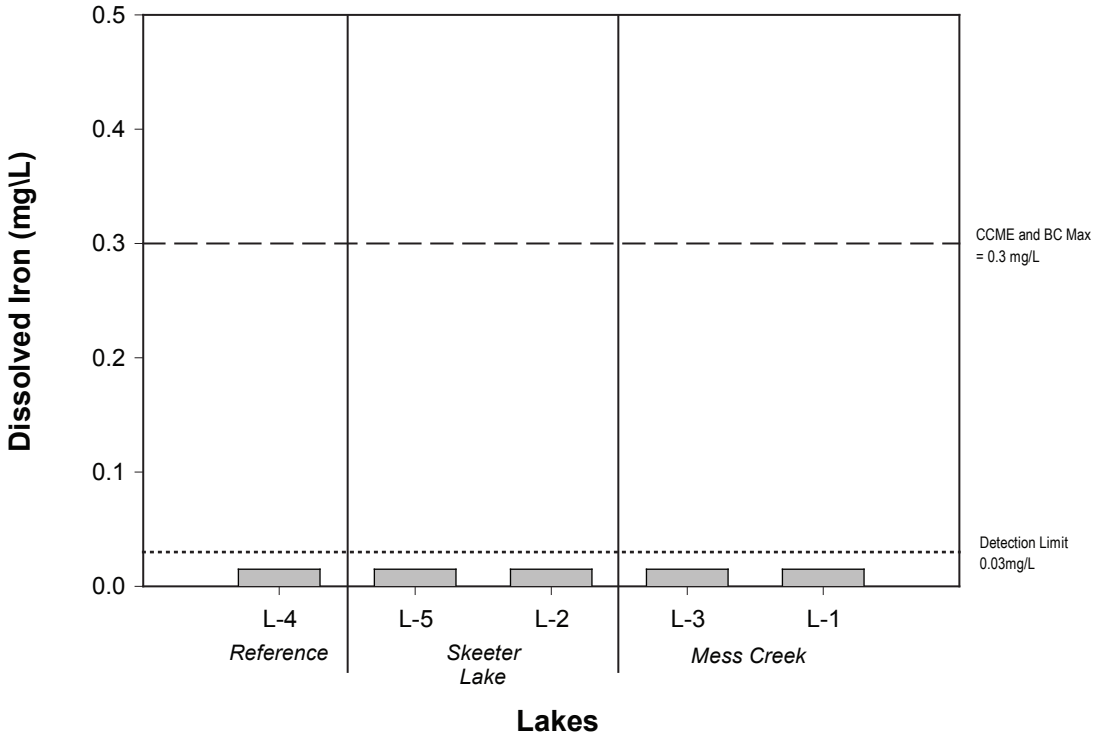


Notes: Dotted line represents analytical detection limit.
Dashed line indicates guideline value, where available.

FIGURE 3.1-71

Total Iron Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

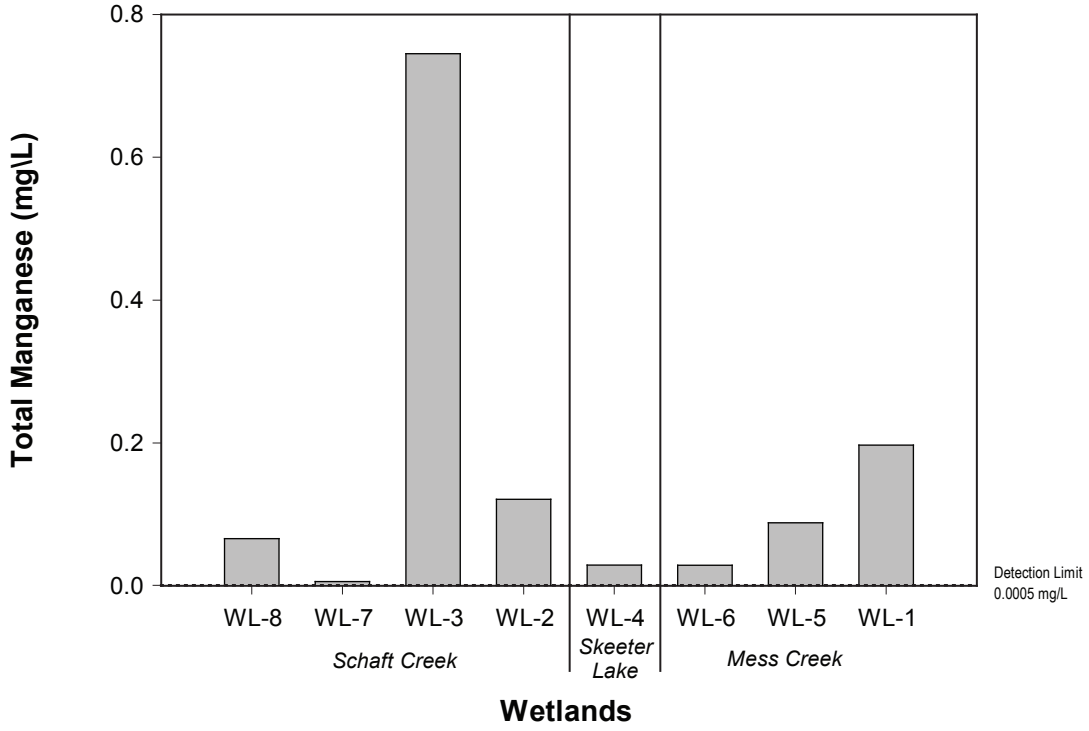


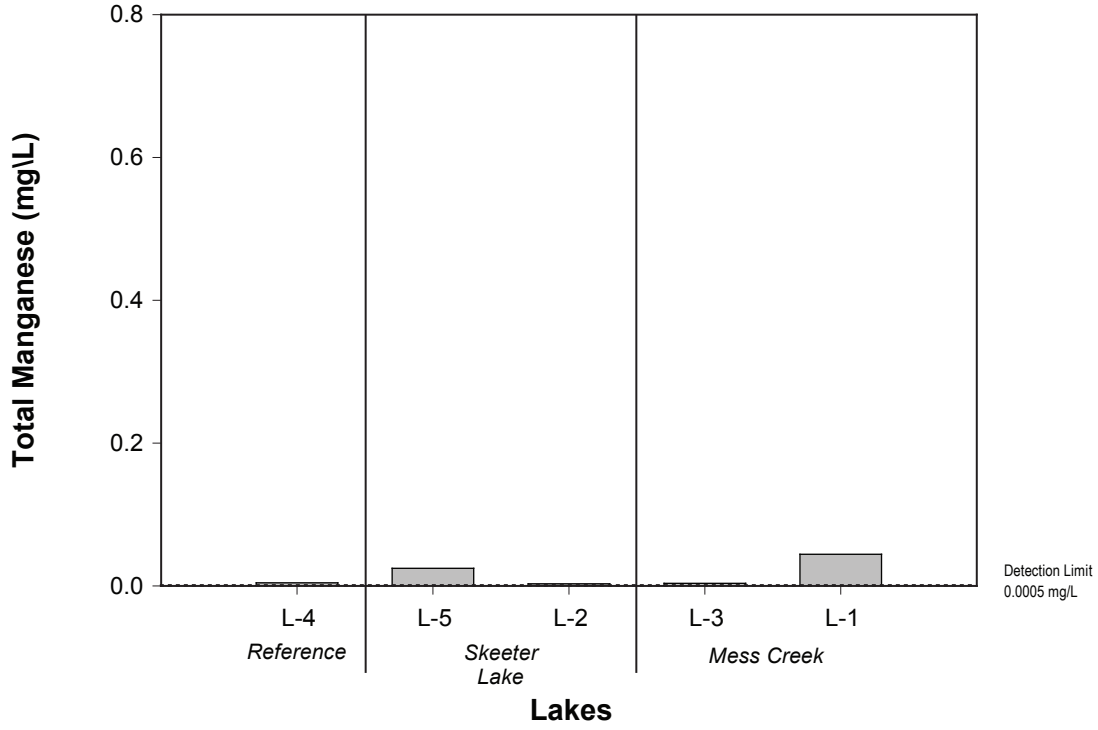


Notes: Dotted line represents analytical detection limit.
Dashed line indicates guideline value, where available.

FIGURE 3.1-72

Dissolved Iron Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

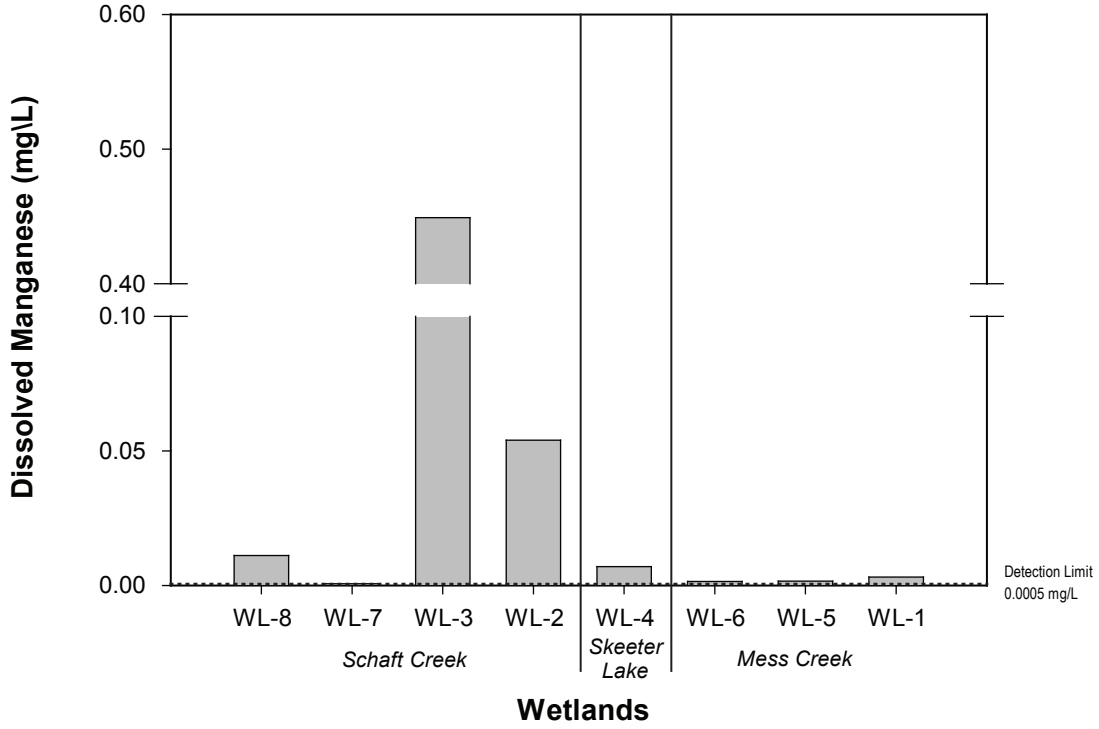


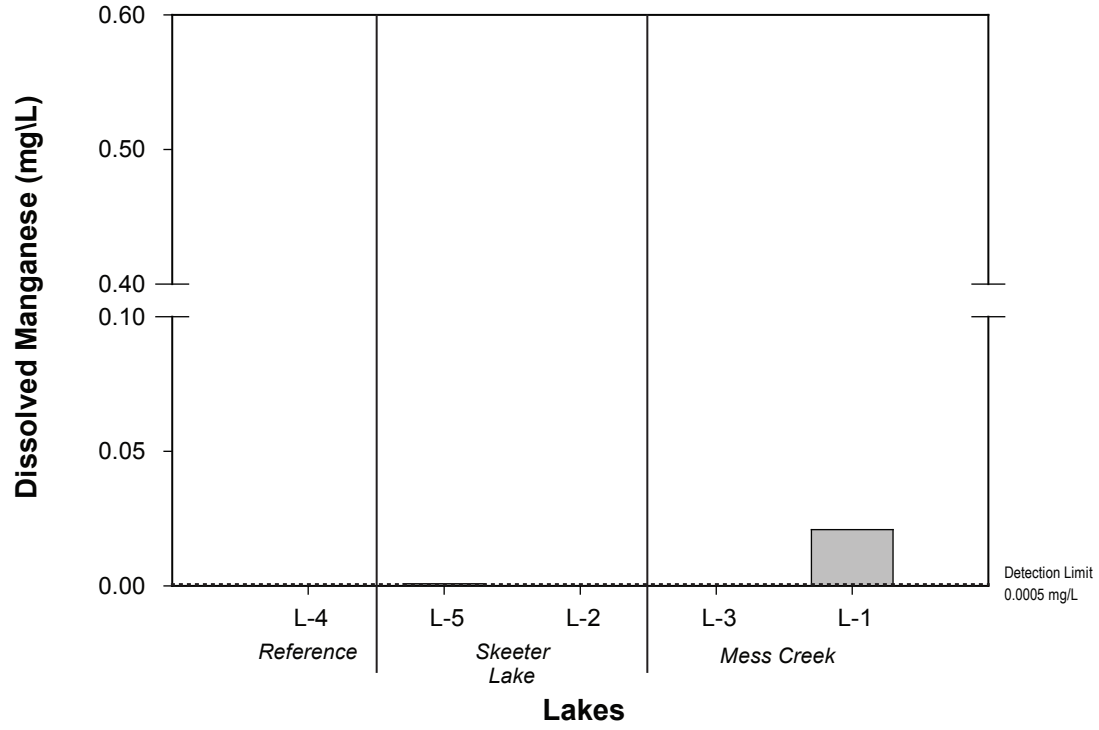


Note: No CCME guideline. BC guideline depends on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-73

Total Manganese Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

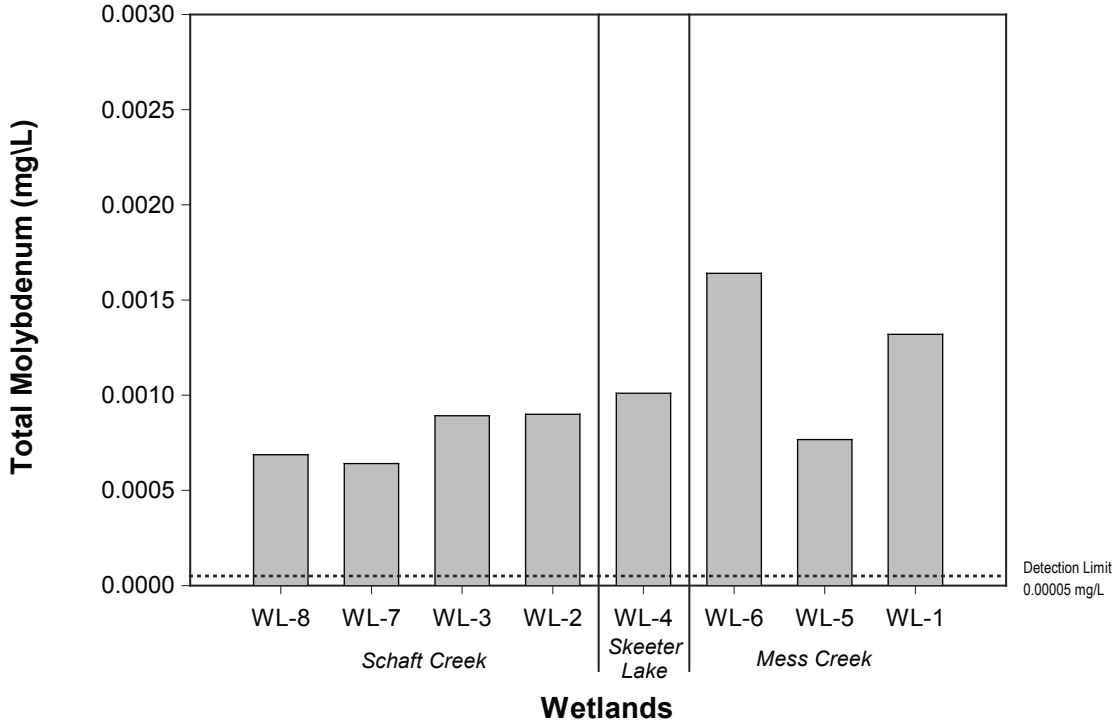


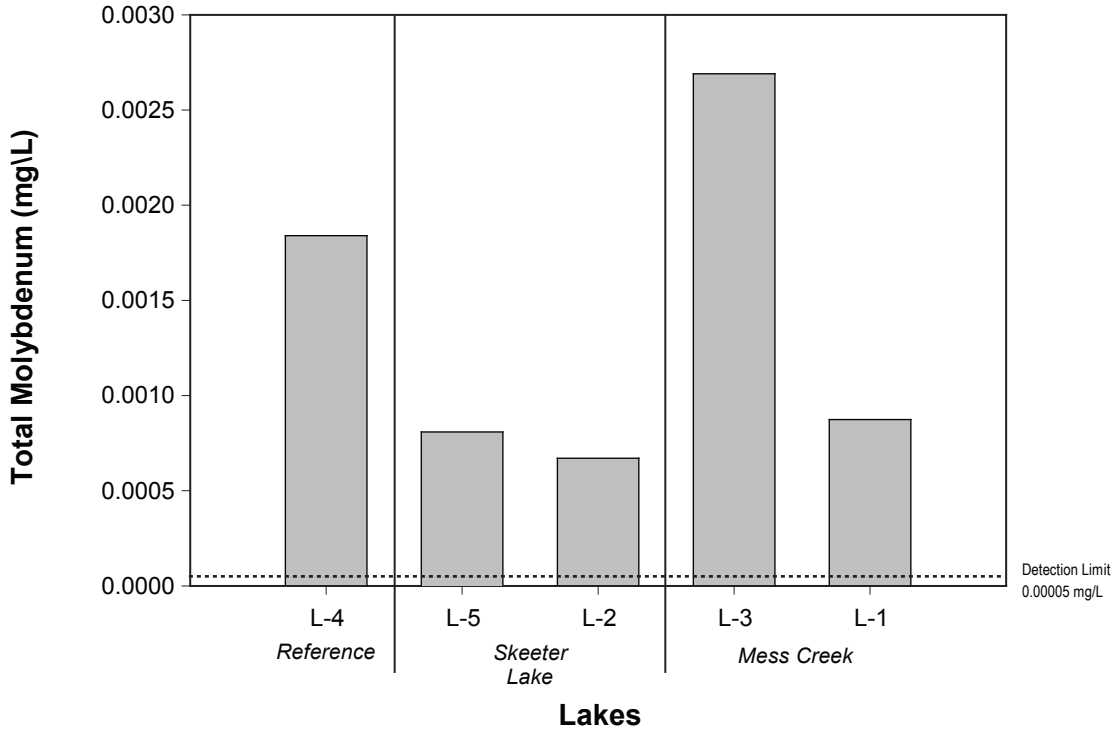


Note: No CCME guideline. BC guideline depends on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-74

Dissolved Manganese Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

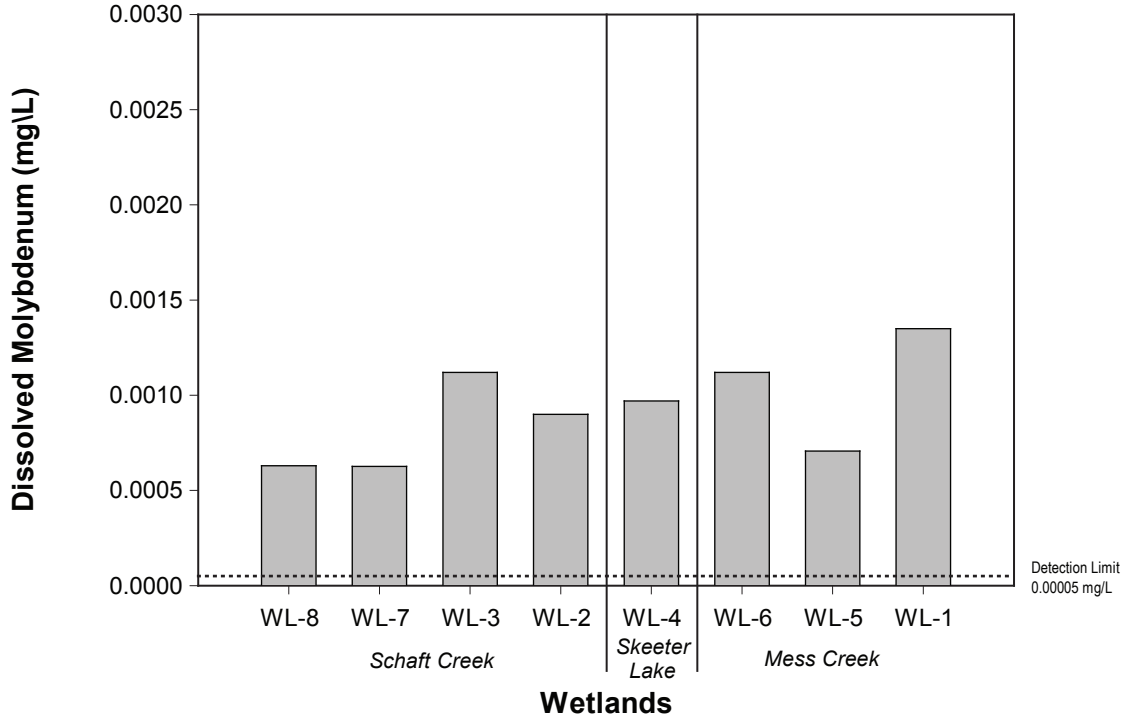


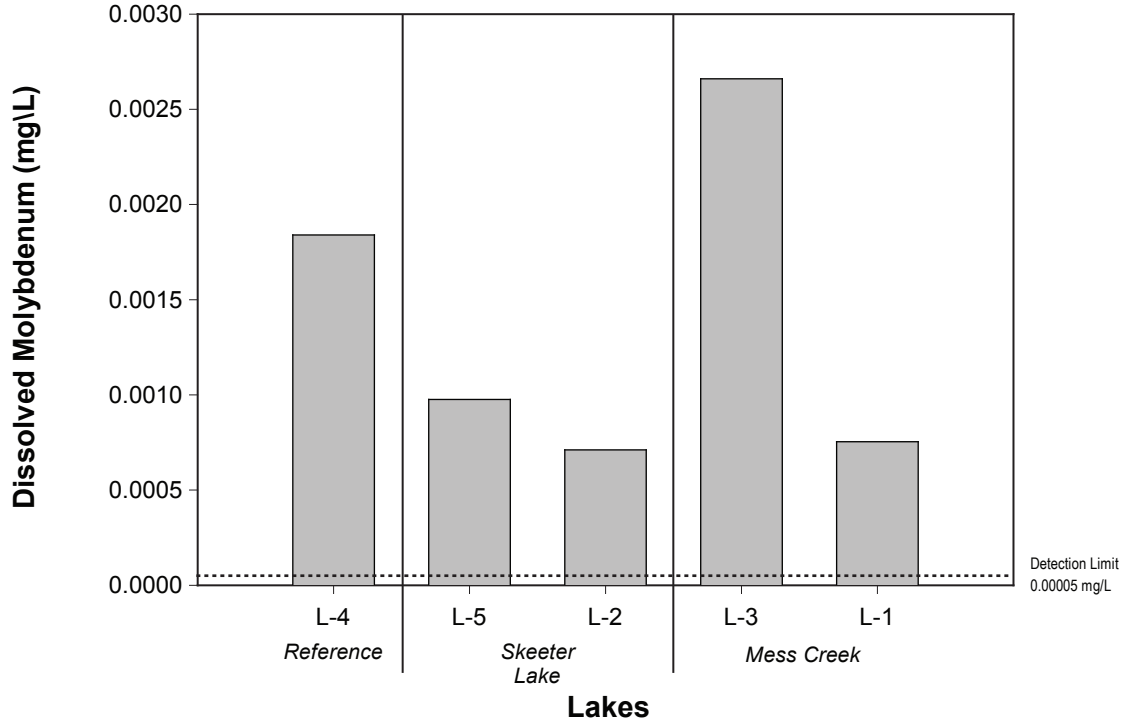


Notes: CCME guideline is 0.07300 mg/L; BC guideline is 2 mg/L (Max) and 1 mg/L (30-d Mean).
Green line represents analytical detection limit.

FIGURE 3.1-75

Total Molybdenum Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

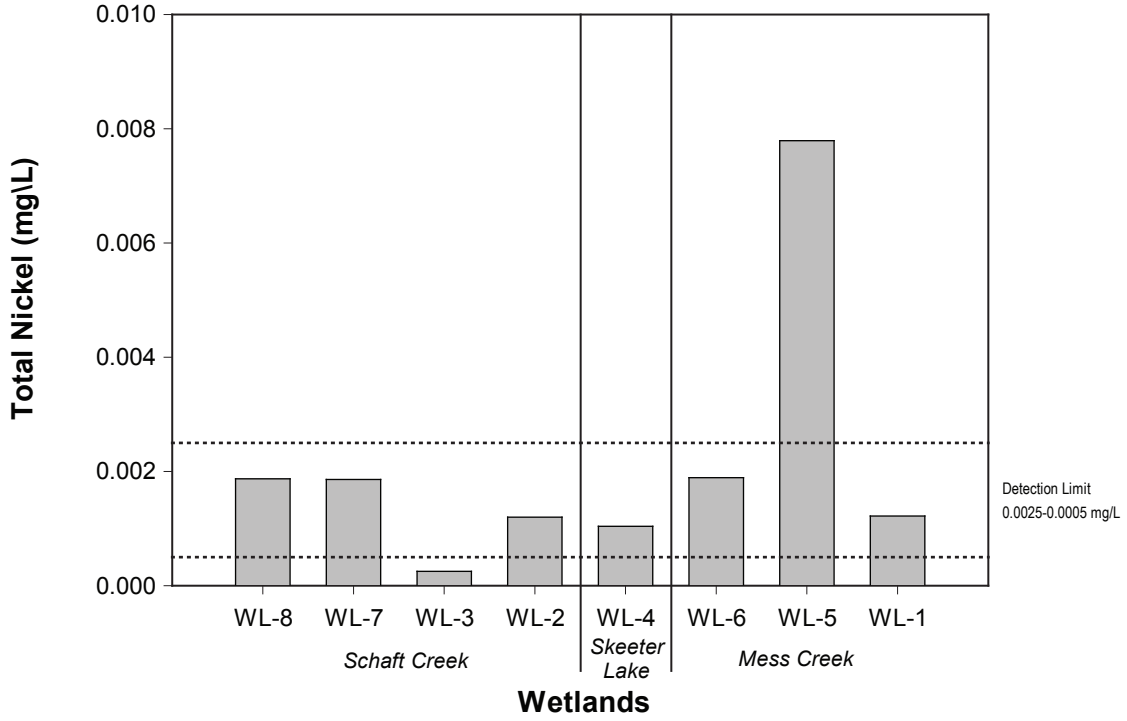


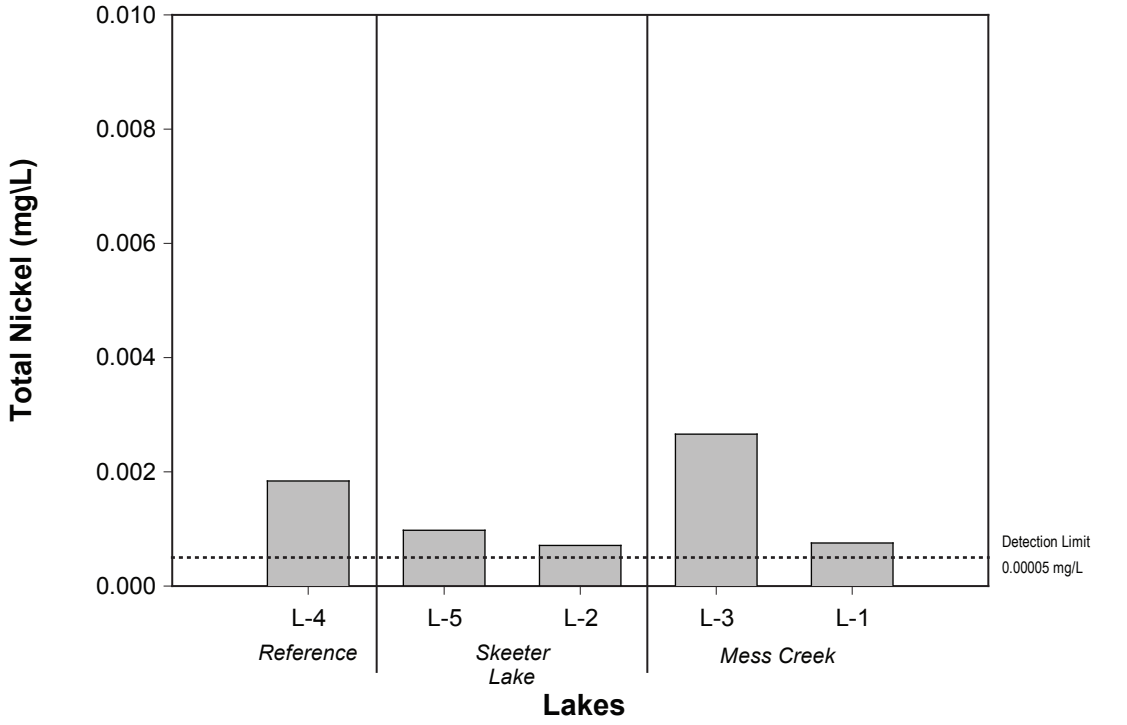


Notes: CCME guideline is 0.07300 mg/L; BC guideline is 2 mg/L (Max) and 1 mg/L (30-d Mean).
Green line represents analytical detection limit.

FIGURE 3.1-76

Dissolved Molybdenum Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

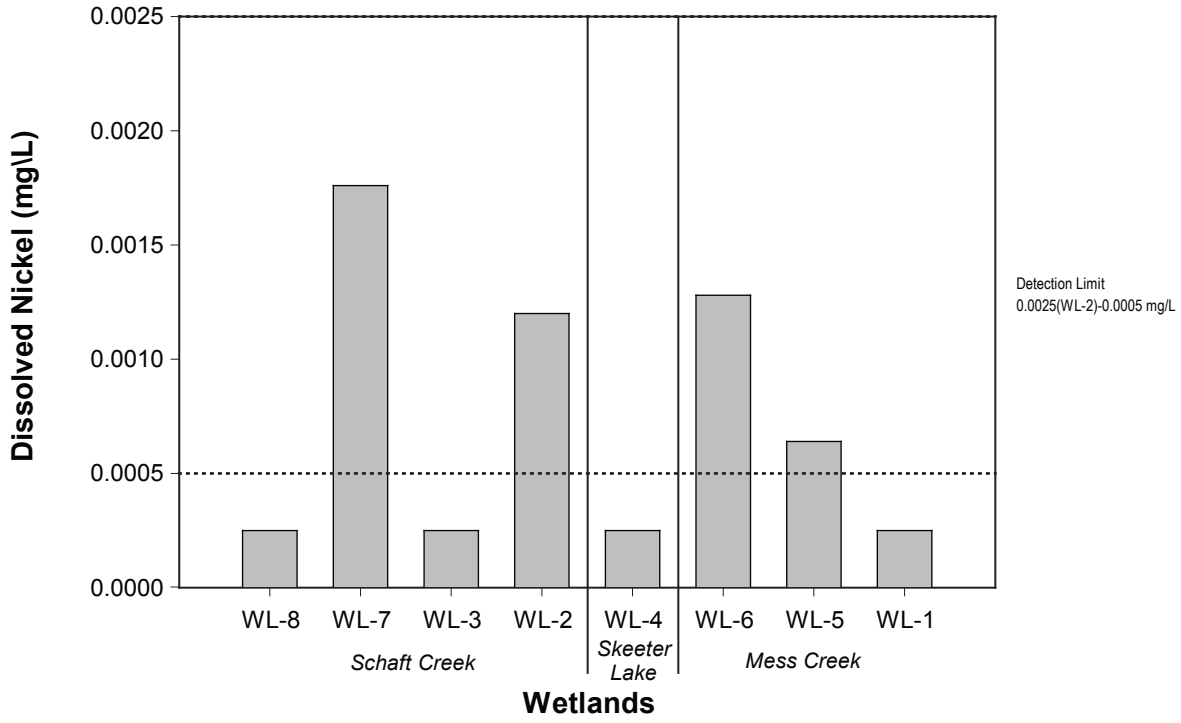


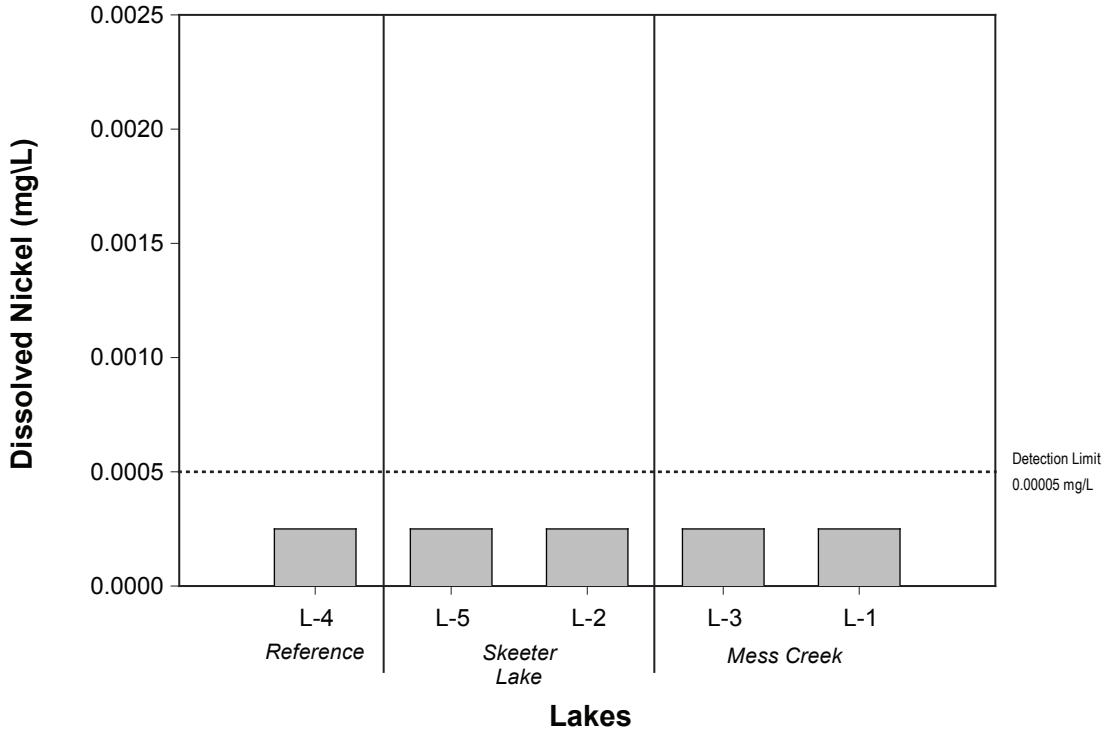


Notes: CCME and BC guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-77

Total Nickel Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

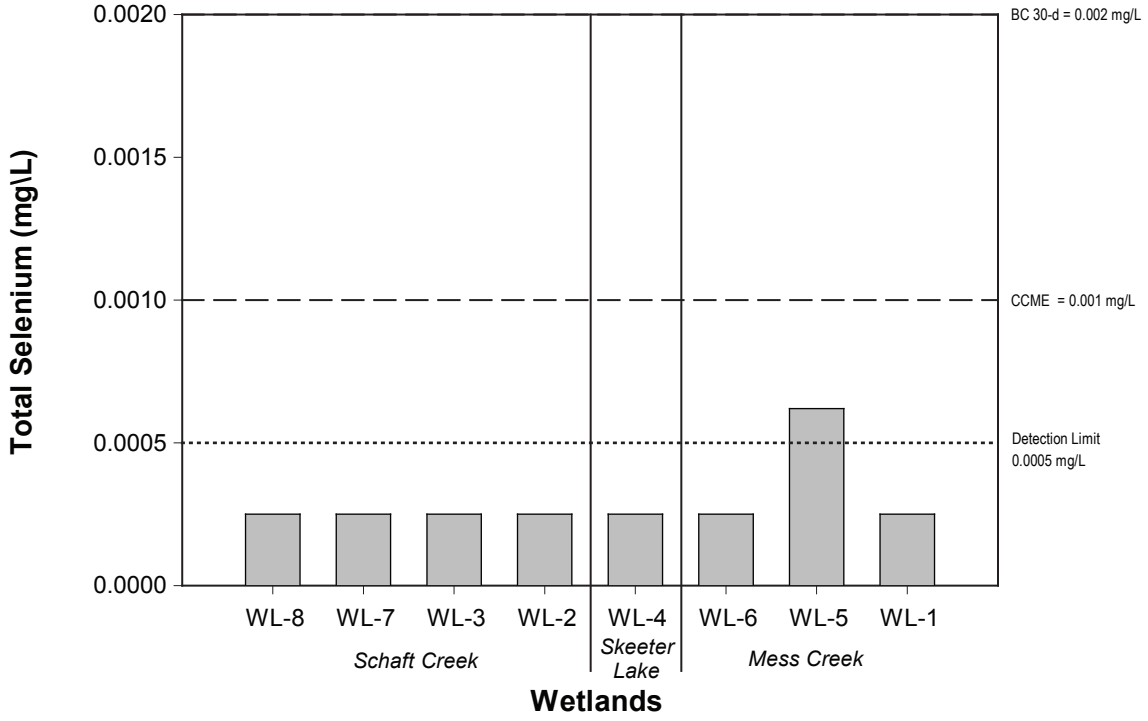


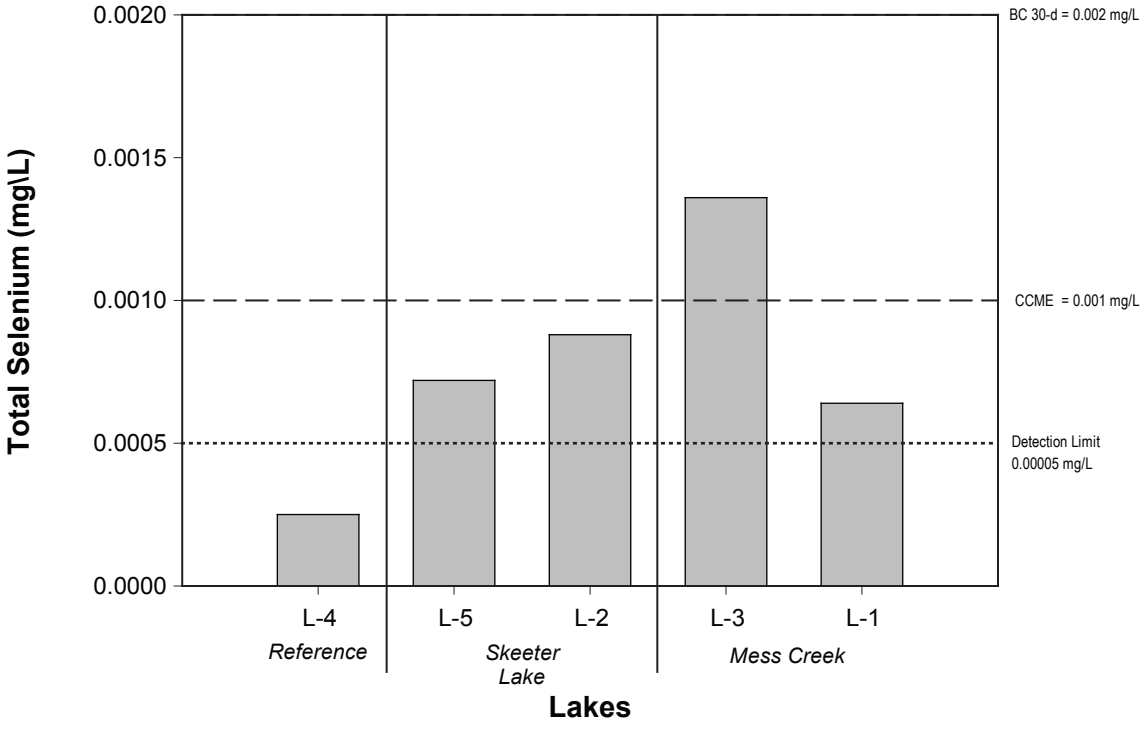


Notes: CCME and BC guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-78

Dissolved Nickel Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

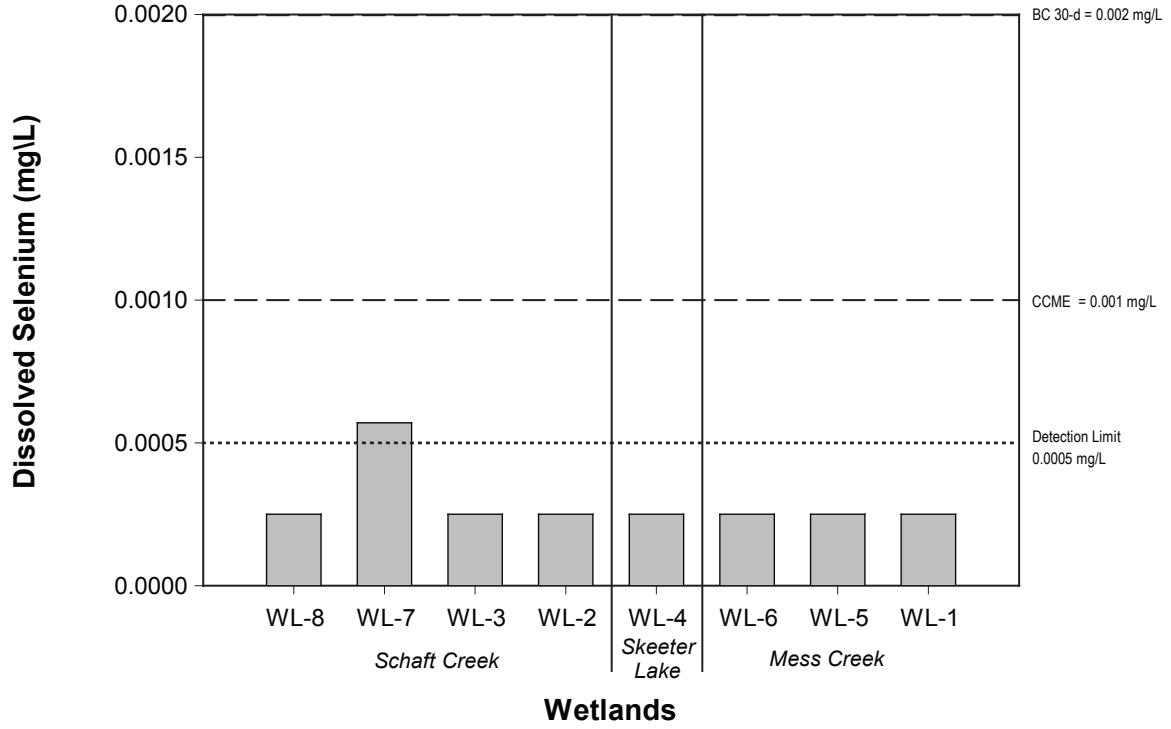


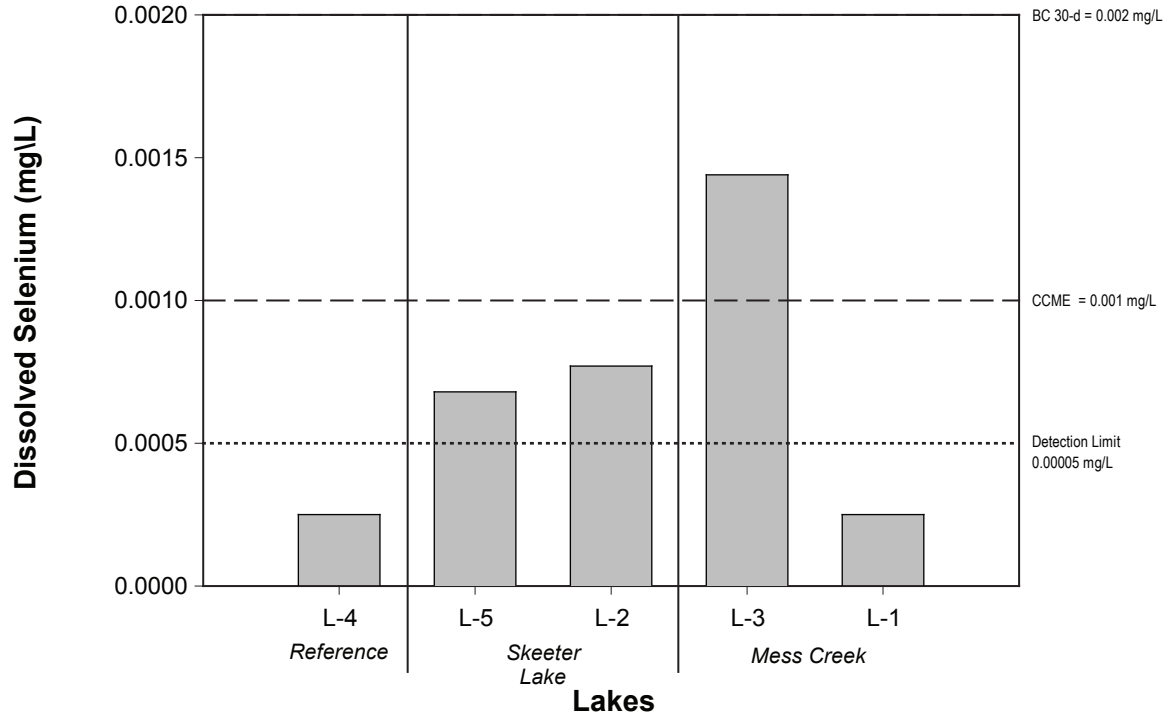


Notes: CCME guideline = 0.01 mg/L; and BC 30-d mean = 0.002 mg/L.
Dotted line represents analytical detection limit.

FIGURE 3.1-79

Total Selenium Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

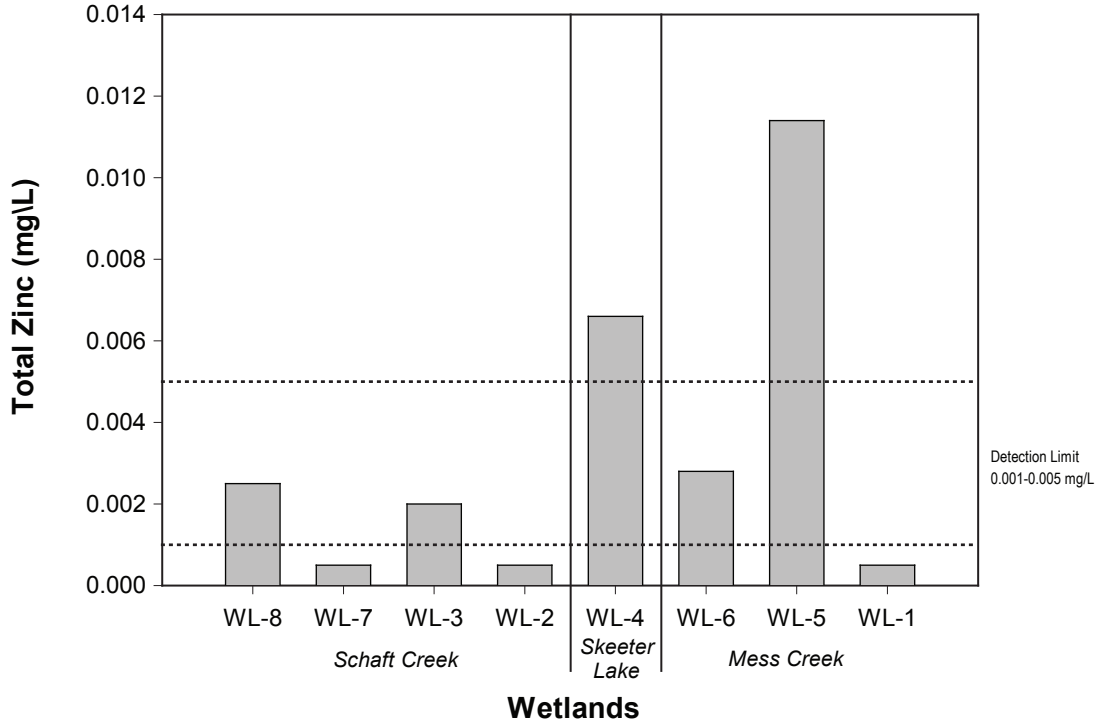


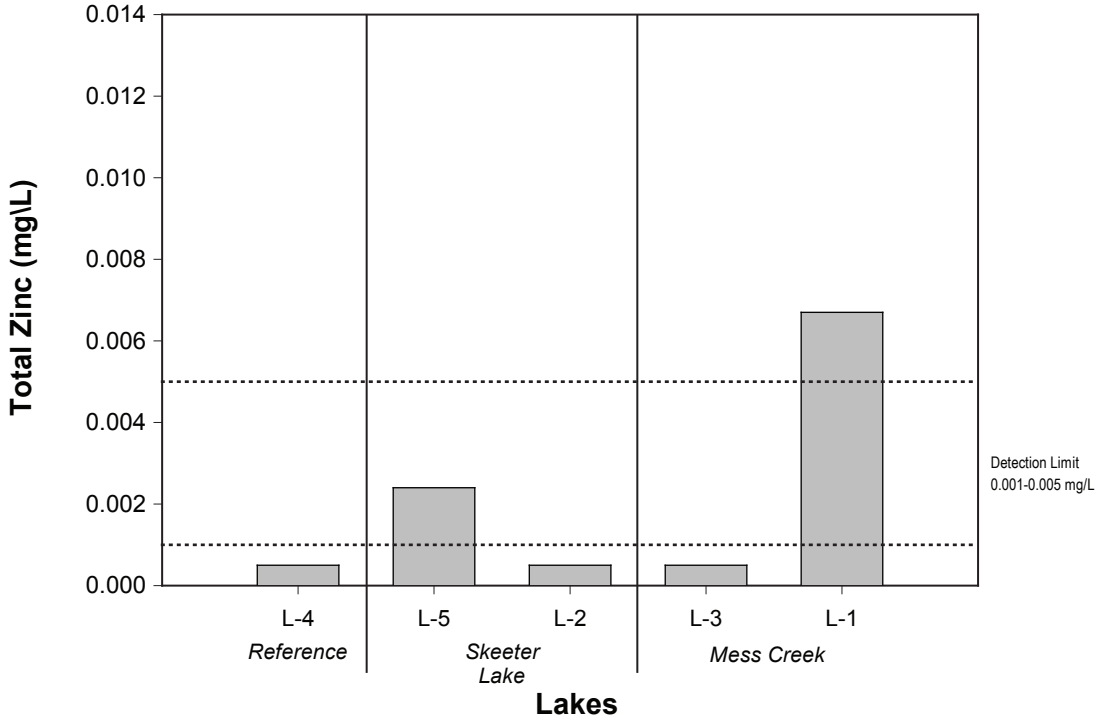


Notes: CCME guideline = 0.01 mg/L; and BC 30-d mean = 0.002 mg/L.
Dotted line represents analytical detection limit.

FIGURE 3.1-80

Dissolved Selenium Concentrations in Schaft Creek Project Wetlands and Lakes, 2006





Notes: CCME guideline = 0.03mg/L; BC Max and 30-d Mean guidelines depend on hardness.
Dotted line represents analytical detection limit.

FIGURE 3.1-81

Total Zinc Concentrations in Schaft Creek Project Wetlands and Lakes, 2006

The RPD analysis of QA/QC field duplicate data for wetlands and lakes are reported in Appendix 3.1-5

Two duplicate pairs of samples were compared for each variable, using the RPD between the replicates as a measure of the variability inherent in field sampling (environmental heterogeneity, sampler handling leading to contamination). Approximately 48% of analytical results were below the method detection limit (MDL), and therefore RPD values were not calculated. Of the remaining results, 6.6% (5 of 76 RPD calculations) were greater than the threshold of 20% indicated by provincial guidance.

3.1.2.2 Physical Limnology

Basic physical limnological parameters (temperature, dissolved oxygen, conductivity, surface pH and Secchi depth) were measured at all five of the Schaft Creek Project lakes. The raw limnology data are shown in Appendix 3.1-6.

Surface pH and depth profiles of temperature, dissolved oxygen and conductivity were measured at each site (Table 3.1-2). The depth of these sites ranged from 6 to 9 meters. Secchi depth (a measure of surface water transparency) ranged from 0.5 to 7.0 meters. Extreme average temperatures in these lakes were 9.3ºC at L-1 and 14.9ºC at L-4. Extreme average DO concentrations were 7.4 mg/L at L-4 and 8.7 mg/L at L-1. Extreme average conductivity measurements were 117 µS at L-5 and 159 µS at L-2.

Table 3.1-2
Limnology data from Schaft Creek Project Lakes, August 2006

Site	Max Depth (m)	Mean Temperature (°C)	SE	Mean Dissolved Oxygen (mg/L)	SE	Mean Conductivity (µS)	SE	Surface pH	Secchi Depth (m)
L-1	7	9.3	0.1	8.7	0.1	130.3	0.7	7.70	0.5
L-2	9	12.6	0.1	8.2	0.1	159.4	0.3	8.30	7.0
L-3	7	9.8	0.1	8.6	0.1	145.0	0.4	8.60	4.0
L-4	6	14.9	0.1	7.4	0.2	152.3	0.2	8.70	4.0
L-5	9	11.1	0.1	8.4	0.0	117.4	0.2	8.60	0.5

Note: Mean values are averaged over the depths sampled.
SE = standard error of the mean.

3.1.2.3 Sediment Quality

Sediment quality was assessed at 12 wetland and lake sites by collecting triplicate sediment samples at each site in late August, 2006 (Figure 2.1-1). All raw data, including highlighted samples that exceed guidelines, are shown in Appendix 3.1-7 Results from Relative Percent Difference analysis is presented in Appendix 3.1-8

Particle Size

Analysis of the particle size data in wetland sediments indicated that most wetland sites were composed primarily of silt (7.4 to 64.1%) and clay (0.9 to 64.7%) with smaller proportions of

sand (0.5 to 44.2%) and gravel (0 to 47.4%) (Figure 3.1-82). The exception to this was WL-5, which was primarily composed of sand (44.2%) and gravel (47.4%). The sediment composition at WL-5 is noticeably different than the other wetlands because the replicates were closer to flowing water than in the other wetlands. Consequently, the sediments at this site may have been exposed to greater water flow more recently than other sites resulting in a relatively high proportion of large particles like sand and gravel at this site.

Most lake sediments were composed primarily of silt (6.8 to 66.3%) and clay (0.8 to 46.4%) with smaller proportions of sand (1.4 to 85.1%) (Figure 3.1-82). L-4 was the only site with sediments dominated by sand (85.1%) and smaller proportions of gravel (7.3%). The sand and gravel contributions to L-4 primarily came from one replicate, which was shallow and near a rocky shore.

Nutrients, TOC and Cyanides

Wetland nutrient (available phosphorus and nitrogen) and total organic carbon (TOC) concentrations were considerably higher at WL-7 than other wetlands (Figure 3.1-83). The average available phosphorus in wetlands ranged from below detection limits at WL-6 and WL-2 to 2.0 mg/kg at WL-7 and average nitrogen values ranged from 0.03% at WL-5 to 0.82% at WL-7. Average wetland TOC values ranged from 0.5% at WL-1 to 22.9% at WL-7.

Lake phosphorus concentrations were highest at L-2, while nitrogen and TOC concentrations were highest at L-4 (Figure 3.1-84). The average available phosphorus in lakes ranged from 0.5 mg/kg at L-1 to 1.6 mg/kg at L-2 and average nitrogen values ranged from 0.4% at L-1 and L-3 to 1.2% at L-4. Average TOC values in lakes ranged from 0.4 % at L-1 to 18.9% at L-4.

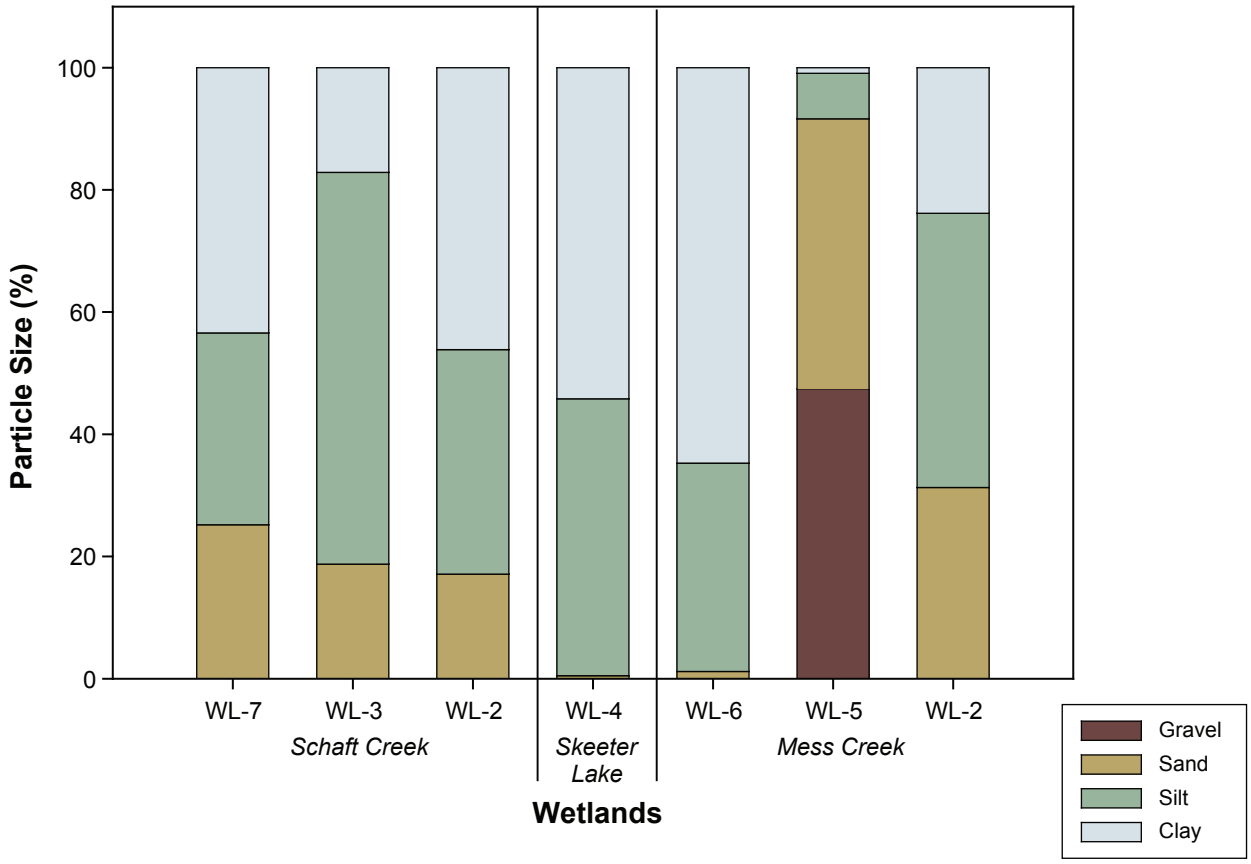
Total cyanide values in wetlands and lakes were below analytical detection limits (3 mg/kg) in all sediment samples.

Total Metals

Of the metals analyzed, antimony, bismuth, molybdenum, selenium, silver, thallium and tin were not detected in more than 80% of samples across all wetland and lake sites. These variables were not analyzed further (Appendix 3.1-7).

Several of the analyzed metals do not have provincial or federal guidelines and are discussed below prior to those metals with guidelines. Even though these metals have no guidelines, they are presented graphically to facilitate comparison between sites (Figures 3.1-85 to 3.1-94). The exception to this is beryllium since more than 50% of the beryllium samples were below detection limits. The highest wetland concentrations of beryllium were found at WL-2 (1.5 mg/kg) and the highest lake concentrations were found at L-4 (1.2 mg/kg).

The highest wetland concentrations of aluminum, cobalt, lithium, magnesium, manganese, titanium and vanadium were found within WL-4. WL-6 was highest in barium and potassium. Strontium was considerably higher at WL-2 than other wetlands. The reference wetland (WL-1) showed relatively low concentrations in most metals. The highest lake concentrations of aluminum, cobalt, lithium, magnesium and vanadium were found at L-5. L-2 showed the highest concentrations of manganese, strontium and titanium. Barium and potassium was highest in L-1 and L-3 respectively. L-4 (reference lake) showed generally low, often the lowest, concentrations of most metals in lake sediments.



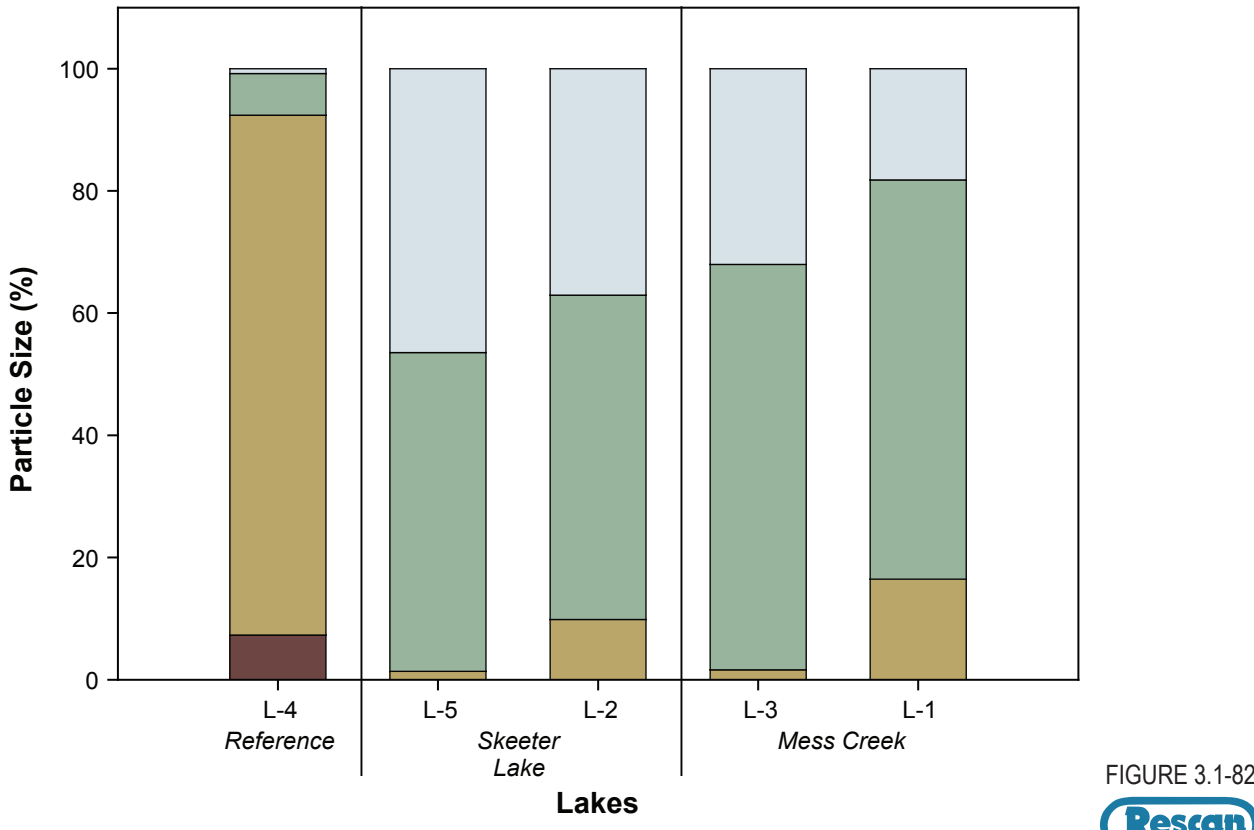
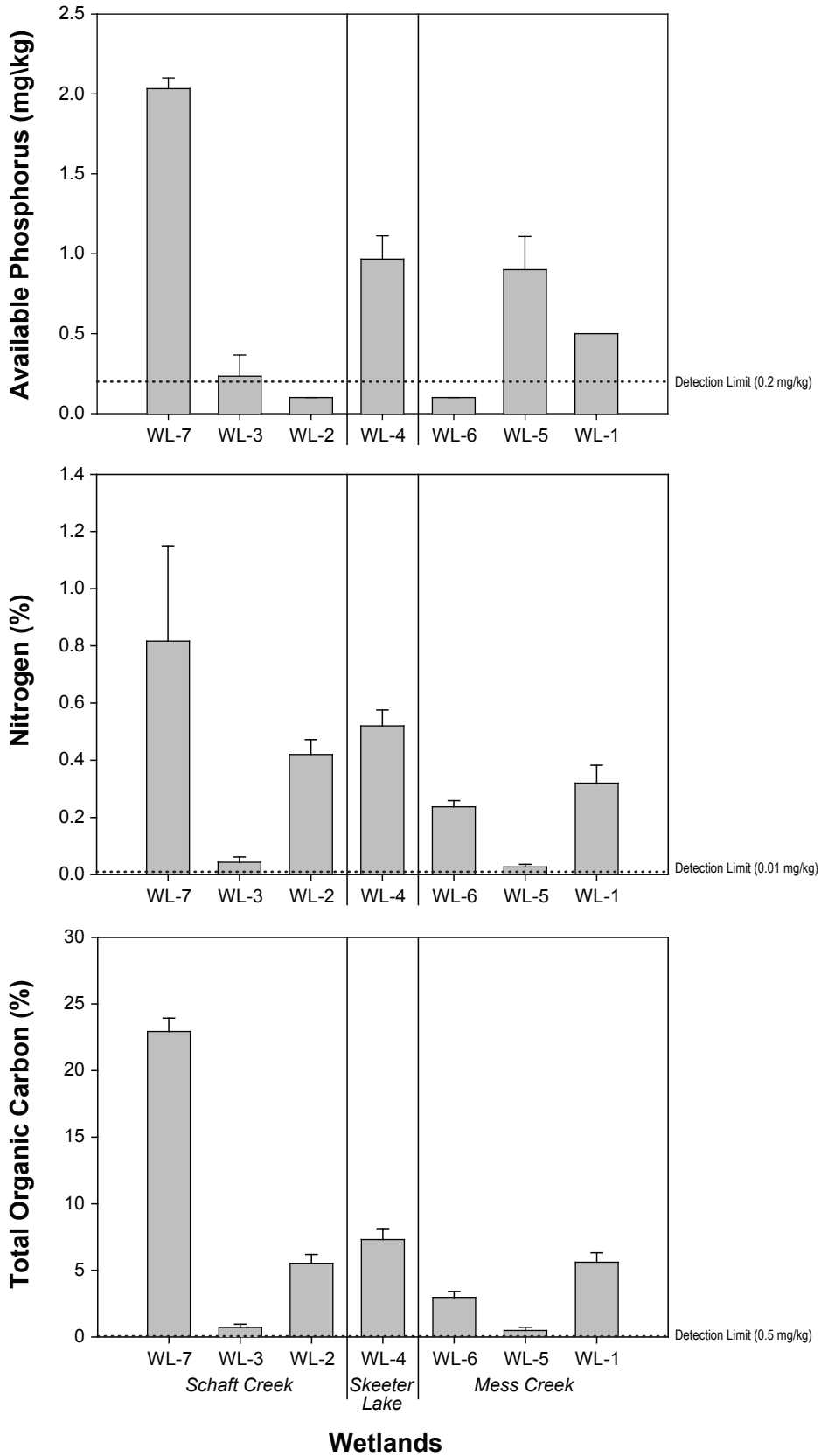


FIGURE 3.1-82

Average Particle Size of Schaft Sediments in Wetlands and Lakes, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

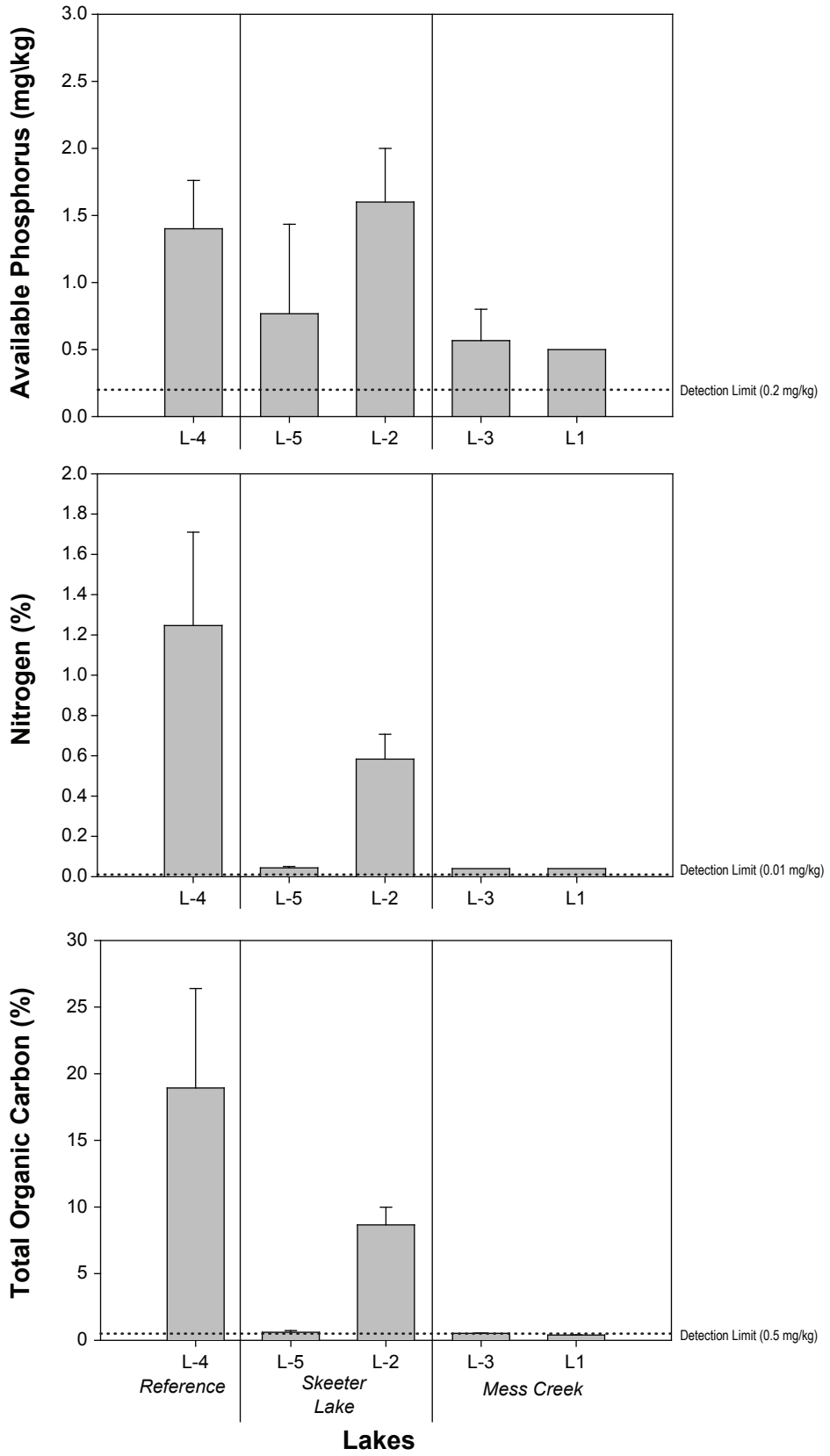
FIGURE 3.1-83

Available Phosphorus, Total Nitrogen and Total Organic Carbon Concentrations in Schaft Wetland Sediments, August 2006

copper FOX metals inc.

Rescan™

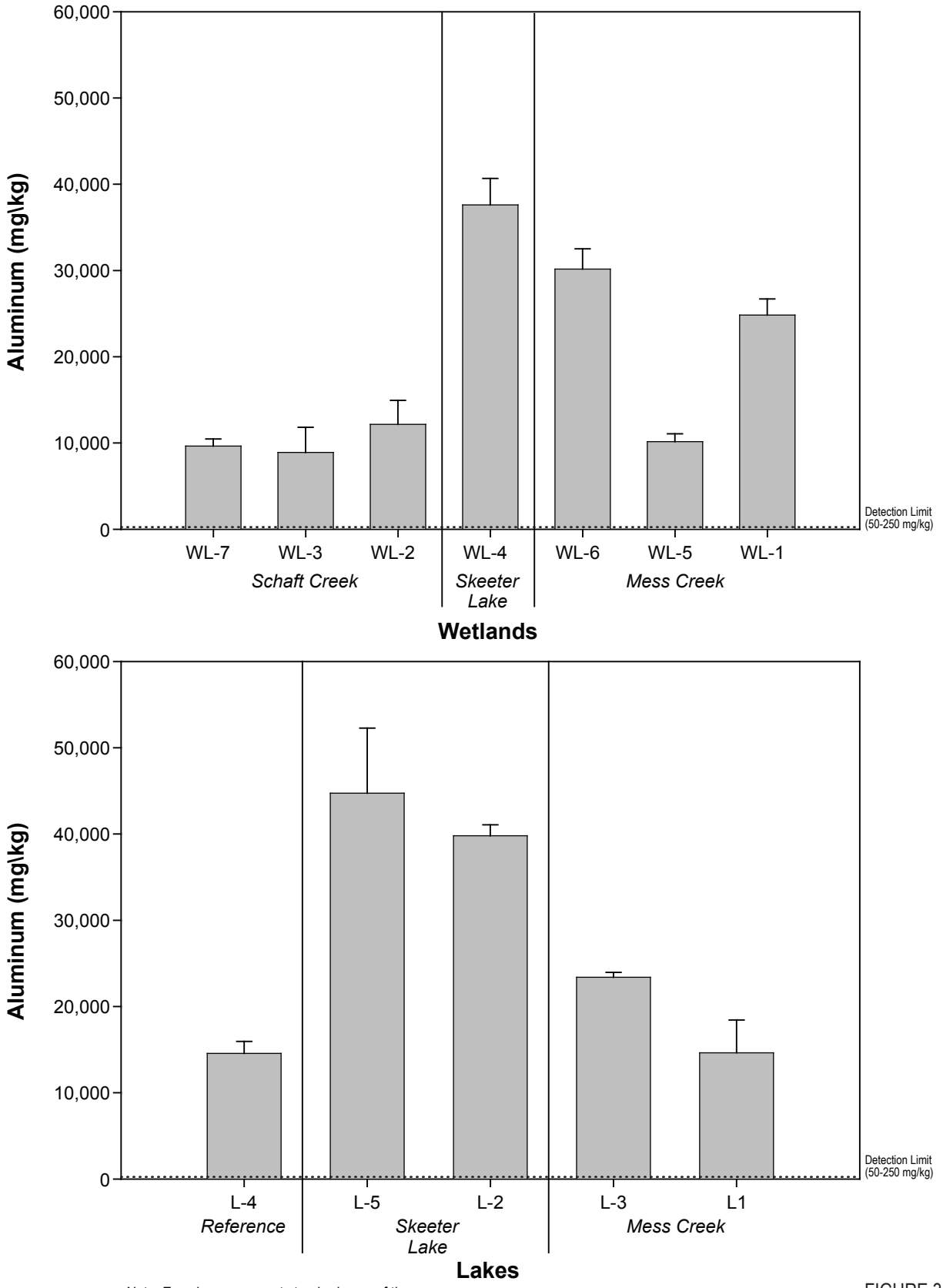
RTEC Keepers of the Land



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-84

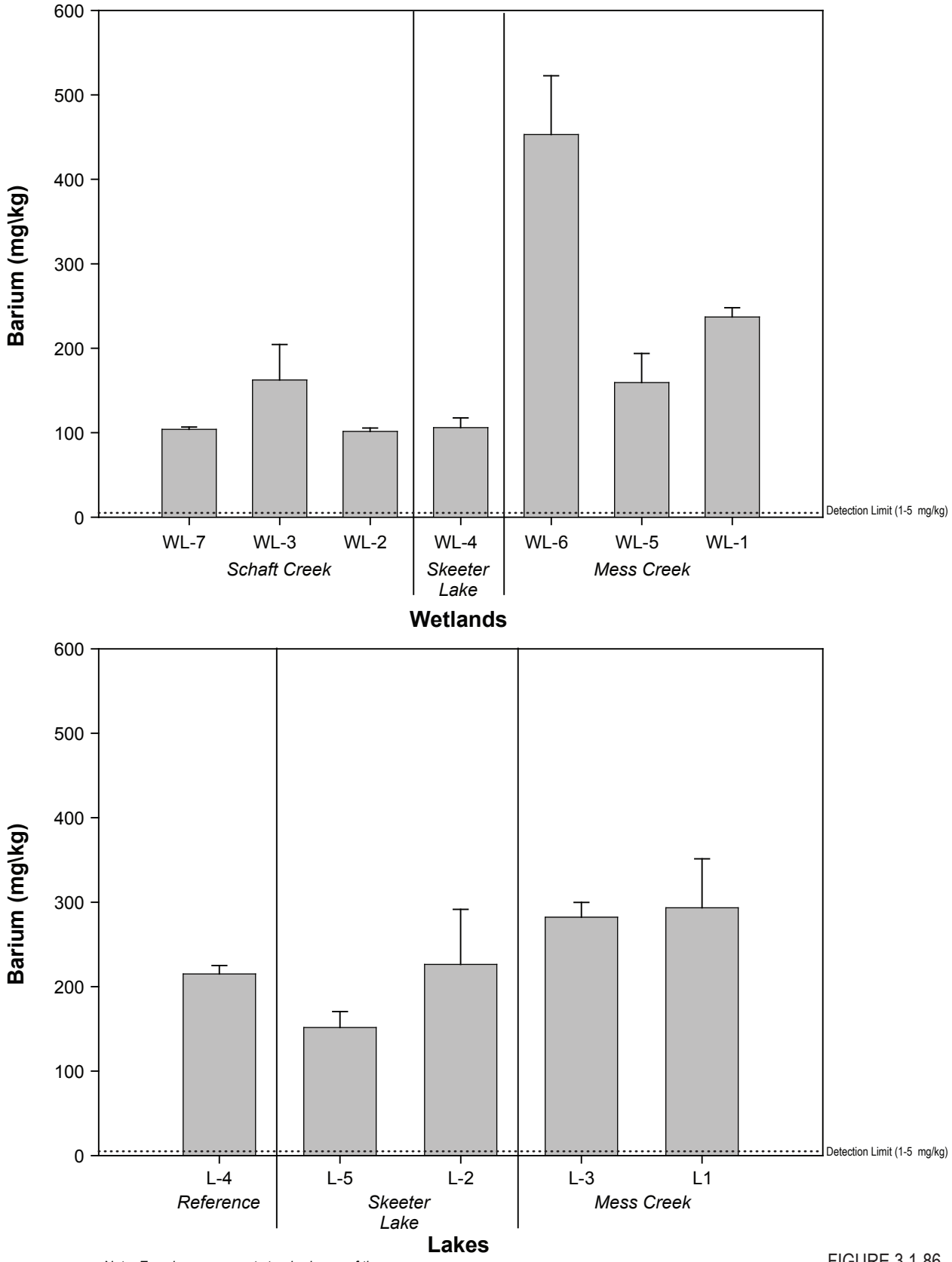
Available Phosphorus, Total Nitrogen and Total Organic Carbon Concentrations in Schaft Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-85

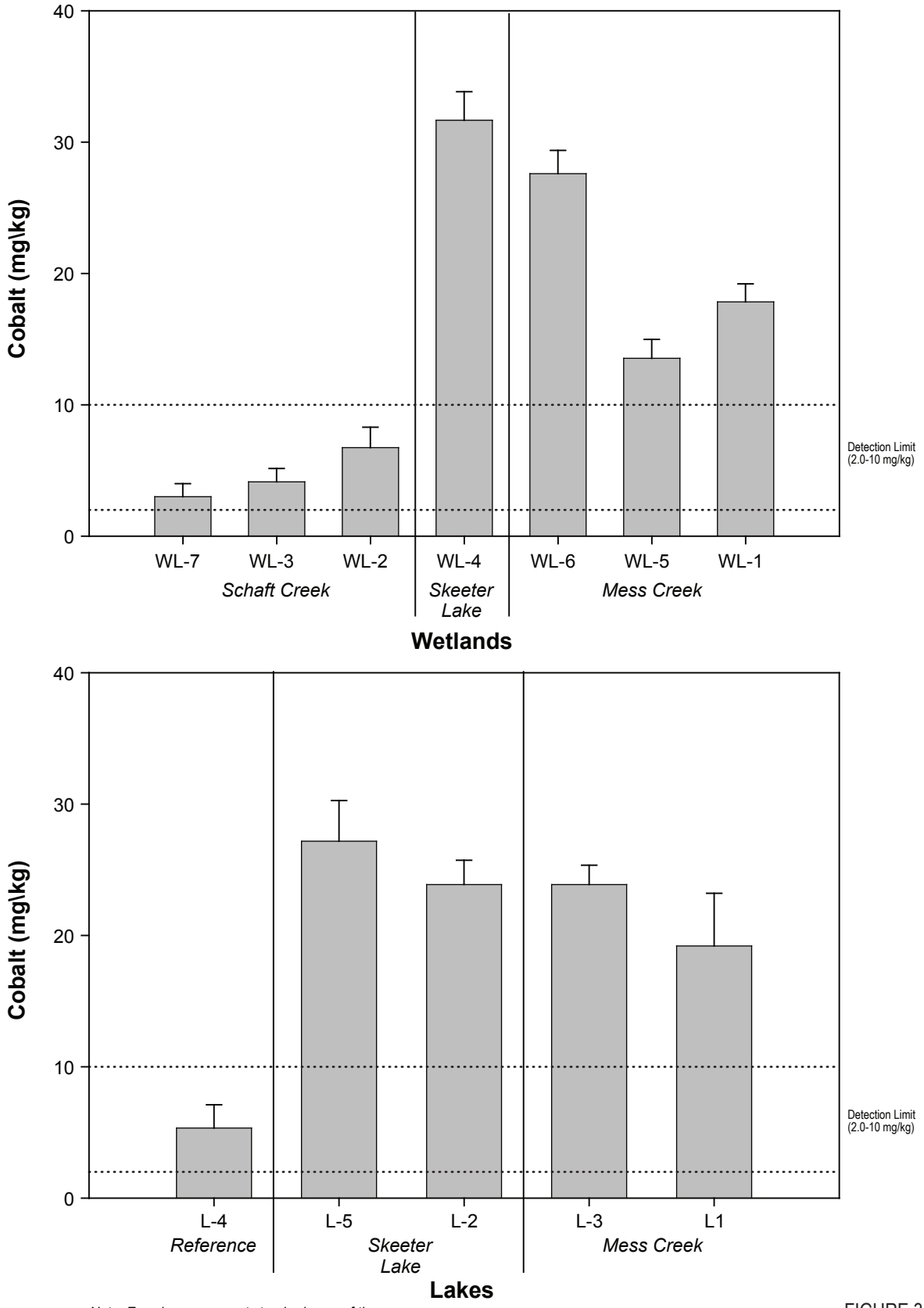
Aluminum Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-86

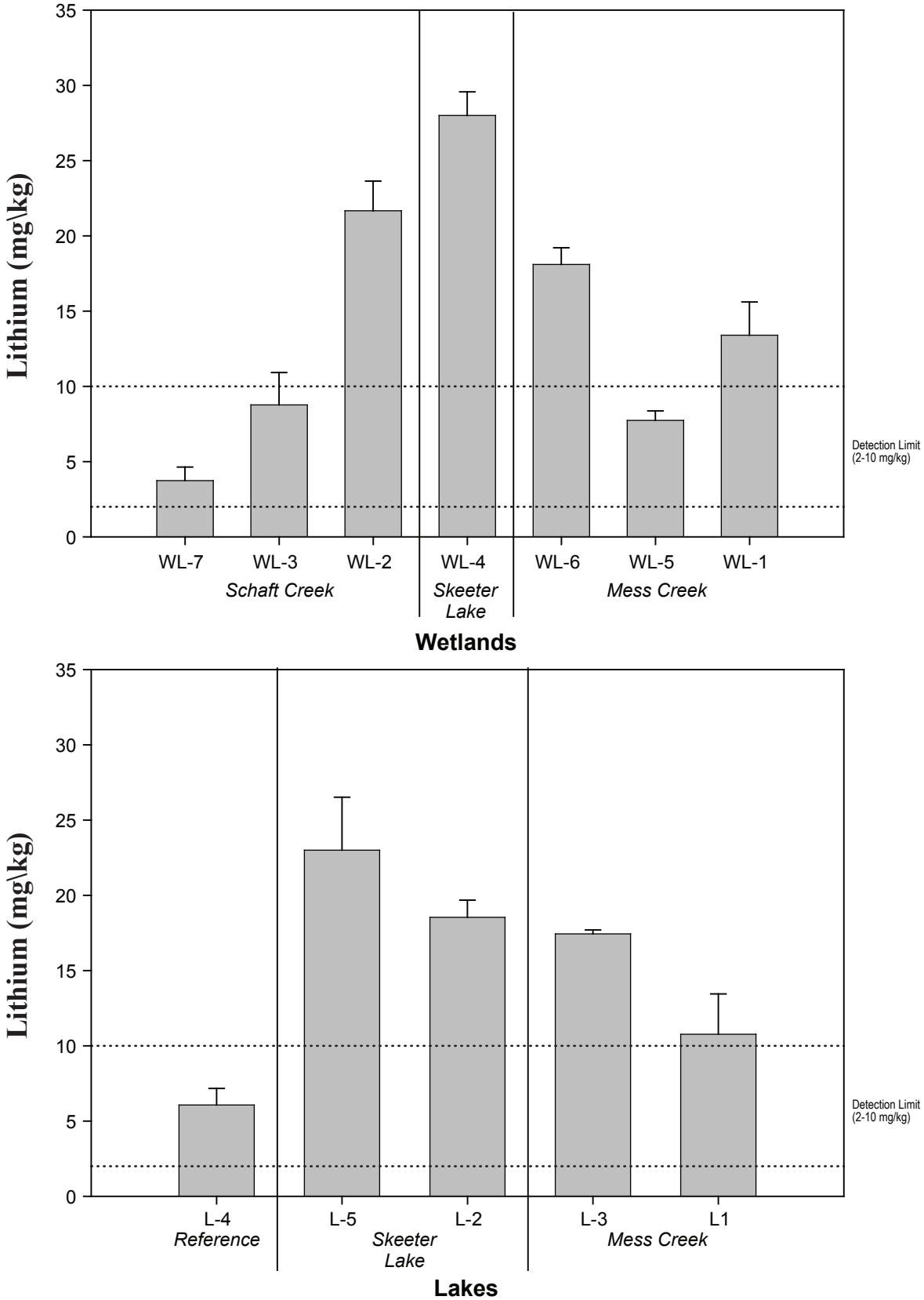
Barium Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-87

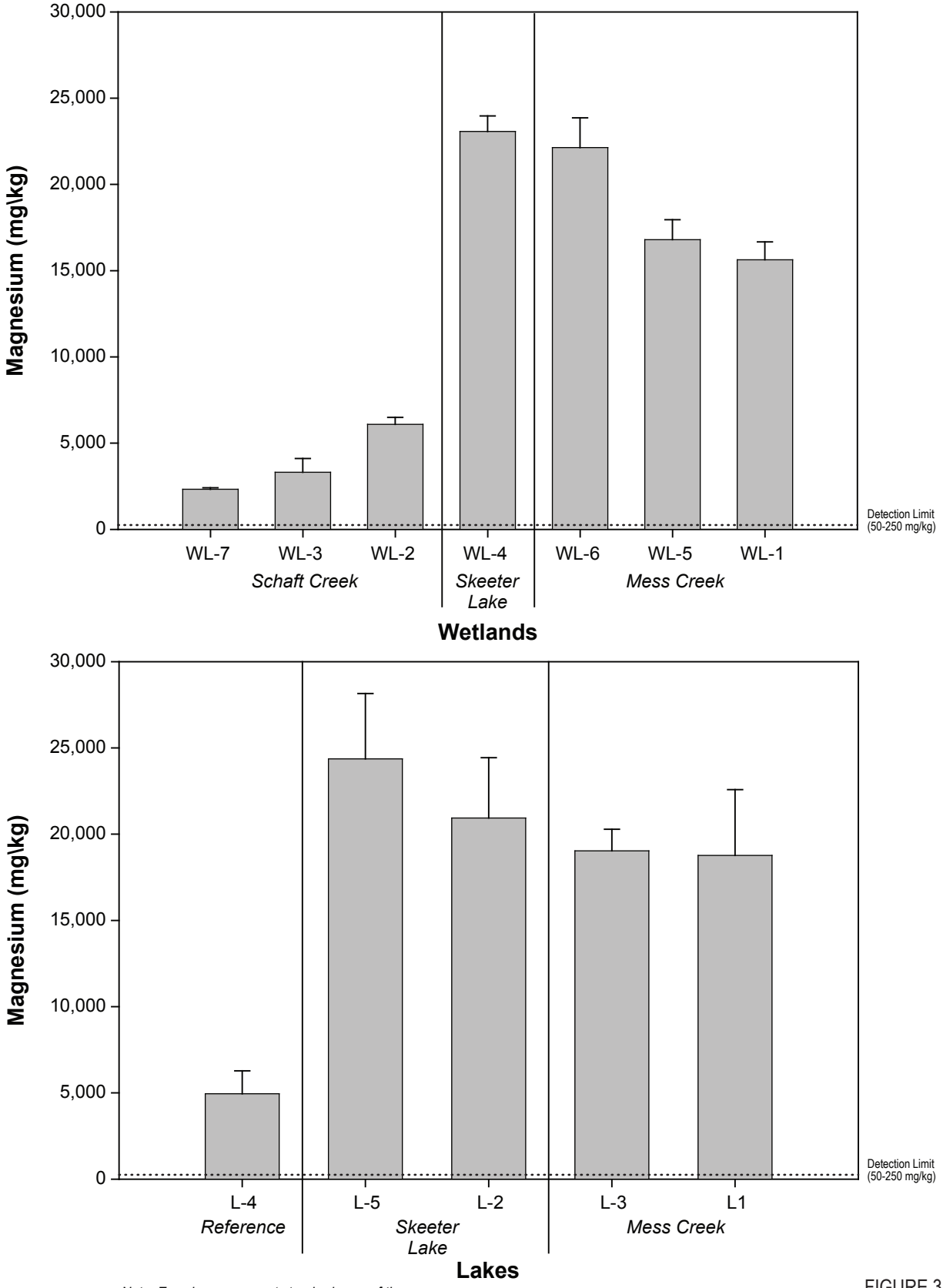
Cobalt Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-88

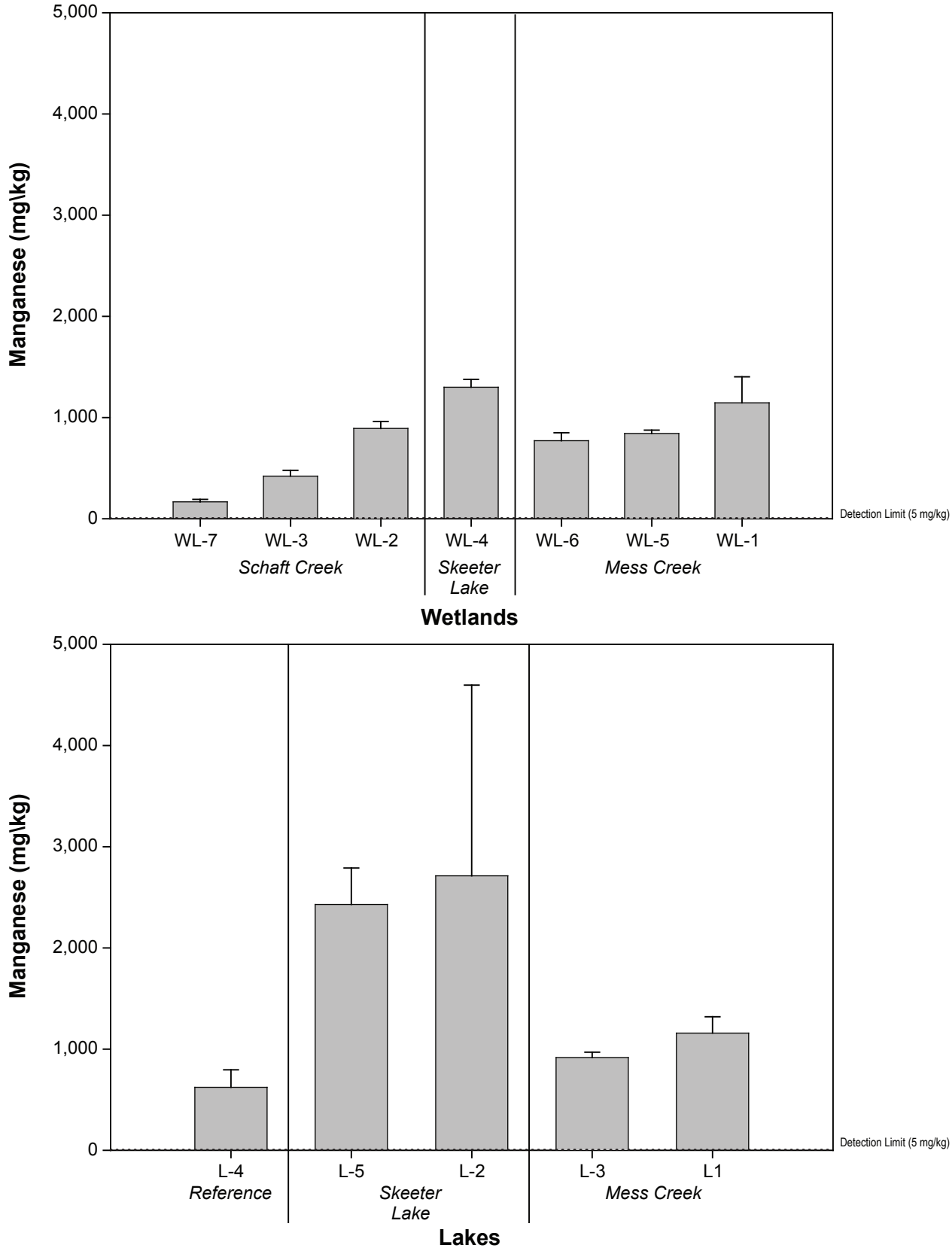
Lithium Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-89

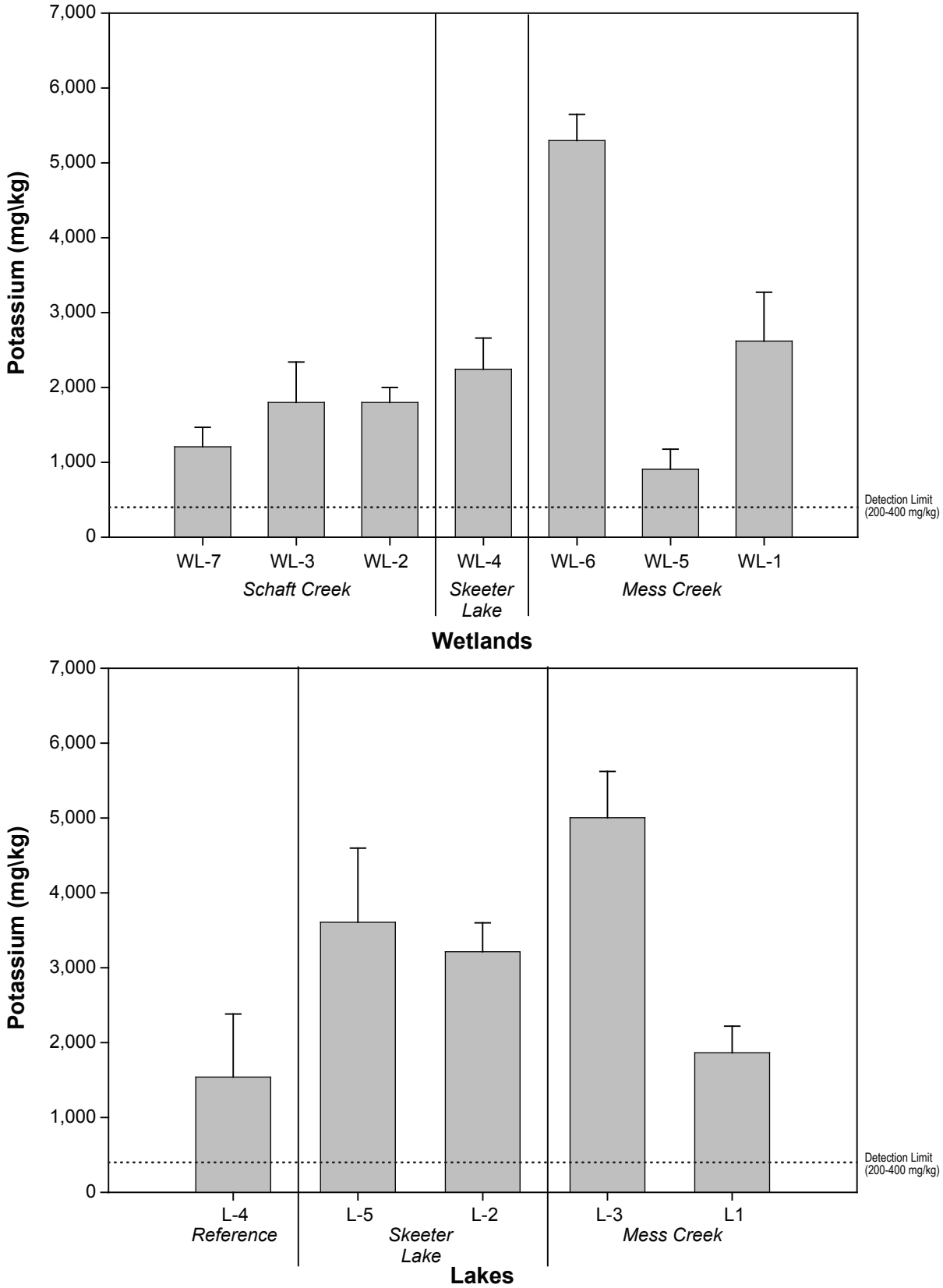
Magnesium Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-90

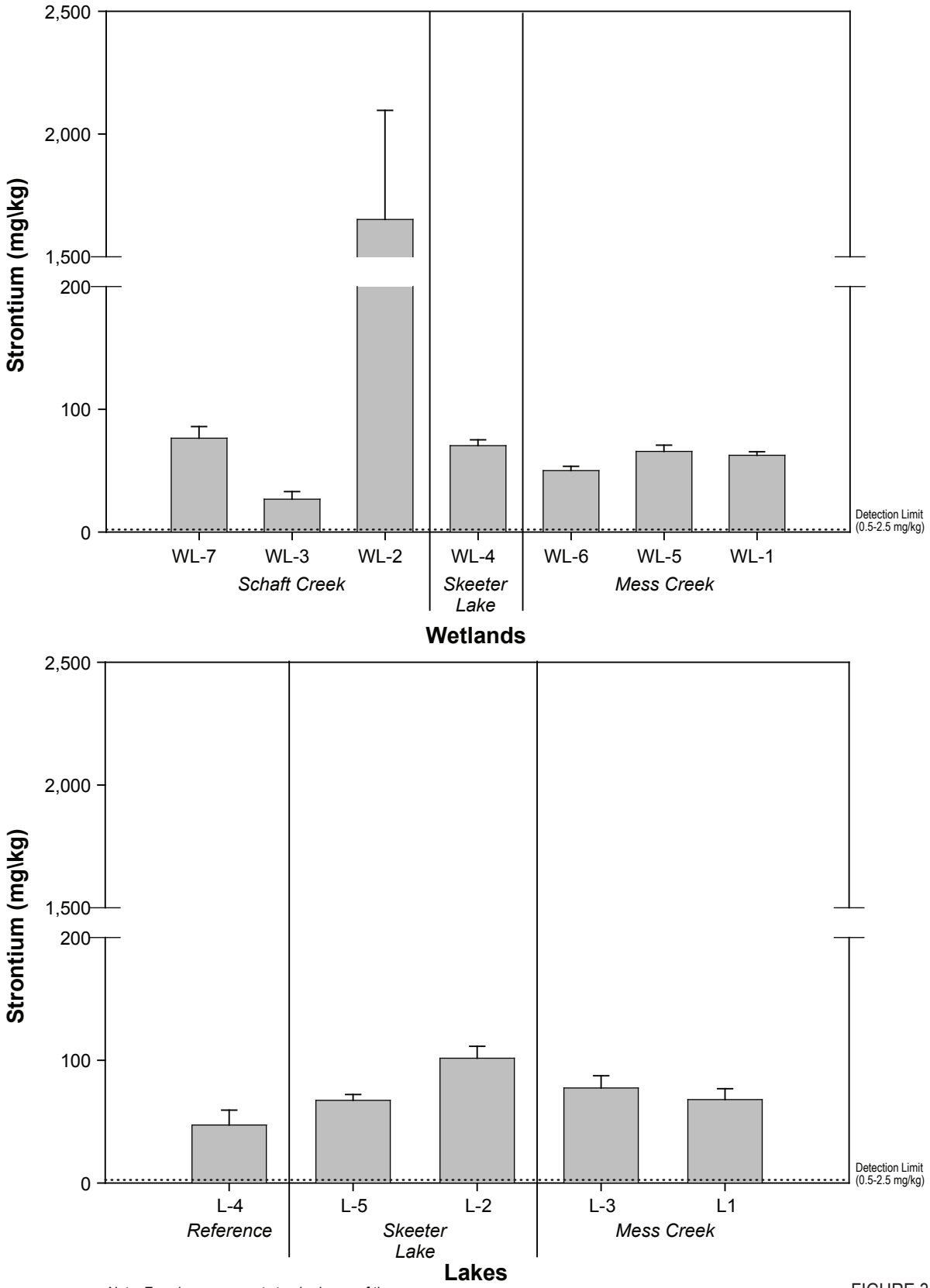
Manganese Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-91

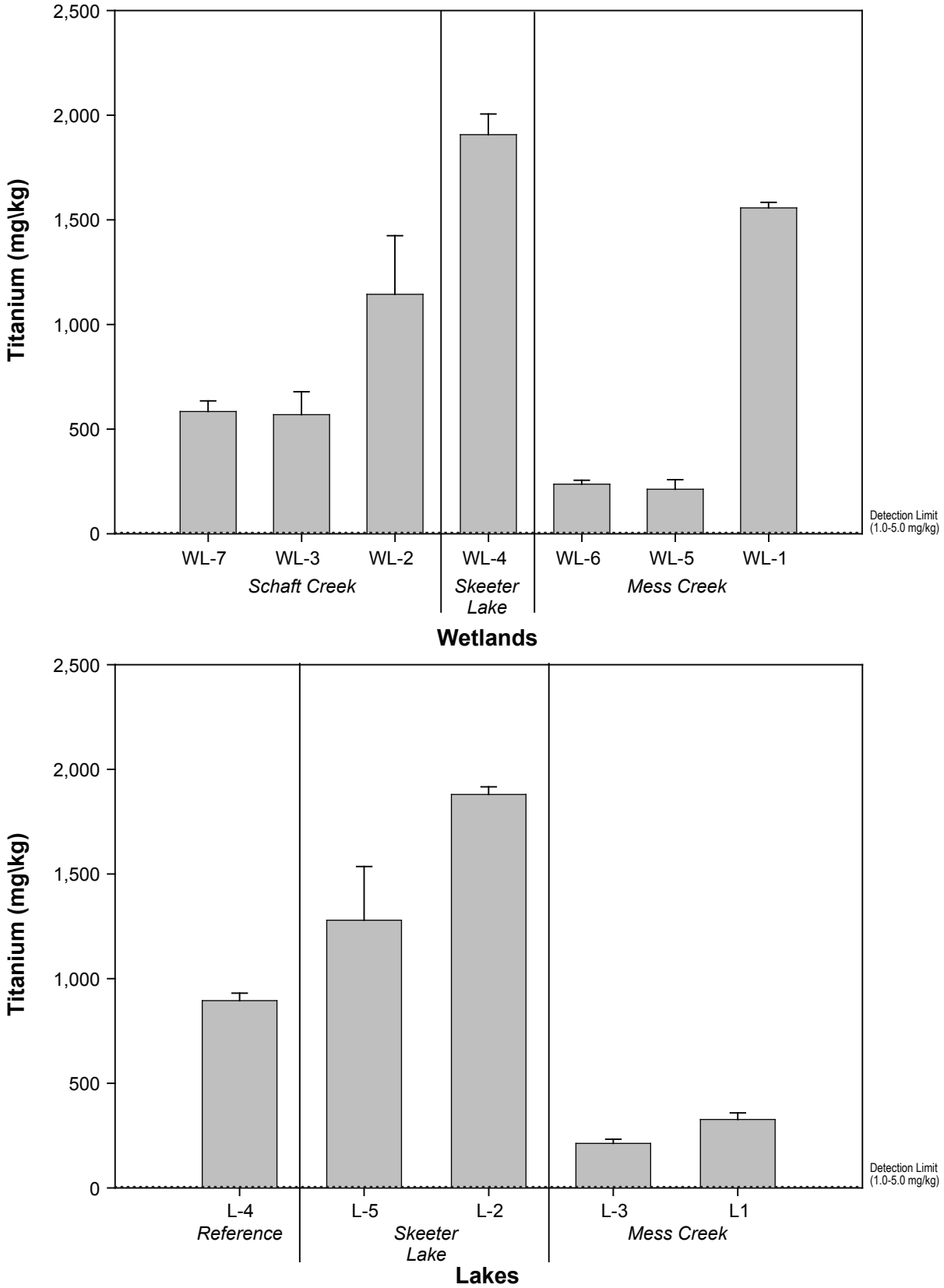
Potassium Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-92

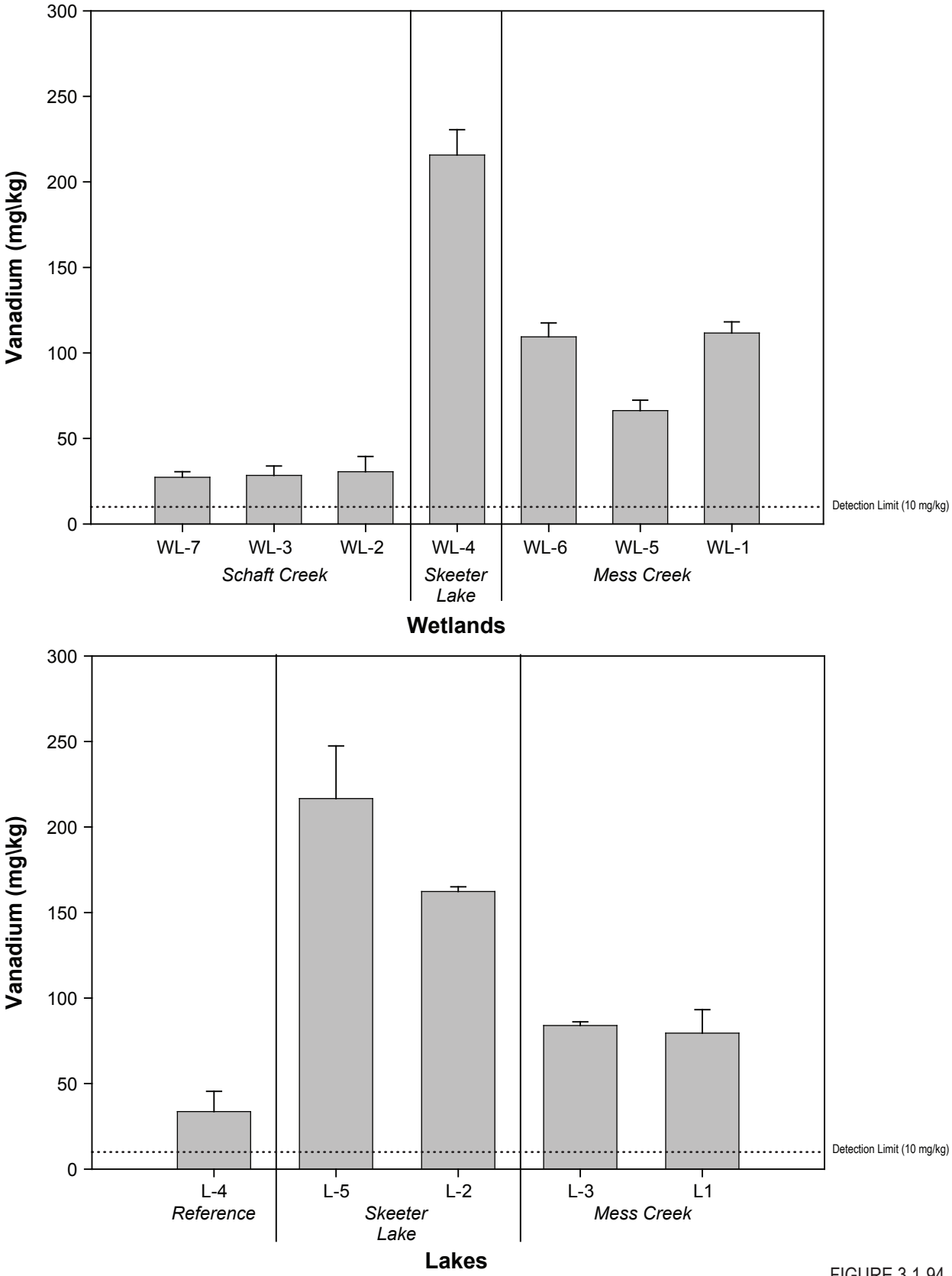
Strontium Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-93

Titanium Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-94

Vanadium Concentrations in Schaft Wetland and Lake Sediments, August 2006

copper FOX metals inc.

Rescan™

RTEC Keepers of the Land

Metals for which guidelines exist are discussed and presented graphically below. Seven of the nine metals that have guidelines exceeded those guidelines at wetland and lake sites. Similar to metals that do not have guidelines, the figures below show that WL-4 and WL-6 have the highest wetland metal concentrations (WL-4 is often considerably higher) and lake metal concentrations were often highest at L-5.

Wetland concentrations of total arsenic ranged from 0.9 mg/kg (WL-7) to 120 mg/kg (WL-4) (Figure 3.1-95). B.C. LEL and CCME ISQG guidelines (6.0 and 5.9 mg/kg, respectively), as well as the CCME PEL guideline (17 mg/kg) was exceeded by WL-1, WL-4, WL-5 and WL-6. The average arsenic concentration at WL-4 was approximately six times that found at most other wetlands. Concentrations of total arsenic in lake sediments ranged from below the analytical detection level of 0.5 mg/kg (L-4) to 37 mg/kg (L-1, L-2 and L-5). All lake sites, except L-4, exceeded B.C. and CCME guidelines.

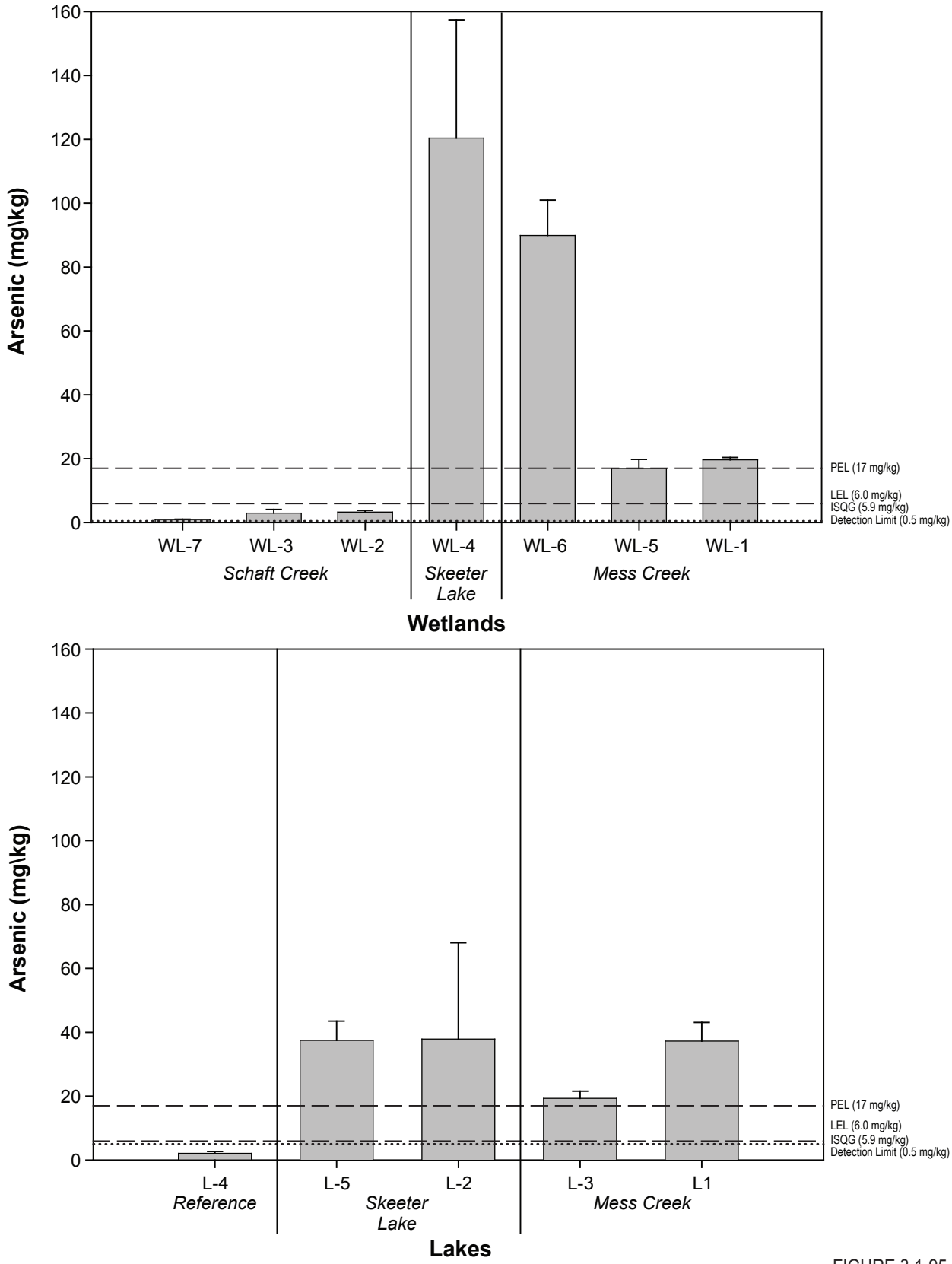
Total cadmium concentrations in wetland sediments ranged from 0.1 mg/kg (WL-7) to 1.1 mg/kg (WL-4) (Figure 3.1-96). WL-4 was the only wetland that exceeded the B.C. LEL and CCME ISQG guideline (0.6 mg/kg). Total cadmium concentrations in lake sediments ranged from 0.2 mg/kg (L-4) to 0.7 mg/kg (L-5). At least one sample at L-2 and the site mean for L-5 exceeded the B.C. LEL and CCME ISQG guideline. Concentrations at all wetlands and lakes were below the CCME PEL value of 3.5 mg/kg.

With the exception of WL-2, WL-3 and WL-7, all wetlands exceeded the B.C. LEL (26.0 mg/kg) and CCME ISQG (37.3 mg/kg) guidelines for chromium concentrations (Figure 3.1-97). Average chromium concentrations ranged from 9.3 mg/kg at WL-3 to 97.1 mg/kg at WL-4. All lake sites exceeded the LEL and ISQG guidelines for chromium concentrations. Lake chromium concentrations ranged from 32.7 mg/kg at L-4 to 132.6 mg/kg at L-3.

All wetland sites, except WL-2 and WL-3, had samples that exceeded the B.C. LEL (16 mg/kg) and the CCME ISQG (35.7 mg/kg) guidelines of for copper (Figure 3.1-98). Average copper concentrations ranged from 8.7 (WL-3) to 231.3 mg/kg (WL-4). Copper concentrations at lake sites ranged from 52.4 mg/kg (L-1) to 180.7 mg/kg (L-5). All lake sites exceeded the B.C. LEL and the CCME ISQG guidelines.

Wetland iron concentrations ranged from 16,496 mg/kg at WL-7 to 67,200 mg/kg at WL-4 (Figure 3.1-99). All wetlands, except WL-7, exceeded the B.C. LEL guideline (21,200 mg/kg) and WL-4 and WL-6 exceeded the BC SEL (43,766 mg/kg) guideline. Iron concentrations in lake sediments ranged from 16,333 mg/kg at L-4 to 62,133 mg/kg at L-5. All lakes, except L-4, exceeded the B.C. LEL and SEL guidelines.

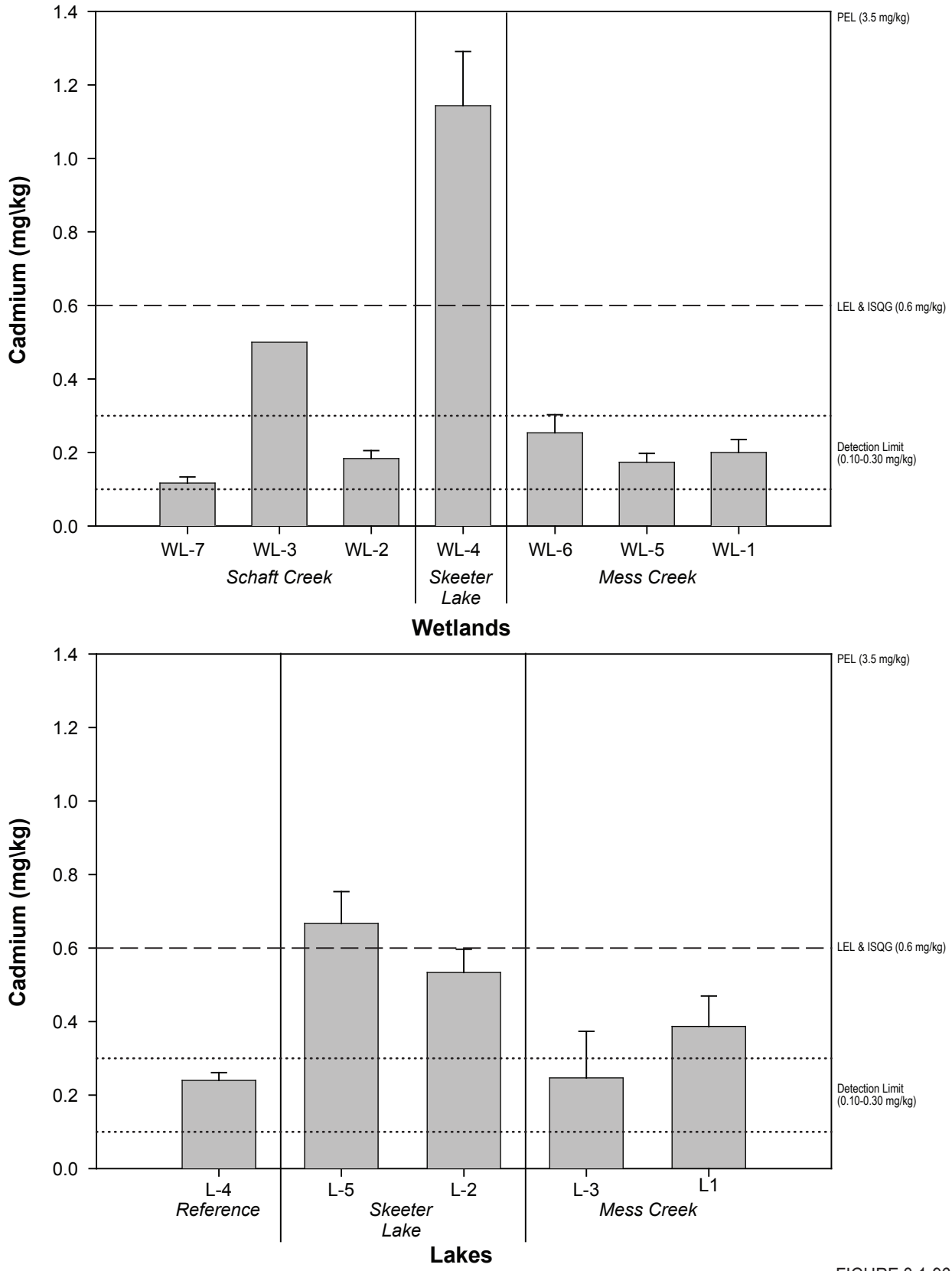
Lead concentrations at all wetlands were well below the CCME ISQG (35 mg/kg) and PEL (91.3 mg/kg) guidelines (Figure 3.1-100). Lead concentrations ranged from 1.4 mg/kg at WL-7 to 17.7 mg/kg at WL-4. Lead concentrations in lake sediments ranged from 3.5 mg/kg at L-4 to 10.7 mg/kg at L-2. All lake lead concentrations were well below CCME guidelines.



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-95

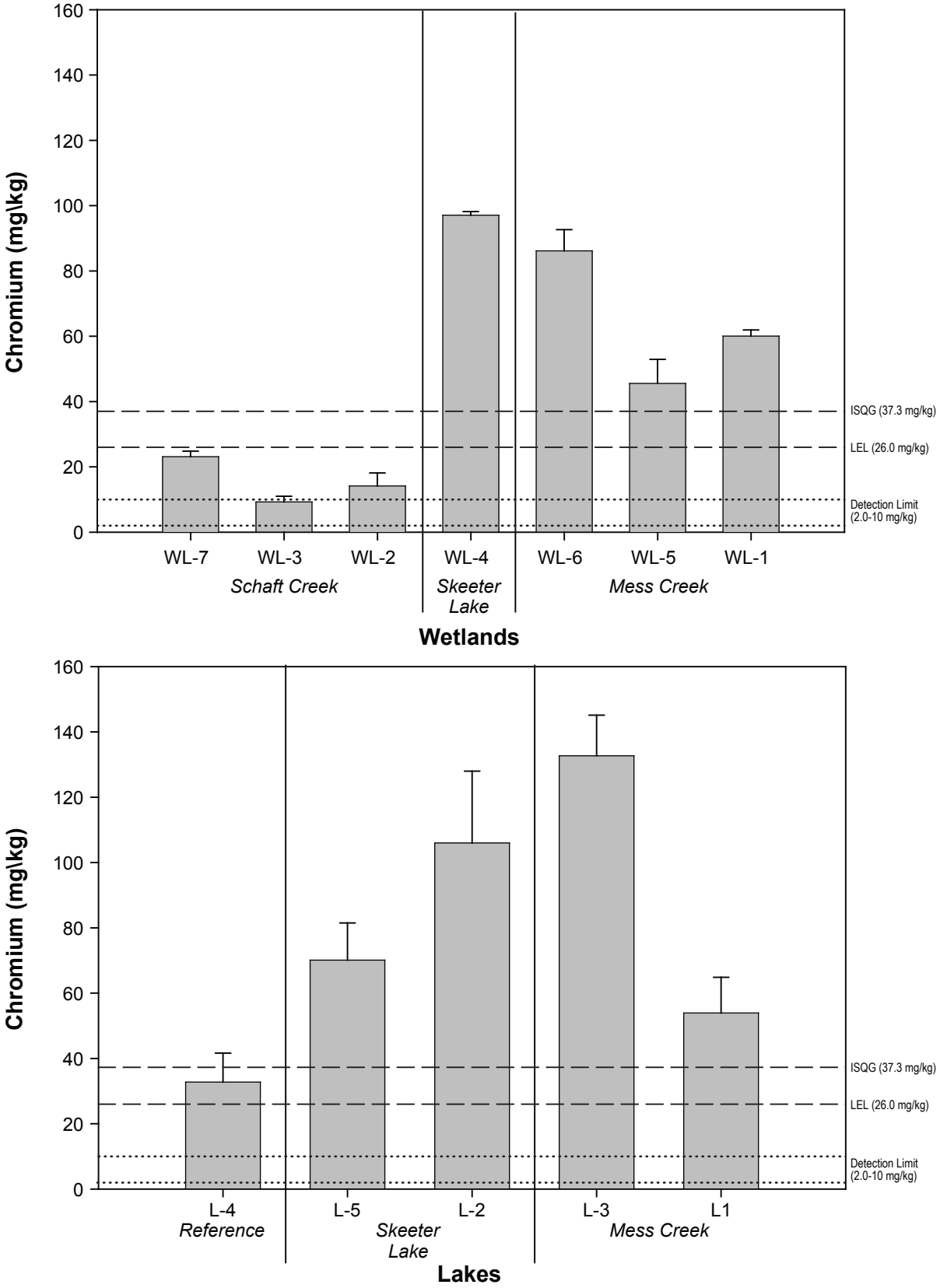
Arsenic Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-96

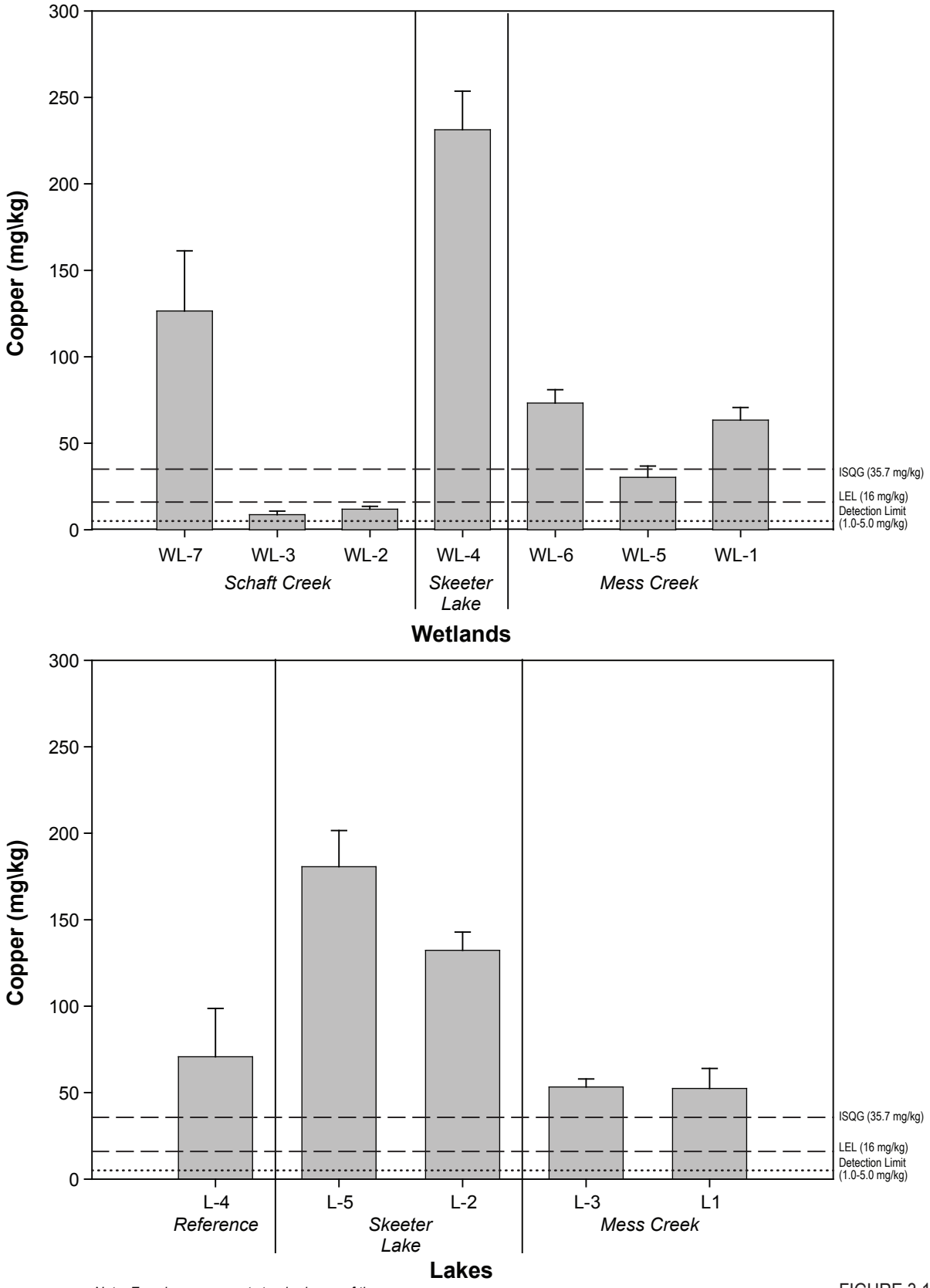
Cadmium Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-97

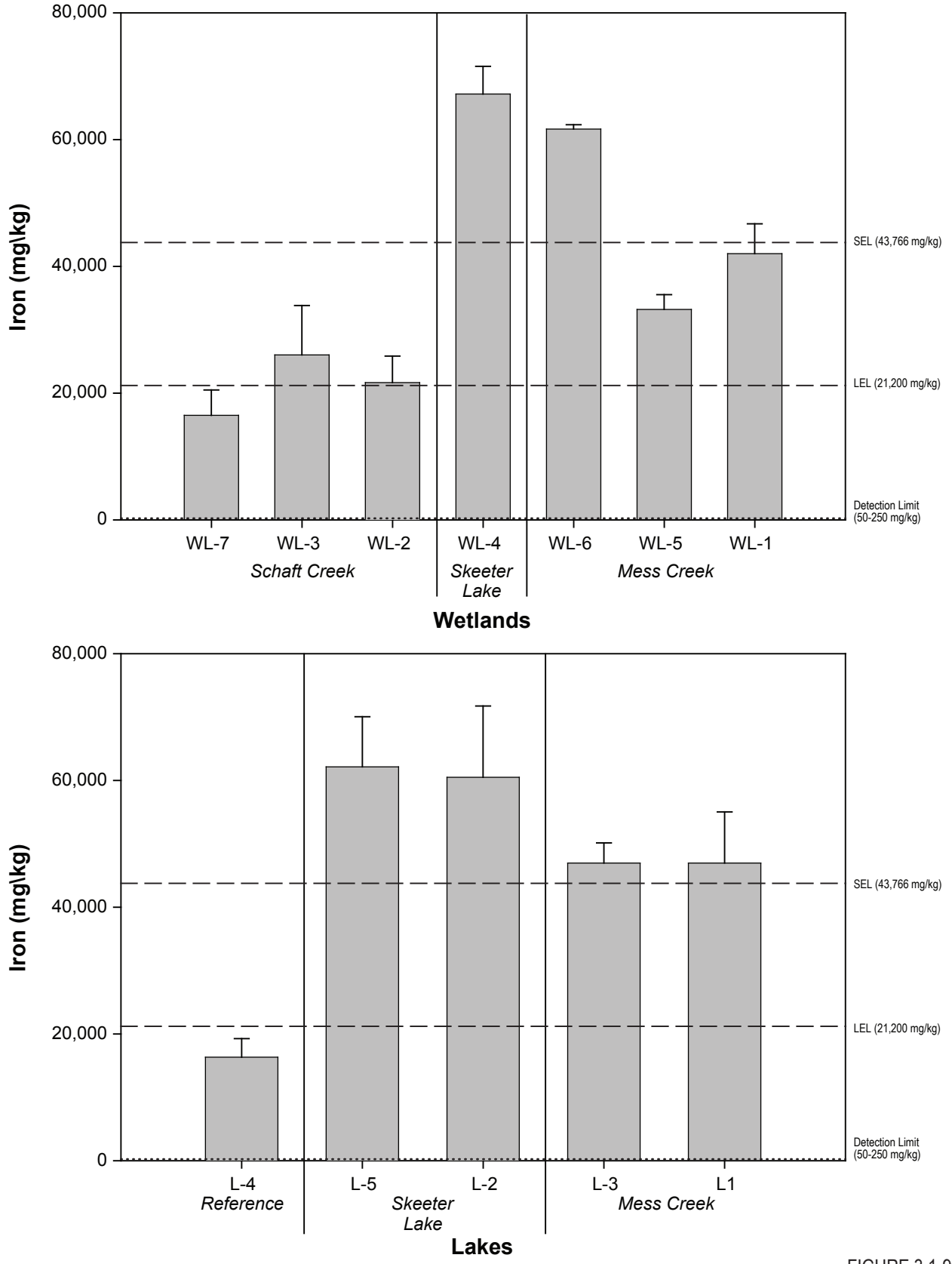
Chromium Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-98

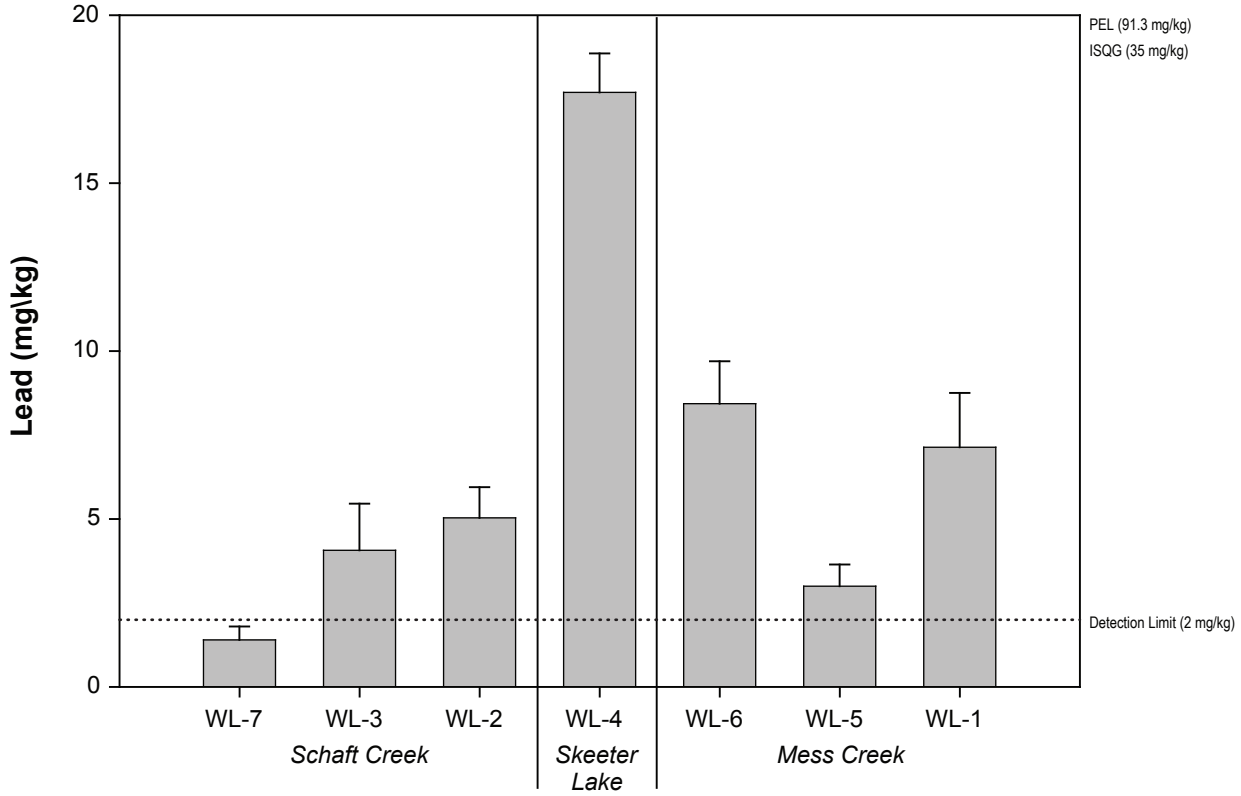
Copper Concentrations in Schaft Wetland and Lake Sediments, August 2006

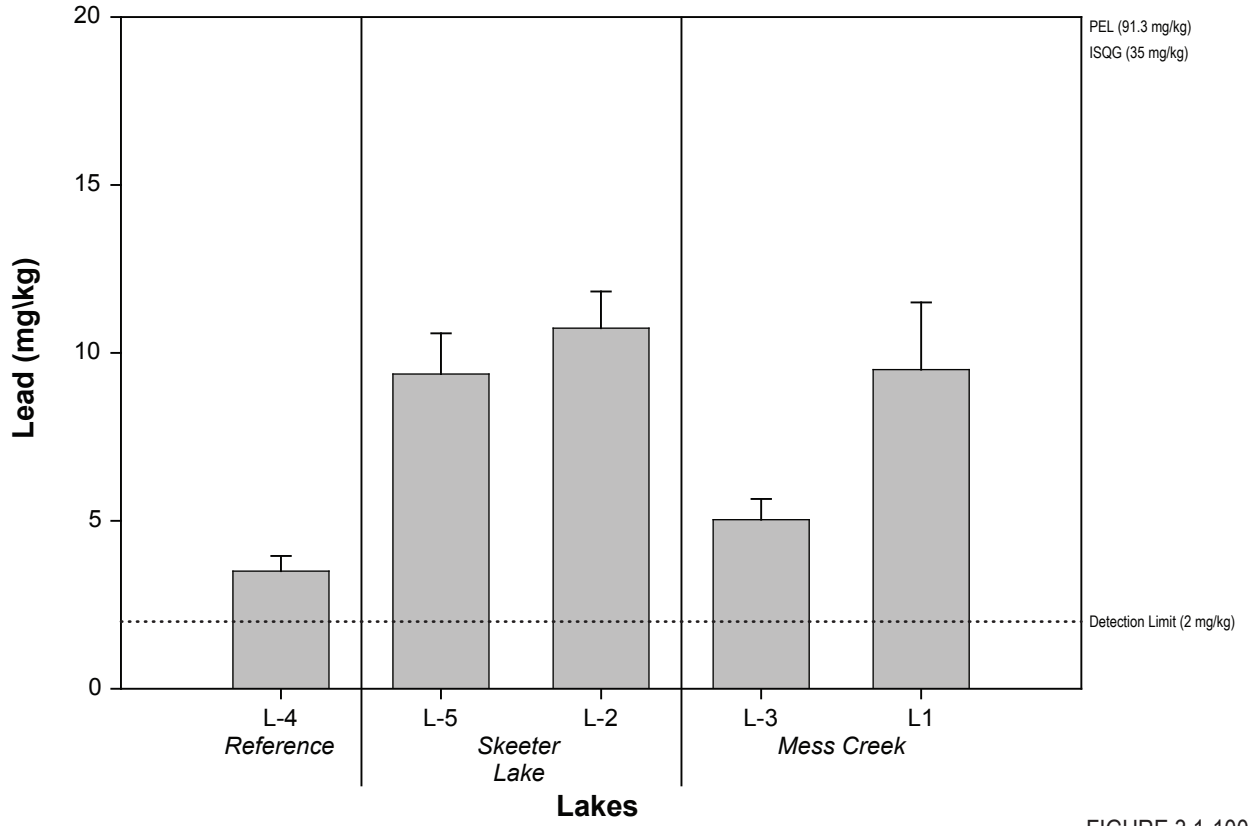


Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-99

Iron Concentrations in Schaft Wetland and Lake Sediments, August 2006





Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-100

Lead Concentrations in Schaft Wetland and Lake Sediments, August 2006

All wetland mercury concentrations were well below LEL and ISQG guidelines with mercury concentrations ranging from 0.01 mg/kg at WL-3 to 0.11 mg/kg at WL-6 (Figure 3.1-101). Average mercury concentrations in lake sediments ranged from 0.02 mg/kg at L-5 to 0.10 mg/kg at L-1. All lake mercury concentrations were well below LEL and ISQG guidelines.

Average nickel concentrations in wetland sediments ranged from below the analytical detection limit (5 mg/kg) at WL-3 to 103 mg/kg at WL-6 (Figure 3.1-102). The B.C. LEL guideline (16 mg/kg) was exceeded by at least one sample at all wetlands except WL-3. WL-6 also exceeded the B.C. SEL guideline of 75 mg/kg. Average nickel concentrations in lake sediments ranged from 38 mg/kg at L-5 to 130 mg/kg at L-2. All lake sites exceeded the B.C. LEL and at least one sample at L-2, L-3 and L-4 exceeded SEL guidelines.

Concentrations of zinc in wetland sediments ranged from 36 (WL-3) to 180 mg/kg (WL-4) (Figure 3.1-103). Only WL-4 exceeded the B.C. LEL (120 mg/kg) and CCME ISQG (123 mg/kg) guidelines. Average concentrations of zinc in lake sediments ranged from 63 (L-4) to 193 mg/kg (L-5). At least one sample at L-1, L-2 and L-5 exceeded the B.C. LEL and CCME ISQG guidelines.

Quality Assurance/Quality Control (QA/QC)

Duplicates from two wetlands were compared for 31 and 38 variables using the relative percent deviation (RPD) between the duplicates as a measure of the variability inherent in field sampling and homogenization of sediment samples (Appendix 3.1-8). The proportion of variables that were below detection limits was 50% in one duplicate pair and 39% in the second duplicate pair. Of the remaining variables, 97% showed less than ±20% difference between duplicates. RPD was also calculated for duplicates from two lakes. Thirty one variables were tested and 22% were below detection limits in one duplicate and 19% were below detection limits in the other. Of the remaining variables, 82% showed a less than ±20% difference between duplicates.

3.1.2.4 Primary and Secondary Producers

Periphyton

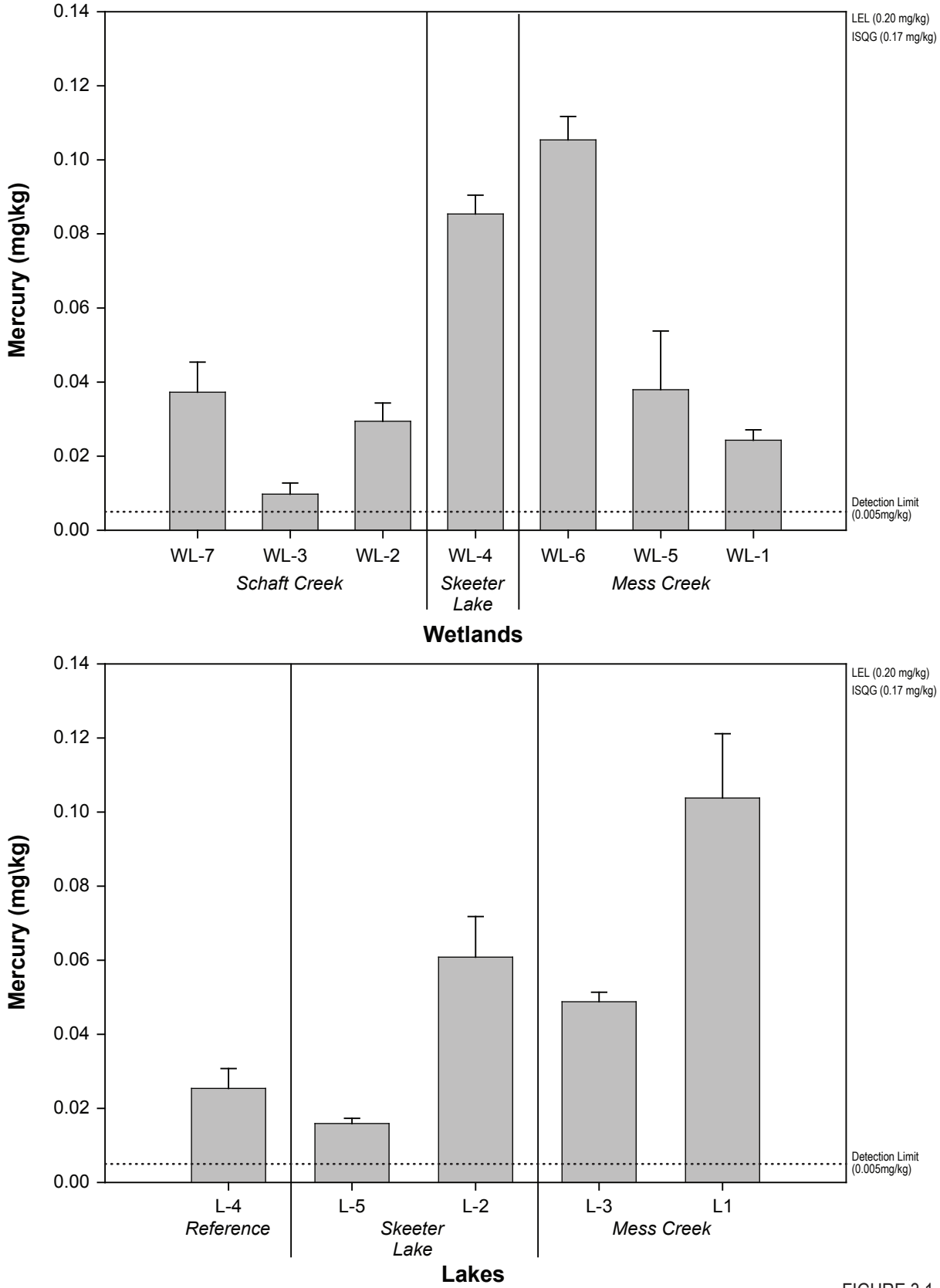
Taxonomic results are unavailable at this time.

Phytoplankton

In August of 2006, phytoplankton samples were collected at five lakes. Samples were assessed for density (cells x 10^3/L), relative taxonomic abundance and diversity (as genus richness and Shannon and Simpson Diversity indices). Raw phytoplankton taxonomy data can be found in Appendix 3.1-9, while biomass data are in Appendix 3.1-10.

Biomass

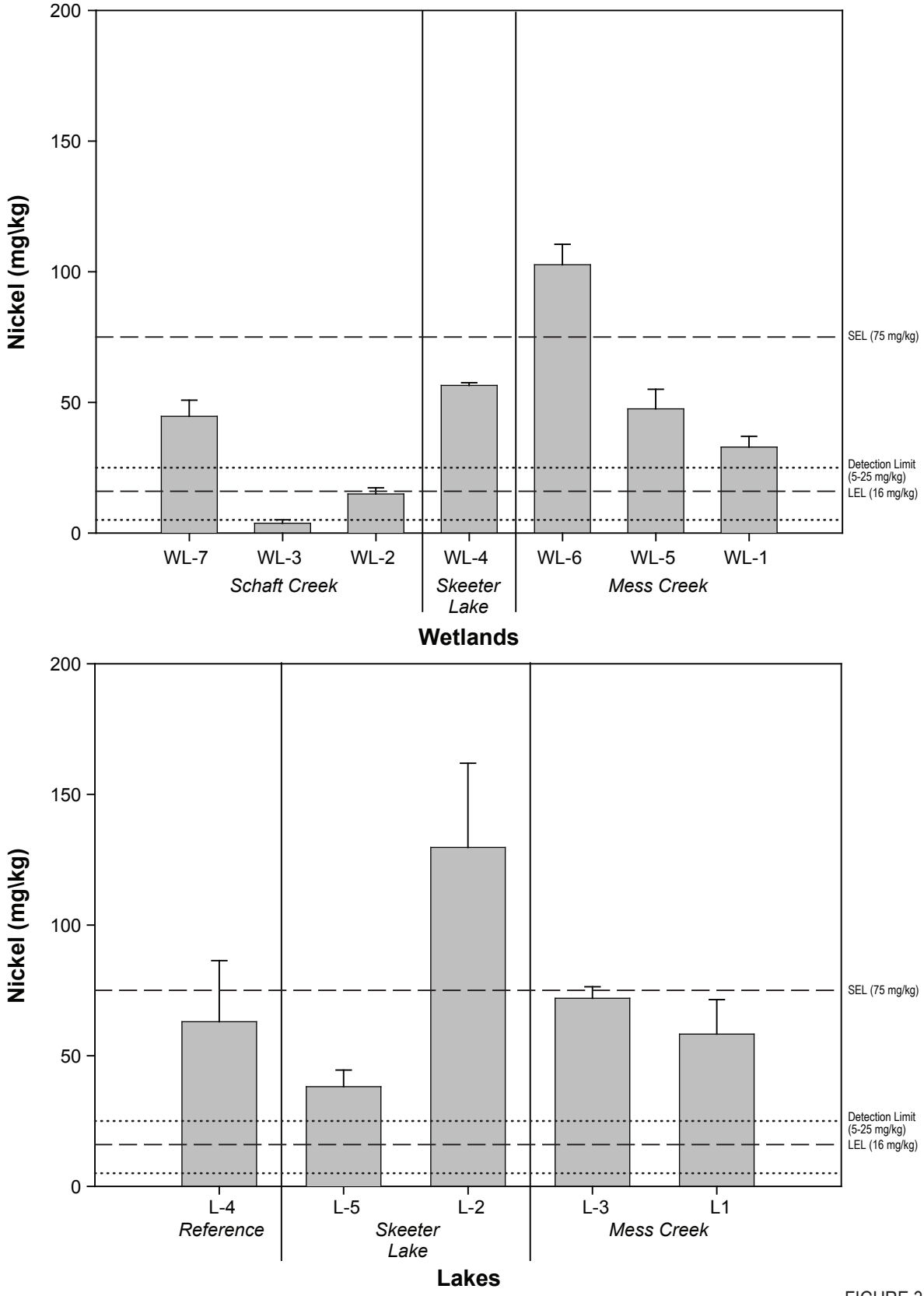
Mean phytoplankton biomass ranged from 0.03 µg/L chlorophyll *a* at L-1 to 0.86 µg/L chlorophyll *a* at L-5 (Figure 3.1-104). L-5 was found to have the greatest biomass but a relatively low cell density (see below). The reason for this is likely because the taxa that were high in number at this site (*i.e. Fragilaria*) are relatively large cells (50 to 150 µm).



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-101

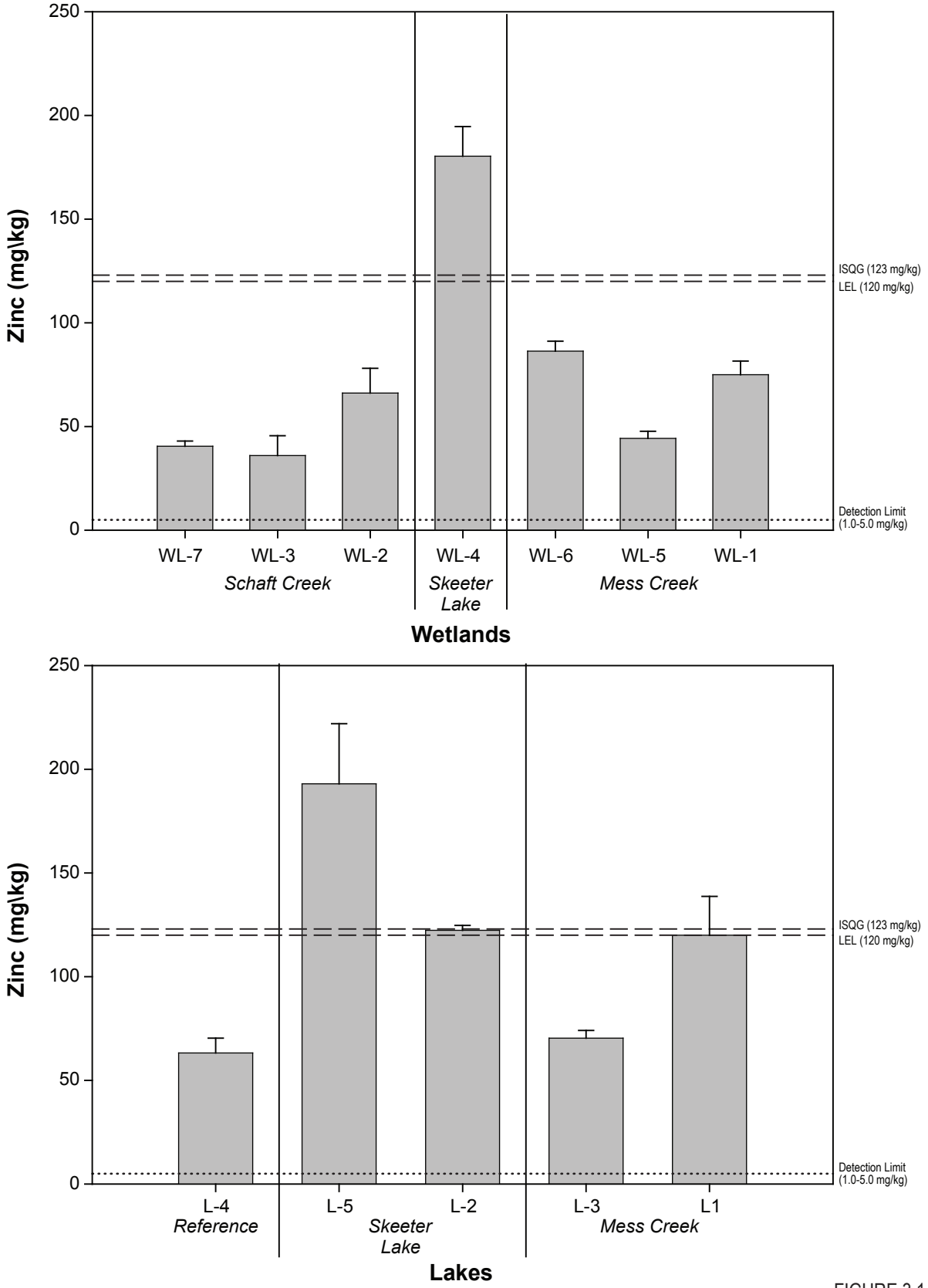
Mercury Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-102

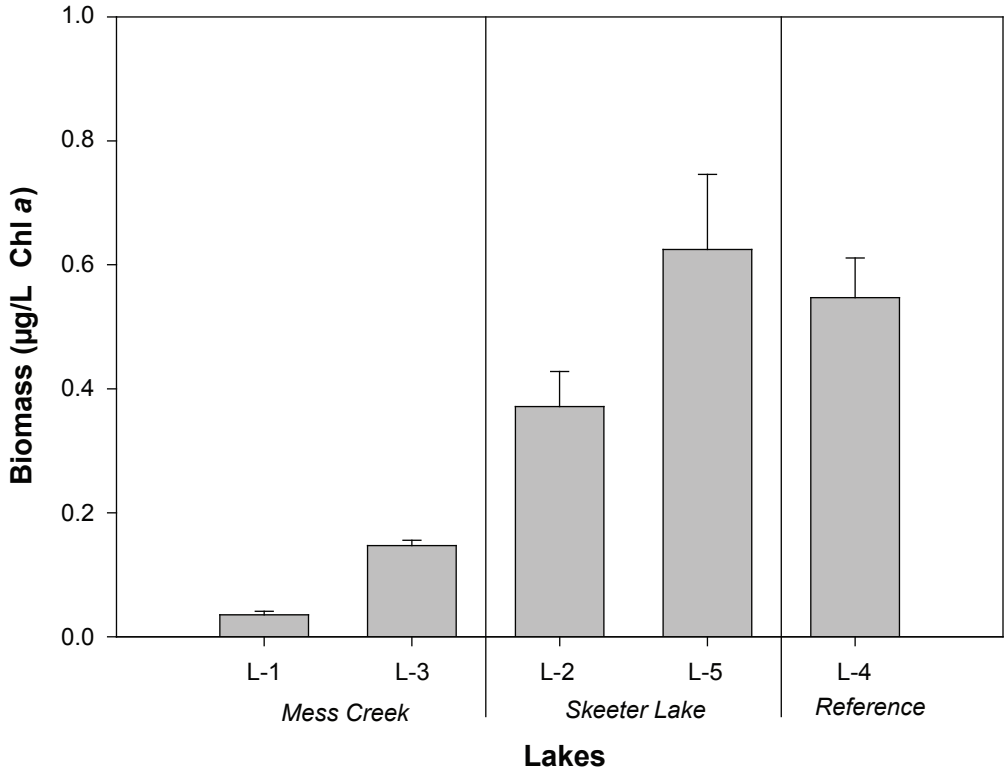
Nickel Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean
Dotted line denotes detection limits
Dashed line denotes guideline values, where available.

FIGURE 3.1-103

Zinc Concentrations in Schaft Wetland and Lake Sediments, August 2006



Note: Error bars represent standard error of the mean

FIGURE 3.1-104

Phytoplankton Biomass in Schaft Creek Project Lakes, August 2006

Density and Relative Abundance

The Mess Creek Watershed had the lowest mean phytoplankton density (Figure 3.1-105). L-1 and L-3 from the Mess Creek Watershed, and L-5 from the Skeeter Lake Watershed all had phytoplankton densities of approximately 22 cells x 10^3/L. The reference lake (L-4) was found to have a considerably greater mean density (508 cells x 10^3/L). The primary contribution to this high density is from a genus of Cyanophyta, *Aphanocapsa*.

The two most dominant phytoplankton taxa in these five lakes were Bacillariophyta and Cyanophyta (Figure 3.1-106). Mean relative abundance ranged from 11 to 100% and they were the dominant taxa at L-1, L-3 and L-5. The relative abundance of Cyanophytes was 61% at L-2 and 79% at L-4, dominating the phytoplankton communities within those two lakes. Smaller proportions of Chlorophyta (2 to 6%), Chrysophyta (3 to 13%), and Pyrrhophyta (1 to 11%) composed the remainder of these communities.

Richness and Diversity

Average phytoplankton richness ranged from 5 at L-1 to 15.6 at L-4 (Figure 3.1-105). As described below, the relatively low richness value at L-1 is likely a result of the shallow light penetration at this lake (Secchi depth for this lake is 0.5m, Section 3.1.2.2).

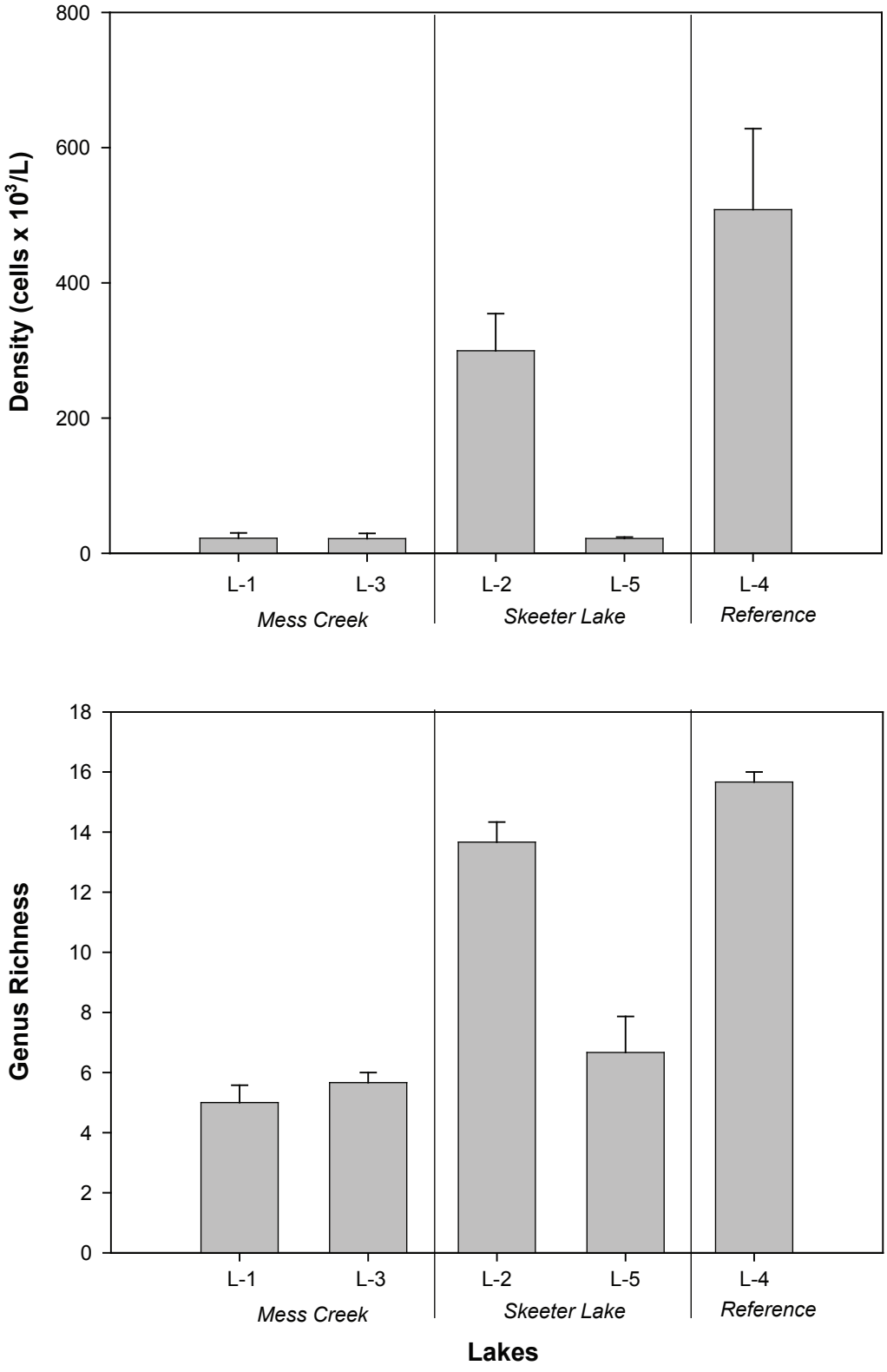
Genus diversity calculations using both Shannon and Simpson diversity indices resulted in L-2 being the most diverse site (Figure 3.1-107). Average Shannon diversity ranged from 1.24 (L-1) to 1.69 (L-2). Average Simpson diversity ranged from 0.62 (L-1) to 0.73 (L-2).

Table 3.1-3 summarizes dominance indicators for phytoplankton diversity. The average number of genera composing 90% of the abundance ranged from 4 (L-1, L-3, and L-5) to 6 (L-2). The maximum percent dominance by one genus at a site ranged from 44% (L-2) to 59% (L-4).

Table 3.1-3
Average Dominance Indicators for Phytoplankton Diversity in Schaft Creek Project Lakes, August 2006

Site	Number of Replicates	G (90%)	SE	Maximum Dominance %	SE
L1	3	4	1.00	53	8.78
L2	3	6	0.33	44	2.62
L3	3	4	0.33	48	4.33
L4	3	5	0.88	59	5.78
L5	3	4	0.88	50	5.76

Note: G (90%) is the average number of genera comprising 90% of the assemblage.
Maximum Dominance is the percent dominance by genus.
SE is the standard error of the mean.



Note: Error bars represent standard error of the mean

FIGURE 3.1-105

Phytoplankton Density and Genus Richness in Schaft Creek Project Lakes, August 2006

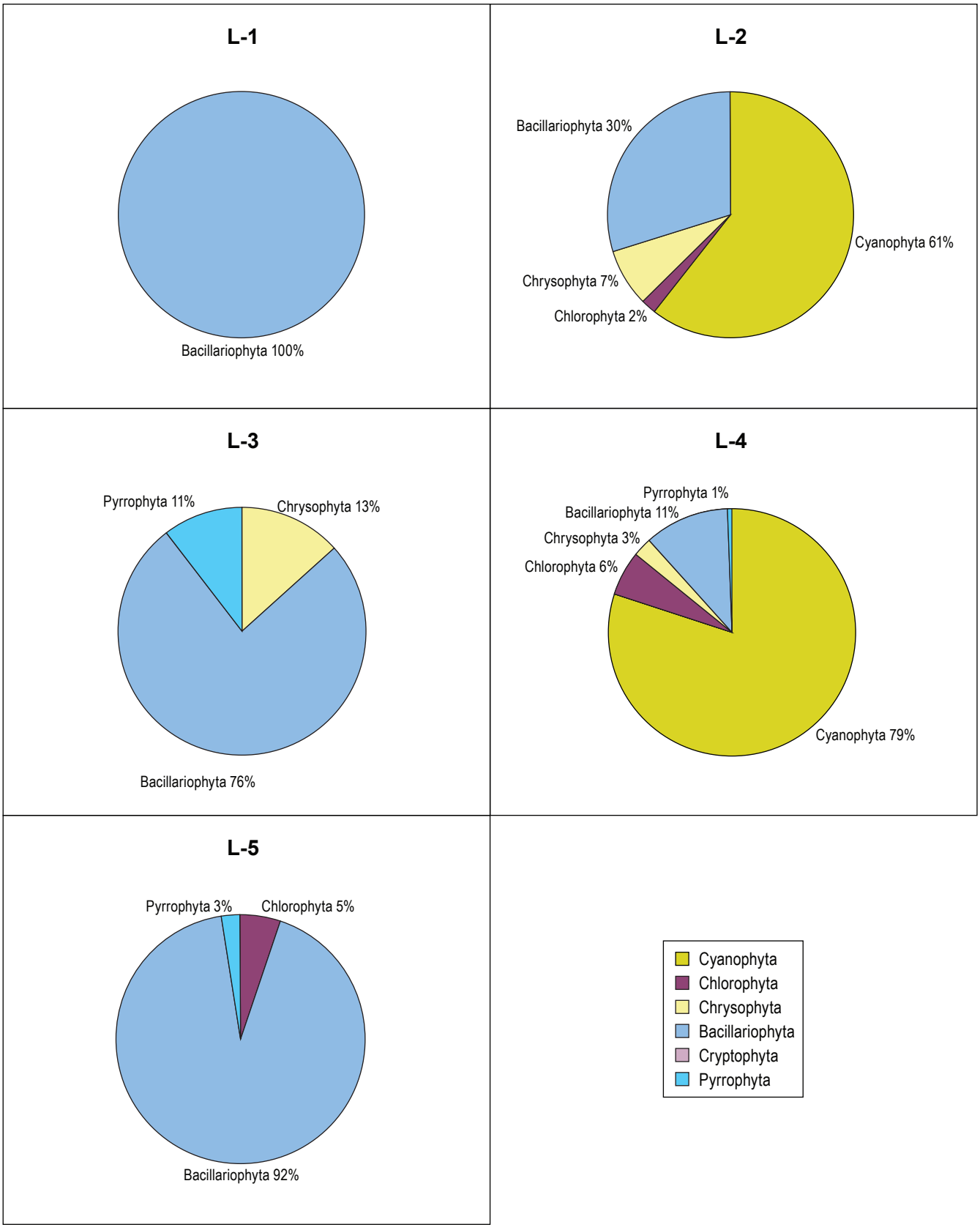
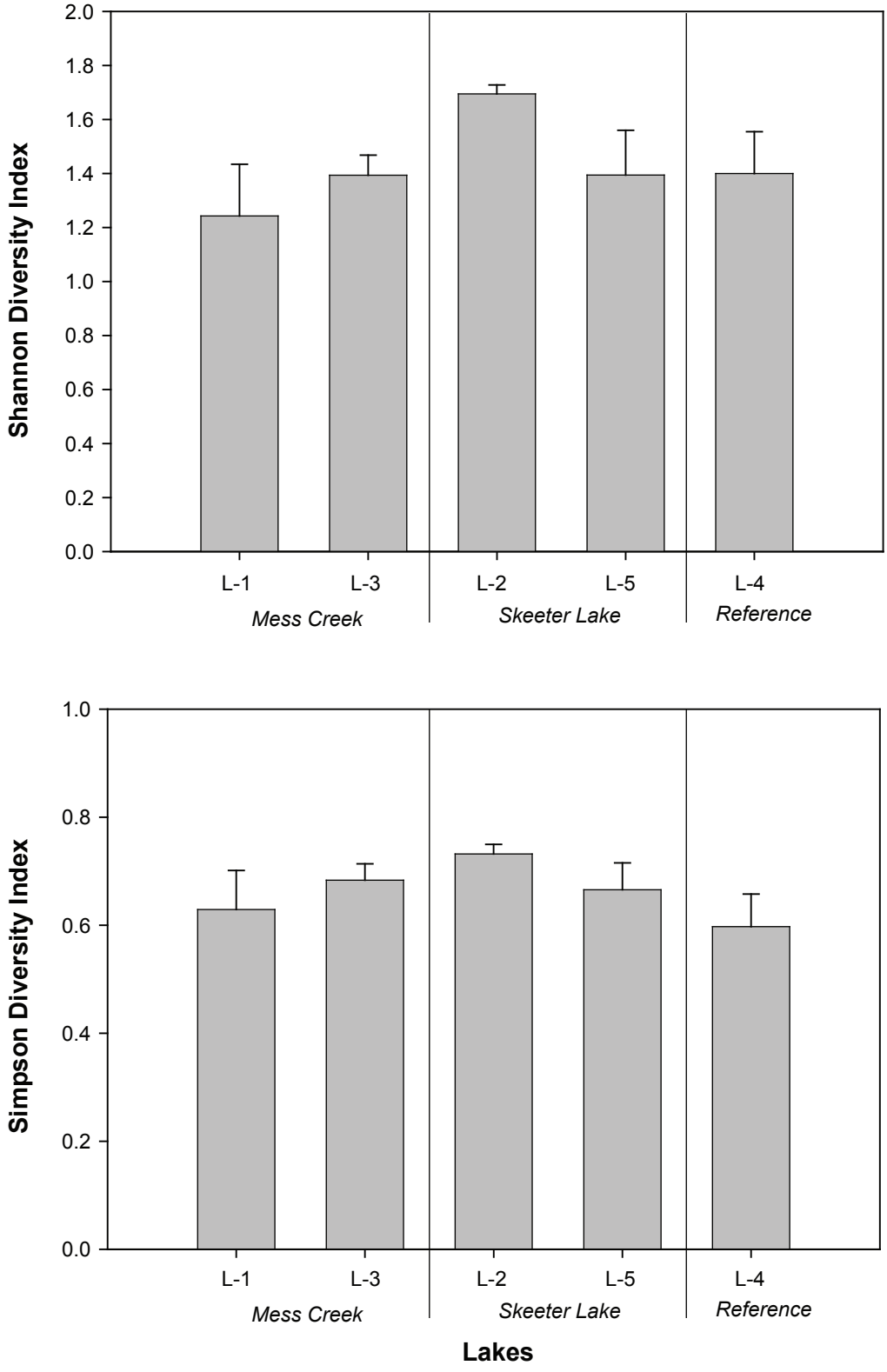


FIGURE 3.1-106

Taxonomic Composition of Phytoplankton in Schaft Creek Project Lakes, August 2006



Note: Error bars represent standard error of the mean

FIGURE 3.1-107

Shannon and Simpson Diversity Indices for Phytoplankton in Schaft Creek Project Lakes, August 2006

Benthic Invertebrates

Taxonomic results are unavailable at this time.

Zooplankton

Zooplankton consume primary producers (phytoplankton) and bacteria in turn providing an important food source for fish and waterfowl. In August of 2006, zooplankton samples were collected in triplicate at five lakes. Samples were assessed for density (organisms/m^3), relative taxonomic abundance and diversity (as genus richness and Shannon and Simpson Diversity indices). Raw zooplankton taxonomy data can be found in Appendix 3.1-11, while additional notes on haul depth and quality are in Appendix 3.1-12.

Density and Relative Abundance

Mean zooplankton densities were lowest at lakes within the Mess Creek Watershed (Figure 3.1-108). L-1 had the lowest density with 7.2 organisms/m^3. This lake receives a great deal of run-off from the steep hill along its western shore. The result is very turbid water with low light penetration (Secchi depth for this lake is 0.5m, Section 3.1.2.2), which inhibits phyotoplankton productivity and, in turn, zooplankton density (Plate 3.1-3). By comparison, the zooplankton density at L-5 was considerably greater (35,264 organisms/m^3). This was primarily a result of the large numbers of immature (nauplii and copepodites) cyclopoid copeopods present during sampling.

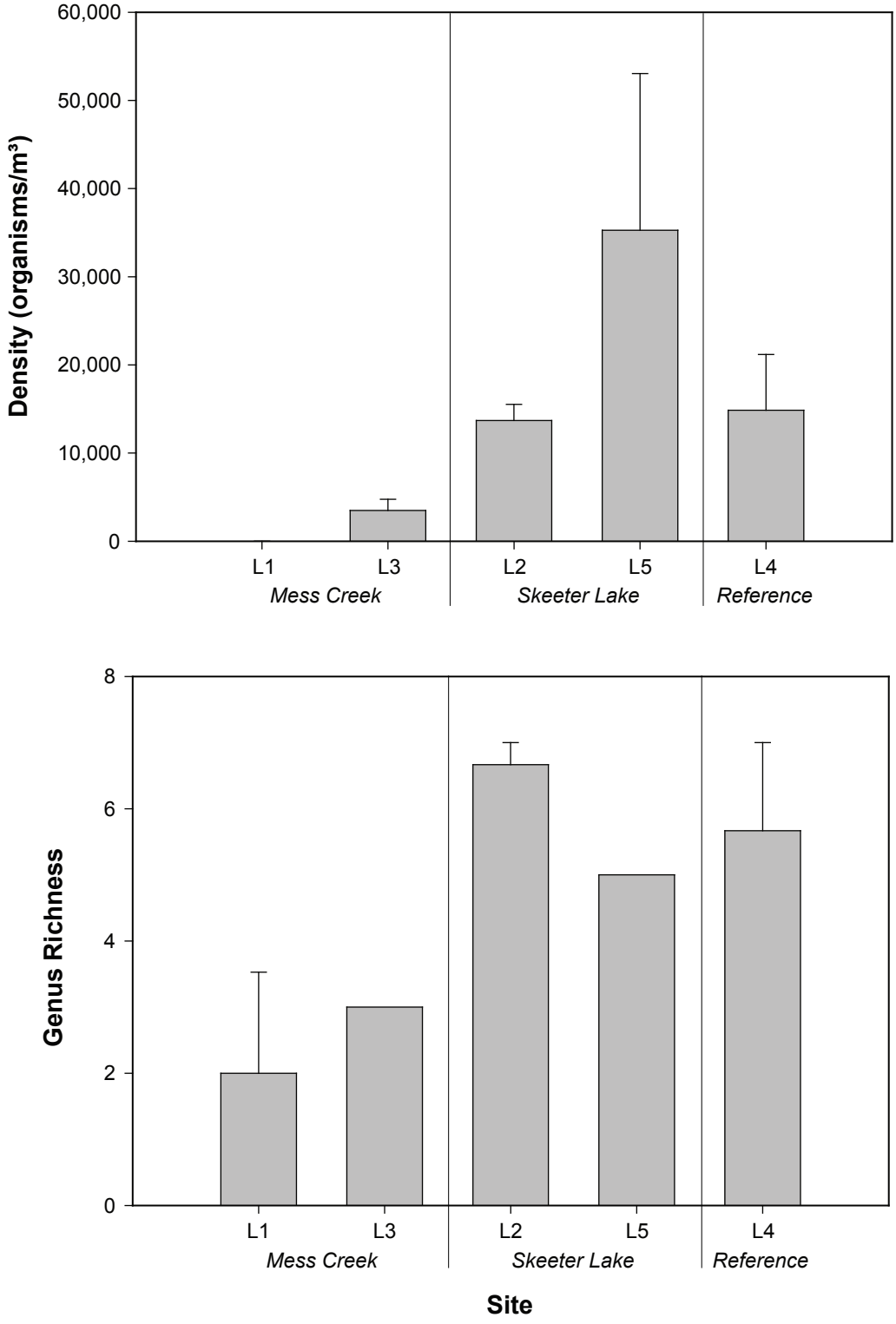
Most samples had relatively large numbers of immature copepods present. Four of the five lake sites were dominated by cyclopoid copepods (Figure 3.1-109). The relative abundance of calanoid copepods ranged from <1 to 27% while cyclopoid copepods abundance ranged from 31 to 98%. The relative abundance of rotifers ranged from <1 to 41% and were the dominant taxa L-2. The zooplankton community at L-1 was also composed of smaller proportions of Bosminidae, Cladocera and Chydoridae.

Richness and Diversity Indices

Average zooplankton richness ranged from 2 at L-1 to 7 at L-2 (Figure 3.1-108). The reference lake, L-4, was found to be at the high end of that range with a genus richness of 6.

Genus diversity calculations using Shannon and Simpson diversity indices resulted in L-5 (Shannon diversity) and L-2 (Simpson diversity) as the most diverse sites (Figure 3.1-110). Average Shannon diversity ranged from 0.48 (L-1) to 0.85 (L-5). Average Simpson diversity ranged from 0.24 (L-1) to 0.49 (L-2). The variable results from the two diversity indices occur because each index weights rare taxa differently (*i.e*. the Shannon diversity index is more affected by the addition of rare species). In other words, L-5 had a greater number of taxa occurring in low numbers than L-2.

Table 3.1-4 summarizes dominance indicators for zooplankton diversity. The average number of genera composing 90% of the abundance was 2 at all sites. The maximum percent dominance by one genus at a site ranged from 48% (L-1) to77% (L-3).



Note: Error bars represent standard error of the mean

FIGURE 3.1-108

Zooplankton Density and Genus Richness in Schaft Creek Project Lakes, August 2006

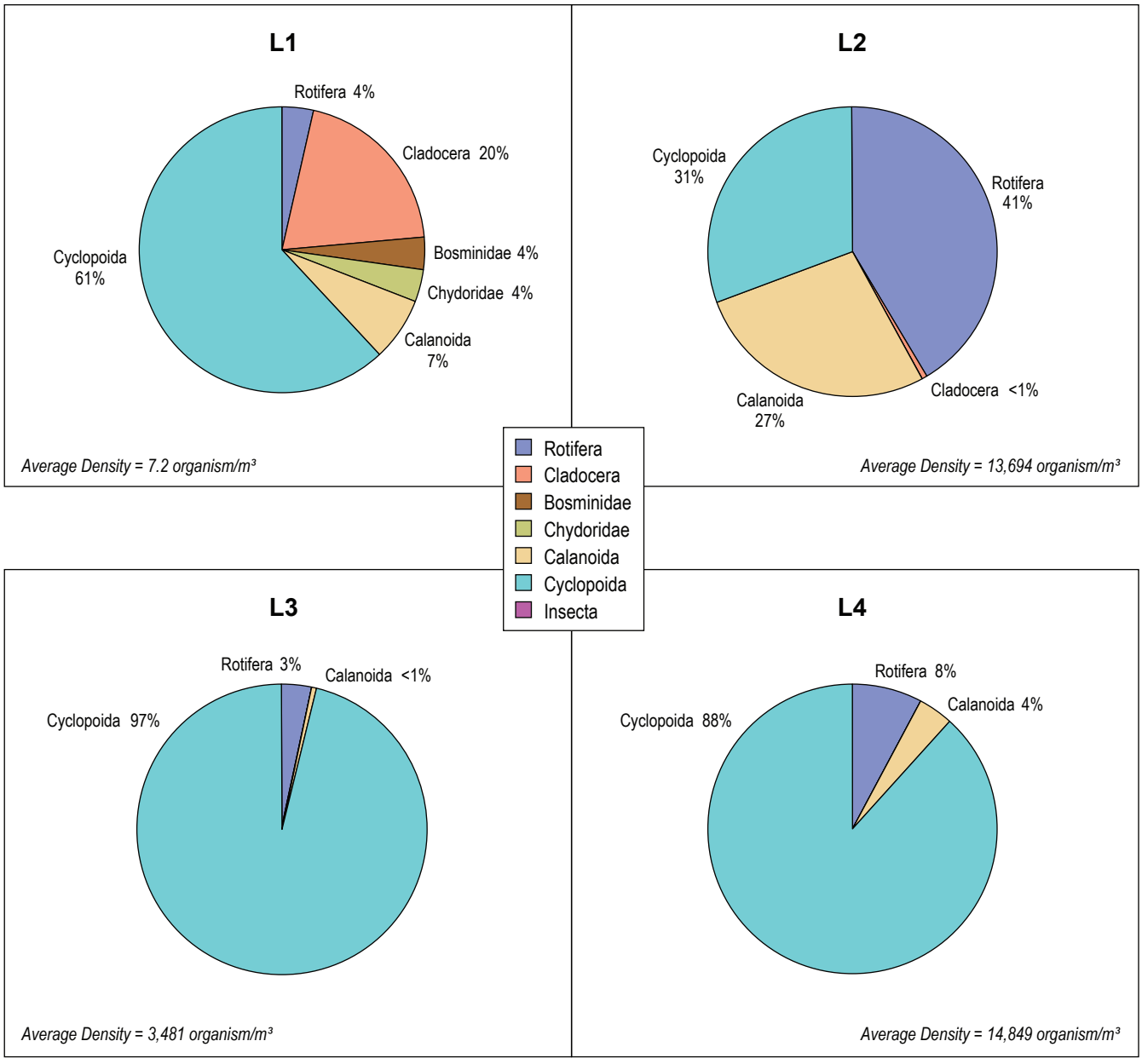
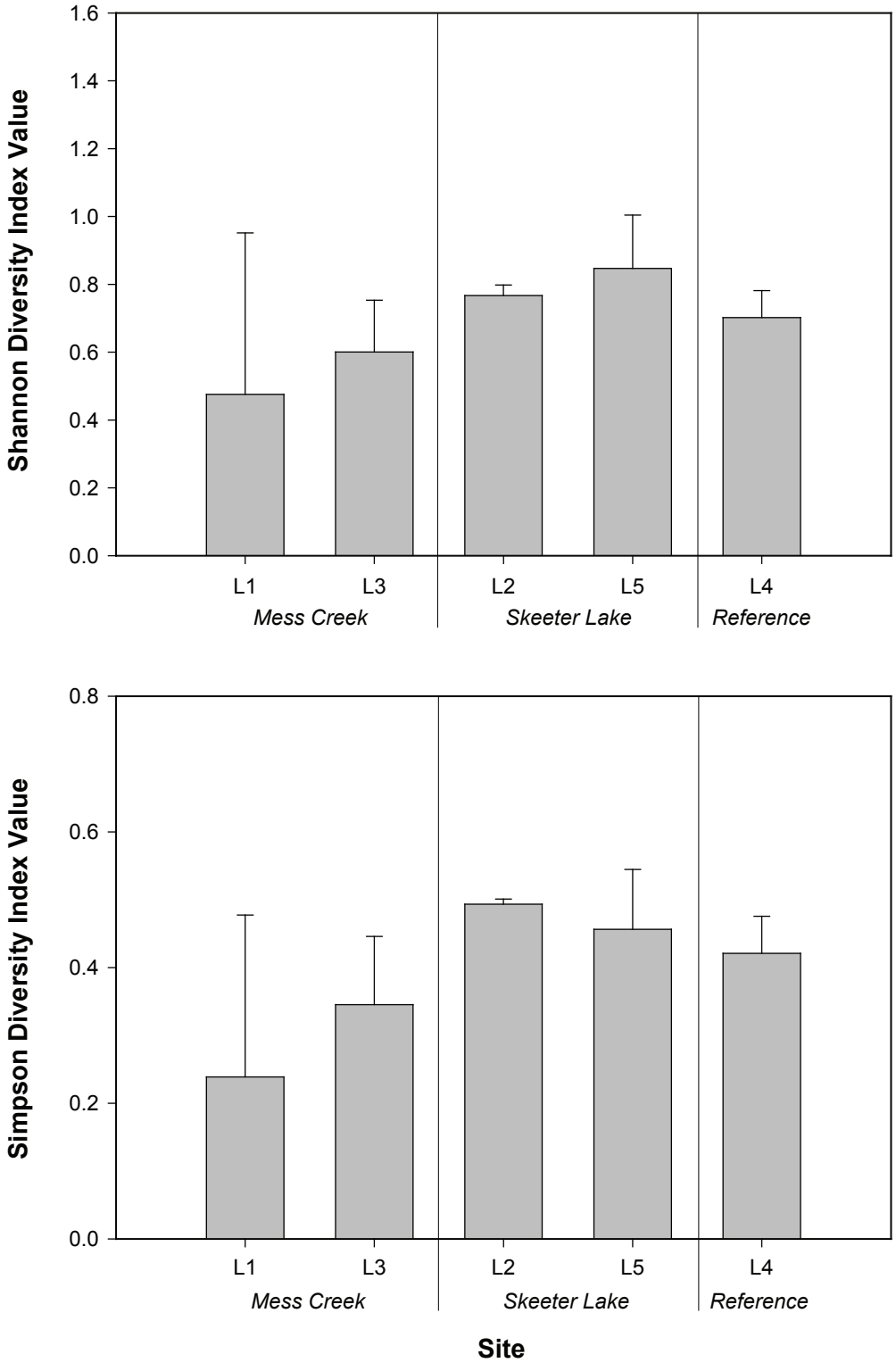


FIGURE 3.1-109

Taxonomic Composition of Zooplankton in Schaft Creek Project Lakes, August 2006



Note: Error bars represent standard error of the mean

FIGURE 3.1-110

Zooplankton Shannon and Simpson Diversity Indices in Schaft Creek Project Lakes, August 2006

Plate 3.1-3. View of L-1 showing water clarity.

Table 3.1-4
Average Dominance Indicators for Zooplankton Diversity in Schaft Creek Project Lakes, August 2006

Site	Number of Replicates	G (90%)	SE	Maximum Dominance %	SE
L1	3	2	1.53	48	28.93
L2	3	2	0.00	60	0.91
L3	3	2	0.33	77	7.70
L4	3	2	0.00	69	7.12
L5	3	2	0.33	69	7.71

Note: G (90%) is the average number of genera comprising 90% of the assemblage.
Maximum Dominance is the percent dominance by genus.
SE is the standard error of the mean.

4. SUMMARY

4. Summary

4.1 Aquatic Resources

4.1.1 Receiving Environment Streams

4.1.1.1 Water Quality

Several of the general water quality variables were below detection in analyzed samples. Most of these variables had their greatest concentrations in the Schaft Creek Watershed (except for TDS and water hardness which was highest in the Mess Creek Watershed) during late July or September. The Schaft Creek Watershed generally had higher concentrations of most total and dissolved metals compared to either Mess Creek or Skeeter Lake watersheds. Most total and dissolved metals peaked in either late July or September. Guidelines were exceeded in one or more samples for total and dissolved aluminium, iron, selenium and zinc, and total arsenic and copper.

4.1.1.2 Sediment Quality

Analysis of particle size distributions indicated that all stream sites were dominated by sand (53 to 93%). Most nutrient concentrations were below detection limits. Average available phosphorus concentrations were only above the detection limit at WC-1. Average nitrogen concentrations were above the detection limit at two Mess Creek sites and two Skeeter Lake sites. TOC values were relatively low and in many cases, below the detection limit.

The concentrations of many metals (without guidelines) are generally high in the Mess Creek Watershed; including barium, cobalt, lithium, magnesium, potassium and vanadium. The Skeeter Lake Watershed also shows relatively high concentrations of some metals including aluminum, magnesium, manganese and titanium. The reference sites (HC-1, SC-1 and WC-1) generally have low metal concentrations, although HC-1 shows relatively high concentrations of cobalt and magnesium.

4.1.1.3 Primary and Secondary Producers

Taxonomic results are unavailable at this time.

4.1.2 Wetlands and Lakes

4.1.2.1 Water Quality

Nutrient and TOC concentrations in wetlands were greatest at WL-7 and at L-4 and L-2 in lakes. Nutrient and ammonia concentrations were generally greater in wetlands than lakes. WL-2 had considerably greater concentrations of some general variables, including TDS, hardness and sulphate. Wetland sites generally had higher concentrations of most total and dissolved metals compared to lake sites. Several of the highest total metal concentrations occurred at WL-5. Guidelines were exceeded in one or more samples for total and dissolved aluminium and iron, and total arsenic, copper, selenium and zinc.

4.1.2.2 Sediment Quality

Analysis of the particle size data in sediments indicated that most wetland and lake sites were composed primarily of silt and clay. Wetland nutrient and total organic carbon (TOC) concentrations were considerably higher at WL-7 than other wetlands. Lake phosphorus concentrations were highest at L-2, while nitrogen and TOC concentrations were highest at L-4.

WL-4 had the highest wetland concentrations of several metals including aluminum, cobalt, lithium, magnesium, manganese, titanium and vanadium. The highest lake concentrations of aluminum, cobalt, lithium, magnesium and vanadium were found at L-5. L-2 showed the highest concentrations of manganese, strontium and titanium.

Seven (arsenic, cadmium, chromium, copper, iron, nickel and zinc) of the nine metals that have guidelines exceeded those guidelines at wetland and lake sites. WL-4 and WL-6 had the highest wetland metal concentrations (WL-4 is often considerably higher) and lake metal concentrations were often highest at L-5.

4.1.2.3 Primary and Secondary Producers

Phytoplankton

The Mess Creek Watershed had the lowest mean phytoplankton density, while the reference lake (L-4) was found to have a considerably greater mean density. The two most dominant phytoplankton taxa in these five lakes were Bacillariophyta and Cyanophyta. The cyanophyte *Aphanocapsa* was primarily responsible for the high density at L-4. Average phytoplankton richness was highest at L-4. Genus diversity calculations using both Shannon and Simpson diversity indices resulted in L-2 being the most diverse site.

Zooplankton

Mean zooplankton densities were lowest at lakes within the Mess Creek Watershed with L-1 having the lowest density. Zooplankton density at L-5 was considerably greater primarily as a result of the large numbers of immature (nauplii and copepodites) cyclopoid copeopods present during sampling. Four of the five lake sites were dominated by cyclopoid copepods. Average zooplankton richness and diversity (Simpson's Diversity Index) were highest at L-2, while L-5 was the most diverse as calculated by the Shannon Diversity Index.

REFERENCES

References

BCMWLAP. 2001. *A Compendium of Working Water Quality Guidelines for British Columbia*. N. K. Nagpal, L. W. Pommen, L. G. Swain. Water Management Branch, Environmental and Resource Management Department, Ministry of Water, Land and Air Protection. August 23, 2001. Refer to http://wlapwww.gov.bc.ca/wat/wq/BCguidelines.

BCMWLAP. 2003. *British Columbia Field Sampling Manual – For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples.* Queens Printer, Victoria, BC.

BCMWLAP. 2005. *Water Quality Guidelines (Criteria) Reports*. British Columbia Ministry of Water, Land and Air Protection. Refer to http://wlapwww.gov.bc.ca/wat/wq/BCguidelines.

CCME. 2003. *Canadian Environmental Quality Guidelines – Summary Table*. Canadian Council of Ministers of the Environment. December 2003. Refer to http://www.ccme.ca/assets/pdf/e1_062.pdf

Environment Canada. 2001. *Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring.* Environment Canada, Ottawa. June 2001.

Piepenburg, D. and U. Piatkowski. 1992. A program for computer-aided analyses of ecological field data. *Bioinformatics*, 8(6): 587-590.

RISC. 1997. *Freshwater Biological Sampling Manual*. Province of British Columbia, Resources Information Standards Committee. Victoria, BC.

RISC. 1998. *Lake and Stream Bottom Sediment Sampling Manual*. Province of British Columbia, Resources Information Standards Committee. Victoria, BC.

SYSTAT. 2006. SigmaPlot for Windows Version 10.0. Systat Software Inc.

APPENDIX 3.1-1
SCHAFT CREEK PROJECT RAW STREAM WATER QUALITY DATA, 2006

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006

Sample ID	MC-1	MC-2	MC-3	MC-4A	MC-4B	MC-5A	MC-5B	HC-1	MT-1	SC-1
Date Sampled	**10/31/2005**	**10/31/2005**	**10/31/2005**	**10/31/2005**	**10/31/2005**	**10/31/2005**	**10/31/2005**	**10/31/2005**	**10/31/2005**	**10/31/2005**
Time Sampled	**15:30**	**15:18**	**14:42**	**14:30**	**14:30**	**14:06**	**14:06**	**12:58**	**15:10**	**13:07**
ALS Sample ID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nature	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Physical Tests										
Colour (CU)	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	7.0	**<5.0**
Conductivity (uS/cm)	330	365	294	275	274	217	216	169	278	126
Total Dissolved Solids	190	209	171	157	156	126	127	101	128	72.0
Hardness CaCO3	200	208	164	146	145	115	116	91.9	75.2	66.5
pH	7.91	8.25	8.26	8.26	8.26	8.19	8.18	8.08	10.1	8.29
Total Suspended Solids	3.1	**<3.0**	15.1	7.7	4.4	**<3.0**	12.4	3.1	**<3.0**	**<3.0**
Turbidity (NTU)	4.57	2.63	4.68	8.02	7.94	2.84	3.47	3.26	1.77	1.05
Dissolved Anions										
Acidity (to pH 8.3) CaCO3	4.4	1.0	**<1.0**	**<1.0**	**<1.0**	1.4	1.5	2.2	**<1.0**	**<1.0**
Alkalinity-Total CaCO3	156	183	152	135	136	110	111	83.8	158	52.6
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Chloride Cl	**<0.50**	2.26	1.48	1.56	1.56	0.89	0.89	**<0.50**	**<0.50**	**<0.50**
Fluoride F	0.032	0.039	0.070	0.078	0.079	0.083	0.082	**<0.020**	0.020	0.032
Sulphate SO4	35.3	22.9	19.0	20.6	20.7	15.6	15.6	17.5	3.62	16.2
Nutrients										
Ammonia Nitrogen N	**<0.0050**	0.0107	0.0113	**<0.0050**	0.0053	**<0.0050**	0.0080	**<0.0050**	**<0.0050**	**<0.0050**
Total Kjeldahl Nitrogen N	**<0.050**	0.059	0.061	0.054	**<0.050**	**<0.050**	0.089	**<0.050**	**<0.050**	**<0.050**
Nitrate Nitrogen N	0.0233	0.0811	0.0689	0.0461	0.0466	0.0369	0.0374	0.0107	**<0.0050**	0.0300
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Nitrogen N	**<0.050**	0.140	0.130	0.100	0.090	0.080	0.100	**<0.050**	**<0.050**	**<0.050**
Total Phosphate P	0.0070	0.0034	0.0070	0.0117	0.0107	0.0041	0.0074	0.0036	**<0.0020**	0.0024
Cyanides										
Total Cyanide CN	**<0.0010**	0.0011	**<0.0010**	0.0015	0.0018	0.0015	0.0014	-	0.0024	**<0.0010**
Total Metals										
Aluminum T-Al	0.0384	0.0268	0.0661	0.0756	0.0705	0.0879	0.0649	0.112	0.0320	0.0598
Antimony T-Sb	0.00164	0.00038	0.00026	0.00030	0.00029	0.00013	0.00014	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic T-As	0.00075	0.00100	0.00139	0.00110	0.00110	0.00064	0.00059	0.00128	0.00031	0.00034
Barium T-Ba	0.0686	0.120	0.108	0.0960	0.0964	0.0737	0.0724	0.0363	0.00955	0.0857
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	**<0.010**	0.045	0.028	0.032	0.032	0.018	0.019	0.010	**<0.010**	**<0.010**
Cadmium T-Cd	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Calcium T-Ca	31.4	43.8	35.9	33.7	35.0	29.9	29.1	28.1	28.3	19.8
Chromium T-Cr	0.00061	**<0.0010**	**<0.00050**	0.00058	0.00054	0.00054	**<0.00050**	0.00107	0.00054	**<0.00050**
Cobalt T-Co	0.00013	0.00024	0.00026	0.00015	0.00012	0.00011	**<0.00010**	0.00011	**<0.00010**	**<0.00010**
Copper T-Cu	0.00056	0.00050	0.00085	0.00082	0.00075	0.00074	0.00066	0.00111	0.00157	0.00032
Iron T-Fe	0.097	0.299	0.535	0.280	0.256	0.266	0.225	0.109	**<0.030**	0.034
Lead T-Pb	**<0.000050**	0.000061	0.000094	0.000079	0.000071	0.000078	0.000064	**<0.000050**	**<0.000050**	**<0.000050**
Lithium T-Li	**<0.0050**	0.0054	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium T-Mg	29.2	25.0	17.3	16.2	16.8	9.99	9.56	5.51	1.74	4.13
Manganese T-Mn	0.00552	0.0641	0.0512	0.0349	0.0286	0.0415	0.0383	0.00424	0.00114	0.00171
Mercury T-Hg	**<0.000050**	**<0.000050**	**<0.000050**	0.000480	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Molybdenum T-Mo	0.000982	0.00106	0.00102	0.000835	0.000827	0.00221	0.00236	0.000632	0.000854	0.00754
Nickel T-Ni	0.00165	0.00286	0.00178	0.00125	0.00116	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Selenium T-Se	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Silicon T-Si	1.55	2.84	3.12	2.89	2.94	3.60	3.47	2.01	3.04	1.11
Silver T-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	**<2.0**	5.5	4.1	4.6	4.8	3.3	3.2	**<2.0**	**<2.0**	**<2.0**
Strontium T-Sr	0.219	0.224	0.165	0.157	0.158	0.129	0.130	0.111	0.0492	0.158
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium T-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium T-U	0.000279	0.000140	0.000121	0.000126	0.000127	0.000522	0.000523	0.000038	0.000027	0.000780
Vanadium T-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc T-Zn	**<0.0010**	0.0014	0.0018	0.0014	0.0013	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Dissolved Metals										
Aluminum D-Al	**<0.0040**	**<0.0030**	0.0095	0.0139	0.0144	0.0121	0.0115	0.0173	0.0136	0.0225
Antimony D-Sb	0.00161	0.00035	0.00025	0.00029	0.00028	0.00014	0.00013	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic D-As	0.00048	0.00061	0.00083	0.00071	0.00073	0.00044	0.00043	0.00124	0.00031	0.00033
Barium D-Ba	0.0664	0.119	0.106	0.0954	0.0942	0.0715	0.0712	0.0361	0.00954	0.0845
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron D-B	**<0.010**	0.045	0.029	0.032	0.033	0.019	0.018	0.011	**<0.010**	**<0.010**
Cadmium D-Cd	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Calcium D-Ca	31.4	43.0	36.5	32.7	32.4	29.7	30.0	28.0	27.4	19.9
Chromium D-Cr	0.00056	**<0.0010**	0.00050	**<0.00050**	0.00050	**<0.00050**	**<0.00050**	0.00084	0.00058	**<0.00050**
Cobalt D-Co	**<0.00010**	0.00017	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Copper D-Cu	**<0.00060**	**<0.00030**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00033	0.00053	0.00156	**<0.00030**
Iron D-Fe	**<0.030**	**<0.030**	**<0.030**	**<0.030**	**<0.030**	0.035	0.033	**<0.030**	**<0.030**	**<0.030**
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Lithium D-Li	**<0.0050**	0.0054	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium D-Mg	29.4	24.4	17.7	15.7	15.5	9.82	9.95	5.36	1.63	4.08
Manganese D-Mn	0.00141	0.0589	0.0278	0.0171	0.0173	0.0277	0.0276	0.000691	0.000260	0.000278
Mercury D-Hg	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Molybdenum D-Mo	0.00115	0.00114	0.00105	0.000971	0.000942	0.00239	0.00233	0.000683	0.000906	0.00775
Nickel D-Ni	0.00156	0.00262	0.00126	0.00091	0.00091	**<0.00050**	0.00084	0.00175	**<0.00050**	**<0.00050**
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium D-K	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Selenium D-Se	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Silicon D-Si	1.48	2.68	3.10	2.64	2.63	3.45	3.48	1.78	2.90	1.05
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium D-Na	**<2.0**	5.4	4.2	4.4	4.4	3.3	3.4	**<2.0**	**<2.0**	**<2.0**
Strontium D-Sr	0.220	0.228	0.169	0.160	0.159	0.132	0.130	0.116	0.0504	0.159
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium D-U	0.000275	0.000143	0.000118	0.000130	0.000124	0.000521	0.000513	0.000037	0.000027	0.000783
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc D-Zn	0.0015	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	0.0011	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Organic Parameters										
Total Organic Carbon C	**<0.50**	0.71	1.10	0.99	0.96	1.03	1.13	**<0.50**	2.35	**<0.50**

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	SC-2	SC-3	SC-4	SC-5	SKC-1	SKC-2	SKC-3	WC-1	BC-1A	BC-1B	TRAVEL BLANK	FIELD BLANK
Date Sampled	10/31/2005	10/31/2005	10/31/2005	10/31/2005	10/31/2005	10/31/2005	10/31/2005	10/31/2005	10/31/2005	10/31/2005	10/31/2005	10/31/2005
Time Sampled	13:17	13:24	13:36	13:54	14:52	13:46	15:01	14:19	16:36	16:36		
ALS Sample ID	11	12	13	14	15	16	17	18	19	20	21	22
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests												
Colour (CU)	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	6.6	10.1	**<5.0**	**<5.0**	**<5.0**	-	**<5.0**
Conductivity (uS/cm)	187	188	161	165	161	207	191	111	145	146	-	**<2.0**
Total Dissolved Solids	106	107	90.1	95.1	98.6	123	111	68.4	90.7	88.7	-	**<3.2**
Hardness CaCO3	103	104	88.9	89.6	86.1	116	110	48.7	70.5	72.5	-	**<0.54**
pH	8.16	8.13	8.09	8.08	7.99	8.09	8.16	7.94	7.84	7.84	-	5.52
Total Suspended Solids	116	**<3.0**	3.1	**<3.0**	**<3.0**	**<3.0**	5.1	**<3.0**	**<3.0**	**<3.0**	-	**<3.0**
Turbidity (NTU)	6.02	0.82	1.27	2.02	0.53	0.40	0.46	0.77	2.21	2.25	-	**<0.10**
Dissolved Anions												
Acidity (to pH 8.3) CaCO3	1.5	1.8	2.0	2.0	2.7	2.1	1.6	2.5	2.5	2.6	-	1.4
Alkalinity-Total CaCO3	87.8	88.7	76.0	84.4	68.9	97.7	110	58.8	47.9	43.1	-	**<2.0**
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	-	**<0.050**
Chloride Cl	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	-	**<0.50**
Fluoride F	0.021	0.022	0.055	0.056	0.028	0.039	0.037	0.192	0.210	0.211	-	**<0.020**
Sulphate SO4	15.8	15.2	11.2	10.9	24.2	21.6	4.34	12.1	35.2	35.3	-	**<0.50**
Nutrients												
Ammonia Nitrogen N	**<0.0050**	**<0.0050**	**<0.0050**	0.0087	**<0.0050**	0.0093	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	-	**<0.0050**
Total Kjeldahl Nitrogen N	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	0.093	0.100	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Nitrate Nitrogen N	0.0188	0.0178	0.0481	0.0429	0.0308	0.0574	0.0897	0.0075	**<0.0050**	**<0.0050**	-	**<0.0050**
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-	**<0.0010**
Total Nitrogen N	**<0.050**	**<0.050**	0.080	0.080	0.060	0.150	0.190	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Total Phosphate P	0.0595	**<0.0020**	**<0.0020**	0.0026	**<0.0020**	**<0.0020**	0.0021	0.0159	0.0035	0.0038	-	**<0.0020**
Cyanides												
Total Cyanide CN	0.0010	0.0010	0.0023	**<0.0010**	0.0012	0.0014	0.0034	0.0012	0.0017	0.0015	**<0.0010**	**<0.0010**
Total Metals												
Aluminum T-Al	0.315	0.0406	0.0455	0.0408	0.0086	0.0047	0.0149	0.116	0.187	0.190	**<0.0010**	**<0.0010**
Antimony T-Sb	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic T-As	0.00115	0.00063	0.00046	0.00041	0.00026	0.00026	0.00011	0.00018	**<0.00010**	0.00010	**<0.00010**	**<0.00010**
Barium T-Ba	0.0720	0.0756	0.0760	0.0760	0.00845	0.0111	0.00850	0.00462	0.0111	0.0114	**<0.000050**	**<0.000050**
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	0.011	0.010	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Cadmium T-Cd	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Calcium T-Ca	31.6	33.0	28.3	29.3	30.8	36.9	34.9	11.1	17.8	17.5	**<0.050**	**<0.050**
Chromium T-Cr	0.00140	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Cobalt T-Co	0.00057	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Copper T-Cu	0.00344	0.00077	0.00065	0.00064	0.00056	0.00048	**<0.00060**	0.00022	0.00023	0.00029	**<0.00010**	**<0.00010**
Iron T-Fe	0.585	0.070	0.149	0.241	0.052	0.047	0.037	0.063	0.110	0.103	**<0.030**	**<0.030**
Lead T-Pb	0.000306	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	0.000082	**<0.000050**	0.000052	0.000055	**<0.000050**	**<0.000050**
Lithium T-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium T-Mg	5.74	5.64	4.33	4.42	2.49	6.13	5.48	4.79	6.69	6.50	**<0.10**	**<0.10**
Manganese T-Mn	0.0645	0.0316	0.0413	0.0579	0.00863	0.00891	0.00552	0.0241	0.0114	0.0114	**<0.000050**	**<0.000050**
Mercury T-Hg	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Molybdenum T-Mo	0.00691	0.00681	0.00536	0.00420	0.000854	0.000667	0.000385	0.000769	0.000443	0.000504	**<0.000050**	**<0.000050**
Nickel T-Ni	0.00137	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Selenium T-Se	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Silicon T-Si	2.56	2.29	2.50	2.77	2.38	3.60	3.52	9.76	5.84	5.79	**<0.050**	**<0.050**
Silver T-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	4.3	2.5	2.4	**<2.0**	**<2.0**
Strontium T-Sr	0.141	0.149	0.126	0.121	0.0434	0.0685	0.0583	0.0474	0.0853	0.0885	**<0.00010**	**<0.00010**
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium T-Ti	0.011	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium T-U	0.000347	0.000382	0.00108	0.000981	0.000127	0.000147	0.000145	0.000107	0.000050	0.000052	**<0.000010**	**<0.000010**
Vanadium T-V	0.0016	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc T-Zn	0.0018	**<0.0010**	**<0.0010**	**<0.0010**	0.0019	**<0.0010**	**<0.0060**	0.0032	0.0048	0.0047	**<0.0010**	**<0.0010**
Dissolved Metals												
Aluminum D-Al	**<0.0090**	**<0.0090**	0.0095	**<0.0080**	**<0.0030**	**<0.0050**	**<0.0070**	0.0502	0.0747	0.0958	-	-
Antimony D-Sb	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-
Arsenic D-As	0.00063	0.00057	0.00038	0.00032	0.00023	0.00025	**<0.00010**	0.00015	**<0.00010**	**<0.00010**	-	-
Barium D-Ba	0.0650	0.0760	0.0758	0.0748	0.00831	0.0112	0.00789	0.00428	0.0108	0.0112	-	-
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-
Boron D-B	0.011	0.011	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	-	-
Cadmium D-Cd	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	-	-
Calcium D-Ca	32.0	32.4	28.5	28.7	30.5	36.4	35.0	11.4	17.5	18.0	-	-
Chromium D-Cr	0.00055	0.00054	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-
Cobalt D-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-
Copper D-Cu	**<0.00060**	**<0.00060**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00020**	**<0.00030**	**<0.00030**	-	-
Iron D-Fe	**<0.030**	**<0.030**	0.060	0.100	**<0.030**	**<0.030**	**<0.030**	**<0.030**	**<0.030**	0.038	-	-
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	-	-
Lithium D-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	-	-
Magnesium D-Mg	5.61	5.53	4.30	4.33	2.42	6.00	5.50	4.94	6.53	6.69	-	-
Manganese D-Mn	0.0224	0.0302	0.0377	0.0538	0.00540	0.00419	0.00110	0.0123	0.00790	0.00821	-	-
Mercury D-Hg	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	-	-
Molybdenum D-Mo	0.00704	0.00696	0.00559	0.00433	0.000863	0.000723	0.000352	0.000782	0.000502	0.000481	-	-
Nickel D-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00050	-	-
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	-	-
Potassium D-K	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	-	-
Selenium D-Se	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-	-
Silicon D-Si	2.17	2.15	2.43	2.66	2.33	3.59	3.58	9.93	5.57	5.91	-	-
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-	-
Sodium D-Na	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	4.5	2.4	2.5	-	-
Strontium D-Sr	0.139	0.151	0.128	0.121	0.0434	0.0706	0.0552	0.0461	0.0879	0.0895	-	-
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	-	-
Uranium D-U	0.000323	0.000383	0.00107	0.000992	0.000129	0.000150	0.000134	0.000091	0.000038	0.000043	-	-
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-	-
Zinc D-Zn	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	0.0013	**<0.0010**	**<0.0010**	0.0020	0.0040	0.0037	-	-
Organic Parameters												
Total Organic Carbon C	0.61	0.60	0.96	1.12	0.77	2.50	3.75	0.80	1.11	1.20	**<0.50**	**<0.50**

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	SC-5	MC-5	HC-1	SC-1-2	SC-1-1	SKC-1	MC-2	SC-2	MC-4	SC-4	FIELD BLANK
Date Sampled	11/30/2005	11/30/2005	12/1/2005	12/1/2005	12/1/2005	12/1/2005	12/1/2005	12/1/2005	12/1/2005	12/1/2005	12/1/2005
Time Sampled											
ALS Sample ID	1	2	3	4	5	6	7	8	9	10	11
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests											
Colour (CU)	5.7	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	-
Conductivity (uS/cm)	181	233	191	108	108	177	444	214	277	189	-
Total Dissolved Solids	98	128	113	59	47	107	244	124	146	114	-
Hardness CaCO3	96.6	122	102	52.1	52.3	87.6	232	113	141	99.8	-
pH	7.79	8.09	7.79	8.00	7.97	7.92	8.14	8.13	8.20	8.12	-
Total Suspended Solids	**<3.0**	4.2	**<3.0**	**<3.0**	**<3.0**	**<3.0**	4.2	**<3.0**	11.2	3.2	-
Turbidity (NTU)	4.27	7.87	3.48	8.61	7.79	0.68	3.04	1.70	25.4	2.60	-
Dissolved Anions											
Acidity (to pH 8.3) CaCO3	5.9	4.1	7.2	4.6	4.6	5.2	3.6	3.5	2.5	3.5	-
Alkalinity-Total CaCO3	104	116	103	49.9	48.9	81.4	234	106	139	101	-
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	-
Chloride Cl	**<0.50**	0.90	**<0.50**	**<0.50**	**<0.50**	**<0.50**	3.28	**<0.50**	1.56	**<0.50**	-
Fluoride F	0.067	0.085	**<0.020**	0.041	0.041	0.033	0.047	0.025	0.070	0.068	-
Sulphate SO4	11.2	15.6	15.3	10.1	10.1	23.8	24.6	15.4	19.0	12.0	-
Nutrients											
Ammonia Nitrogen N	0.0087	0.0067	**<0.0050**	0.0067	0.0060	**<0.0050**	0.0093	**<0.0050**	**<0.0050**	**<0.0050**	-
Total Kjeldahl Nitrogen N	0.211	0.169	0.174	0.164	0.164	0.193	0.055	0.159	0.216	**<0.050**	-
Nitrate Nitrogen N	0.0989	0.0909	0.0556	0.0560	0.0564	0.0566	0.141	0.0614	0.0942	0.0905	-
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-
Total Nitrogen N	0.310	0.260	0.230	0.220	0.220	0.250	0.270	0.220	0.310	0.240	-
Total Phosphate P	0.0026	0.0064	0.0028	0.0052	0.0063	**<0.0020**	0.0056	0.0033	0.0293	0.0037	-
Cyanides											
Total Cyanide CN	0.0015	**<0.0010**	0.0011	**<0.0010**	**<0.0010**	0.0011	0.0010	**<0.0010**	0.0011	**<0.0010**	-
Total Metals											
Aluminum T-Al	0.0815	0.127	0.102	0.273	0.302	0.0096	0.0264	0.0446	0.890	0.0582	-
Antimony T-Sb	**<0.00010**	0.00015	**<0.00010**	0.00010	0.00010	**<0.00010**	0.00038	**<0.00010**	0.00041	**<0.00010**	-
Arsenic T-As	0.00049	0.00067	0.00120	0.00036	0.00036	0.00029	0.00074	0.00067	0.00195	0.00052	-
Barium T-Ba	0.0923	0.0894	0.0401	0.0780	0.0776	0.00927	0.146	0.0927	0.117	0.0973	-
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Boron T-B	**<0.010**	0.019	0.011	**<0.010**	**<0.010**	**<0.010**	0.061	0.011	0.038	**<0.010**	-
Cadmium T-Cd	0.000023	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	0.000036	-
Calcium T-Ca	31.8	34.2	31.5	16.0	15.9	31.1	51.8	35.1	38.3	31.5	-
Chromium T-Cr	**<0.00050**	**<0.00050**	0.00094	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00165	**<0.00050**	-
Cobalt T-Co	**<0.00010**	0.00012	0.00011	**<0.00010**	**<0.00010**	**<0.00010**	0.00033	**<0.00010**	0.00054	**<0.00010**	-
Copper T-Cu	0.00143	0.00128	0.00164	0.00120	0.00123	0.00077	0.00067	0.00118	0.00269	0.00107	-
Iron T-Fe	0.229	0.237	0.080	0.186	0.229	0.068	0.181	0.067	0.892	0.086	-
Lead T-Pb	0.000055	0.000111	**<0.000050**	0.000076	0.000081	**<0.000050**	**<0.000050**	**<0.000050**	0.000225	**<0.000050**	-
Lithium T-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.0064	**<0.0050**	**<0.0050**	**<0.0050**	-
Magnesium T-Mg	4.34	9.27	5.24	2.98	2.96	2.29	24.3	5.46	16.0	4.31	-
Manganese T-Mn	0.0494	0.0377	0.00353	0.00647	0.00705	0.0120	0.0691	0.0253	0.0464	0.0200	-
Mercury T-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-
Molybdenum T-Mo	0.00546	0.00335	0.000698	0.00818	0.00818	0.000961	0.00170	0.00800	0.00127	0.00826	-
Nickel T-Ni	**<0.00050**	0.00069	0.00054	**<0.00050**	**<0.00050**	**<0.00050**	0.00376	**<0.00050**	0.00320	**<0.00050**	-
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	-
Potassium T-K	0.683	0.916	0.528	0.656	0.670	0.331	1.01	0.668	1.24	0.643	-
Selenium T-Se	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00065	0.00053	0.00090	**<0.00050**	-
Silicon T-Si	3.26	3.76	2.50	1.53	1.71	2.79	3.56	2.55	3.95	2.64	-
Silver T-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-
Sodium T-Na	**<2.0**	3.6	**<2.0**	**<2.0**	**<2.0**	**<2.0**	7.9	**<2.0**	5.0	**<2.0**	-
Strontium T-Sr	0.152	0.165	0.129	0.146	0.149	0.0508	0.254	0.165	0.189	0.158	-
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00050**	**<0.00010**	**<0.00010**	**<0.00010**	0.00012	**<0.00010**	-
Titanium T-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	0.011	**<0.010**	**<0.010**	**<0.010**	0.017	**<0.010**	-
Uranium T-U	0.00124	0.000763	0.000039	0.000601	0.000595	0.000135	0.000162	0.000426	0.000160	0.00138	-
Vanadium T-V	**<0.0010**	**<0.0010**	**<0.0010**	0.0011	0.0011	**<0.0010**	**<0.0010**	**<0.0010**	0.0020	**<0.0010**	-
Zinc T-Zn	**<0.0010**	0.0010	0.0018	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0070**	**<0.0010**	-
Dissolved Metals											
Aluminum D-Al	0.0222	0.0215	0.0146	0.164	0.153	**<0.0020**	**<0.0020**	0.0093	0.0221	0.0121	-
Antimony D-Sb	**<0.00010**	0.00014	**<0.00010**	0.00011	0.00011	**<0.00010**	0.00035	**<0.00010**	0.00030	**<0.00010**	-
Arsenic D-As	0.00039	0.00044	0.00112	0.00034	0.00034	0.00021	0.00054	0.00061	0.00069	0.00046	-
Barium D-Ba	0.0886	0.0844	0.0387	0.0745	0.0741	0.00900	0.145	0.0918	0.0999	0.0962	-
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Boron D-B	**<0.010**	0.019	0.011	**<0.010**	**<0.010**	**<0.010**	0.060	0.012	0.033	**<0.010**	-
Cadmium D-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	0.000025	**<0.000020**	0.000021	-
Calcium D-Ca	31.7	33.9	32.3	16.0	16.1	31.3	52.3	36.0	33.3	32.7	-
Chromium D-Cr	**<0.00050**	**<0.00050**	0.00097	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Cobalt D-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00026	**<0.00010**	**<0.00010**	**<0.00010**	-
Copper D-Cu	0.00098	0.00078	0.00105	0.00057	0.00049	0.00052	0.00041	0.00090	0.00073	0.00081	-
Iron D-Fe	0.084	0.045	**<0.030**	0.080	0.071	**<0.030**	**<0.030**	**<0.030**	**<0.030**	**<0.030**	-
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	-
Lithium D-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.0064	**<0.0050**	**<0.0050**	**<0.0050**	-
Magnesium D-Mg	4.24	9.09	5.28	2.93	2.95	2.28	24.7	5.50	14.1	4.38	-
Manganese D-Mn	0.0444	0.0288	0.000912	0.00295	0.00280	0.00785	0.0635	0.0236	0.0174	0.0173	-
Mercury D-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-
Molybdenum D-Mo	0.00541	0.00338	0.000759	0.00844	0.00850	0.000997	0.00183	0.00827	0.00118	0.00877	-
Nickel D-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00367	**<0.00050**	0.00113	**<0.00050**	-
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	-
Potassium D-K	0.671	0.886	0.528	0.643	0.643	0.334	1.03	0.683	0.875	0.667	-
Selenium D-Se	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00072	**<0.00050**	**<0.00050**	0.00100	**<0.00050**	-
Silicon D-Si	3.06	3.51	2.24	1.28	1.26	2.66	3.36	2.40	2.82	2.43	-
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-
Sodium D-Na	**<2.0**	3.6	**<2.0**	**<2.0**	**<2.0**	**<2.0**	7.5	**<2.0**	4.8	**<2.0**	-
Strontium D-Sr	0.152	0.163	0.133	0.148	0.149	0.0516	0.260	0.170	0.168	0.164	-
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	-
Uranium D-U	0.00121	0.000736	0.000039	0.000589	0.000585	0.000134	0.000166	0.000433	0.000130	0.00139	-
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-
Zinc D-Zn	0.0013	**<0.0010**	**<0.0010**	0.0013	**<0.0010**	**<0.0010**	**<0.0010**	0.0015	0.0022	**<0.0010**	-
Organic Parameters											
Total Organic Carbon C	4.28	1.79	1.13	**<0.50**	**<0.50**	4.48	1.03	1.04	1.95	1.21	-

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	SC-3	SKC-2	SKC-3-1	SKC-3-2	TRAVEL BLANK
Date Sampled	12/1/2005	12/1/2005	12/1/2005	12/1/2005	12/1/2005
Time Sampled					
ALS Sample ID	12	13	14	15	16
Nature	Water	Water	Water	Water	Water
Physical Tests					
Colour (CU)	**<5.0**	**<5.0**	8.5	8.1	**<5.0**
Conductivity (uS/cm)	219	210	211	213	**<2.0**
Total Dissolved Solids	126	126	123	129	**<10**
Hardness CaCO3	121	116	119	119	**<0.50**
pH	8.14	8.03	8.10	8.11	5.69
Total Suspended Solids	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**
Turbidity (NTU)	1.35	0.50	0.60	0.46	**<0.10**
Dissolved Anions					
Acidity (to pH 8.3) CaCO3	3.2	4.3	3.6	3.8	**<1.0**
Alkalinity-Total CaCO3	118	99.9	133	122	**<2.0**
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Chloride Cl	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**
Fluoride F	0.030	0.044	0.043	0.043	**<0.020**
Sulphate SO4	14.8	20.9	4.66	4.63	**<0.50**
Nutrients					
Ammonia Nitrogen N	**<0.0050**	0.0093	0.0093	0.0113	**<0.0050**
Total Kjeldahl Nitrogen N	0.164	0.222	0.144	0.128	**<0.050**
Nitrate Nitrogen N	0.0855	0.0776	0.222	0.221	**<0.0050**
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Nitrogen N	0.250	0.300	0.360	0.360	**<0.050**
Total Phosphate P	0.0022	**<0.0020**	0.0022	**<0.0020**	**<0.0020**
Cyanides					
Total Cyanide CN	**<0.0010**	0.0023	0.0026	0.0016	**<0.0010**
Total Metals					
Aluminum T-Al	0.0354	0.0094	0.0309	0.0285	**<0.0010**
Antimony T-Sb	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic T-As	0.00057	0.00028	0.00013	0.00012	**<0.00010**
Barium T-Ba	0.118	0.0123	0.00971	0.00979	**<0.000050**
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	0.011	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Cadmium T-Cd	0.000029	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium T-Ca	38.7	36.9	42.3	41.3	**<0.020**
Chromium T-Cr	**<0.00050**	**<0.00050**	0.00212	**<0.00050**	**<0.00050**
Cobalt T-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Copper T-Cu	0.00127	0.00069	0.00107	0.00079	**<0.00010**
Iron T-Fe	0.055	0.061	0.227	0.060	**<0.030**
Lead T-Pb	**<0.000050**	**<0.000050**	**<0.000050**	0.000069	**<0.000050**
Lithium T-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium T-Mg	5.68	5.30	6.08	5.99	**<0.0050**
Manganese T-Mn	0.0415	0.0153	0.0128	0.0102	**<0.000050**
Mercury T-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum T-Mo	0.00793	0.000764	0.000594	0.000442	**<0.000050**
Nickel T-Ni	**<0.00050**	0.00070	0.00092	0.00062	**<0.00050**
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	0.703	0.461	0.400	0.448	**<0.050**
Selenium T-Se	**<0.00050**	**<0.00050**	0.00061	0.00071	**<0.00050**
Silicon T-Si	2.65	3.80	3.68	3.62	**<0.050**
Silver T-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Strontium T-Sr	0.202	0.0770	0.0713	0.0711	**<0.00010**
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	0.00010	**<0.00010**
Titanium T-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium T-U	0.000535	0.000167	0.000196	0.000183	**<0.000010**
Vanadium T-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc T-Zn	**<0.0010**	**<0.0010**	0.0030	0.0078	**<0.0010**
Dissolved Metals					
Aluminum D-Al	0.0088	**<0.0070**	0.0073	0.0072	-
Antimony D-Sb	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-
Arsenic D-As	0.00054	0.00025	**<0.00010**	**<0.00010**	-
Barium D-Ba	0.116	0.0120	0.00906	0.00923	-
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Boron D-B	0.011	**<0.010**	**<0.010**	**<0.010**	-
Cadmium D-Cd	0.000027	**<0.000020**	**<0.000020**	**<0.000020**	-
Calcium D-Ca	39.3	37.5	38.4	38.3	-
Chromium D-Cr	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Cobalt D-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-
Copper D-Cu	0.00103	0.00063	0.00037	0.00035	-
Iron D-Fe	**<0.030**	0.032	**<0.030**	**<0.030**	-
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	-
Lithium D-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	-
Magnesium D-Mg	5.69	5.40	5.62	5.68	-
Manganese D-Mn	0.0395	0.00988	0.000902	0.000973	-
Mercury D-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-
Molybdenum D-Mo	0.00807	0.000823	0.000392	0.000395	-
Nickel D-Ni	**<0.00050**	0.00080	**<0.00050**	**<0.00050**	-
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	-
Potassium D-K	0.699	0.472	0.349	0.350	-
Selenium D-Se	**<0.00050**	**<0.00050**	0.00051	**<0.00050**	-
Silicon D-Si	2.58	3.68	3.65	3.77	-
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-
Sodium D-Na	**<2.0**	**<2.0**	**<2.0**	**<2.0**	-
Strontium D-Sr	0.203	0.0785	0.0643	0.0644	-
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	-
Uranium D-U	0.000544	0.000166	0.000173	0.000178	-
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-
Zinc D-Zn	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-
Organic Parameters					
Total Organic Carbon C	1.27	3.03	4.07	4.18	**<0.50**

Results are expressed as milligrams per litre except where noted. **(continued)**

< = Less than the detection limit indicated.

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	SC-1	SC-2	SC-3	SC-4	SC-5	MC-1	MC-2-1	MC-2-2	MC-4	MC-5	HC-1
Date Sampled	1/13/2005	1/13/2005	1/13/2005	1/13/2005	1/13/2005	1/13/2005	1/13/2005	1/13/2005	1/13/2005	1/13/2005	1/13/2005
Time Sampled											
ALS Sample ID	1	2	3	4	5	6	7	8	9	10	11
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests											
Colour (CU)	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**
Conductivity (uS/cm)	138	216	222	196	190	190	459	459	338	250	194
Total Dissolved Solids	79	125	128	111	108	97	242	252	185	143	110
Hardness CaCO3	63.4	108	112	97.3	96.4	97.4	252	252	170	124	93.4
pH	7.76	8.10	8.14	8.14	8.16	8.21	8.23	8.25	8.26	8.24	8.19
Total Suspended Solids	**<3.0**	**<3.0**	**<3.0**	3.6	**<3.0**	**<3.0**	3.1	3.1	**<3.0**	**<3.0**	**<3.0**
Turbidity (NTU)	1.16	0.90	1.05	2.12	1.00	0.61	2.32	2.35	3.39	1.66	2.29
Dissolved Anions											
Acidity (to pH 8.3) CaCO3	1.6	1.1	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**
Alkalinity-Total CaCO3	61.9	111	106	93.4	94.3	96.6	228	248	160	116	87.2
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Chloride Cl	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	3.63	3.63	2.11	1.04	**<0.50**
Fluoride F	0.045	0.027	0.028	0.065	0.061	0.030	0.046	0.046	0.090	0.099	**<0.020**
Sulphate SO4	20.1	17.4	16.8	13.8	11.9	12.7	26.3	26.3	21.9	16.6	19.1
Nutrients											
Ammonia Nitrogen N	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.0113	0.0127	0.0107	0.0053	**<0.0050**
Total Kjeldahl Nitrogen N	0.213	0.220	0.228	0.219	0.232	0.210	0.241	0.242	0.262	0.232	0.207
Nitrate Nitrogen N	0.0568	0.0503	0.0619	0.0877	0.0875	0.0496	0.119	0.118	0.108	0.0877	0.0526
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**<0.0010**	0.0030	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Nitrogen N	0.270	0.270	0.290	0.310	0.320	0.260	0.360	0.360	0.370	0.320	0.260
Total Phosphate P	0.0031	0.0023	0.0029	0.0054	0.0021	0.0024	0.0044	0.0045	0.0042	0.0037	0.0035
Cyanides											
Total Cyanide CN	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Metals											
Aluminum T-Al	0.0417	0.0183	0.0186	0.0242	0.0165	0.0091	0.0134	0.0144	0.0484	0.0321	0.0456
Antimony T-Sb	0.00012	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00031	0.00032	0.00026	0.00010	0.00010
Arsenic T-As	0.00033	0.00061	0.00052	0.00043	0.00032	**<0.00010**	0.00070	0.00071	0.00079	0.00039	0.00134
Barium T-Ba	0.0994	0.0913	0.108	0.102	0.0978	0.0592	0.148	0.153	0.119	0.0878	0.0422
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	0.011	0.012	0.011	**<0.010**	**<0.010**	**<0.010**	0.068	0.072	0.040	0.019	0.012
Cadmium T-Cd	**<0.000020**	0.000031	0.000024	0.000024	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium T-Ca	19.5	33.7	35.0	30.3	30.1	20.3	53.5	54.9	39.8	33.7	29.1
Chromium T-Cr	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00062	**<0.00050**	**<0.00050**	0.00104
Cobalt T-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00023	0.00024	**<0.00010**	**<0.00010**	**<0.00010**
Copper T-Cu	0.00052	0.00080	0.00080	0.00072	0.00057	0.00023	0.00055	0.00057	0.00071	0.00051	0.00074
Iron T-Fe	**<0.030**	0.079	0.052	0.072	0.136	**<0.030**	0.201	0.196	0.132	0.108	0.044
Lead T-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Lithium T-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.0078	0.0073	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium T-Mg	3.92	5.68	5.55	4.52	4.31	11.1	27.6	28.1	16.9	9.26	5.24
Manganese T-Mn	0.000941	0.0271	0.0350	0.0162	0.0485	0.000684	0.0802	0.0815	0.0259	0.0259	0.00179
Mercury T-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum T-Mo	0.0111	0.00914	0.00842	0.00861	0.00468	0.00121	0.00139	0.00140	0.00124	0.00289	0.000773
Nickel T-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00409	0.00424	0.00139	**<0.00050**	**<0.00050**
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	0.627	0.616	0.600	0.593	0.569	0.407	0.919	0.953	0.879	0.875	0.483
Selenium T-Se	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00076	**<0.00050**	**<0.00050**	**<0.00050**	0.00084	0.00059	**<0.00050**
Silicon T-Si	1.19	2.61	2.66	2.58	3.25	2.03	3.61	3.59	3.59	4.43	2.28
Silver T-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	2.3	**<2.0**	2.0	**<2.0**	2.2	**<2.0**	9.2	9.1	6.7	4.8	**<2.0**
Strontium T-Sr	0.196	0.169	0.188	0.167	0.153	0.197	0.284	0.286	0.197	0.163	0.132
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium T-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium T-U	0.000972	0.000416	0.000461	0.00127	0.00118	0.000138	0.000163	0.000162	0.000161	0.000681	0.000042
Vanadium T-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc T-Zn	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	0.0012	0.0010	**<0.0010**
Dissolved Metals											
Aluminum D-Al	0.0193	0.0052	0.0050	0.0060	0.0045	0.0020	0.0011	**<0.0010**	0.0040	0.0042	0.0058
Antimony D-Sb	0.00012	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00033	0.00033	0.00026	0.00010	**<0.00010**
Arsenic D-As	0.00033	0.00052	0.00047	0.00038	0.00029	**<0.00010**	0.00051	0.00052	0.00055	0.00033	0.00128
Barium D-Ba	0.0969	0.0892	0.107	0.101	0.0972	0.0595	0.150	0.152	0.116	0.0865	0.0408
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron D-B	0.011	0.012	0.011	**<0.010**	**<0.010**	**<0.010**	0.071	0.073	0.040	0.020	0.012
Cadmium D-Cd	**<0.000020**	0.000031	0.000026	0.000036	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium D-Ca	19.1	33.9	35.5	31.5	31.5	20.4	54.7	54.8	40.3	34.2	28.9
Chromium D-Cr	**<0.00050**	0.00055	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00050	0.00054	**<0.00050**	**<0.00050**	0.00113
Cobalt D-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00020	0.00019	**<0.00010**	**<0.00010**	**<0.00010**
Copper D-Cu	0.00042	0.00075	0.00064	0.00055	0.00048	0.00063	0.00036	0.00037	0.00052	0.00047	0.00045
Iron D-Fe	**<0.030**	**<0.030**	**<0.030**	**<0.030**	0.053	**<0.030**	**<0.030**	**<0.030**	**<0.030**	**<0.030**	**<0.030**
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Lithium D-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.0077	0.0079	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium D-Mg	3.85	5.58	5.56	4.50	4.30	11.2	28.0	27.9	16.8	9.33	5.14
Manganese D-Mn	0.000372	0.0264	0.0319	0.0145	0.0489	0.000289	0.0775	0.0790	0.0177	0.0235	0.000369
Mercury D-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum D-Mo	0.0113	0.00926	0.00864	0.00906	0.00474	0.00127	0.00143	0.00149	0.00127	0.00295	0.000803
Nickel D-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00419	0.00426	0.00125	**<0.00050**	**<0.00050**
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium D-K	0.623	0.611	0.603	0.606	0.570	0.409	0.947	0.959	0.880	0.886	0.481
Selenium D-Se	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00061	**<0.00050**	**<0.00050**
Silicon D-Si	1.14	2.51	2.57	2.46	3.18	1.96	3.52	3.52	3.40	4.33	2.16
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium D-Na	2.3	**<2.0**	2.0	**<2.0**	2.2	**<2.0**	9.0	8.9	6.6	4.7	**<2.0**
Strontium D-Sr	0.193	0.167	0.187	0.170	0.153	0.198	0.286	0.287	0.196	0.163	0.130
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00030
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium D-U	0.000956	0.000414	0.000464	0.00127	0.00120	0.000143	0.000161	0.000163	0.000158	0.000691	0.000041
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc D-Zn	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Organic Parameters											
Total Organic Carbon C	**<0.50**	**<0.50**	0.55	0.50	0.88	**<0.50**	**<0.50**	**<0.50**	1.00	0.86	**<0.50**

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	SKC-1	SKC-2-1	SKC-2-2	SKC-3	WC-1	Travel Blank	Field Blank
Date Sampled	1/13/2005	1/13/2005	1/13/2005	1/13/2005	1/13/2005	1/13/2005	1/13/2005
Time Sampled							
ALS Sample ID	12	13	14	15	16	17	18
Nature	Water	Water	Water	Water	Water	Water	Water
Physical Tests							
Colour (CU)	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	-	**<5.0**
Conductivity (uS/cm)	184	228	227	226	127	-	**<2.0**
Total Dissolved Solids	107	134	134	133	85	-	**<10**
Hardness CaCO3	86.5	112	113	116	49.1	-	**<0.50**
pH	8.10	8.14	8.12	8.23	8.04	-	5.74
Total Suspended Solids	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	-	**<3.0**
Turbidity (NTU)	0.74	0.60	0.56	0.89	1.10	-	**<0.10**
Dissolved Anions							
Acidity (to pH 8.3) CaCO3	**<1.0**	**<1.0**	**<1.0**	**<1.0**	1.1	-	3.6
Alkalinity-Total CaCO3	82.1	107	96.8	124	61.7	-	**<2.0**
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	-	**<0.050**
Chloride Cl	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	-	**<0.50**
Fluoride F	0.032	0.046	0.048	0.046	0.212	-	**<0.020**
Sulphate SO4	22.8	23.6	23.6	5.42	12.4	-	**<0.50**
Nutrients							
Ammonia Nitrogen N	**<0.0050**	0.0080	0.0050	0.0260	0.0050	-	**<0.0050**
Total Kjeldahl Nitrogen N	0.225	0.261	0.260	0.172	0.218	-	**<0.050**
Nitrate Nitrogen N	0.0748	0.106	0.108	0.168	0.0623	-	**<0.0050**
Nitrite Nitrogen N	**<0.0010**	0.0028	0.0022	0.0011	**<0.0010**	-	**<0.0010**
Total Nitrogen N	0.300	0.370	0.370	0.460	0.280	-	**<0.050**
Total Phosphate P	**<0.0020**	0.0021	0.0023	0.0022	0.0205	-	**<0.0020**
Cyanides							
Total Cyanide CN	**<0.0010**	**<0.0010**	**<0.0010**	0.0012	**<0.0010**	-	**<0.0010**
Total Metals							
Aluminum T-Al	0.0047	0.0063	0.0069	0.0066	0.0569	**<0.0010**	**<0.0010**
Antimony T-Sb	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic T-As	0.00034	0.00024	0.00024	**<0.00010**	0.00017	**<0.00010**	**<0.00010**
Barium T-Ba	0.0101	0.0132	0.0132	0.00901	0.00467	**<0.000050**	**<0.000050**
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Cadmium T-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium T-Ca	32.4	36.0	35.7	35.8	11.7	**<0.020**	**<0.020**
Chromium T-Cr	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Cobalt T-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Copper T-Cu	0.00056	0.00051	0.00053	0.00024	0.00024	**<0.00010**	**<0.00010**
Iron T-Fe	0.089	0.076	0.078	0.093	0.058	**<0.030**	**<0.030**
Lead T-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Lithium T-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium T-Mg	2.32	5.54	5.56	5.31	4.86	**<0.0050**	**<0.0050**
Manganese T-Mn	0.00720	0.0102	0.0102	0.00271	0.00650	**<0.000050**	**<0.000050**
Mercury T-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum T-Mo	0.000838	0.000796	0.000731	0.000389	0.000857	**<0.000050**	**<0.000050**
Nickel T-Ni	**<0.00050**	0.00060	0.00055	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	0.325	0.449	0.444	0.294	1.68	**<0.050**	**<0.050**
Selenium T-Se	**<0.00050**	0.00113	0.00095	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Silicon T-Si	2.82	3.99	4.10	4.06	11.2	**<0.050**	**<0.050**
Silver T-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	**<2.0**	2.1	2.1	**<2.0**	6.1	**<2.0**	**<2.0**
Strontium T-Sr	0.0516	0.0813	0.0818	0.0647	0.0547	**<0.00010**	**<0.00010**
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium T-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium T-U	0.000171	0.000160	0.000166	0.000179	0.000124	**<0.000010**	**<0.000010**
Vanadium T-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc T-Zn	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	0.0016	**<0.0010**	**<0.0010**
Dissolved Metals							
Aluminum D-Al	0.0014	0.0033	0.0034	0.0040	0.0268	-	-
Antimony D-Sb	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-
Arsenic D-As	0.00027	0.00022	0.00022	**<0.00010**	0.00016	-	-
Barium D-Ba	0.00989	0.0130	0.0132	0.00894	0.00447	-	-
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-
Boron D-B	**<0.010**	**<0.010**	**<0.010**	**<0.010**	0.010	-	-
Cadmium D-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	-	-
Calcium D-Ca	30.9	35.6	36.1	37.6	11.7	-	-
Chromium D-Cr	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-
Cobalt D-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-
Copper D-Cu	0.00044	0.00046	0.00045	0.00027	0.00023	-	-
Iron D-Fe	**<0.030**	0.042	0.041	0.045	**<0.030**	-	-
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	-	-
Lithium D-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	-	-
Magnesium D-Mg	2.28	5.64	5.60	5.41	4.83	-	-
Manganese D-Mn	0.00510	0.00843	0.00851	0.000813	0.00141	-	-
Mercury D-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-	-
Molybdenum D-Mo	0.000851	0.000772	0.000764	0.000395	0.000914	-	-
Nickel D-Ni	**<0.00050**	0.00060	0.00053	**<0.00050**	**<0.00050**	-	-
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	-	-
Potassium D-K	0.316	0.448	0.455	0.303	1.70	-	-
Selenium D-Se	**<0.00050**	0.00113	0.00098	**<0.00050**	**<0.00050**	-	-
Silicon D-Si	2.74	4.01	4.01	4.03	11.0	-	-
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-	-
Sodium D-Na	**<2.0**	2.1	2.1	**<2.0**	5.9	-	-
Strontium D-Sr	0.0503	0.0811	0.0812	0.0664	0.0546	-	-
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	-	-
Uranium D-U	0.000167	0.000163	0.000165	0.000185	0.000123	-	-
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-	-
Zinc D-Zn	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-	-
Organic Parameters							
Total Organic Carbon C	0.80	2.12	2.19	2.23	0.58	**<0.50**	**<0.50**

Results are expressed as milligrams per litre except where noted. **(continued)**

< = Less than the detection limit indicated.

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	SC-4	HC-1-1	HC-1-2	WC-1	SC-5	SKC-1	MC-5	MC-3
Date Sampled	3/2/2006	3/2/2006	3/2/2006	3/4/2006	3/4/2006	3/4/2006	3/4/2006	3/4/2006
Time Sampled								
ALS Sample ID	1	2	3	1	2	3	4	5
Nature	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests								
Colour (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	204	197	195	133	189	192	248	361
Total Dissolved Solids	123	117	124	88	110	115	139	203
Hardness CaCO3	100	92.9	94.4	52.7	96.9	96.2	121	178
pH	8.06	8.09	8.10	8.04	7.29	7.88	8.14	8.17
Total Suspended Solids	<3.0	<3.0	<3.0	<3.0	6.7	<3.0	11.7	<3.0
Turbidity (NTU)	0.87	0.62	0.54	1.18	1.91	0.29	3.23	0.64
Dissolved Anions								
Acidity (to pH 8.3) CaCO3	2.6	2.5	2.3	3.4	6.4	4.4	2.9	2.7
Alkalinity-Total CaCO3	99.8	89.5	93.0	63.2	92.1	82.3	123	187
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.12	2.62
Fluoride F	0.058	<0.020	<0.020	0.212	0.056	0.030	0.098	0.096
Sulphate SO4	15.7	19.9	19.8	12.4	12.3	24.1	16.6	24.1
Nutrients								
Ammonia Nitrogen N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0067
Total Kjeldahl Nitrogen N	<0.050	<0.050	<0.050	<0.050	0.827	0.871	<0.050	<0.050
Nitrate Nitrogen N	0.0863	0.0553	0.0566	0.0535	0.0834	0.0787	0.0826	0.106
Nitrite Nitrogen N	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Nitrogen N	0.150	0.080	0.070	0.110	0.910	0.950	0.136	0.140
Total Phosphate P	<0.0020	<0.0020	<0.0020	0.0213	0.0046	<0.0020	0.0078	<0.0020
Cyanides								
Total Cyanide CN	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Metals								
Aluminum T-Al	0.0228	0.0215	0.0329	0.0544	0.0435	0.0049	0.0631	0.0170
Antimony T-Sb	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00023
Arsenic T-As	0.00040	0.00119	0.00116	0.00018	0.00036	0.00019	0.00038	0.00058
Barium T-Ba	0.0943	0.0401	0.0395	0.00518	0.0894	0.0118	0.0779	0.108
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	<0.010	0.013	0.013	0.012	<0.010	<0.010	0.022	0.052
Cadmium T-Cd	0.000032	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Calcium T-Ca	31.7	29.0	29.3	13.3	31.8	34.7	34.5	42.4
Chromium T-Cr	<0.00050	0.00112	0.00093	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt T-Co	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper T-Cu	0.00057	0.00053	0.00079	0.00021	0.00062	0.00095	0.00058	0.00043
Iron T-Fe	0.053	<0.030	<0.030	0.050	0.237	<0.030	0.197	0.042
Lead T-Pb	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000086	<0.000050
Lithium T-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0056
Magnesium T-Mg	4.35	4.76	4.83	4.82	3.91	2.09	8.47	16.1
Manganese T-Mn	0.0168	0.000704	0.00135	0.0118	0.0498	0.00426	0.0354	0.0264
Mercury T-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum T-Mo	0.00925	0.000813	0.000791	0.000972	0.00495	0.000901	0.00290	0.00133
Nickel T-Ni	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00144
Phosphorus T-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium T-K	0.609	0.550	0.579	1.82	0.573	0.321	0.911	0.916
Selenium T-Se	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00086	<0.00050	<0.00050
Silicon T-Si	2.61	2.41	2.55	11.2	3.27	2.70	4.58	3.75
Silver T-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium T-Na	<2.0	<2.0	2.2	6.7	2.4	<2.0	5.5	8.7
Strontium T-Sr	0.154	0.116	0.114	0.0541	0.140	0.0474	0.152	0.195
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium T-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium T-U	0.00134	0.000042	0.000043	0.000138	0.00113	0.000212	0.000733	0.000177
Vanadium T-V	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc T-Zn	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Metals								
Aluminum D-Al	0.0045	0.0040	0.0036	0.0174	0.0032	0.0018	0.0035	0.0030
Antimony D-Sb	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00022
Arsenic D-As	0.00035	0.00116	0.00122	0.00017	0.00023	0.00016	0.00026	0.00048
Barium D-Ba	0.0939	0.0398	0.0399	0.00486	0.0872	0.0117	0.0750	0.109
Beryllium D-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron D-B	<0.010	0.013	0.013	0.012	<0.010	<0.010	0.023	0.053
Cadmium D-Cd	0.000026	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Calcium D-Ca	32.7	29.2	29.7	13.2	32.2	35.1	34.3	44.0
Chromium D-Cr	<0.00050	0.00113	0.00115	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt D-Co	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper D-Cu	0.00042	0.00039	0.00038	<0.00020	<0.00040	<0.00050	<0.00040	<0.00040
Iron D-Fe	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead D-Pb	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium D-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0056
Magnesium D-Mg	4.48	4.84	4.95	4.77	4.02	2.08	8.52	16.6
Manganese D-Mn	0.0148	0.000171	0.000168	0.000692	0.0424	0.00361	0.0204	0.0252
Mercury D-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum D-Mo	0.00962	0.000784	0.000852	0.00105	0.00526	0.000971	0.00326	0.00140
Nickel D-Ni	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00151
Phosphorus D-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium D-K	0.620	0.558	0.564	1.83	0.578	0.325	0.907	0.948
Selenium D-Se	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00085	<0.00050	<0.00050
Silicon D-Si	2.52	2.31	2.37	11.0	3.09	2.65	4.32	3.68
Silver D-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium D-Na	<2.0	<2.0	2.1	6.6	2.3	<2.0	5.4	8.6
Strontium D-Sr	0.160	0.116	0.119	0.0552	0.143	0.0478	0.153	0.202
Thallium D-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin D-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium D-U	0.00129	0.000036	0.000039	0.000137	0.00106	0.000195	0.000643	0.000167
Vanadium D-V	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc D-Zn	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic Parameters								
Total Organic Carbon C	0.56	0.51	<0.50	0.80	0.91	0.95	1.87	1.00

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	TRAVEL	FIELD	WQ-3	Field Bl ank	Travel Blank
Date Sampled	3/4/2006	3/4/2006	3/18/2006	3/18/2006	3/18/2006
Time Sampled					
ALS Sample ID	6	7	1	2	3
Nature	Water	Water	Water	Water	Water
Physical Tests					
Colour (CU)	-	-	**<5.0**	**<5.0**	**<5.0**
Conductivity (uS/cm)	-	-	397	**<2.0**	**<2.0**
Total Dissolved Solids	-	-	265	**<10**	**<10**
Hardness CaCO3	-	-	211	**<0.50**	**<0.50**
pH	-	-	8.09	5.61	5.61
Total Suspended Solids	-	-	**<3.0**	**<3.0**	**<3.0**
Turbidity (NTU)	-	-	0.47	**<0.10**	**<0.10**
Dissolved Anions					
Acidity (to pH 8.3) CaCO3	-	-	5.1	2.6	2.8
Alkalinity-Total CaCO3	-	-	94.0	**<2.0**	**<2.0**
Bromide Br	-	-	**<0.050**	**<0.050**	**<0.050**
Chloride Cl	-	-	**<0.50**	**<0.50**	**<0.50**
Fluoride F	-	-	0.031	**<0.020**	**<0.020**
Sulphate SO4	-	-	113	**<0.50**	**<0.50**
Nutrients					
Ammonia Nitrogen N	-	-	**<0.0050**	0.0107	0.0073
Total Kjeldahl Nitrogen N	-	-	**<0.050**	**<0.050**	**<0.050**
Nitrate Nitrogen N	-	-	0.140	**<0.0050**	**<0.0050**
Nitrite Nitrogen N	-	-	**<0.0010**	**<0.0010**	**<0.0010**
Total Nitrogen N	-	-	0.210	**<0.050**	**<0.050**
Total Phosphate P	-	-	0.0036	**<0.0020**	**<0.0020**
Cyanides					
Total Cyanide CN	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Metals					
Aluminum T-Al	**<0.0010**	**<0.0010**	0.0048	**<0.0010**	**<0.0010**
Antimony T-Sb	**<0.00010**	**<0.00010**	0.00020	**<0.00010**	**<0.00010**
Arsenic T-As	**<0.00010**	**<0.00010**	0.00125	**<0.00010**	**<0.00010**
Barium T-Ba	**<0.000050**	**<0.000050**	0.0916	**<0.000050**	**<0.000050**
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	**<0.010**	**<0.010**	0.015	**<0.010**	**<0.010**
Cadmium T-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium T-Ca	0.021	**<0.020**	60.1	**<0.020**	**<0.020**
Chromium T-Cr	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Cobalt T-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Copper T-Cu	**<0.00010**	**<0.00010**	0.00036	**<0.00010**	**<0.00010**
Iron T-Fe	**<0.030**	**<0.030**	**<0.030**	**<0.030**	**<0.030**
Lead T-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Lithium T-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium T-Mg	**<0.0050**	**<0.0050**	8.18	**<0.0050**	**<0.0050**
Manganese T-Mn	**<0.000050**	**<0.000050**	0.000387	**<0.000050**	**<0.000050**
Mercury T-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum T-Mo	**<0.000050**	**<0.000050**	0.00452	**<0.000050**	**<0.000050**
Nickel T-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	**<0.050**	**<0.050**	0.541	**<0.050**	**<0.050**
Selenium T-Se	**<0.00050**	**<0.00050**	0.00257	**<0.00050**	**<0.00050**
Silicon T-Si	**<0.050**	**<0.050**	2.30	**<0.050**	**<0.050**
Silver T-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	**<2.0**	**<2.0**	5.2	**<2.0**	**<2.0**
Strontium T-Sr	**<0.00010**	**<0.00010**	0.702	**<0.00010**	**<0.00010**
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium T-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium T-U	**<0.000010**	**<0.000010**	0.000462	**<0.000010**	**<0.000010**
Vanadium T-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc T-Zn	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	0.0021
Dissolved Metals					
Aluminum D-Al	-	-	0.0015	-	-
Antimony D-Sb	-	-	0.00019	-	-
Arsenic D-As	-	-	0.00113	-	-
Barium D-Ba	-	-	0.0897	-	-
Beryllium D-Be	-	-	**<0.00050**	-	-
Bismuth D-Bi	-	-	**<0.00050**	-	-
Boron D-B	-	-	0.014	-	-
Cadmium D-Cd	-	-	**<0.000020**	-	-
Calcium D-Ca	-	-	68.9	-	-
Chromium D-Cr	-	-	**<0.00050**	-	-
Cobalt D-Co	-	-	**<0.00010**	-	-
Copper D-Cu	-	-	0.00027	-	-
Iron D-Fe	-	-	**<0.030**	-	-
Lead D-Pb	-	-	**<0.000050**	-	-
Lithium D-Li	-	-	**<0.0050**	-	-
Magnesium D-Mg	-	-	9.45	-	-
Manganese D-Mn	-	-	**<0.000050**	-	-
Mercury D-Hg	-	-	**<0.000010**	-	-
Molybdenum D-Mo	-	-	0.00454	-	-
Nickel D-Ni	-	-	**<0.00050**	-	-
Phosphorus D-P	-	-	**<0.30**	-	-
Potassium D-K	-	-	0.521	-	-
Selenium D-Se	-	-	0.00259	-	-
Silicon D-Si	-	-	2.24	-	-
Silver D-Ag	-	-	**<0.000010**	-	-
Sodium D-Na	-	-	5.1	-	-
Strontium D-Sr	-	-	0.690	-	-
Thallium D-Tl	-	-	**<0.00010**	-	-
Tin D-Sn	-	-	**<0.00010**	-	-
Titanium D-Ti	-	-	**<0.010**	-	-
Uranium D-U	-	-	0.000448	-	-
Vanadium D-V	-	-	**<0.0010**	-	-
Zinc D-Zn	-	-	**<0.0010**	-	-
Organic Parameters					
Total Organic Carbon C	**<0.50**	**<0.50**	1.68	**<0.50**	-

Results are expressed as milligrams per litre except where noted. **(continued)**

< = Less than the detection limit indicated.

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	WC-1	HC-1	SKC-1	SKC-3	FIELD BLANK	MC-1	MC-2	MC-4	MC-5	TRAVEL BLANK
Date Sampled	4/6/2006	4/6/2006	4/6/2006	4/6/2006	4/6/2006	4/6/2006	4/6/2006	4/6/2006	4/6/2006	4/6/2006
Time Sampled										
ALS Sample ID	1	2	3	4	5	6	7	8	9	10
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests										
Colour (CU)	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**
Conductivity (uS/cm)	138	197	200	223	**<2.0**	601	470	379	251	**<2.0**
Total Dissolved Solids	95	114	120	137	20	350	251	212	147	12
Hardness CaCO3	58.2	104	107	124	**<0.54**	356	252	203	129	**<0.54**
pH	8.02	8.08	7.87	8.11	5.62	8.22	8.19	8.12	8.18	5.60
Total Suspended Solids	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	6.2	**<3.0**	19.7	**<3.0**
Turbidity (NTU)	1.80	0.49	0.20	0.69	**<0.10**	1.44	5.53	0.77	8.19	**<0.10**
Dissolved Anions										
Acidity (to pH 8.3) CaCO3	3.1	2.8	3.9	2.8	1.9	1.5	2.4	3.2	2.0	1.8
Alkalinity-Total CaCO3	65.0	81.3	70.4	115	**<2.0**	281	239	181	109	**<2.0**
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Chloride Cl	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	4.41	3.12	1.27	**<0.50**
Fluoride F	0.210	**<0.020**	0.028	0.040	**<0.020**	0.049	0.046	0.100	0.098	**<0.020**
Sulphate SO4	12.5	20.1	23.5	5.92	**<0.50**	75.7	25.3	25.3	16.5	**<0.50**
Nutrients										
Ammonia Nitrogen N	**<0.0050**	**<0.0050**	**<0.0050**	0.0287	0.0073	**<0.0050**	0.0100	**<0.0050**	**<0.0050**	0.0053
Total Kjeldahl Nitrogen N	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Nitrate Nitrogen N	0.0353	0.0609	0.0915	0.213	**<0.0050**	0.0123	0.111	0.119	0.0827	**<0.0050**
Nitrite Nitrogen N	0.0010	**<0.0010**	**<0.0010**	0.0027	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	0.0018
Total Nitrogen N	0.090	0.110	0.150	0.310	**<0.050**	**<0.050**	0.170	0.170	0.150	**<0.050**
Total Phosphate P	0.0244	**<0.0020**	**<0.0020**	**<0.0020**	**<0.0020**	0.0023	0.0117	**<0.0020**	0.0260	**<0.0020**
Cyanides										
Total Cyanide CN	**<0.0010**	**<0.0010**	**<0.0010**	0.0012	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Metals										
Aluminum T-Al	0.0898	0.0166	0.0034	0.0061	**<0.0010**	0.0087	0.0309	0.0096	0.166	**<0.0010**
Antimony T-Sb	**<0.00010**	0.00012	**<0.00010**	**<0.00010**	**<0.00010**	0.00466	0.00034	0.00023	0.00011	**<0.00010**
Arsenic T-As	0.00020	0.00130	0.00016	**<0.00010**	**<0.00010**	0.00059	0.00133	0.00062	0.00057	**<0.00010**
Barium T-Ba	0.00553	0.0402	0.0129	0.0101	**<0.000050**	0.0556	0.154	0.119	0.0835	**<0.000050**
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	0.012	0.015	**<0.010**	**<0.010**	**<0.010**	0.010	0.085	0.057	0.026	**<0.010**
Cadmium T-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	0.000023	**<0.000020**
Calcium T-Ca	14.0	32.6	39.4	40.4	**<0.050**	52.5	55.3	47.0	35.0	**<0.050**
Chromium T-Cr	**<0.00050**	0.00107	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Cobalt T-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00010	0.00036	**<0.00010**	0.00023	**<0.00010**
Copper T-Cu	0.00023	0.00044	0.00062	0.00020	**<0.00010**	0.00044	0.00062	0.00036	0.00105	**<0.00010**
Iron T-Fe	0.064	**<0.030**	**<0.030**	0.084	**<0.030**	**<0.030**	0.592	0.047	0.493	**<0.030**
Lead T-Pb	0.000054	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	0.000067	**<0.000050**	0.000245	**<0.000050**
Lithium T-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.0057	0.0086	0.0068	**<0.0050**	**<0.0050**
Magnesium T-Mg	5.89	5.84	2.35	5.90	**<0.10**	56.6	29.5	20.8	10.6	**<0.10**
Manganese T-Mn	0.00851	0.000635	0.00398	0.00188	**<0.000050**	0.00573	0.110	0.0343	0.0678	**<0.000050**
Mercury T-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum T-Mo	0.000990	0.000790	0.000812	0.000444	**<0.000050**	0.000728	0.00190	0.00137	0.00281	**<0.000050**
Nickel T-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00218	0.00505	0.00157	0.00076	**<0.00050**
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Selenium T-Se	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Silicon T-Si	10.5	2.16	2.41	3.77	**<0.050**	1.08	3.43	3.57	4.34	**<0.050**
Silver T-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	6.8	2.1	**<2.0**	**<2.0**	**<2.0**	3.6	10.5	9.2	5.7	**<2.0**
Strontium T-Sr	0.0597	0.120	0.0488	0.0664	**<0.00010**	0.314	0.278	0.211	0.151	**<0.00010**
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium T-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium T-U	0.000167	0.000043	0.000241	0.000206	**<0.000010**	0.000510	0.000175	0.000182	0.000688	**<0.000010**
Vanadium T-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc T-Zn	0.0017	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	0.0019	**<0.0010**
Dissolved Metals										
Aluminum D-Al	0.0232	0.0045	0.0015	0.0053	-	0.0014	0.0021	0.0034	0.0057	-
Antimony D-Sb	**<0.00010**	0.00012	**<0.00010**	**<0.00010**	-	0.00475	0.00033	0.00026	0.00010	-
Arsenic D-As	0.00018	0.00131	0.00014	**<0.00010**	-	0.00047	0.00066	0.00053	0.00031	-
Barium D-Ba	0.00488	0.0398	0.0130	0.00988	-	0.0537	0.148	0.121	0.0774	-
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Boron D-B	0.013	0.015	**<0.010**	**<0.010**	-	0.012	0.085	0.062	0.025	-
Cadmium D-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	-	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	-
Calcium D-Ca	13.8	32.1	39.2	40.0	-	51.0	53.2	47.1	34.5	-
Chromium D-Cr	**<0.00050**	0.00147	**<0.00050**	**<0.00050**	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-
Cobalt D-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	**<0.00010**	0.00023	**<0.00010**	**<0.00010**	-
Copper D-Cu	0.00020	0.00032	0.00045	0.00022	-	0.00035	0.00023	0.00046	0.00029	-
Iron D-Fe	**<0.030**	**<0.030**	**<0.030**	0.032	-	**<0.030**	**<0.030**	**<0.030**	**<0.030**	-
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	-	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	-
Lithium D-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	-	0.0051	0.0087	0.0066	**<0.0050**	-
Magnesium D-Mg	5.77	5.73	2.34	5.82	-	55.4	29.0	20.8	10.4	-
Manganese D-Mn	0.000928	0.000203	0.00366	0.000426	-	0.00372	0.0977	0.0327	0.0195	-
Mercury D-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-
Molybdenum D-Mo	0.00101	0.000839	0.000850	0.000444	-	0.000753	0.00204	0.00139	0.00302	-
Nickel D-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	0.00231	0.00444	0.00180	**<0.00050**	-
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	-	**<0.30**	**<0.30**	**<0.30**	**<0.30**	-
Potassium D-K	**<2.0**	**<2.0**	**<2.0**	**<2.0**	-	**<2.0**	**<2.0**	**<2.0**	**<2.0**	-
Selenium D-Se	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-
Silicon D-Si	10.2	2.10	2.39	3.67	-	1.06	3.30	3.54	4.10	-
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-
Sodium D-Na	6.7	2.1	**<2.0**	**<2.0**	-	3.5	10.4	9.3	5.7	-
Strontium D-Sr	0.0551	0.121	0.0496	0.0662	-	0.302	0.278	0.211	0.150	-
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	-	**<0.010**	**<0.010**	**<0.010**	**<0.010**	-
Uranium D-U	0.000164	0.000045	0.000245	0.000205	-	0.000532	0.000175	0.000184	0.000670	-
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-
Zinc D-Zn	**<0.0010**	**<0.0010**	0.0011	**<0.0010**	-	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-
Organic Parameters										
Total Organic Carbon C	0.58	**<0.50**	0.54	1.65	1.00	**<0.50**	0.58	0.66	0.81	**<0.50**

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	SC-1	SC-2-1	SC-2-2	SC-3	SC-4	SC-5
Date Sampled	4/6/2006	4/6/2006	4/6/2006	4/6/2006	4/6/2006	4/6/2006
Time Sampled						
ALS Sample ID	11	12	13	14	15	16
Nature	Water	Water	Water	Water	Water	Water
Physical Tests						
Colour (CU)	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**
Conductivity (uS/cm)	151	218	219	223	203	186
Total Dissolved Solids	91	129	127	133	119	113
Hardness CaCO3	71.9	117	117	118	108	97.2
pH	7.89	7.56	8.04	8.08	8.08	8.09
Total Suspended Solids	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	14.2
Turbidity (NTU)	1.56	0.74	0.80	1.58	1.62	3.80
Dissolved Anions						
Acidity (to pH 8.3) CaCO3	3.4	4.8	3.2	2.9	2.8	2.7
Alkalinity-Total CaCO3	61.5	101	97.4	107	95.1	103
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Chloride Cl	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**
Fluoride F	0.044	0.026	0.024	0.026	0.051	0.052
Sulphate SO4	20.8	18.0	17.8	17.1	14.5	12.0
Nutrients						
Ammonia Nitrogen N	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.0053
Total Kjeldahl Nitrogen N	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Nitrate Nitrogen N	0.0834	0.0500	0.0506	0.0641	0.0870	0.0868
Nitrite Nitrogen N	0.0010	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Nitrogen N	0.120	0.110	0.100	0.120	0.140	0.150
Total Phosphate P	0.0042	**<0.0020**	0.0020	0.0056	0.0062	0.0168
Cyanides						
Total Cyanide CN	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Metals						
Aluminum T-Al	0.0491	0.0182	0.0184	0.0319	0.0376	0.0698
Antimony T-Sb	0.00012	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic T-As	0.00031	0.00056	0.00057	0.00053	0.00044	0.00044
Barium T-Ba	0.0962	0.0821	0.0825	0.101	0.0987	0.0910
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	0.014	0.014	0.014	0.013	**<0.010**	**<0.010**
Cadmium T-Cd	**<0.000050**	0.000033	**<0.000020**	**<0.000020**	0.000036	**<0.000020**
Calcium T-Ca	22.4	38.0	37.5	38.7	35.3	32.2
Chromium T-Cr	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Cobalt T-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Copper T-Cu	0.00055	0.00055	0.00057	0.00070	0.00065	0.00082
Iron T-Fe	**<0.030**	0.082	0.090	0.063	0.079	0.365
Lead T-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	0.000054
Lithium T-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium T-Mg	4.63	6.39	6.31	6.26	5.35	4.74
Manganese T-Mn	0.00183	0.0356	0.0358	0.0358	0.0208	0.0594
Mercury T-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum T-Mo	0.0126	0.0114	0.0113	0.0109	0.00987	0.00511
Nickel T-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Selenium T-Se	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Silicon T-Si	1.19	2.60	2.59	2.61	2.55	2.96
Silver T-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	2.7	2.0	2.0	2.1	2.0	2.2
Strontium T-Sr	0.187	0.157	0.157	0.179	0.162	0.138
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium T-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium T-U	0.00111	0.000432	0.000430	0.000492	0.00127	0.00119
Vanadium T-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc T-Zn	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Dissolved Metals						
Aluminum D-Al	0.0211	0.0060	0.0045	0.0045	0.0054	0.0036
Antimony D-Sb	0.00012	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic D-As	0.00028	0.00046	0.00048	0.00047	0.00037	0.00024
Barium D-Ba	0.0944	0.0812	0.0829	0.0977	0.0966	0.0876
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron D-B	0.014	0.013	0.015	0.013	**<0.010**	**<0.010**
Cadmium D-Cd	**<0.000050**	0.000032	0.000026	0.000024	0.000030	**<0.000020**
Calcium D-Ca	21.6	36.8	36.8	37.3	34.7	31.4
Chromium D-Cr	**<0.00050**	0.00069	0.00066	0.00078	**<0.00050**	**<0.00050**
Cobalt D-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Copper D-Cu	0.00030	0.00040	0.00033	0.00039	0.00032	0.00030
Iron D-Fe	**<0.030**	**<0.030**	**<0.030**	**<0.030**	**<0.030**	0.037
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Lithium D-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium D-Mg	4.39	6.18	6.18	6.05	5.24	4.59
Manganese D-Mn	0.000477	0.0336	0.0342	0.0287	0.0159	0.0423
Mercury D-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum D-Mo	0.0127	0.0112	0.0117	0.0108	0.0101	0.00508
Nickel D-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium D-K	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Selenium D-Se	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Silicon D-Si	1.11	2.51	2.52	2.55	2.44	2.84
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium D-Na	2.5	**<2.0**	2.0	2.1	**<2.0**	2.1
Strontium D-Sr	0.184	0.154	0.159	0.176	0.163	0.137
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium D-U	0.00111	0.000433	0.000436	0.000494	0.00126	0.00116
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc D-Zn	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Organic Parameters						
Total Organic Carbon C	**<0.50**	0.51	**<0.50**	**<0.50**	0.53	0.84

Results are expressed as milligrams per litre except where noted. **(continued)**

< = Less than the detection limit indicated.

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	WC-1	HC-1	MC-5	FIELD BLANK	TRAVEL BLANK	SC-1	SC-2	SC-3	SC-4	MC-4
Date Sampled	9-May-06	9-May-06	9-May-06	9-May-06	9-May-06	9-May-06	9-May-06	9-May-06	9-May-06	9-May-06
Time Sampled										
ALS Sample ID	1	2	3	4	5	6	7	8	9	10
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests										
Colour (CU)	<5.0	<5.0	5.8	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	139	185	251	<2.0	<2.0	147	192	190	172	347
Total Dissolved Solids	95	108	141	<10	<10	86	110	112	100	192
Hardness CaCO3	56.3	91.4	118	<0.50	<0.50	71.0	94.6	92.7	83.8	160
pH	7.95	8.08	8.18	6.11	5.96	7.98	8.11	8.12	8.10	8.09
Total Suspended Solids	3.0	<3.0	9.5	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	<3.0
Turbidity (NTU)	1.46	0.60	4.02	<0.10	<0.10	0.75	1.64	1.17	1.34	2.90
Dissolved Anions										
Acidity (to pH 8.3) CaCO3	1.6	1.4	1.2	1.5	1.5	1.4	1.2	1.2	1.3	1.9
Alkalinity-Total CaCO3	60.8	84.0	115	<2.0	<2.0	57.0	86.2	88.2	84.2	160
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	<0.50	<0.50	1.78	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.54
Fluoride F	0.210	<0.020	0.081	<0.020	<0.020	0.040	0.022	0.025	0.050	0.083
Sulphate SO4	12.4	17.1	16.2	<0.50	<0.50	18.6	15.6	13.6	11.2	24.5
Nutrients										
Ammonia Nitrogen N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0060
Total Kjeldahl Nitrogen N	0.080	0.068	0.073	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrate Nitrogen N	<0.0050	0.0414	0.0722	<0.0050	<0.0050	0.101	0.0398	0.0432	0.0720	0.0910
Nitrite Nitrogen N	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Nitrogen N	0.080	0.110	0.160	<0.050	<0.050	0.140	0.100	0.120	0.140	0.160
Total Phosphate P	0.0193	0.0023	0.0113	<0.0020	<0.0020	0.0024	0.0053	0.0047	0.0045	0.0095
Cyanides										
Total Cyanide CN	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.0014	0.0010	0.0011
Total Metals										
Aluminum T-Al	0.0686	0.0252	0.0720	<0.0010	<0.0010	0.0350	0.0318	0.0306	0.0464	0.0289
Antimony T-Sb	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00023
Arsenic T-As	0.00019	0.00120	0.00067	<0.00010	<0.00010	0.00027	0.00059	0.00052	0.00044	0.00112
Barium T-Ba	0.00573	0.0381	0.0888	<0.000050	<0.000050	0.0994	0.0728	0.0832	0.0853	0.115
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	0.012	0.011	0.038	<0.010	<0.010	0.013	0.011	0.010	<0.010	0.079
Cadmium T-Cd	<0.000020	<0.000020	0.000021	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000022	<0.000020
Calcium T-Ca	13.5	27.8	31.5	<0.020	<0.020	21.0	29.9	29.7	27.7	37.6
Chromium T-Cr	<0.00050	0.00080	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt T-Co	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011
Copper T-Cu	0.00033	0.00091	0.00099	<0.00010	<0.00010	0.00074	0.00127	0.00128	0.00110	0.00060
Iron T-Fe	0.094	0.030	0.383	<0.030	<0.030	<0.030	0.114	0.102	0.121	0.275
Lead T-Pb	<0.000050	<0.000050	0.000091	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000055
Lithium T-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0078
Magnesium T-Mg	5.42	4.86	9.89	<0.0050	<0.0050	3.91	4.78	4.56	3.95	15.6
Manganese T-Mn	0.0101	0.00168	0.0554	<0.000050	<0.000050	0.00109	0.0337	0.0429	0.0270	0.0411
Mercury T-Hg	0.000021	<0.000010	0.000020	<0.000010	<0.000010	<0.000010	<0.000010	0.000022	<0.000010	0.000021
Molybdenum T-Mo	0.000959	0.000664	0.00281	<0.000050	<0.000050	0.0108	0.0120	0.0111	0.00954	0.00117
Nickel T-Ni	<0.00050	<0.00050	0.00093	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00172
Phosphorus T-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium T-K	1.88	0.501	0.973	<0.050	<0.050	0.633	0.674	0.642	0.646	0.986
Selenium T-Se	<0.00050	0.00054	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon T-Si	9.85	2.14	3.43	<0.050	<0.050	1.26	2.28	2.44	2.44	3.23
Silver T-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium T-Na	6.3	<2.0	5.5	<2.0	<2.0	2.1	<2.0	2.1	<2.0	9.4
Strontium T-Sr	0.0598	0.116	0.158	<0.00010	<0.00010	0.186	0.140	0.155	0.140	0.199
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium T-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium T-U	0.000177	0.000037	0.000538	<0.000010	<0.000010	0.00104	0.000361	0.000420	0.00115	0.000158
Vanadium T-V	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc T-Zn	0.0014	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Metals										
Aluminum D-Al	0.0138	0.0038	0.0049	-	-	0.0148	0.0074	0.0065	0.0075	0.0021
Antimony D-Sb	<0.00010	0.00011	0.00012	-	-	0.00010	<0.00010	<0.00010	<0.00010	0.00024
Arsenic D-As	0.00017	0.00116	0.00044	-	-	0.00029	0.00053	0.00043	0.00037	0.00071
Barium D-Ba	0.00526	0.0382	0.0858	-	-	0.101	0.0721	0.0795	0.0830	0.115
Beryllium D-Be	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron D-B	0.012	0.012	0.037	-	-	0.013	0.012	0.010	<0.010	0.081
Cadmium D-Cd	<0.000020	<0.000020	<0.000020	-	-	<0.000020	<0.000020	<0.000020	0.000025	<0.000020
Calcium D-Ca	13.6	28.5	31.2	-	-	21.8	30.0	29.9	27.2	38.2
Chromium D-Cr	<0.00050	0.00073	<0.00050	-	-	<0.00050	0.00052	<0.00050	<0.00050	<0.00050
Cobalt D-Co	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper D-Cu	0.00024	0.00072	0.00052	-	-	0.00057	0.00096	0.00092	0.00081	0.00040
Iron D-Fe	<0.030	<0.030	0.070	-	-	<0.030	0.036	0.041	0.038	<0.030
Lead D-Pb	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium D-Li	<0.0050	<0.0050	<0.0050	-	-	<0.0050	<0.0050	<0.0050	<0.0050	0.0080
Magnesium D-Mg	5.41	4.91	9.80	-	-	4.04	4.79	4.41	3.85	15.8
Manganese D-Mn	0.00199	0.000738	0.0347	-	-	0.000371	0.0270	0.0283	0.0212	0.0347
Mercury D-Hg	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum D-Mo	0.00104	0.000694	0.00291	-	-	0.0114	0.0124	0.0112	0.00951	0.00130
Nickel D-Ni	<0.00050	<0.00050	0.00058	-	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00157
Phosphorus D-P	<0.30	<0.30	<0.30	-	-	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium D-K	1.88	0.507	0.949	-	-	0.654	0.665	0.636	0.630	0.999
Selenium D-Se	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon D-Si	9.86	2.01	3.57	-	-	1.17	2.21	2.43	2.35	3.06
Silver D-Ag	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium D-Na	6.3	<2.0	6.0	-	-	<2.0	<2.0	<2.0	<2.0	9.4
Strontium D-Sr	0.0597	0.115	0.159	-	-	0.190	0.141	0.149	0.140	0.201
Thallium D-Tl	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin D-Sn	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium D-Ti	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium D-U	0.000171	0.000039	0.000530	-	-	0.00108	0.000366	0.000418	0.00116	0.000158
Vanadium D-V	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc D-Zn	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	0.0023	<0.0010
Organic Parameters										
Chemical Oxygen Demand COD	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	MC-2	MC-1-1	MC-1-2	SKC-1	SKC-3	SC-5	SKC-2
Date Sampled	9-May-06	9-May-06	9-May-06	9-May-06	9-May-06	9-May-06	9-May-06
Time Sampled							
ALS Sample ID	11	12	13	14	15	16	17
Nature	Water	Water	Water	Water	Water	Water	Water
Physical Tests							
Colour (CU)	**<5.0**	**<5.0**	**<5.0**	6.6	13.8	10.6	11.5
Conductivity (uS/cm)	363	464	465	158	178	157	178
Total Dissolved Solids	198	256	261	93	105	95	102
Hardness CaCO3	180	263	258	77.5	90.7	76.2	87.9
pH	8.18	8.31	8.31	7.97	8.10	8.11	7.96
Total Suspended Solids	7.5	5.5	3.5	**<3.0**	**<3.0**	7.0	**<3.0**
Turbidity (NTU)	4.51	7.13	5.42	0.85	1.01	3.87	0.82
Dissolved Anions							
Acidity (to pH 8.3) CaCO3	1.4	**<1.0**	**<1.0**	1.5	1.3	1.2	1.5
Alkalinity-Total CaCO3	191	231	219	66.9	98.1	79.6	70.7
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Chloride Cl	2.80	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**
Fluoride F	0.033	0.042	0.041	0.023	0.024	0.044	0.030
Sulphate SO4	16.9	51.7	51.7	12.9	3.32	8.27	16.4
Nutrients							
Ammonia Nitrogen N	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.0080	**<0.0050**
Total Kjeldahl Nitrogen N	**<0.050**	**<0.050**	**<0.050**	0.099	0.120	0.053	0.069
Nitrate Nitrogen N	0.109	0.0663	0.0656	0.0085	0.176	0.0703	0.0687
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	0.0010	0.0011
Total Nitrogen N	0.180	0.110	0.100	0.090	0.310	0.160	0.200
Total Phosphate P	0.0081	0.0068	0.0033	0.0032	0.0043	0.0108	0.0047
Cyanides							
Total Cyanide CN	0.0015	**<0.0010**	**<0.0010**	0.0022	0.0034	0.0030	0.0037
Total Metals							
Aluminum T-Al	0.0256	0.0802	0.0418	0.0124	0.0242	0.0870	0.0151
Antimony T-Sb	0.00026	0.00278	0.00278	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic T-As	0.00134	0.00065	0.00064	0.00034	**<0.00010**	0.00051	0.00026
Barium T-Ba	0.141	0.0552	0.0567	0.00957	0.00876	0.0861	0.0118
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	0.056	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Cadmium T-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium T-Ca	40.2	38.8	39.9	28.0	29.4	26.0	27.3
Chromium T-Cr	**<0.00050**	**<0.00050**	**<0.0010**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Cobalt T-Co	0.00035	0.00012	0.00012	**<0.00010**	**<0.00010**	0.00014	**<0.00010**
Copper T-Cu	0.00065	0.00067	0.00063	0.00082	0.00033	0.00141	0.00086
Iron T-Fe	0.685	0.074	0.079	0.153	0.137	0.594	0.212
Lead T-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	0.000064	**<0.000050**
Lithium T-Li	0.0054	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium T-Mg	19.6	38.0	38.7	2.46	4.34	3.62	4.29
Manganese T-Mn	0.111	0.00655	0.00657	0.0177	0.0106	0.0915	0.0239
Mercury T-Hg	**<0.000010**	**<0.000010**	0.000022	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum T-Mo	0.00128	0.000886	0.000874	0.000645	0.000279	0.00501	0.000652
Nickel T-Ni	0.00367	0.00183	0.00196	**<0.00050**	**<0.00050**	0.00050	0.00088
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	0.856	1.40	1.43	0.484	0.493	0.703	0.581
Selenium T-Se	0.00056	0.00060	**<0.00050**	0.00069	**<0.00050**	**<0.00050**	0.00071
Silicon T-Si	2.71	1.27	1.29	2.49	3.12	2.90	3.43
Silver T-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	5.7	2.2	2.1	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Strontium T-Sr	0.203	0.274	0.281	0.0431	0.0498	0.126	0.0625
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium T-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium T-U	0.000123	0.000380	0.000368	0.000154	0.000150	0.000982	0.000111
Vanadium T-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc T-Zn	**<0.0010**	**<0.0010**	0.0010	**<0.0010**	0.0013	**<0.0010**	**<0.0010**
Dissolved Metals							
Aluminum D-Al	0.0012	0.0012	0.0020	0.0039	0.0057	0.0090	0.0067
Antimony D-Sb	0.00025	0.00279	0.00274	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic D-As	0.00069	0.00043	0.00041	0.00027	**<0.00010**	0.00035	0.00024
Barium D-Ba	0.137	0.0556	0.0549	0.00915	0.00852	0.0804	0.0118
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron D-B	0.057	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Cadmium D-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium D-Ca	40.0	40.6	39.8	27.1	29.2	24.8	28.0
Chromium D-Cr	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Cobalt D-Co	0.00020	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Copper D-Cu	0.00036	0.00030	0.00048	0.00075	0.00028	0.00076	0.00049
Iron D-Fe	**<0.030**	**<0.030**	**<0.030**	0.066	0.063	0.237	0.133
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Lithium D-Li	0.0054	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium D-Mg	19.6	39.3	38.4	2.37	4.33	3.46	4.36
Manganese D-Mn	0.0871	0.00147	0.00182	0.00638	0.000997	0.0645	0.00947
Mercury D-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum D-Mo	0.00141	0.00103	0.00102	0.000658	0.000280	0.00494	0.000631
Nickel D-Ni	0.00305	0.00166	0.00174	**<0.00050**	**<0.00050**	**<0.00050**	0.00085
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium D-K	0.864	1.45	1.40	0.464	0.482	0.669	0.588
Selenium D-Se	0.00059	0.00054	**<0.00050**	0.00069	**<0.00050**	**<0.00050**	0.00072
Silicon D-Si	2.70	1.19	1.33	2.43	3.08	2.66	3.58
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium D-Na	5.6	2.1	2.3	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Strontium D-Sr	0.204	0.289	0.278	0.0424	0.0500	0.122	0.0639
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium D-U	0.000126	0.000392	0.000372	0.000148	0.000142	0.000926	0.000118
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc D-Zn	**<0.0010**	**<0.0010**	0.0028	0.0037	0.0014	**<0.0010**	**<0.0010**
Organic Parameters							
Chemical Oxygen Demand COD	**<20**	**<20**	**<20**	**<20**	20	**<20**	**<20**

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	SC-1	SC-2	SC-3	SC-4	SC-5	SKC-1	SKC-2	SKC-3	MT-1	MC-1
Date Sampled	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06
Time Sampled										
ALS Sample ID	1	2	3	4	5	6	7	8	9	10
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests										
Colour (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	11.3	12.4	9.5	<5.0
Conductivity (uS/cm)	72.1	129	129	116	104	159	185	180	92.1	54.1
Total Dissolved Solids	77	83	83	81	68	96	112	105	57	36
Hardness CaCO3	34.7	62.2	62.5	55.8	49.8	77.7	91.3	89.1	45.7	26.3
pH	6.65	7.76	8.02	8.13	8.13	8.05	8.08	8.16	8.23	8.31
Total Suspended Solids	41.5	13.0	16.0	98.5	86.0	4.0	<3.0	<3.0	3.0	14.0
Turbidity (NTU)	63.2	25.3	23.2	58.8	38.8	1.34	0.39	0.36	5.02	8.54
Dissolved Anions										
Acidity (to pH 8.3) CaCO3	14.6	11.9	6.7	4.7	4.4	6.3	5.7	4.3	2.8	<1.0
Alkalinity-Total CaCO3	36.7	76.3	62.8	56.9	47.8	66.2	82.3	95.0	46.5	27.4
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride F	0.020	<0.020	<0.020	0.049	0.041	0.023	0.032	0.033	<0.020	<0.020
Sulphate SO4	3.77	8.19	7.69	6.19	5.23	17.5	16.6	2.77	1.30	2.13
Nutrients										
Ammonia Nitrogen N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl Nitrogen N	<0.050	<0.050	<0.050	0.067	<0.050	<0.050	0.055	0.151	0.083	<0.050
Nitrate Nitrogen N	0.0538	0.0578	0.0806	0.0936	0.0835	0.114	0.115	0.231	0.0223	0.0185
Nitrite Nitrogen N	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	<0.0010
Total Nitrogen N	0.130	0.100	0.140	0.130	0.150	0.180	0.210	0.330	0.060	<0.050
Total Phosphate P	0.0553	0.0215	0.0230	0.0330	0.0928	0.0037	0.0028	0.0025	0.0089	0.0181
Cyanides										
Total Cyanide CN	<0.0010	0.0014	<0.0010	0.0010	<0.0010	<0.0010	0.0022	0.0026	<0.0010	<0.0010
Total Metals										
Aluminum T-Al	3.08	1.09	0.859	2.52	1.75	0.0499	0.0102	0.0116	0.117	0.147
Antimony T-Sb	0.00017	0.00013	0.00010	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic T-As	0.00071	0.00118	0.00096	0.00124	0.00097	0.00044	0.00025	<0.00010	0.00024	<0.00010
Barium T-Ba	0.0948	0.0622	0.0733	0.0995	0.0824	0.00994	0.0105	0.00832	0.00811	0.0315
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium T-Cd	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Calcium T-Ca	13.0	21.9	21.9	20.9	18.5	27.7	29.8	29.4	17.2	6.95
Chromium T-Cr	0.00170	0.00237	0.00170	0.00262	0.00225	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt T-Co	0.00127	0.00103	0.00077	0.00133	0.00108	<0.00010	<0.00010	<0.00010	0.00013	0.00016
Copper T-Cu	0.00824	0.00544	0.00457	0.00774	0.00603	0.00142	0.00075	0.00042	0.00231	0.00097
Iron T-Fe	2.21	1.11	0.802	2.25	1.80	0.098	0.051	0.045	0.102	0.203
Lead T-Pb	0.000655	0.000279	0.000241	0.000916	0.000669	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium T-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium T-Mg	2.99	4.08	3.78	3.69	3.09	1.98	4.26	4.13	0.950	2.27
Manganese T-Mn	0.0725	0.0455	0.0403	0.0852	0.0772	0.0106	0.00745	0.00586	0.00831	0.0188
Mercury T-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum T-Mo	0.00305	0.00351	0.00366	0.00477	0.00278	0.000836	0.000703	0.000295	0.000447	0.000141
Nickel T-Ni	0.00124	0.00220	0.00178	0.00251	0.00236	<0.00050	0.00066	<0.00050	<0.00050	<0.00050
Phosphorus T-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium T-K	1.25	0.741	0.700	1.20	0.913	0.337	0.445	0.364	0.247	0.164
Selenium T-Se	0.00551	0.00389	0.00409	0.00588	0.00565	0.00376	0.00313	0.00232	0.00202	0.00173
Silicon T-Si	5.95	3.48	2.97	6.19	4.92	2.26	3.10	2.84	2.09	1.43
Silver T-Ag	0.000021	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium T-Na	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium T-Sr	0.0931	0.105	0.113	0.109	0.0910	0.0458	0.0611	0.0504	0.0340	0.0371
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium T-Ti	0.126	0.043	0.032	0.118	0.080	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium T-U	0.000486	0.000261	0.000346	0.00122	0.00103	0.000223	0.000141	0.000145	0.000021	0.000028
Vanadium T-V	0.0072	0.0037	0.0028	0.0051	0.0043	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc T-Zn	0.0128	0.0060	<0.0050	0.0072	0.0057	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Metals										
Aluminum D-Al	0.375	0.0746	0.0636	0.235	0.0749	0.0036	0.0071	0.0068	0.0213	0.0142
Antimony D-Sb	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic D-As	0.00029	0.00073	0.00063	0.00060	0.00037	0.00032	0.00022	<0.00010	0.00019	<0.00010
Barium D-Ba	0.0534	0.0492	0.0598	0.0593	0.0523	0.00963	0.0103	0.00790	0.00710	0.0273
Beryllium D-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron D-B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium D-Cd	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Calcium D-Ca	10.8	19.7	19.9	18.2	16.4	27.9	29.6	29.0	16.9	6.86
Chromium D-Cr	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00079	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt D-Co	0.00011	<0.00010	<0.00010	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper D-Cu	0.00117	0.00113	0.00110	0.00126	0.00094	0.00091	0.00068	0.00038	0.00147	0.00025
Iron D-Fe	0.126	0.063	0.059	0.125	0.069	<0.030	<0.030	<0.030	<0.030	<0.030
Lead D-Pb	0.000077	<0.000050	<0.000050	0.000060	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium D-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium D-Mg	1.88	3.19	3.09	2.54	2.14	1.95	4.22	4.06	0.843	2.22
Manganese D-Mn	0.0132	0.00791	0.00902	0.0132	0.00501	0.00227	0.00220	0.000528	0.000653	0.00190
Mercury D-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum D-Mo	0.00279	0.00329	0.00339	0.00433	0.00260	0.000898	0.000722	0.000308	0.000496	0.000215
Nickel D-Ni	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00061	0.00060	<0.00050	<0.00050	<0.00050
Phosphorus D-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium D-K	0.506	0.502	0.503	0.558	0.436	0.334	0.441	0.352	0.235	0.146
Selenium D-Se	0.00402	0.00269	0.00308	0.00341	0.00325	0.00358	0.00338	0.00217	0.00219	0.00180
Silicon D-Si	1.07	1.68	1.80	1.89	1.93	2.14	3.04	2.77	1.89	1.28
Silver D-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium D-Na	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium D-Sr	0.0754	0.0964	0.103	0.0938	0.0787	0.0458	0.0606	0.0493	0.0332	0.0370
Thallium D-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin D-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium D-U	0.000360	0.000221	0.000297	0.000945	0.000758	0.000220	0.000140	0.000145	0.000018	0.000016
Vanadium D-V	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc D-Zn	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic Parameters										
Chemical Oxygen Demand COD	<20	<20	<20	27	23	23	25	<20	<20	<20

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	MC-2-1	MC-2-2	MC-5	TRAVEL	FIELD	HC-1	WC-1
Date Sampled	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06	6-Jun-06
Time Sampled							
ALS Sample ID	11	12	13	14	15	16	17
Nature	Water	Water	Water	Water	Water	Water	Water
Physical Tests							
Colour (CU)	<5.0	<5.0	6.6	<5.0	<5.0	<5.0	5.7
Conductivity (uS/cm)	193	193	126	<2.0	<2.0	126	61.4
Total Dissolved Solids	110	107	78	<10	<10	82	50
Hardness CaCO3	93.4	94.8	59.7	<0.50	<0.50	61.4	22.9
pH	8.10	8.12	8.20	5.62	5.62	8.19	8.27
Total Suspended Solids	74.5	86.5	73.5	<3.0	<3.0	13.5	30.0
Turbidity (NTU)	50.0	46.7	4.17	<0.10	<0.10	25.7	12.4
Dissolved Anions							
Acidity (to pH 8.3) CaCO3	4.6	4.6	3.6	3.6	3.6	3.5	2.3
Alkalinity-Total CaCO3	96.5	96.4	61.6	<2.0	<2.0	58.1	25.2
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	0.68	0.69	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride F	0.022	0.024	0.058	<0.020	<0.020	<0.020	0.124
Sulphate SO4	9.73	9.84	6.93	<0.50	<0.50	8.83	6.97
Nutrients							
Ammonia Nitrogen N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl Nitrogen N	<0.050	<0.050	0.062	<0.050	<0.050	0.054	0.062
Nitrate Nitrogen N	0.102	0.102	0.0827	<0.0050	<0.0050	0.0613	0.0273
Nitrite Nitrogen N	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Nitrogen N	0.170	0.140	0.170	<0.050	<0.050	0.090	0.090
Total Phosphate P	0.109	0.127	0.0268	<0.0020	<0.0020	0.0260	0.0374
Cyanides							
Total Cyanide CN	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0084	<0.0010
Total Metals							
Aluminum T-Al	1.26	1.38	1.20	<0.0010	<0.0010	1.12	0.892
Antimony T-Sb	0.00073	0.00076	0.00017	<0.00010	<0.00010	0.00012	0.00017
Arsenic T-As	0.00410	0.00443	0.00123	<0.00010	<0.00010	0.00172	0.00042
Barium T-Ba	0.101	0.102	0.0726	<0.000050	<0.000050	0.0361	0.0130
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	0.015	0.016	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium T-Cd	0.000025	0.000034	0.000025	<0.000020	<0.000020	0.000021	0.000056
Calcium T-Ca	25.4	25.4	19.3	<0.020	<0.020	21.6	6.96
Chromium T-Cr	0.00319	0.00336	0.00161	<0.00050	<0.00050	0.00352	<0.00070
Cobalt T-Co	0.00188	0.00200	0.00096	<0.00010	<0.00010	0.00146	0.00055
Copper T-Cu	0.00528	0.00548	0.00706	<0.00010	<0.00010	0.00574	0.00121
Iron T-Fe	3.01	3.23	1.49	0.089	<0.030	1.28	1.29
Lead T-Pb	0.000688	0.000707	0.000696	<0.000050	<0.000050	0.000239	0.000640
Lithium T-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium T-Mg	12.1	12.3	4.85	<0.0050	<0.0050	4.55	2.48
Manganese T-Mn	0.104	0.104	0.0793	<0.000050	<0.000050	0.0384	0.0885
Mercury T-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum T-Mo	0.000901	0.000945	0.00198	<0.000050	<0.000050	0.000677	0.000589
Nickel T-Ni	0.00618	0.00654	0.00532	<0.00050	<0.00050	0.00295	0.00140
Phosphorus T-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium T-K	1.08	1.13	0.907	<0.050	<0.050	0.590	1.44
Selenium T-Se	0.00355	<0.00050	0.00051	<0.00050	<0.00050	<0.00050	<0.00050
Silicon T-Si	3.35	3.62	4.28	<0.050	<0.050	3.46	8.27
Silver T-Ag	0.000013	0.000021	0.000013	<0.000010	<0.000010	<0.000010	0.000027
Sodium T-Na	2.0	2.0	2.2	<2.0	<2.0	<2.0	2.5
Strontium T-Sr	0.131	0.131	0.0927	<0.00010	<0.00010	0.0948	0.0290
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	<0.00030	<0.00030	<0.00030	<0.00010	<0.00010	<0.00030	<0.00030
Titanium T-Ti	0.032	0.036	0.050	<0.010	<0.010	0.047	0.038
Uranium T-U	0.000110	0.000108	0.000638	<0.000010	<0.000010	0.000038	0.000153
Vanadium T-V	0.0049	0.0056	0.0030	<0.0010	<0.0010	0.0045	0.0021
Zinc T-Zn	0.0064	0.0066	0.0077	<0.0010	<0.0010	<0.0050	0.0132
Dissolved Metals							
Aluminum D-Al	0.0179	0.0259	0.0756	-	-	0.0596	0.0900
Antimony D-Sb	0.00036	0.00035	0.00010	-	-	<0.00010	<0.00010
Arsenic D-As	0.00040	0.00044	0.00042	-	-	0.00122	0.00010
Barium D-Ba	0.0672	0.0690	0.0491	-	-	0.0280	0.00282
Beryllium D-Be	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050
Boron D-B	0.013	0.013	<0.010	-	-	<0.010	<0.010
Cadmium D-Cd	<0.000020	<0.000020	<0.000020	-	-	<0.000020	<0.000020
Calcium D-Ca	21.3	21.6	17.3	-	-	19.3	5.77
Chromium D-Cr	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050
Cobalt D-Co	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010
Copper D-Cu	0.00052	0.00061	0.00091	-	-	0.00115	0.00036
Iron D-Fe	<0.030	0.043	0.084	-	-	0.066	0.084
Lead D-Pb	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050
Lithium D-Li	<0.0050	<0.0050	<0.0050	-	-	<0.0050	<0.0050
Magnesium D-Mg	9.78	9.96	4.02	-	-	3.23	2.06
Manganese D-Mn	0.0114	0.0108	0.00686	-	-	0.00313	0.0216
Mercury D-Hg	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010
Molybdenum D-Mo	0.000824	0.000816	0.00186	-	-	0.000685	0.000432
Nickel D-Ni	0.00101	0.00104	<0.00050	-	-	<0.00050	<0.00050
Phosphorus D-P	<0.30	<0.30	<0.30	-	-	<0.30	<0.30
Potassium D-K	0.508	0.515	0.558	-	-	0.401	1.18
Selenium D-Se	0.00159	0.00129	<0.00050	-	-	<0.00050	<0.00050
Silicon D-Si	1.64	1.73	2.51	-	-	1.59	6.71
Silver D-Ag	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010
Sodium D-Na	<2.0	2.1	<2.0	-	-	<2.0	2.3
Strontium D-Sr	0.114	0.115	0.0834	-	-	0.0846	0.0225
Thallium D-Tl	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010
Tin D-Sn	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010
Titanium D-Ti	<0.010	<0.010	<0.010	-	-	<0.010	<0.010
Uranium D-U	0.000078	0.000079	0.000500	-	-	0.000027	0.000044
Vanadium D-V	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010
Zinc D-Zn	<0.0010	<0.0010	<0.0010	-	-	<0.0010	0.0015
Organic Parameters							
Chemical Oxygen Demand COD	<20	<20	21	<20	<20	26	<20

Results are expressed as milligrams per litre except where noted. **(continued)**

< = Less than the detection limit indicated.

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	MC-5	SC-5	MC-1	MC-2	SC-1	SC-2	SC-3	SC-4	SKC-1	SKC-2
Date Sampled	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06
Time Sampled										
ALS Sample ID	1	2	3	4	5	6	7	8	9	10
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests										
Colour (CU)	<5.0	<5.0	<5.0	<5.0	6.8	<5.0	<5.0	<5.0	<5.0	6.8
Conductivity (uS/cm)	103	81.9	83.8	172	64.5	86.8	91.6	80.9	147	208
Total Dissolved Solids	76	68	50	99	89	86	85	66	88	126
Hardness CaCO3	48.2	39.3	40.7	83.8	31.8	42.9	44.7	38.7	68.6	98.9
pH	8.15	8.03	8.00	8.15	8.02	8.01	8.00	7.95	7.98	8.13
Total Suspended Solids	188	246	45.5	148	461	281	294	282	6.5	<3.0
Turbidity (NTU)	97.1	132	31.1	96.4	359	174	166	169	4.32	0.49
Dissolved Anions										
Acidity (to pH 8.3) CaCO3	<1.0	1.0	<1.0	<1.0	1.1	1.2	1.3	1.4	1.4	1.1
Alkalinity-Total CaCO3	43.8	35.1	39.2	89.6	25.9	38.7	40.3	36.6	49.3	90.6
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride F	0.057	0.035	<0.020	0.021	<0.020	<0.020	<0.020	0.032	0.022	0.037
Sulphate SO4	5.86	3.75	5.37	10.2	2.21	4.10	4.54	4.13	21.0	19.1
Nutrients										
Ammonia Nitrogen N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl Nitrogen N	0.054	0.094	<0.050	0.080	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrate Nitrogen N	0.0263	0.0255	0.0061	0.0301	0.0243	0.0190	0.0205	0.0252	0.0384	0.0885
Nitrite Nitrogen N	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	0.0015	0.0010	0.0012	<0.0010
Total Nitrogen N	0.080	0.120	<0.050	0.110	<0.050	<0.050	0.060	0.060	0.100	0.160
Total Phosphate P	0.0363	0.0267	0.0095	0.0233	0.0536	0.0609	0.0399	0.0848	0.0076	0.0037
Cyanides										
Total Cyanide CN	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012
Total Metals										
Aluminum T-Al	4.39	4.90	0.497	2.11	12.7	6.67	6.85	5.77	0.113	0.0070
Antimony T-Sb	0.00024	0.00013	0.00013	0.00077	0.00027	0.00017	0.00017	0.00015	0.00010	<0.00010
Arsenic T-As	0.00225	0.00217	0.00137	0.00501	0.00326	0.00292	0.00353	0.00294	0.00069	0.00037
Barium T-Ba	0.0911	0.109	0.0487	0.114	0.297	0.142	0.156	0.124	0.0101	0.0122
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium T-Cd	0.000058	0.000032	<0.000020	0.000056	0.000097	0.000049	0.000062	0.000050	<0.000020	<0.000020
Calcium T-Ca	15.7	16.1	10.1	24.0	22.3	17.6	22.6	16.6	24.8	32.5
Chromium T-Cr	0.00608	0.00656	0.00159	0.00494	0.00843	0.00794	0.00944	0.00871	<0.00050	<0.00050
Cobalt T-Co	0.00282	0.00311	0.00068	0.00317	0.00679	0.00440	0.00514	0.00418	0.00015	<0.00010
Copper T-Cu	0.0114	0.0146	0.00149	0.00811	0.0402	0.0223	0.0273	0.0205	0.00142	0.00096
Iron T-Fe	4.28	4.23	0.723	4.48	10.5	5.99	6.55	5.56	0.142	0.052
Lead T-Pb	0.00145	0.00150	0.000284	0.00123	0.00391	0.00245	0.00217	0.00185	0.000099	<0.000050
Lithium T-Li	<0.0050	<0.0050	<0.0050	<0.0050	0.0068	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium T-Mg	5.27	4.09	4.83	11.5	6.97	5.37	5.99	5.07	1.58	4.44
Manganese T-Mn	0.156	0.166	0.0325	0.196	0.453	0.219	0.288	0.210	0.0135	0.0118
Mercury T-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum T-Mo	0.00150	0.00185	0.000438	0.000695	0.00187	0.00182	0.00206	0.00269	0.000845	0.000721
Nickel T-Ni	0.00615	0.00573	0.00268	0.0109	0.00679	0.00677	0.0238	0.00768	<0.00050	<0.00050
Phosphorus T-P	<0.30	<0.30	<0.30	<0.30	0.86	0.38	0.60	0.33	<0.30	<0.30
Potassium T-K	1.45	1.51	0.392	1.32	3.47	1.89	1.95	1.63	0.247	0.384
Selenium T-Se	<0.00050	0.00051	<0.00050	0.00090	<0.00050	<0.00050	<0.00050	0.00099	<0.00050	<0.00050
Silicon T-Si	8.96	9.40	1.42	4.65	17.9	11.9	12.1	10.3	1.75	3.07
Silver T-Ag	<0.000030	<0.000030	<0.000010	<0.000030	<0.000050	<0.000030	<0.000030	<0.000030	<0.000010	<0.000010
Sodium T-Na	2.0	<2.0	<2.0	2.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium T-Sr	0.0784	0.0816	0.0670	0.116	0.125	0.0976	0.111	0.0910	0.0415	0.0645
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium T-Ti	0.223	0.240	0.011	0.064	0.530	0.327	0.337	0.306	<0.010	<0.010
Uranium T-U	0.000604	0.00103	0.000057	0.000119	0.00112	0.000537	0.000592	0.000881	0.000274	0.000148
Vanadium T-V	0.0114	0.0132	0.0023	0.0082	0.0308	0.0181	0.0201	0.0164	<0.0010	<0.0010
Zinc T-Zn	0.134	0.0138	0.0017	0.0119	0.0305	0.0181	0.0213	0.0175	0.0014	<0.0010
Dissolved Metals										
Aluminum D-Al	0.187	0.307	0.0300	0.0617	0.406	0.383	0.320	0.346	0.0085	0.0039
Antimony D-Sb	0.00011	<0.00010	<0.00010	0.00036	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic D-As	0.00048	0.00051	0.00028	0.00054	0.00045	0.00083	0.00083	0.00079	0.00052	0.00033
Barium D-Ba	0.0452	0.0469	0.0341	0.0652	0.0668	0.0564	0.0551	0.0477	0.00939	0.0121
Beryllium D-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron D-B	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium D-Cd	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Calcium D-Ca	14.0	13.1	9.33	19.1	10.6	14.0	14.7	12.8	25.0	32.3
Chromium D-Cr	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt D-Co	<0.00010	0.00010	<0.00010	<0.00010	0.00013	0.00015	0.00011	0.00013	<0.00010	<0.00010
Copper D-Cu	0.00074	0.00106	0.00023	0.00036	0.00109	0.00132	0.00116	0.00118	0.00040	0.00043
Iron D-Fe	0.099	0.154	<0.030	0.034	0.156	0.145	0.136	0.148	<0.030	<0.030
Lead D-Pb	0.000056	0.000085	<0.000050	<0.000050	0.000082	0.000083	0.000068	0.000084	<0.000050	<0.000050
Lithium D-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium D-Mg	3.20	1.59	4.23	8.77	1.31	1.92	1.96	1.62	1.53	4.44
Manganese D-Mn	0.00726	0.00912	0.00329	0.00858	0.0222	0.0159	0.0142	0.0125	0.00197	0.00277
Mercury D-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum D-Mo	0.00138	0.00182	0.000539	0.000742	0.00158	0.00187	0.00207	0.00262	0.000920	0.000761
Nickel D-Ni	<0.00050	<0.00050	<0.00050	0.00091	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus D-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium D-K	0.504	0.426	0.221	0.477	0.471	0.479	0.466	0.454	0.241	0.382
Selenium D-Se	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon D-Si	2.08	1.52	1.13	1.35	0.959	1.26	1.30	1.36	1.60	3.04
Silver D-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium D-Na	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium D-Sr	0.0672	0.0636	0.0655	0.104	0.0677	0.0777	0.0777	0.0678	0.0412	0.0651
Thallium D-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin D-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium D-U	0.000367	0.000527	0.000042	0.000081	0.000208	0.000256	0.000247	0.000518	0.000261	0.000147
Vanadium D-V	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0012	0.0011	0.0011	<0.0010	<0.0010
Zinc D-Zn	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic Parameters										
Chemical Oxygen Demand COD	<20	<20	<20	<20	25	<20	<20	24	<20	<20

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	SKC-3-1	SKC-3-2	WC-1	HC-1	MT-1	TRAVEL BLANK	FIELD BLANK
Date Sampled	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06	6-Jul-06
Time Sampled							
ALS Sample ID	11	12	13	14	15	16	17
Nature	Water	Water	Water	Water	Water	Water	Water
Physical Tests							
Colour (CU)	6.1	6.7	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	195	194	51.7	80.8	61.4	<2.0	<2.0
Total Dissolved Solids	115	113	42	65	44	<10	<10
Hardness CaCO3	97.7	99.6	18.4	39.7	30.2	<0.50	<0.50
pH	8.23	8.23	7.72	7.93	7.89	5.66	5.61
Total Suspended Solids	<3.0	<3.0	9.5	40.5	17.0	<3.0	<3.0
Turbidity (NTU)	0.64	0.69	3.82	49.5	24.8	<0.10	<0.10
Dissolved Anions							
Acidity (to pH 8.3) CaCO3	<1.0	<1.0	1.4	1.1	1.2	1.0	<1.0
Alkalinity-Total CaCO3	99.4	101	15.9	34.6	31.0	<2.0	<2.0
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride F	0.036	0.036	0.118	<0.020	<0.020	<0.020	<0.020
Sulphate SO4	3.96	3.95	7.81	5.71	<0.50	<0.50	<0.50
Nutrients							
Ammonia Nitrogen N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl Nitrogen N	0.054	0.150	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrate Nitrogen N	0.128	0.129	0.0099	0.0097	<0.0050	<0.0050	<0.0050
Nitrite Nitrogen N	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Nitrogen N	0.190	0.200	<0.050	<0.050	<0.050	<0.050	<0.050
Total Phosphate P	0.0039	0.0035	0.0079	0.0171	0.0111	0.0020	<0.0020
Cyanides							
Total Cyanide CN	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Metals							
Aluminum T-Al	0.0165	0.0149	0.221	1.35	0.601	<0.0010	<0.0010
Antimony T-Sb	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic T-As	0.00016	0.00014	0.00014	0.00235	0.00043	<0.00010	<0.00010
Barium T-Ba	0.00937	0.00941	0.00432	0.0291	0.0100	<0.000050	<0.000050
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium T-Cd	<0.000020	<0.000020	0.000030	0.000020	<0.000020	<0.000020	<0.000020
Calcium T-Ca	32.9	33.4	4.89	13.0	11.9	<0.020	<0.020
Chromium T-Cr	<0.00050	<0.00050	<0.00050	0.00431	0.00177	<0.00050	<0.00050
Cobalt T-Co	<0.00010	<0.00010	0.00015	0.00177	0.00063	<0.00010	<0.00010
Copper T-Cu	0.00037	0.00035	0.00031	0.00612	0.00400	<0.00010	<0.00010
Iron T-Fe	0.042	<0.030	0.192	0.917	0.205	<0.030	<0.030
Lead T-Pb	<0.000050	<0.000050	0.000093	0.000408	0.000103	<0.000050	<0.000050
Lithium T-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium T-Mg	3.82	3.84	1.67	3.22	1.01	<0.0050	<0.0050
Manganese T-Mn	0.0112	0.00987	0.0717	0.0463	0.0256	<0.000050	<0.000050
Mercury T-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum T-Mo	0.000466	0.000460	0.000286	0.000302	0.000161	<0.000050	<0.000050
Nickel T-Ni	<0.00050	<0.00050	<0.00050	0.00385	0.00184	<0.00050	<0.00050
Phosphorus T-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium T-K	0.278	0.278	1.00	0.516	0.209	<0.050	<0.050
Selenium T-Se	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon T-Si	2.98	3.02	6.50	2.41	1.45	<0.050	<0.050
Silver T-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium T-Na	<2.0	<2.0	2.3	<2.0	<2.0	<2.0	<2.0
Strontium T-Sr	0.0563	0.0566	0.0188	0.0598	0.0239	<0.00010	<0.00010
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium T-Ti	<0.010	<0.010	<0.010	0.027	<0.010	<0.010	<0.010
Uranium T-U	0.000174	0.000179	0.000051	0.000038	0.000028	<0.000010	<0.000010
Vanadium T-V	<0.0010	<0.0010	<0.0010	0.0051	0.0041	<0.0010	<0.0010
Zinc T-Zn	<0.0010	<0.0010	0.0066	0.0052	0.0019	<0.0010	<0.0010
Dissolved Metals							
Aluminum D-Al	0.0061	0.0076	0.0533	0.177	0.0552	-	-
Antimony D-Sb	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Arsenic D-As	0.00015	0.00013	<0.00010	0.00154	0.00021	-	-
Barium D-Ba	0.00899	0.00917	0.00278	0.0206	0.00495	-	-
Beryllium D-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-
Boron D-B	<0.010	<0.010	<0.010	<0.010	<0.010	-	-
Cadmium D-Cd	<0.000020	<0.000020	0.000022	<0.000020	<0.000020	-	-
Calcium D-Ca	32.9	33.5	4.74	12.5	11.4	-	-
Chromium D-Cr	<0.00050	<0.00050	<0.00050	0.00078	<0.00050	-	-
Cobalt D-Co	<0.00010	<0.00010	<0.00010	0.00017	<0.00010	-	-
Copper D-Cu	0.00025	0.00024	0.00016	0.00081	0.00045	-	-
Iron D-Fe	<0.030	<0.030	<0.030	0.129	0.032	-	-
Lead D-Pb	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-
Lithium D-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-
Magnesium D-Mg	3.78	3.84	1.60	2.02	0.419	-	-
Manganese D-Mn	0.000435	0.000363	0.0579	0.00691	0.00266	-	-
Mercury D-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-
Molybdenum D-Mo	0.000465	0.000482	0.000358	0.000345	0.000191	-	-
Nickel D-Ni	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-
Phosphorus D-P	<0.30	<0.30	<0.30	<0.30	<0.30	-	-
Potassium D-K	0.279	0.280	0.967	0.307	0.133	-	-
Selenium D-Se	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-
Silicon D-Si	2.97	2.99	6.19	1.17	1.06	-	-
Silver D-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-
Sodium D-Na	<2.0	<2.0	2.2	<2.0	<2.0	-	-
Strontium D-Sr	0.0561	0.0572	0.0180	0.0569	0.0219	-	-
Thallium D-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Tin D-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Titanium D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	-	-
Uranium D-U	0.000169	0.000168	0.000025	0.000016	0.000019	-	-
Vanadium D-V	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	-	-
Zinc D-Zn	<0.0010	<0.0010	0.0027	<0.0010	<0.0010	-	-
Organic Parameters							
Chemical Oxygen Demand COD	<20	<20	<20	<20	<20	<20	<20

Results are expressed as milligrams per litre except where noted. **(continued)**

< = Less than the detection limit indicated.

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	MC-1	MC-2-1	MC-2-2	MT-1	MC-5	SC-3	SC-2	SKC-2	SKC-3
Date Sampled	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06
Time Sampled									
ALS Sample ID	1	2	3	4	5	8	9	10	11
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests									
Colour (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.4	5.3
Conductivity (uS/cm)	87.9	176	178	64.8	102	89.4	86.1	211	198
Total Dissolved Solids	45	95	94	33	52	45	44	117	107
Hardness CaCO3	44.7	89.1	88.3	31.3	47.4	43.0	41.8	99.5	98.7
pH	7.74	8.06	8.11	7.91	7.99	7.99	7.99	8.10	8.20
Total Suspended Solids	388	240	230	5.0	278	390	328	<3.0	<3.0
Turbidity (NTU)	306	215	220	21.7	168	254	238	0.62	0.56
Dissolved Anions									
Acidity (to pH 8.3) CaCO3	2.0	1.7	1.4	2.1	1.7	1.8	1.9	1.9	1.4
Alkalinity-Total CaCO3	35.7	85.6	85.5	33.2	44.9	38.9	37.2	92.6	104
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride F	<0.020	<0.020	<0.020	<0.020	0.053	<0.020	<0.020	0.037	0.036
Sulphate SO4	8.13	11.3	11.1	<0.50	5.76	3.99	3.97	20.3	4.41
Nutrients									
Ammonia Nitrogen N	0.0090	<0.0050	<0.0050	0.0130	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl Nitrogen N	<0.080	0.065	<0.050	<0.050	0.054	<0.050	<0.050	0.149	0.101
Nitrate Nitrogen N	0.0119	0.0242	0.0206	<0.0050	0.0161	0.0140	0.0140	0.0508	0.0590
Nitrite Nitrogen N	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Nitrogen N	0.090	0.089	<0.050	<0.050	0.070	<0.050	<0.050	0.200	0.160
Total Phosphate P	0.362	0.201	0.345	0.0152	0.315	0.232	0.674	<0.0020	0.0036
Cyanides									
Total Cyanide CN	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010
Total Metals									
Aluminum T-Al	10.2	5.10	6.84	0.627	4.11	5.36	6.52	0.0138	0.0128
Antimony T-Sb	0.00104	0.00087	0.00091	<0.00010	0.00018	0.00014	0.00014	<0.00010	<0.00010
Arsenic T-As	0.0119	0.0111	0.0119	0.00058	0.00272	0.00352	0.00327	0.00033	0.00013
Barium T-Ba	0.226	0.172	0.176	0.0116	0.107	0.166	0.168	0.0129	0.00956
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	0.013	0.016	0.018	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium T-Cd	0.000082	0.000255	0.000267	<0.000020	0.000063	0.000060	0.000070	<0.000020	<0.000020
Calcium T-Ca	19.7	25.9	24.7	12.6	16.6	20.7	22.9	32.8	33.5
Chromium T-Cr	0.0188	0.00839	0.0101	0.00207	0.00469	0.00634	0.00721	<0.00050	<0.00050
Cobalt T-Co	0.00767	0.00442	0.00514	0.00069	0.00260	0.00426	0.00474	<0.00010	<0.00010
Copper T-Cu	0.0129	0.0132	0.0140	0.00467	0.0143	0.0277	0.0301	0.00053	0.00032
Iron T-Fe	10.8	6.22	6.27	0.823	4.32	6.42	6.68	0.112	0.051
Lead T-Pb	0.00258	0.00490	0.00479	0.000116	0.00224	0.00225	0.00232	<0.000050	<0.000050
Lithium T-Li	0.0066	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium T-Mg	13.5	13.2	13.0	1.19	4.84	5.02	5.49	4.74	4.25
Manganese T-Mn	0.352	0.249	0.244	0.0325	0.192	0.263	0.303	0.0202	0.0123
Mercury T-Hg	<0.000010	0.000015	0.000016	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum T-Mo	0.000358	0.000494	0.000546	0.000165	0.00116	0.00119	0.00112	0.000683	0.000491
Nickel T-Ni	0.0273	0.0145	0.0162	0.00204	0.00538	0.00656	0.00721	<0.00050	<0.00050
Phosphorus T-P	0.54	<0.30	<0.30	<0.30	<0.30	0.53	0.62	<0.30	<0.30
Potassium T-K	3.65	1.92	2.49	0.202	1.50	1.41	1.78	0.368	0.274
Selenium T-Se	0.00067	0.00080	0.00053	<0.00050	0.00066	<0.00050	0.00052	<0.00050	<0.00050
Silicon T-Si	6.29	7.07	7.44	2.57	8.09	9.52	9.72	3.04	3.08
Silver T-Ag	0.000114	0.000093	0.000105	<0.000010	0.000055	0.000037	0.000041	<0.000010	<0.000010
Sodium T-Na	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium T-Sr	0.0895	0.130	0.127	0.0243	0.0784	0.0994	0.103	0.0683	0.0610
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	0.00014	<0.00010	0.00014	<0.00010	0.00016	<0.00010	<0.00010	<0.00010	<0.00010
Titanium T-Ti	0.095	0.098	0.102	0.021	0.110	0.142	0.151	<0.010	<0.010
Uranium T-U	0.000316	0.000176	0.000199	0.000026	0.000724	0.000524	0.000514	0.000147	0.000169
Vanadium T-V	0.0292	0.0141	0.0178	0.0019	0.0095	0.0150	0.0177	<0.0010	<0.0010
Zinc T-Zn	0.0195	0.0297	0.0314	0.0020	0.0150	0.0149	0.0298	<0.0010	<0.0010
Dissolved Metals									
Aluminum D-Al	0.125	0.103	0.0697	0.0777	0.202	0.292	0.325	0.0032	0.0055
Antimony D-Sb	0.00046	0.00039	0.00037	<0.00010	0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic D-As	0.00049	0.00068	0.00063	0.00022	0.00055	0.00056	0.00062	0.00028	0.00012
Barium D-Ba	0.0479	0.0741	0.0728	0.00480	0.0453	0.0545	0.0522	0.0123	0.00945
Beryllium D-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron D-B	<0.010	0.012	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium D-Cd	<0.000020	0.000024	0.000032	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Calcium D-Ca	8.75	20.7	20.4	11.8	14.1	14.3	13.8	32.1	32.7
Chromium D-Cr	<0.00050	0.00062	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt D-Co	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	0.00012	<0.00010	<0.00010
Copper D-Cu	0.00019	0.00038	0.00033	0.00059	0.00072	0.00095	0.00097	0.00037	0.00023
Iron D-Fe	0.057	0.052	0.037	0.053	0.156	0.186	0.198	0.036	<0.030
Lead D-Pb	<0.000050	0.000054	<0.000050	<0.000050	0.000085	0.000054	0.000062	<0.000050	<0.000050
Lithium D-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium D-Mg	5.55	9.07	9.07	0.433	2.94	1.79	1.78	4.69	4.15
Manganese D-Mn	0.00106	0.0152	0.0135	0.00272	0.0153	0.0188	0.0189	0.00664	0.00205
Mercury D-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum D-Mo	0.000332	0.000662	0.000681	0.000179	0.00146	0.00172	0.00151	0.000688	0.000494
Nickel D-Ni	0.00065	0.00091	0.00088	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus D-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium D-K	0.442	0.538	0.512	0.135	0.510	0.443	0.453	0.355	0.266
Selenium D-Se	0.00067	0.00078	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon D-Si	0.540	1.28	1.22	1.06	2.07	1.42	1.39	3.12	3.08
Silver D-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium D-Na	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium D-Sr	0.0551	0.109	0.107	0.0218	0.0643	0.0745	0.0704	0.0656	0.0596
Thallium D-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin D-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium D-U	0.000033	0.000079	0.000078	0.000019	0.000371	0.000204	0.000167	0.000137	0.000162
Vanadium D-V	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010
Zinc D-Zn	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic Parameters									
Chemical Oxygen Demand COD	78	70	69	<20	74	110	98	<20	<20

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	SC-4	WC-1	HC-1	SC-1	TRAVEL BLANK	FIELD BLANK	SKC-1	SC-5
Date Sampled	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06	30-Jul-06
Time Sampled								
ALS Sample ID	12	13	14	15	16	17	18	19
Nature	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests								
Colour (CU)	<5.0	<5.0	<5.0	6.0	<5.0	<5.0	<5.0	6.2
Conductivity (uS/cm)	77.0	72.6	73.6	59.9	<2.0	<2.0	145	81.2
Total Dissolved Solids	39	39	37	29	<10	<10	76	41
Hardness CaCO3	37.8	26.9	33.8	29.3	<0.50	<0.50	67.4	38.7
pH	7.97	7.76	7.90	7.94	5.51	5.54	8.03	7.97
Total Suspended Solids	384	4.3	60.3	614	<3.0	<3.0	53.7	396
Turbidity (NTU)	239	2.34	91.8	378	<0.10	<0.10	107	224
Dissolved Anions								
Acidity (to pH 8.3) CaCO3	1.6	2.2	1.6	1.7	1.9	2.0	1.4	1.9
Alkalinity-Total CaCO3	33.4	23.0	30.0	24.4	<2.0	<2.0	49.6	35.8
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride F	0.023	0.152	<0.020	<0.020	<0.020	<0.020	0.022	0.027
Sulphate SO4	3.30	11.4	5.45	1.75	<0.50	<0.50	19.0	3.42
Nutrients								
Ammonia Nitrogen N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl Nitrogen N	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrate Nitrogen N	0.0175	<0.0050	0.0126	0.0140	<0.0050	<0.0050	0.0150	0.0148
Nitrite Nitrogen N	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Nitrogen N	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Phosphate P	0.255	0.0120	0.0950	1.13	<0.0020	<0.0020	0.137	0.591
Cyanides								
Total Cyanide CN	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Total Metals								
Aluminum T-Al	6.37	0.227	1.95	8.86	<0.0010	<0.0010	2.36	4.25
Antimony T-Sb	0.00011	<0.00010	<0.00010	0.00016	<0.00010	<0.00010	0.00014	<0.00010
Arsenic T-As	0.00354	0.00012	0.00270	0.00368	<0.00010	<0.00010	0.00434	0.00268
Barium T-Ba	0.146	0.00442	0.0353	0.296	<0.000050	<0.000050	0.0319	0.127
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium T-Cd	0.000059	0.000060	0.000032	0.000098	<0.000020	<0.000020	0.000184	0.000054
Calcium T-Ca	16.5	6.77	12.2	28.6	<0.020	<0.020	26.0	16.3
Chromium T-Cr	0.00794	<0.00050	0.00632	0.00624	<0.00050	<0.00050	0.00711	0.00569
Cobalt T-Co	0.00433	0.00012	0.00262	0.00607	<0.00010	<0.00010	0.00265	0.00344
Copper T-Cu	0.0261	0.00032	0.00915	0.0447	<0.00010	<0.00010	0.0139	0.0210
Iron T-Fe	6.28	0.141	2.40	11.5	<0.030	<0.030	5.60	5.46
Lead T-Pb	0.00243	<0.000050	0.000644	0.00407	<0.000050	<0.000050	0.00218	0.00202
Lithium T-Li	<0.0050	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium T-Mg	4.79	2.47	3.63	6.34	<0.0050	<0.0050	3.23	3.89
Manganese T-Mn	0.253	0.102	0.0735	0.517	<0.000050	<0.000050	0.212	0.202
Mercury T-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum T-Mo	0.00170	0.000397	0.000250	0.000859	<0.000050	<0.000050	0.000566	0.00137
Nickel T-Ni	0.00808	<0.00050	0.00628	0.00588	<0.00050	<0.00050	0.00557	0.00648
Phosphorus T-P	0.43	<0.30	<0.30	1.22	<0.30	<0.30	<0.30	0.35
Potassium T-K	1.66	1.24	0.580	2.06	<0.050	<0.050	0.476	1.17
Selenium T-Se	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00069	<0.00050
Silicon T-Si	9.78	8.00	5.17	13.4	<0.050	<0.050	7.23	9.19
Silver T-Ag	0.000031	<0.000010	0.000015	0.000053	<0.000010	<0.000010	0.000046	0.000026
Sodium T-Na	<2.0	2.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium T-Sr	0.0867	0.0271	0.0551	0.127	<0.00010	<0.00010	0.0420	0.0789
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium T-Ti	0.154	<0.010	0.073	0.218	<0.010	<0.010	0.084	0.136
Uranium T-U	0.000835	0.000062	0.000036	0.000944	<0.000010	<0.000010	0.000280	0.000900
Vanadium T-V	0.0153	<0.0010	0.0063	0.0258	<0.0010	<0.0010	0.0116	0.0113
Zinc T-Zn	0.0158	0.0075	0.0063	0.0258	<0.0010	<0.0010	0.0299	0.0125
Dissolved Metals								
Aluminum D-Al	0.214	0.0574	0.168	0.583	-	-	0.136	0.314
Antimony D-Sb	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010
Arsenic D-As	0.00078	<0.00010	0.00122	0.00037	-	-	0.00082	0.00060
Barium D-Ba	0.0489	0.00386	0.0193	0.0566	-	-	0.0147	0.0483
Beryllium D-Be	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050
Boron D-B	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	<0.010
Cadmium D-Cd	<0.000020	0.000046	<0.000020	<0.000020	-	-	0.000053	<0.000020
Calcium D-Ca	12.7	6.74	10.7	9.85	-	-	24.5	13.0
Chromium D-Cr	<0.00050	<0.00050	0.00058	<0.00050	-	-	<0.00050	<0.00050
Cobalt D-Co	<0.00010	<0.00010	0.00017	0.00015	-	-	0.00011	0.00011
Copper D-Cu	0.00088	0.00019	0.00079	0.00146	-	-	0.00093	0.00102
Iron D-Fe	0.163	<0.030	0.153	0.334	-	-	0.168	0.213
Lead D-Pb	0.000065	<0.000050	<0.000050	0.000098	-	-	0.000070	0.000083
Lithium D-Li	<0.0050	<0.0050	<0.0050	<0.0050	-	-	<0.0050	<0.0050
Magnesium D-Mg	1.51	2.44	1.74	1.14	-	-	1.50	1.49
Manganese D-Mn	0.0159	0.0952	0.0105	0.0231	-	-	0.0538	0.0148
Mercury D-Hg	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010
Molybdenum D-Mo	0.00227	0.000453	0.000290	0.00119	-	-	0.000873	0.00183
Nickel D-Ni	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050
Phosphorus D-P	<0.30	<0.30	<0.30	<0.30	-	-	<0.30	<0.30
Potassium D-K	0.413	1.23	0.259	0.493	-	-	0.257	0.429
Selenium D-Se	<0.00050	<0.00050	<0.00050	<0.00050	-	-	0.00068	<0.00050
Silicon D-Si	1.28	7.60	1.05	1.46	-	-	1.80	1.71
Silver D-Ag	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010
Sodium D-Na	<2.0	2.5	<2.0	<2.0	-	-	<2.0	<2.0
Strontium D-Sr	0.0649	0.0268	0.0494	0.0649	-	-	0.0391	0.0609
Thallium D-Tl	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010
Tin D-Sn	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010
Titanium D-Ti	<0.010	<0.010	<0.010	0.017	-	-	<0.010	<0.010
Uranium D-U	0.000448	0.000038	0.000014	0.000137	-	-	0.000232	0.000487
Vanadium D-V	<0.0010	<0.0010	<0.0010	0.0015	-	-	<0.0010	<0.0010
Zinc D-Zn	<0.0010	0.0044	0.0014	<0.0010	-	-	<0.0010	<0.0010
Organic Parameters								
Chemical Oxygen Demand COD	97	<20	<20	159	<20	<20	27	93

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	MC -6	MC -7	MC -8	MT-1	TRAVEL BLANK	FIELD BLANK	SKC-1	WC-1-1	WC-1-2	SKC-3	MC-1	MC-2
Date Sampled	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06
Time Sampled												
ALS Sample ID	1	2	3	4	5	6	7	8	9	10	11	12
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests												
Colour (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.1	<5.0	<5.0
Conductivity (uS/cm)	189	126	171	60.6	<2.0	<2.0	139	88.9	88.7	206	106	189
Total Dissolved Solids	116	78	97	33	<10	<10	86	54	53	125	62	110
Hardness CaCO3	94.0	61.0	87.8	30.6	<0.50	<0.50	64.3	33.6	32.5	104	53.4	91.1
pH	8.19	8.18	8.16	8.13	5.58	5.63	8.02	7.98	7.98	8.14	8.16	8.13
Total Suspended Solids	182	306	3.5	22.2	<3.0	<3.0	43.5	<3.0	<3.0	<3.0	172	188
Turbidity (NTU)	13.8	250	3.57	53.0	<0.10	<0.10	41.9	1.70	1.72	0.61	128	189
Dissolved Anions												
Acidity (to pH 8.3) CaCO3	1.5	1.7	1.9	1.8	2.2	1.9	2.4	2.5	2.2	1.9	1.7	1.9
Alkalinity-Total CaCO3	99.6	68.3	74.0	30.0	<2.0	<2.0	54.4	30.9	30.3	113	48.1	91.0
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	0.65	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.60
Fluoride F	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.024	0.168	0.168	0.040	<0.020	0.021
Sulphate SO4	12.5	9.44	15.1	<0.50	<0.50	<0.50	19.3	13.7	13.6	4.65	7.92	12.9
Nutrients												
Ammonia Nitrogen N	0.0087	0.0140	<0.0050	0.0127	<0.0050	<0.0050	0.0093	<0.0050	<0.0050	<0.0050	0.0413	0.0087
Total Kjeldahl Nitrogen N	<0.10	0.152	0.059	<0.050	<0.050	<0.050	<0.050	<0.050	0.058	0.138	0.087	0.088
Nitrate Nitrogen N	0.0171	0.0183	0.0061	0.0061	<0.0050	<0.0050	0.0064	<0.0050	<0.0050	0.0416	0.0076	0.0185
Nitrite Nitrogen N	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Nitrogen N	<0.11	0.171	0.065	<0.056	<0.056	<0.056	<0.056	<0.056	0.058	0.180	0.095	0.106
Total Phosphate P	0.172	0.288	0.0055	0.0578	<0.0020	<0.0020	0.0758	0.0102	0.0112	0.0053	0.0635	0.0388
Cyanides												
Total Cyanide CN	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	0.0014	<0.0010	<0.0010
Total Metals												
Aluminum T-Al	3.98	5.78	0.0338	1.97	0.0010	<0.0010	2.31	0.227	0.221	0.0107	4.02	4.11
Antimony T-Sb	0.00086	0.00130	<0.00010	<0.00010	<0.00010	<0.00010	0.00025	<0.00010	<0.00010	<0.00010	0.00065	0.00084
Arsenic T-As	0.00575	0.0104	0.00020	0.00057	<0.00010	<0.00010	0.00519	0.00013	0.00015	0.00012	0.00460	0.00634
Barium T-Ba	0.162	0.177	0.0475	0.0124	<0.000050	<0.000050	0.0277	0.00477	0.00473	0.00942	0.123	0.167
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	0.021	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.021
Cadmium T-Cd	0.000040	0.000051	<0.000020	<0.000020	<0.000020	<0.000020	0.000109	0.000052	0.000065	<0.000020	0.000023	0.000044
Calcium T-Ca	24.9	19.5	17.8	13.0	<0.020	<0.020	27.1	8.51	8.23	33.3	16.1	25.6
Chromium T-Cr	0.00814	0.0144	<0.00050	0.00744	<0.00050	<0.00050	0.00647	<0.00050	<0.00050	<0.00050	0.0112	0.00804
Cobalt T-Co	0.00408	0.00695	0.00011	0.00260	<0.00010	<0.00010	0.00198	<0.00010	0.00011	<0.00010	0.00426	0.00402
Copper T-Cu	0.0102	0.0131	0.00046	0.0110	<0.00010	<0.00010	0.0121	0.00037	0.00032	0.00041	0.0109	0.0104
Iron T-Fe	6.12	10.3	0.144	1.38	<0.030	<0.030	3.82	0.121	0.123	<0.030	6.40	6.30
Lead T-Pb	0.00155	0.00160	<0.000050	0.000194	<0.000050	<0.000050	0.00146	<0.000050	<0.000050	<0.000050	0.000928	0.00138
Lithium T-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium T-Mg	14.6	14.9	10.1	3.19	<0.0050	<0.0050	3.04	3.11	3.06	4.39	10.9	13.9
Manganese T-Mn	0.186	0.258	0.00612	0.0816	<0.000050	<0.000050	0.161	0.107	0.103	0.00646	0.184	0.184
Mercury T-Hg	0.000020	0.000024	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000018	0.000016
Molybdenum T-Mo	0.000727	0.000733	0.000995	0.000202	<0.000050	<0.000050	0.00101	0.000493	0.000506	0.000449	0.000918	0.000864
Nickel T-Ni	0.0164	0.0287	<0.00050	0.00680	<0.00050	<0.00050	0.00442	0.00054	<0.00050	<0.00050	0.0201	0.0153
Phosphorus T-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium T-K	2.29	2.44	0.316	0.292	<0.050	<0.050	0.632	1.43	1.39	0.279	1.77	2.27
Selenium T-Se	<0.00050	<0.00050	0.00056	0.00077	<0.00050	<0.00050	0.00065	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon T-Si	10.5	12.6	0.900	4.12	<0.050	<0.050	5.11	8.23	8.50	3.16	8.33	10.3
Silver T-Ag	<0.000050	<0.000070	<0.000010	<0.000020	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000040	<0.000050
Sodium T-Na	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.0	3.1	<2.0	<2.0	2.3
Strontium T-Sr	0.139	0.107	0.210	0.0269	<0.00010	<0.00010	0.0468	0.0356	0.0349	0.0636	0.104	0.138
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	0.00015	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00027	<0.00010
Titanium T-Ti	0.219	0.370	<0.010	0.062	<0.010	<0.010	0.073	<0.010	<0.010	<0.010	0.167	0.209
Uranium T-U	0.000165	0.000207	0.000190	0.000030	<0.000010	<0.000010	0.000252	0.000074	0.000072	0.000162	0.000127	0.000168
Vanadium T-V	0.0119	0.0174	<0.0010	0.0047	<0.0010	<0.0010	0.0109	<0.0010	<0.0010	<0.0010	0.0116	0.0121
Zinc T-Zn	0.0140	0.0186	0.0011	<0.0080	<0.0010	<0.0010	0.0209	0.0107	0.0104	0.0028	0.0111	0.0129
Dissolved Metals												
Aluminum D-Al	0.0388	0.121	0.0044	0.0943	-	-	0.0272	0.0387	0.0379	0.0089	0.0873	0.0320
Antimony D-Sb	0.00042	0.00060	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	0.00031	0.00041
Arsenic D-As	0.00036	0.00035	<0.00010	0.00022	-	-	0.00062	0.00011	<0.00010	0.00012	0.00039	0.00044
Barium D-Ba	0.0854	0.0614	0.0470	0.00469	-	-	0.0125	0.00419	0.00416	0.00925	0.0533	0.0804
Beryllium D-Be	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron D-B	0.014	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.015
Cadmium D-Cd	<0.000020	<0.000020	<0.000020	<0.000020	-	-	0.000027	0.000042	0.000036	<0.000020	<0.000020	<0.000020
Calcium D-Ca	20.4	12.5	18.2	11.5	-	-	23.3	8.41	8.08	34.5	11.5	20.3
Chromium D-Cr	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt D-Co	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper D-Cu	<0.00030	<0.00040	<0.00020	<0.00080	-	-	<0.00050	<0.00040	<0.00030	<0.00050	<0.00040	<0.00030
Iron D-Fe	<0.030	0.069	<0.030	0.055	-	-	0.030	<0.030	<0.030	<0.030	0.064	<0.030
Lead D-Pb	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium D-Li	<0.0050	<0.0050	<0.0050	<0.0050	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium D-Mg	10.5	7.24	10.3	0.423	-	-	1.46	3.05	2.98	4.41	5.97	9.79
Manganese D-Mn	0.00914	0.00103	0.000173	0.00366	-	-	0.0195	0.0940	0.0882	0.00274	0.00128	0.00308
Mercury D-Hg	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum D-Mo	0.000623	0.000501	0.00115	0.000161	-	-	0.000824	0.000549	0.000536	0.000448	0.000579	0.000717
Nickel D-Ni	0.00135	0.00101	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00112	0.00105
Phosphorus D-P	<0.30	<0.30	<0.30	<0.30	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium D-K	0.553	0.418	0.362	0.120	-	-	0.242	1.40	1.36	0.270	0.359	0.539
Selenium D-Se	<0.00050	<0.00050	<0.00050	<0.00050	-	-	0.00085	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon D-Si	1.08	0.779	0.850	0.852	-	-	1.54	7.89	7.95	3.19	0.943	1.17
Silver D-Ag	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	0.000049	<0.000010	<0.000010	<0.000010
Sodium D-Na	<2.0	<2.0	<2.0	<2.0	-	-	<2.0	2.9	2.9	<2.0	<2.0	<2.0
Strontium D-Sr	0.116	0.0770	0.215	0.0223	-	-	0.0403	0.0353	0.0338	0.0650	0.0822	0.113
Thallium D-Tl	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin D-Sn	<0.00010	<0.00010	0.00012	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium D-Ti	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium D-U	0.000091	0.000066	0.000198	0.000015	-	-	0.000185	0.000050	0.000051	0.000162	0.000074	0.000087
Vanadium D-V	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc D-Zn	<0.0020	<0.0020	<0.0010	<0.0010	-	-	<0.0070	<0.0080	<0.0070	<0.0010	<0.0010	<0.0010
Organic Parameters												
Chemical Oxygen Demand COD	24	<20	<20	<20	<20	<20	21	<20	<20	<20	21	<20

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	ST-1	ST-2	MC-9	SKC-2-1	SKC-2-2	SC-1	SC-2	SC-3	SC-4	HC-1	MC-5	SC-5
Date Sampled	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06	4-Sep-06
Time Sampled												
ALS Sample ID	13	14	15	16	17	18	19	20	21	22	23	24
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests												
Colour (CU)	10.4	8.4	**<5.0**	5.5	5.4	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	**<5.0**	5.4
Conductivity (uS/cm)	139	134	120	223	222	62.3	88.0	94.6	88.9	75.5	124	98.3
Total Dissolved Solids	82	83	74	130	133	36	51	54	51	45	73	57
Hardness CaCO3	57.5	60.5	51.6	95.2	108	30.0	41.9	45.5	44.4	37.4	59.9	49.8
pH	8.12	8.11	8.12	8.10	8.12	8.22	8.11	8.13	8.09	8.10	8.10	8.13
Total Suspended Solids	29.5	74.2	281	**<3.0**	**<3.0**	1290	794	375	369	294	320	423
Turbidity (NTU)	32.0	84.5	222	0.63	0.58	770	410	348	349	212	281	373
Dissolved Anions												
Acidity (to pH 8.3) CaCO3	1.8	2.2	2.0	2.2	2.1	1.1	1.7	1.9	2.3	2.0	1.9	1.7
Alkalinity-Total CaCO3	57.4	63.0	66.5	95.2	93.5	30.1	42.0	44.4	41.3	34.8	61.5	46.2
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Chloride Cl	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**
Fluoride F	0.043	0.057	0.082	0.039	0.039	**<0.020**	**<0.020**	**<0.020**	0.032	**<0.020**	0.060	0.035
Sulphate SO4	16.0	13.3	6.89	22.8	22.7	1.80	4.15	4.41	3.90	5.23	6.98	3.90
Nutrients												
Ammonia Nitrogen N	0.0093	0.0230	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.0053	**<0.0050**	**<0.0050**	**<0.0050**	0.0140	**<0.0050**
Total Kjeldahl Nitrogen N	0.188	0.180	0.14	0.145	0.109	0.14	0.18	0.057	**<0.050**	**<0.050**	**<0.050**	0.064
Nitrate Nitrogen N	**<0.0050**	0.0059	0.0135	0.0299	0.0298	0.0091	0.0075	0.0079	0.0112	**<0.0050**	0.0122	0.0111
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Nitrogen N	0.188	0.186	0.15	0.175	0.139	0.15	0.19	0.065	**<0.056**	**<0.056**	**<0.056**	0.075
Total Phosphate P	0.0380	0.0995	0.224	0.0058	0.0060	0.120	1.03	0.577	0.481	0.161	0.399	0.591
Cyanides												
Total Cyanide CN	0.0015	0.0013	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Metals												
Aluminum T-Al	1.12	2.89	7.24	0.0073	0.0290	23.0	15.6	10.4	12.1	5.03	8.66	11.8
Antimony T-Sb	0.00011	0.00013	0.00022	**<0.00010**	**<0.00010**	0.00037	0.00025	0.00018	0.00019	0.00013	0.00023	0.00015
Arsenic T-As	0.00053	0.00122	0.00294	0.00034	0.00044	0.00689	0.00667	0.00376	0.00424	0.00391	0.00341	0.00350
Barium T-Ba	0.0392	0.0600	0.128	0.0131	0.0149	0.431	0.303	0.233	0.238	0.0477	0.184	0.222
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.0010**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.0010**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	**<0.010**	**<0.010**	0.011	**<0.010**	**<0.010**	**<0.020**	0.012	0.011	**<0.010**	**<0.010**	0.010	**<0.010**
Cadmium T-Cd	0.000028	0.000036	0.000069	**<0.000020**	**<0.000020**	0.000132	0.000130	0.000078	0.000085	0.000066	0.000073	0.000079
Calcium T-Ca	17.2	17.0	19.1	31.7	34.8	38.9	33.4	22.4	21.5	16.6	23.5	23.0
Chromium T-Cr	0.00263	0.00421	0.00899	**<0.00050**	**<0.00050**	0.0176	0.0221	0.0126	0.0150	0.0269	0.00912	0.0132
Cobalt T-Co	0.00070	0.00163	0.00433	**<0.00010**	**<0.00010**	0.0144	0.0128	0.00738	0.00857	0.00885	0.00572	0.00797
Copper T-Cu	0.00294	0.00689	0.0186	0.00052	0.00065	0.0829	0.0591	0.0407	0.0462	0.0196	0.0267	0.0361
Iron T-Fe	1.74	3.53	8.23	0.107	0.298	24.3	18.9	11.1	12.5	6.65	9.05	12.1
Lead T-Pb	0.000353	0.000857	0.00242	**<0.000050**	**<0.000050**	0.00665	0.00493	0.00303	0.00390	0.00122	0.00330	0.00364
Lithium T-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.015	0.0099	0.0060	0.0074	**<0.0050**	0.0059	0.0075
Magnesium T-Mg	5.25	5.61	7.52	4.93	5.29	13.9	13.1	8.26	9.13	9.06	8.89	8.74
Manganese T-Mn	0.0357	0.0869	0.236	0.0172	0.0409	0.931	0.693	0.400	0.450	0.197	0.333	0.419
Mercury T-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum T-Mo	0.000647	0.00102	0.00185	0.000634	0.000735	0.00194	0.00203	0.00204	0.00296	0.000347	0.00195	0.00240
Nickel T-Ni	0.00373	0.00463	0.00876	**<0.00050**	0.00068	0.0146	0.0195	0.0109	0.0133	0.0208	0.00836	0.0115
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	1.69	1.36	0.45	0.43	**<0.30**	0.36	0.46
Potassium T-K	0.640	1.14	2.30	0.362	0.398	4.75	3.03	2.49	2.81	0.945	2.38	2.64
Selenium T-Se	0.00057	**<0.00050**	**<0.00050**	**<0.00050**	0.00189	0.00053	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Silicon T-Si	5.10	9.05	17.8	3.10	3.02	30.8	26.5	19.9	21.8	10.8	18.0	21.6
Silver T-Ag	**<0.000020**	**<0.000030**	**<0.000060**	**<0.000010**	**<0.000010**	0.000118	**<0.000070**	**<0.000050**	**<0.000060**	**<0.000030**	**<0.000040**	**<0.000040**
Sodium T-Na	**<2.0**	2.3	3.4	**<2.0**	**<2.0**	2.7	2.3	**<2.0**	2.0	**<2.0**	2.6	2.2
Strontium T-Sr	0.118	0.110	0.104	0.0695	0.0766	0.193	0.163	0.135	0.132	0.0687	0.123	0.126
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00020**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	0.00021	**<0.00010**	**<0.00010**	0.00025	**<0.00010**	**<0.00010**	0.00014	**<0.00010**	0.00016	**<0.00010**
Titanium T-Ti	0.045	0.173	0.461	**<0.010**	**<0.010**	1.10	0.879	0.521	0.611	0.263	0.499	0.637
Uranium T-U	0.000098	0.000294	0.000832	0.000142	0.000167	0.00158	0.00116	0.000783	0.00121	0.000067	0.00102	0.00128
Vanadium T-V	0.0032	0.0074	0.0177	**<0.0010**	**<0.0010**	0.0670	0.0488	0.0289	0.0338	0.0186	0.0230	0.0315
Zinc T-Zn	**<0.0050**	0.0110	0.0228	0.0012	**<0.0010**	0.0637	0.0445	0.0272	0.0334	0.0180	0.0268	0.0320
Dissolved Metals												
Aluminum D-Al	0.0369	0.0844	0.193	0.0021	0.0026	0.626	0.292	0.295	0.254	0.177	0.148	0.264
Antimony D-Sb	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00020**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00011	**<0.00010**
Arsenic D-As	0.00019	0.00032	0.00048	0.00029	0.00030	0.00044	0.00054	0.00047	0.00041	0.00107	0.00048	0.00045
Barium D-Ba	0.0230	0.0315	0.0380	0.0123	0.0136	0.0652	0.0599	0.0613	0.0575	0.0179	0.0609	0.0597
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.0010**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.0010**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron D-B	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.020**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Cadmium D-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000040**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium D-Ca	15.8	16.9	14.9	30.3	34.5	10.0	13.8	15.0	14.8	12.0	17.8	16.9
Chromium D-Cr	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.0010**	**<0.00050**	**<0.00050**	**<0.00050**	0.00058	**<0.00050**	**<0.00050**
Cobalt D-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00020**	**<0.00010**	**<0.00010**	**<0.00010**	0.00017	**<0.00010**	**<0.00010**
Copper D-Cu	**<0.0010**	0.00122	**<0.00090**	**<0.00040**	**<0.00040**	0.00151	**<0.00090**	**<0.00090**	**<0.00090**	**<0.00070**	**<0.00090**	**<0.00090**
Iron D-Fe	0.036	0.074	0.138	0.031	0.035	0.365	0.162	0.153	0.134	0.133	0.090	0.153
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000070**	**<0.000050**	**<0.000050**	0.00016	**<0.000060**	**<0.000060**	**<0.000050**	**<0.000050**	**<0.000080**	**<0.000070**
Lithium D-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.010**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium D-Mg	4.40	4.47	3.53	4.75	5.20	1.21	1.83	1.97	1.79	1.82	3.75	1.81
Manganese D-Mn	0.00103	0.00555	0.00646	0.00101	0.000874	0.00972	0.0113	0.0143	0.00926	0.0101	0.0106	0.0130
Mercury D-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum D-Mo	0.000615	0.000960	0.00155	0.000639	0.000777	0.00138	0.00163	0.00191	0.00266	0.000269	0.00175	0.00232
Nickel D-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.0010**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium D-K	0.388	0.525	0.701	0.347	0.373	0.62	0.483	0.501	0.481	0.303	0.570	0.510
Selenium D-Se	**<0.00050**	0.00050	**<0.00050**	0.00051	0.00087	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Silicon D-Si	2.71	2.68	2.59	2.91	3.01	1.55	1.21	1.21	1.27	0.934	1.83	1.50
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000020**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium D-Na	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Strontium D-Sr	0.106	0.105	0.0737	0.0673	0.0749	0.0824	0.0829	0.0906	0.0833	0.0518	0.0847	0.0847
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00020**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00020**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	0.018	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium D-U	0.000072	0.000212	0.000437	0.000138	0.000158	0.000141	0.000195	0.000239	0.000531	**<0.000010**	0.000476	0.000662
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0020**	0.0010	0.0010	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc D-Zn	**<0.0020**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0020**	**<0.0020**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0030**	**<0.0010**
Organic Parameters												
Chemical Oxygen Demand COD	22	32	40	**<20**	**<20**	69	75	58	74	27	92	94

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	MC-2	MC-5	MC-7	MC-8-1	MC-8-2	MC-9	MC-10	MT-1	HC-1	WC-1-1	WC-1-2	ST-1
Date Sampled	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06
Time Sampled												
ALS Sample ID	1	2	3	4	5	6	7	8	9	10	11	12
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests												
Colour (CU)	<5.0	6.4	<5.0	<5.0	<5.0	<5.0	<5.0	6.1	<5.0	<5.0	<5.0	8.7
Conductivity (uS/cm)	284	147	309	202	200	158	258	130	132	90.4	90.6	151
Total Dissolved Solids	165	81	187	121	120	92	156	76	76	54	55	90
Hardness CaCO3	142	69.0	167	98.8	98.3	72.3	126	66.5	63.9	34.6	34.0	71.0
pH	8.15	8.07	8.22	8.16	8.16	8.10	8.19	8.08	8.01	7.82	7.81	8.01
Total Suspended Solids	41.1	31.8	28.4	3.8	<3.0	29.1	21.1	<3.0	14.4	<3.0	3.1	22.4
Turbidity (NTU)	41.8	42.2	40.2	6.06	6.73	33.9	20.6	2.39	66.8	1.96	2.27	18.4
Dissolved Anions												
Acidity (to pH 8.3) CaCO3	1.6	1.7	1.2	1.3	1.3	1.6	1.4	1.5	1.5	1.8	2.0	1.7
Alkalinity-Total CaCO3	130	62.5	158	98.2	96.1	68.9	127	66.5	53.2	32.7	34.3	57.4
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	1.26	<0.50	<0.50	<0.50	<0.50	0.51	1.04	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride F	0.030	0.082	0.031	<0.020	0.020	0.115	0.035	<0.020	<0.020	0.174	0.175	0.045
Sulphate SO4	20.1	10.2	22.3	17.4	17.5	10.6	18.0	1.82	13.3	12.0	12.1	18.7
Nutrients												
Ammonia Nitrogen N	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0053	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl Nitrogen N	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050
Nitrate Nitrogen N	0.0313	0.0151	0.0336	0.0059	0.0065	0.0177	0.0305	<0.0050	0.0102	<0.0050	<0.0050	<0.0050
Nitrite Nitrogen N	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Nitrogen N	0.050	<0.050	0.050	<0.050	<0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	0.050
Total Phosphate P	0.0528	0.0374	0.0295	0.0449	0.0040	0.0393	0.0239	0.0056	0.0561	0.0149	0.0143	0.0366
Cyanides												
Total Cyanide CN	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0020
Total Metals												
Aluminum T-Al	0.356	1.71	1.23	0.0378	0.0449	1.26	0.619	0.0462	1.98	0.166	0.167	0.836
Antimony T-Sb	0.00049	0.00030	0.00070	<0.00010	<0.00010	0.00018	0.00045	<0.00010	0.00011	<0.00010	<0.00010	0.00010
Arsenic T-As	0.00198	0.00120	0.00239	0.00025	0.00026	0.00104	0.00186	0.00025	0.00173	0.00013	0.00012	0.00042
Barium T-Ba	0.116	0.0794	0.0984	0.0552	0.0548	0.0661	0.104	0.00912	0.0433	0.00452	0.00470	0.0361
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	0.024	0.011	<0.010	<0.010	<0.010	0.013	0.022	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium T-Cd	0.000021	0.000027	<0.000020	<0.000020	<0.000020	0.000027	<0.000020	<0.000020	<0.000020	0.000035	0.000035	<0.000020
Calcium T-Ca	31.1	21.3	30.4	21.2	20.7	21.8	31.8	23.5	22.5	8.69	8.26	22.1
Chromium T-Cr	0.00124	0.00273	0.00263	<0.00050	<0.00050	0.00216	0.00159	<0.00050	0.00395	<0.00050	<0.00050	0.00210
Cobalt T-Co	0.00091	0.00091	0.00093	0.00010	<0.00010	0.00080	0.00064	<0.00010	0.00173	<0.00010	<0.00010	0.00053
Copper T-Cu	0.00231	0.00407	0.00208	0.00066	0.00062	0.00328	0.00215	0.00123	0.00747	0.00029	0.00030	0.00306
Iron T-Fe	1.21	1.54	1.33	0.103	0.107	1.41	1.12	0.034	1.72	0.136	0.153	1.10
Lead T-Pb	0.000311	0.000517	0.000229	<0.000050	<0.000050	0.000417	0.000215	<0.000050	0.000242	<0.000050	<0.000050	0.000261
Lithium T-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium T-Mg	16.6	5.96	23.7	11.7	11.4	6.32	14.6	1.05	5.16	3.20	3.06	5.90
Manganese T-Mn	0.0694	0.0606	0.0438	0.00627	0.00619	0.0499	0.0485	0.00211	0.0548	0.0701	0.0665	0.0280
Mercury T-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum T-Mo	0.000412	0.00200	0.000610	0.00159	0.00154	0.00208	0.000883	0.000582	0.000550	0.000503	0.000477	0.000713
Nickel T-Ni	0.00445	0.00317	0.00427	<0.00050	<0.00050	<0.0030	0.00368	<0.00050	0.00331	<0.00050	<0.00050	<0.0030
Phosphorus T-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium T-K	0.823	1.27	1.18	0.437	0.419	1.36	0.987	0.221	0.803	1.42	1.34	0.659
Selenium T-Se	0.00056	<0.00050	0.00094	0.00110	0.00061	0.00070	0.00086	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon T-Si	2.34	5.17	3.04	1.24	1.26	5.36	2.98	2.02	4.31	8.22	8.40	3.96
Silver T-Ag	0.000015	<0.000030	<0.000020	<0.000010	<0.000010	<0.000020	<0.000010	<0.000010	<0.000030	<0.000010	<0.000010	<0.000020
Sodium T-Na	3.2	<2.0	<2.0	<2.0	<2.0	3.5	3.0	<2.0	<2.0	3.3	3.3	2.0
Strontium T-Sr	0.167	0.104	0.185	0.291	0.284	0.108	0.156	0.0439	0.103	0.0346	0.0328	0.141
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010
Titanium T-Ti	0.011	0.063	0.040	<0.010	<0.010	0.049	0.016	<0.010	0.055	<0.010	<0.010	0.031
Uranium T-U	0.000141	0.000706	0.000145	0.000179	0.000171	0.000655	0.000128	0.000028	0.000047	0.000073	0.000069	0.000126
Vanadium T-V	0.0015	0.0038	0.0030	<0.0010	<0.0010	0.0038	0.0018	<0.0010	0.0058	<0.0010	<0.0010	0.0026
Zinc T-Zn	0.0022	<0.0070	<0.0040	<0.0010	<0.0010	<0.0060	<0.0040	<0.0010	<0.0070	0.0068	0.0062	<0.0060
Dissolved Metals												
Aluminum D-Al	0.0086	0.0580	0.0096	0.0038	0.0039	0.0480	0.0088	0.0106	0.114	0.0570	0.0569	0.0292
Antimony D-Sb	0.00048	0.00016	0.00059	<0.00010	<0.00010	0.00011	0.00032	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic D-As	0.00068	0.00043	0.00102	0.00016	0.00014	0.00042	0.00069	0.00023	0.00120	0.00011	0.00011	0.00018
Barium D-Ba	0.0995	0.0555	0.0831	0.0522	0.0509	0.0486	0.0884	0.00895	0.0309	0.00386	0.00380	0.0256
Beryllium D-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron D-B	0.025	<0.010	<0.010	<0.010	<0.010	0.011	0.021	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium D-Cd	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000027	<0.000020
Calcium D-Ca	30.5	19.6	29.1	20.9	20.9	20.1	28.7	24.9	19.9	8.66	8.54	20.0
Chromium D-Cr	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00061	<0.00050	<0.00050	<0.00050
Cobalt D-Co	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper D-Cu	0.00032	0.00056	0.00037	0.00033	0.00029	0.00057	0.00035	0.00087	0.00095	0.00023	0.00022	0.00082
Iron D-Fe	<0.030	0.044	<0.030	<0.030	<0.030	0.037	<0.030	<0.030	0.086	0.037	0.037	<0.030
Lead D-Pb	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium D-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium D-Mg	16.1	4.85	22.8	11.3	11.2	5.38	13.3	1.06	3.46	3.14	3.07	5.11
Manganese D-Mn	0.0169	0.00821	0.0109	0.000248	0.000264	0.00483	0.00687	0.000073	0.00653	0.0625	0.0629	0.00205
Mercury D-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum D-Mo	0.000925	0.00209	0.000680	0.00180	0.00183	0.00205	0.000895	0.000631	0.000510	0.000553	0.000562	0.000689
Nickel D-Ni	0.00162	<0.00050	0.00060	<0.00050	<0.00050	<0.00050	0.00113	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus D-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium D-K	0.746	0.687	0.688	0.414	0.411	0.971	0.690	0.229	0.401	1.39	1.36	0.441
Selenium D-Se	<0.00050	<0.00050	0.00080	0.00080	<0.00050	<0.00050	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	0.00056
Silicon D-Si	1.67	2.37	1.25	1.13	1.09	3.26	2.00	1.91	1.32	7.72	7.89	2.64
Silver D-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium D-Na	3.1	<2.0	<2.0	<2.0	<2.0	3.4	2.9	<2.0	<2.0	3.1	3.1	<2.0
Strontium D-Sr	0.168	0.0935	0.180	0.286	0.281	0.0963	0.143	0.0451	0.0912	0.0336	0.0334	0.129
Thallium D-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin D-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium D-U	0.000128	0.000601	0.000117	0.000176	0.000178	0.000581	0.000111	0.000026	0.000029	0.000057	0.000055	0.000102
Vanadium D-V	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc D-Zn	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0039	0.0040	<0.0010
Organic Parameters												
Chemical Oxygen Demand COD	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (continued)

Sample ID	ST-2	SKC-1	SKC-2	SKC-3	Travel Blank	Field Blank	SC-1	SC-2	SC-3	SC-4	SC-5
Date Sampled	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06	5-Oct-06
Time Sampled											
ALS Sample ID	13	14	15	16	17	18	19	20	21	22	23
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests											
Colour (CU)	7.9	**<5.0**	6.9	8.7	**<5.0**	**<5.0**	6.3	**<5.0**	**<5.0**	**<5.0**	**<5.0**
Conductivity (uS/cm)	158	151	208	194	**<2.0**	**<2.0**	85.7	132	136	117	117
Total Dissolved Solids	94	92	136	111	**<10**	**<10**	51	75	79	67	66
Hardness CaCO3	73.3	72.6	104	97.0	**<0.50**	**<0.50**	42.1	63.4	68.5	54.6	55.2
pH	8.04	7.95	8.08	8.14	5.55	5.54	7.95	8.04	8.04	8.00	8.00
Total Suspended Solids	31.1	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	90.5	16.5	23.2	30.5	47.2
Turbidity (NTU)	23.4	0.65	0.43	0.52	**<0.10**	**<0.10**	89.5	37.5	33.4	35.1	39.6
Dissolved Anions											
Acidity (to pH 8.3) CaCO3	1.6	1.7	1.8	1.5	1.7	1.7	1.5	1.4	1.6	1.5	1.7
Alkalinity-Total CaCO3	62.1	52.8	100	95.0	**<2.0**	**<2.0**	39.4	56.4	60.0	53.7	50.7
Bromide Br	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Chloride Cl	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**
Fluoride F	0.058	0.027	0.041	0.041	**<0.020**	**<0.020**	0.022	**<0.020**	0.020	0.054	0.050
Sulphate SO4	17.3	22.3	21.4	4.27	**<0.50**	**<0.50**	5.71	9.82	9.88	7.69	7.13
Nutrients											
Ammonia Nitrogen N	0.0060	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Total Kjeldahl Nitrogen N	**<0.050**	**<0.050**	0.078	0.108	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Nitrate Nitrogen N	0.0080	0.0132	0.0322	0.0418	**<0.0050**	**<0.0050**	0.0242	0.0142	0.0149	0.0220	0.0195
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Nitrogen N	**<0.050**	**<0.050**	0.110	0.150	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Total Phosphate P	0.0449	0.0115	0.0043	0.0044	0.0020	0.0034	0.178	0.0425	0.0571	0.0489	0.0625
Cyanides											
Total Cyanide CN	0.0017	**<0.0010**	0.0010	0.0019	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Metals											
Aluminum T-Al	0.896	0.0317	0.0057	0.0095	**<0.0010**	**<0.0010**	3.79	2.08	1.91	1.86	1.72
Antimony T-Sb	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00013	0.00016	0.00011	**<0.00010**	**<0.00010**
Arsenic T-As	0.00055	0.00038	0.00029	0.00011	**<0.00010**	**<0.00010**	0.00099	0.00122	0.00106	0.00096	0.00090
Barium T-Ba	0.0424	0.00821	0.0122	0.00868	**<0.000050**	**<0.000050**	0.122	0.0888	0.0923	0.0859	0.0863
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Cadmium T-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	0.000021	**<0.000020**	0.000022	0.000026	**<0.000020**
Calcium T-Ca	22.1	25.4	33.5	32.4	**<0.020**	**<0.020**	15.4	22.9	21.8	20.1	19.9
Chromium T-Cr	0.00260	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00225	0.00284	0.00258	0.00230	0.00249
Cobalt T-Co	0.00062	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00169	0.00136	0.00121	0.00106	0.00109
Copper T-Cu	0.00313	0.00073	0.00051	0.00040	**<0.00010**	**<0.00010**	0.00868	0.00607	0.00562	0.00488	0.00487
Iron T-Fe	1.16	0.080	0.077	0.045	**<0.030**	**<0.030**	3.02	1.79	1.58	1.56	1.69
Lead T-Pb	0.000309	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	0.000849	0.000363	0.000322	0.000447	0.000489
Lithium T-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium T-Mg	5.95	1.74	4.95	4.51	**<0.0050**	**<0.0050**	3.66	4.62	4.21	3.62	3.37
Manganese T-Mn	0.0355	0.00794	0.0114	0.00690	**<0.000050**	**<0.000050**	0.105	0.0652	0.0617	0.0589	0.0689
Mercury T-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum T-Mo	0.000931	0.000860	0.000704	0.000365	**<0.000050**	**<0.000050**	0.00335	0.00335	0.00340	0.00457	0.00317
Nickel T-Ni	**<0.0030**	**<0.00050**	0.00059	**<0.00050**	**<0.00050**	**<0.00050**	0.00338	**<0.0030**	0.00355	**<0.0020**	**<0.0030**
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	0.801	0.283	0.468	0.353	**<0.050**	**<0.050**	1.49	1.01	0.954	1.01	0.941
Selenium T-Se	**<0.00050**	0.00133	0.00067	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Silicon T-Si	4.21	1.87	3.09	3.04	**<0.050**	**<0.050**	6.38	4.72	4.34	4.52	4.50
Silver T-Ag	**<0.000020**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000020**	**<0.000020**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	2.3	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Strontium T-Sr	0.131	0.0424	0.0708	0.0564	**<0.00010**	**<0.00010**	0.140	0.133	0.126	0.115	0.104
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium T-Ti	0.036	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	0.169	0.083	0.072	0.074	0.073
Uranium T-U	0.000240	0.000178	0.000146	0.000137	**<0.000010**	**<0.000010**	0.000513	0.000385	0.000386	0.00111	0.00108
Vanadium T-V	0.0029	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	0.0086	0.0056	0.0049	0.0040	0.0037
Zinc T-Zn	**<0.0060**	**<0.0010**	**<0.0010**	0.0013	**<0.0010**	**<0.0010**	**<0.0090**	**<0.0060**	0.0234	**<0.0060**	**<0.0050**
Dissolved Metals											
Aluminum D-Al	0.0314	0.0019	0.0035	0.0048	-	-	0.350	0.150	0.0889	0.118	0.0986
Antimony D-Sb	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic D-As	0.00023	0.00031	0.00027	**<0.00010**	-	-	0.00037	0.00068	0.00065	0.00053	0.00040
Barium D-Ba	0.0305	0.00799	0.0117	0.00821	-	-	0.0722	0.0660	0.0712	0.0599	0.0605
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron D-B	**<0.010**	**<0.010**	**<0.010**	**<0.010**	-	-	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Cadmium D-Cd	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	-	-	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium D-Ca	20.6	26.2	33.5	31.6	-	-	13.2	20.1	21.9	17.7	18.2
Chromium D-Cr	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Cobalt D-Co	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Copper D-Cu	0.00081	0.00042	0.00043	0.00028	-	-	0.00087	0.00081	0.00069	0.00053	0.00065
Iron D-Fe	**<0.030**	**<0.030**	**<0.030**	**<0.030**	-	-	0.194	0.095	0.049	0.063	0.074
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	-	-	0.000059	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Lithium D-Li	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	-	-	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium D-Mg	5.28	1.75	4.90	4.39	-	-	2.23	3.21	3.35	2.50	2.39
Manganese D-Mn	0.00143	0.00218	0.00210	0.000483	-	-	0.0222	0.0150	0.0164	0.0107	0.0113
Mercury D-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-	-	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum D-Mo	0.000963	0.000908	0.000711	0.000375	-	-	0.00370	0.00315	0.00354	0.00438	0.00308
Nickel D-Ni	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	-	-	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium D-K	0.573	0.285	0.461	0.339	-	-	0.644	0.540	0.550	0.520	0.502
Selenium D-Se	**<0.00050**	0.00062	0.00061	**<0.00050**	-	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Silicon D-Si	2.79	1.72	2.95	2.90	-	-	1.26	1.42	1.43	1.51	1.69
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-	-	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium D-Na	2.2	**<2.0**	**<2.0**	**<2.0**	-	-	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Strontium D-Sr	0.121	0.0428	0.0702	0.0562	-	-	0.122	0.114	0.124	0.0997	0.0922
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	-	-	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	-	-	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium D-U	0.000199	0.000167	0.000154	0.000140	-	-	0.000365	0.000313	0.000361	0.000917	0.000907
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-	-	0.0010	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc D-Zn	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	-	-	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Organic Parameters											
Chemical Oxygen Demand COD	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	30	**<20**	**<20**	**<20**	29

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

(continued)

Appendix 3.1-1
Raw Stream Water Quality Data, 2005/2006 (completed)

Sample ID	SC-2	SC-5	SC-4-1	SC-4-2	HC-1	MC-2	MC-5	MC-7	MC-9	WC-1	SKC-1	St 2	Travel Blank	Field Blank
Date Sampled	21-Nov-06	22-Nov-06	21-Nov-06	21-Nov-06	21-Nov-06	22-Nov-06	21-Nov-06	21-Nov-06	21-Nov-06	22-Nov-06	21-Nov-06	22-Nov-06		
Time Sampled														
ALS Sample ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests														
Colour (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (uS/cm)	186	166	175	177	171	427	210	417	226	108	164	203	<2.0	<2.0
Total Dissolved Solids	110	97	100	98	89	228	118	216	130	74	98	118	<10	<10
Hardness CaCO3	92.8	79.4	84.0	84.7	78.4	218	96.5	227	105	41.2	74.6	92.8	<0.50	<0.50
pH	8.01	8.04	8.06	8.07	8.05	8.07	8.13	8.22	8.14	7.88	7.94	8.11	5.66	5.57
Total Suspended Solids	<3.0	3.2	7.8	3.2	<3.0	3.2	4.2	8.8	8.2	3.8	<3.0	3.2	<3.0	<3.0
Turbidity (NTU)	1.61	1.38	3.07	1.97	4.45	1.38	2.60	2.45	4.50	1.02	0.46	4.73	<0.10	<0.10
Dissolved Anions														
Acidity (to pH 8.3) CaCO3	1.7	1.5	1.5	1.5	1.4	1.9	1.4	1.3	1.4	1.7	<1.0	1.4	1.7	<1.0
Alkalinity-Total CaCO3	86.3	80.8	81.9	80.9	72.8	221	99.1	215	111	43.5	57.9	79.3	<2.0	<2.0
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	<0.50	<0.50	<0.50	<0.50	<0.50	3.24	0.77	0.61	0.81	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride F	<0.020	0.052	0.051	0.053	<0.020	0.038	0.093	0.040	0.137	0.186	0.024	0.073	<0.020	<0.020
Sulphate SO4	18.3	11.6	13.3	13.3	18.8	25.2	15.2	27.3	14.6	11.7	25.8	22.4	<0.50	<0.50
Nutrients														
Ammonia Nitrogen N	0.0393	<0.0050	<0.0050	<0.0050	<0.0050	0.0053	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl Nitrogen N	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.051	<0.050	<0.050	<0.050	<0.050	0.067	<0.050	<0.050
Nitrate Nitrogen N	0.0333	0.0578	0.0504	0.0562	0.0341	0.0677	0.0519	0.0923	0.0579	0.0570	0.0439	0.0396	<0.0050	<0.0050
Nitrite Nitrogen N	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010
Total Nitrogen N	<0.050	0.080	0.120	0.070	<0.050	0.120	0.070	0.130	0.090	0.070	<0.050	0.090	<0.050	<0.050
Total Phosphate P	0.0053	0.0044	0.0109	0.0053	0.0056	0.0076	0.0056	0.0124	0.0184	0.0177	0.0021	0.0101	<0.0020	<0.0020
Cyanides														
Total Cyanide CN	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010
Total Metals														
Aluminum T-Al	0.0468	0.0396	0.0781	0.0549	0.0763	0.0097	0.0529	0.0156	0.0859	0.0740	0.0067	0.0812	<0.0010	<0.0010
Antimony T-Sb	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00030	<0.00010	0.00063	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic T-As	0.00059	0.00029	0.00053	0.00050	0.00128	0.00047	0.00034	0.00079	0.00039	0.00017	0.00032	0.00026	<0.00010	<0.00010
Barium T-Ba	0.0697	0.0804	0.0931	0.0929	0.0356	0.141	0.0691	0.0818	0.0532	0.00473	0.00852	0.0368	<0.000050	<0.000050
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	0.010	<0.010	<0.010	<0.010	0.010	0.059	0.016	<0.010	0.020	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium T-Cd	<0.000020	<0.000020	0.000026	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Calcium T-Ca	28.1	26.0	27.8	28.2	25.0	47.5	27.2	39.2	28.3	10.4	27.0	26.2	<0.020	<0.020
Chromium T-Cr	<0.00050	<0.00050	<0.00050	<0.00050	0.00077	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt T-Co	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	0.00028	<0.00010	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper T-Cu	0.00070	0.00053	0.00132	0.00068	0.00099	0.00040	0.00053	0.00033	0.00071	0.00023	0.00048	0.00085	<0.00010	<0.00010
Iron T-Fe	0.069	0.089	0.144	0.066	0.059	0.101	0.108	0.256	0.145	0.079	0.086	0.125	<0.030	<0.030
Lead T-Pb	<0.000050	<0.000050	0.000093	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000063	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium T-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0067	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium T-Mg	4.55	3.42	3.87	3.95	4.36	23.1	7.19	30.3	8.31	3.89	1.92	6.89	<0.0050	<0.0050
Manganese T-Mn	0.0152	0.0461	0.0247	0.0204	0.00326	0.0891	0.0300	0.0233	0.0165	0.0129	0.0125	0.00687	<0.000050	<0.000050
Mercury T-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum T-Mo	0.00791	0.00420	0.00725	0.00734	0.000683	0.00114	0.00243	0.000216	0.00221	0.000717	0.000863	0.00102	<0.000050	<0.000050
Nickel T-Ni	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00420	<0.00050	0.00071	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus T-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium T-K	0.568	0.519	0.593	0.581	0.440	0.951	0.795	0.663	1.33	1.56	0.285	0.708	<0.050	<0.050
Selenium T-Se	0.00065	<0.00050	0.00090	<0.00050	0.00061	<0.00050	<0.00050	0.00096	0.00050	<0.00050	0.00093	0.00062	<0.00050	<0.00050
Silicon T-Si	2.25	2.72	2.39	2.28	1.96	3.35	4.04	1.68	5.79	10.5	2.44	4.39	<0.050	<0.050
Silver T-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium T-Na	<2.0	<2.0	<2.0	<2.0	<2.0	8.6	4.1	3.1	7.8	5.1	<2.0	4.5	<2.0	<2.0
Strontium T-Sr	0.139	0.123	0.143	0.142	0.106	0.234	0.126	0.240	0.135	0.0445	0.0459	0.157	<0.00010	<0.00010
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium T-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium T-U	0.000377	0.000993	0.00106	0.00106	0.000035	0.000144	0.000591	0.000132	0.000624	0.000092	0.000146	0.000214	<0.000010	<0.000010
Vanadium T-V	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc T-Zn	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0023	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Metals														
Aluminum D-Al	<0.0090	<0.0060	0.0148	0.0119	0.0124	<0.0020	<0.0080	<0.0020	0.0083	0.0317	<0.0030	0.0095	-	-
Antimony D-Sb	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00029	<0.00010	0.00059	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Arsenic D-As	0.00054	0.00023	0.00040	0.00040	0.00122	0.00036	0.00028	0.00036	0.00034	0.00021	0.00028	0.00022	-	-
Barium D-Ba	0.0704	0.0796	0.0902	0.0915	0.0341	0.142	0.0665	0.0800	0.0515	0.00430	0.00824	0.0357	-	-
Beryllium D-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-
Boron D-B	0.010	<0.010	<0.010	<0.010	0.011	0.061	0.015	<0.010	0.020	<0.010	<0.010	<0.010	-	-
Cadmium D-Cd	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	-	-
Calcium D-Ca	29.5	26.2	27.4	27.6	24.6	48.1	27.0	39.8	28.5	10.2	26.8	26.0	-	-
Chromium D-Cr	<0.00050	<0.00050	<0.00050	<0.00050	0.00084	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-
Cobalt D-Co	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00024	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Copper D-Cu	<0.00040	<0.00040	<0.00040	<0.00090	<0.00040	<0.00040	<0.00050	<0.00020	<0.00070	<0.00030	<0.00040	<0.0010	-	-
Iron D-Fe	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.031	<0.030	<0.030	-	-
Lead D-Pb	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-
Lithium D-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0065	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-
Magnesium D-Mg	4.68	3.43	3.80	3.85	4.12	23.7	7.08	30.9	8.21	3.83	1.86	6.75	-	-
Manganese D-Mn	0.0134	0.0444	0.0164	0.0166	0.000488	0.0864	0.0247	0.0167	0.0111	0.00750	0.00927	0.00300	-	-
Mercury D-Hg	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	<0.000010	<0.000010	<0.000010	-	-
Molybdenum D-Mo	0.00839	0.00432	0.00740	0.00747	0.000731	0.00114	0.00253	0.000272	0.00241	0.000747	0.000853	0.00113	-	-
Nickel D-Ni	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00421	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-
Phosphorus D-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	-
Potassium D-K	0.582	0.522	0.566	0.579	0.427	0.975	0.781	0.672	1.34	1.53	0.279	0.706	-	-
Selenium D-Se	0.00071	<0.00050	0.00053	0.00085	0.00087	<0.00050	0.00068	0.00079	0.00081	<0.00050	0.00140	<0.00050	-	-
Silicon D-Si	2.13	2.55	2.13	2.12	1.80	3.19	3.71	1.58	5.14	10.1	2.26	3.97	-	-
Silver D-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-
Sodium D-Na	<2.0	<2.0	<2.0	<2.0	<2.0	8.3	3.9	3.0	7.1	4.9	<2.0	4.5	-	-
Strontium D-Sr	0.143	0.124	0.141	0.145	0.106	0.240	0.124	0.245	0.137	0.0443	0.0458	0.159	-	-
Thallium D-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Tin D-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-
Titanium D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-
Uranium D-U	0.000394	0.00102	0.00104	0.00105	0.000033	0.000140	0.000601	0.000134	0.000631	0.000083	0.000141	0.000217	-	-
Vanadium D-V	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	<0.0010	-	-
Zinc D-Zn	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	-	-
Organic Parameters														
Chemical Oxygen Demand COD	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

APPENDIX 3.1-2
SCHAFT CREEK PROJECT RELATIVE PERCENT DIFFERENCE RESULTS FOR STREAM WATER QUALITY, 2006

Appendix 3.1-2
Relative Percent Difference (RPD) Duplicate Results for Stream Water Quality

Sample ID	SKC-3	SKC-3	RPD %	MC-4	MC-4	RPD %	WC-1-1	WC-1-1	RPD %	SC-4	SC-4	RPD %	MC-4	MC-4	RPD %
Date Sampled	4/6/2006	QC# 495858		4/6/2006	QC# 495859		12/20/2006	QC# 535671		1/13/2005	QC# 483737		1/13/2005	QC# 483738	
Time Sampled															
ALS Sample ID	4			8			11			4			9		
Nature	Water			Water			Water			Water			Water		
Physical Tests															
Colour (CU)	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0
Conductivity (uS/cm)	223	221	0.901	379	384	1.31	119	117	1.69	196	198	1.02	338	339	0.295
Total Dissolved Solids	137	129	6.02	212	211	0.473				111	110	0.905	185	185	0
Hardness CaCO3	124	125	0.803	203	200	1.49	47.3	47.0	0.636	97.3	98.2	0.921	170	171	0.587
pH	8.11	8.13	0.246	8.12	8.12	0	7.92	7.85	0.888	8.14	8.14	0	8.26	8.26	0
Total Suspended Solids	<3.0	<3.0	0	<3.0	<3.0	0				3.6	3.6	0	<3.0	<3.0	0
Turbidity (NTU)	0.69	0.70	1.44	0.77	0.80	3.82	0.76	0.78	2.6	2.12	2.19	3.25	3.39	3.44	1.46
Dissolved Anions															
Acidity (to pH 8.3) CaCO3	2.8	2.5	11.3	3.2	3.1	3.17	2.2	1.6	31.6	<1.0	<1.0	0	<1.0	<1.0	0
Alkalinity-Total CaCO3	115	114	0.873	181	183	1.1	47.2	49.5	4.76	93.4	99.4	6.22	160	162	1.24
Bromide Br	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0
Chloride Cl	<0.50	<0.50	0	3.12	3.10	0.643	<0.50	<0.50	0	<0.50	<0.50	0	2.11	2.11	0
Fluoride F	0.040	0.039	2.53	0.100	0.099	1.01	0.190	0.188	1.06	0.065	0.063	3.13	0.090	0.090	0
Sulphate SO4	5.92	5.89	0.508	25.3	25.1	0.794	11.8	11.9	0.844	13.8	13.8	0	21.9	21.9	0
Nutrients															
Ammonia Nitrogen N	0.0287	0.0293	2.07	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0	0.0107	0.0107	0
Total Kjeldahl Nitrogen N	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0	0.219	0.219	0	0.262	0.262	0
Nitrate Nitrogen N	0.213	0.212	0.471	0.119	0.127	6.5	0.0691	0.0688	0.435	0.0877	0.0865	1.38	0.108	0.107	0.93
Nitrite Nitrogen N	0.0027	0.0028	3.64	<0.0010	<0.0010	0	<0.0010	<0.0010	0	0.0030	<0.0010	100	<0.0010	<0.0010	0
Total Nitrogen N	0.310	0.320	3.17	0.170	0.170	0	0.120	0.110	8.7	0.310	0.310	0	0.370	0.370	0
Total Phosphate P	<0.0020	<0.0020	0	<0.0020	<0.0020	0	0.0195	0.0198	1.53	0.0054	0.0054	0	0.0042	0.0043	2.35
Total Metals															
Aluminum T-Al	0.0061	0.0061	0	0.0096	0.0103	7.04	0.0633	0.0644	1.72	0.0242	0.0267	9.82	0.0484	0.0544	11.7
Antimony T-Sb	<0.00010	<0.00010	0	0.00023	0.00025	8.33	<0.00010	<0.00010	0	<0.00010	<0.00010	0	0.00026	0.00026	0
Arsenic T-As	<0.00010	<0.00010	0	0.00062	0.00062	0	0.00017	0.00017	0	0.00043	0.00044	2.3	0.00079	0.00081	2.5
Barium T-Ba	0.0101	0.0101	0	0.119	0.122	2.49	0.00482	0.00472	2.1	0.102	0.104	1.94	0.119	0.119	0
Beryllium T-Be	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Bismuth T-Bi	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Boron T-B	<0.010	<0.010	0	0.057	0.062	8.4	<0.010	<0.010	0	<0.010	<0.010	0	0.040	0.041	2.47
Cadmium T-Cd	<0.000020	<0.000020	0	<0.000020	<0.000020	0	<0.000020	<0.000020	0	0.000024	0.000026	8	<0.000020	<0.000020	0
Calcium T-Ca	40.4	40.4	0	47.0	47.2	0.425	11.2	11.3	0.889	30.3	32.4	6.7	39.8	41.3	3.7
Chromium T-Cr	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Cobalt T-Co	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0
Copper T-Cu	0.00020	0.00019	5.13	0.00036	0.00038	5.41	0.00025	0.00024	4.08	0.00072	0.00072	0	0.00071	0.00067	5.8
Iron T-Fe	0.084	0.097	14.4	0.047	0.049	4.17	0.054	0.053	1.87	0.072	0.076	5.41	0.132	0.124	6.25
Lead T-Pb	<0.000050	<0.000050	0	<0.000050	<0.000050	0	<0.000050	<0.000050	0	<0.000050	<0.000050	0	<0.000050	<0.000050	0
Lithium T-Li	<0.0050	<0.0050	0	0.0068	0.0070	2.9	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0
Magnesium T-Mg	5.90	5.87	0.51	20.8	20.9	0.48	4.38	4.46	1.81	4.52	4.64	2.62	16.9	17.2	1.76
Manganese T-Mn	0.00188	0.00186	1.07	0.0343	0.0353	2.87	0.0101	0.0103	1.96	0.0162	0.0171	5.41	0.0259	0.0261	0.769
Mercury T-Hg	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0
Molybdenum T-Mo	0.000444	0.000426	4.14	0.00137	0.00138	0.727	0.000769	0.000784	1.93	0.00861	0.00892	3.54	0.00124	0.00125	0.803
Nickel T-Ni	<0.00050	<0.00050	0	0.00157	0.00177	12	<0.00050	<0.00050	0	<0.00050	<0.00050	0	0.00139	0.00130	6.69
Phosphorus T-P	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0
Potassium T-K	<2.0	<2.0	0	<2.0	<2.0	0	1.67	1.69	1.19	0.593	0.600	1.17	0.879	0.893	1.58
Selenium T-Se	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	0.00084	<0.00050	50.7
Silicon T-Si	3.77	3.73	1.07	3.57	3.57	0	10.2	10.4	1.94	2.58	2.58	0	3.59	3.60	0.278
Silver T-Ag	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0
Sodium T-Na	<2.0	<2.0	0	9.2	9.3	1.08	4.8	4.7	2.11	<2.0	<2.0	0	6.7	6.8	1.48
Strontium T-Sr	0.0664	0.0656	1.21	0.211	0.215	1.88	0.0489	0.0489	0	0.167	0.171	2.37	0.197	0.199	1.01
Thallium T-Tl	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0
Tin T-Sn	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0
Titanium T-Ti	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0
Uranium T-U	0.000206	0.000208	0.966	0.000182	0.000190	4.3	0.000112	0.000112	0	0.00127	0.00129	1.56	0.000161	0.000152	5.75
Vanadium T-V	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0
Zinc T-Zn	<0.0010	<0.0010	0	<0.0010	<0.0010	0	0.0020	0.0019	5.13	<0.0010	<0.0010	0	0.0012	<0.0010	18.2
Dissolved Metals															
Aluminum D-Al	0.0053	0.0044	18.6	0.0034	0.0057	50.5	0.0338	0.0342	1.18	0.0060	0.0061	1.65	0.0040	0.0041	2.47
Antimony D-Sb	<0.00010	<0.00010	0	0.00026	0.00025	3.92	<0.00010	<0.00010	0	<0.00010	<0.00010	0	0.00026	0.00025	3.92
Arsenic D-As	<0.00010	<0.00010	0	0.00053	0.00053	0	0.00017	0.00016	6.06	0.00038	0.00035	8.22	0.00055	0.00056	1.8
Barium D-Ba	0.00988	0.00996	0.806	0.121	0.119	1.67	0.00459	0.00456	0.656	0.101	0.102	0.985	0.116	0.116	0
Beryllium D-Be	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Bismuth D-Bi	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Boron D-B	<0.010	<0.010	0	0.062	0.061	1.63	<0.010	<0.010	0	<0.010	<0.010	0	0.040	0.041	2.47
Cadmium D-Cd	<0.000020	<0.000020	0	<0.000020	<0.000020	0	<0.000020	<0.000020	0	0.000036	0.000034	5.71	<0.000020	<0.000020	0
Calcium D-Ca	40.0	40.4	0.995	47.1	46.3	1.71	11.5	11.4	0.873	31.5	31.8	0.948	40.3	40.7	0.988
Chromium D-Cr	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Cobalt D-Co	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0
Copper D-Cu	0.00022	0.00016	31.6	0.00046	0.00035	27.2	0.00076	0.00019	120	0.00055	0.00053	3.7	0.00052	0.00052	0
Iron D-Fe	0.032	<0.030	6.45	<0.030	<0.030	0	<0.030	<0.030	0	<0.030	<0.030	0	<0.030	<0.030	0
Lead D-Pb	<0.000050	<0.000050	0	<0.000050	<0.000050	0	<0.000050	<0.000050	0	<0.000050	<0.000050	0	<0.000050	<0.000050	0
Lithium D-Li	<0.0050	<0.0050	0	0.0066	0.0066	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0
Magnesium D-Mg	5.82	5.92	1.7	20.8	20.4	1.94	4.52	4.50	0.443	4.50	4.59	1.98	16.8	16.8	0
Manganese D-Mn	0.000426	0.000416	2.38	0.0327	0.0318	2.79	0.00338	0.00333	1.49	0.0145	0.0146	0.687	0.0177	0.0177	0
Mercury D-Hg	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0
Molybdenum D-Mo	0.000444	0.000445	0.225	0.00139	0.00141	1.43	0.000872	0.000819	6.27	0.00906	0.00900	0.664	0.00127	0.00132	3.86
Nickel D-Ni	<0.00050	<0.00050	0	0.00180	0.00177	1.68	<0.00050	<0.00050	0	<0.00050	<0.00050	0	0.00125	0.00131	4.69
Phosphorus D-P	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0
Potassium D-K	<2.0	<2.0	0	<2.0	<2.0	0	1.73	1.71	1.16	0.606	0.605	0.165	0.880	0.881	0.114
Selenium D-Se	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	0.00061	0.00050	19.8
Silicon D-Si	3.67	3.70	0.814	3.54	3.48	1.71	10.0	10.2	1.98	2.46	2.47	0.406	3.40	3.40	0
Silver D-Ag	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0
Sodium D-Na	<2.0	<2.0	0	9.3	9.0	3.28	4.7	4.7	0	<2.0	<2.0	0	6.6	6.6	0
Strontium D-Sr	0.0662	0.0664	0.302	0.211	0.208	1.43	0.0503	0.0501	0.398	0.170	0.169	0.59	0.196	0.196	0
Thallium D-Tl	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0
Tin D-Sn	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0
Titanium D-Ti	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0
Uranium D-U	0.000205	0.000211	2.88	0.000184	0.000184	0	0.000107	0.000111	3.67	0.00127	0.00128	0.784	0.000158	0.000152	3.87
Vanadium D-V	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0
Zinc D-Zn	<0.0010	<0.0010	0	<0.0010	<0.0010	0	0.0017	0.0014	19.4	<0.0010	<0.0010	0	<0.0010	<0.0010	0
Organic Parameters															
Chemical Oxygen Demand COD							<20	<20	0						
Total Organic Carbon C	1.65	1.69	2.4	0.66	0.66	0	0.61	0.58	5.04	0.50	0.51	1.98	1.00	0.97	3.05

(continued)

Appendix 3.1-2
Relative Percent Difference (RPD) Duplicate Results for Stream Water Quality (continued)

Sample ID	SKC-3-1	SKC-3-1	RPD %	HC-1	HC-1	RPD %	SKC-2	SKC-2	RPD %	SKC-1	SKC-1	RPD %	SC-2	SC-2	RPD %
Date Sampled	7/6/2006	QC# 510624		7/6/2006	QC# 510625		7/30/2006	QC# 514407		3/4/2006	QC# 490549		5/9/2006	QC# 501832	
Time Sampled															
ALS Sample ID	11			14			10			3			7		
Nature	Water			Water			Water			Water			Water		
Physical Tests															
Colour (CU)	6.1	6.4	**4.8**	**<5.0**	**<5.0**	**0**	6.4	6.3	**1.57**	**<5.0**	**<5.0**	**0**	**<5.0**	**<5.0**	**0**
Conductivity (uS/cm)	195	194	**0.514**	80.8	80.9	**0.124**	211	211	**0**	192	191	**0.522**	192	192	**0**
Total Dissolved Solids	115	113	**1.75**	65	66	**1.53**				115	110	**4.44**	110	111	**0.905**
Hardness CaCO3	97.7	95.9	**1.86**	39.7	38.6	**2.81**	99.5	105	**5.38**	96.2	96.0	**0.208**	94.6	94.5	**0.106**
pH	8.23	8.23	**0**	7.93	7.91	**0.253**	8.10	8.12	**0.247**	7.88	7.95	**0.884**	8.11	8.12	**0.123**
Total Suspended Solids	**<3.0**	3.0	**0**	40.5	40.5	**0**	**<3.0**	**<3.0**	**0**	**<3.0**	**<3.0**	**0**	**<3.0**	**<3.0**	**0**
Turbidity (NTU)	0.64	0.66	**3.08**	49.5	51.3	**3.57**	0.62	0.64	**3.17**	0.29	0.37	**24.2**	1.64	1.61	**1.85**
Dissolved Anions															
Acidity (to pH 8.3) CaCO3	**<1.0**	**<1.0**	**0**	1.1	1.2	**8.7**	1.9	1.8	**5.41**	4.4	3.8	**14.6**	1.2	1.3	**8**
Alkalinity-Total CaCO3	99.4	102	**2.58**	34.6	34.0	**1.75**	92.6	89.1	**3.85**	82.3	80.1	**2.71**	86.2	85.7	**0.582**
Bromide Br	**<0.050**	**<0.050**	**0**	-	-	**-**	**<0.050**	**<0.050**	**0**	**<0.050**	**<0.050**	**0**	**<0.050**	**<0.050**	**0**
Chloride Cl	**<0.50**	**<0.50**	**0**	-	-	**-**	**<0.50**	**<0.50**	**0**	**<0.50**	**<0.50**	**0**	**<0.50**	**<0.50**	**0**
Fluoride F	0.036	0.036	**0**	-	-	**-**	0.037	0.037	**0**	0.030	0.030	**0**	0.022	0.021	**4.65**
Sulphate SO4	3.96	3.94	**0.506**	-	-	**-**	20.3	20.4	**0.491**	24.1	24.1	**0**	15.6	15.6	**0**
Nutrients															
Ammonia Nitrogen N	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**
Total Kjeldahl Nitrogen N	0.054	0.051	**5.71**	**<0.050**	**<0.050**	**0**	0.149	0.149	**0**	0.871	0.881	**1.14**	**<0.050**	**<0.050**	**0**
Nitrate Nitrogen N	0.128	0.128	**0**	-	-	**-**	0.0508	0.0506	**0.394**	0.0787	0.0774	**1.67**	0.0398	0.0394	**1.01**
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**0**	-	-	**-**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	0.0012	**18.2**
Total Nitrogen N	0.190	0.190	**0**	**<0.050**	**<0.050**	**0**	0.200	0.210	**4.88**	0.950	0.960	**1.05**	0.100	0.100	**0**
Total Phosphate P	0.0039	0.0048	**20.7**	-	-	**-**	**<0.0020**	**<0.0020**	**0**	**<0.0020**	**<0.0020**	**0**	0.0053	0.0035	**40.9**
Total Metals															
Aluminum T-Al	0.0165	0.0146	**12.2**	1.35	1.43	**5.76**	0.0138	0.0118	**15.6**	0.0049	0.0058	**16.8**	0.0318	0.0292	**8.52**
Antimony T-Sb	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**
Arsenic T-As	0.00016	0.00015	**6.45**	0.00235	0.00236	**0.425**	0.00033	0.00033	**0**	0.00019	0.00019	**0**	0.00059	0.00062	**4.96**
Barium T-Ba	0.00937	0.00915	**2.38**	0.0291	0.0291	**0**	0.0129	0.0130	**0.772**	0.0118	0.0119	**0.844**	0.0728	0.0742	**1.9**
Beryllium T-Be	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**
Boron T-B	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**	0.011	0.012	**8.7**
Cadmium T-Cd	**<0.000020**	**<0.000020**	**0**	0.000020	**<0.000020**	**0.0000**	**<0.000020**	**<0.000020**	**0**	**<0.000020**	**<0.000020**	**0**	**<0.000020**	**<0.000020**	**0**
Calcium T-Ca	32.9	32.3	**1.84**	13.0	13.0	**0**	32.8	33.3	**1.51**	34.7	35.3	**1.71**	29.9	30.7	**2.64**
Chromium T-Cr	**<0.00050**	**<0.00050**	**0**	0.00431	0.00479	**10.5**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**
Cobalt T-Co	**<0.00010**	**<0.00010**	**0**	0.00177	0.00188	**6.03**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**
Copper T-Cu	0.00037	0.00034	**8.45**	0.00612	0.00604	**1.32**	0.00053	0.00052	**1.9**	0.00095	0.00095	**0**	0.00127	0.00129	**1.56**
Iron T-Fe	0.042	0.038	**10**	0.917	0.865	**5.84**	0.112	0.110	**1.8**	**<0.030**	**<0.030**	**0**	0.114	0.122	**6.78**
Lead T-Pb	**<0.000050**	**<0.000050**	**0**	0.000408	0.000402	**1.48**	**<0.000050**	**<0.000050**	**0**	**<0.000050**	**<0.000050**	**0**	**<0.000050**	**<0.000050**	**0**
Lithium T-Li	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**
Magnesium T-Mg	3.82	3.70	**3.19**	3.22	3.36	**4.26**	4.74	4.84	**2.09**	2.09	2.08	**0.48**	4.78	4.85	**1.45**
Manganese T-Mn	0.0112	0.0101	**10.3**	0.0463	0.0477	**2.98**	0.0202	0.0202	**0**	0.00426	0.00435	**2.09**	0.0337	0.0349	**3.5**
Mercury T-Hg	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**
Molybdenum T-Mo	0.000466	0.000434	**7.11**	0.000302	0.000296	**2.01**	0.000683	0.000723	**5.69**	0.000901	0.000923	**2.41**	0.0120	0.0124	**3.28**
Nickel T-Ni	**<0.00050**	**<0.00050**	**0**	0.00385	0.00444	**14.2**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**
Phosphorus T-P	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**
Potassium T-K	0.278	0.276	**0.722**	0.516	0.547	**5.83**	0.368	0.371	**0.812**	0.321	0.327	**1.85**	0.674	0.685	**1.62**
Selenium T-Se	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	0.00086	0.00084	**2.35**	**<0.00050**	0.00066	**27.6**
Silicon T-Si	2.98	2.97	**0.336**	2.41	2.07	**15.2**	3.04	3.11	**2.28**	2.70	2.68	**0.743**	2.28	2.41	**5.54**
Silver T-Ag	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**
Sodium T-Na	**<2.0**	**<2.0**	**0**	**<2.0**	**<2.0**	**0**	**<2.0**	**<2.0**	**0**	**<2.0**	**<2.0**	**0**	**<2.0**	**<2.0**	**0**
Strontium T-Sr	0.0563	0.0551	**2.15**	0.0598	0.0592	**1.01**	0.0683	0.0693	**1.45**	0.0474	0.0486	**2.5**	0.140	0.146	**4.2**
Thallium T-Tl	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**
Tin T-Sn	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**
Titanium T-Ti	**<0.010**	**<0.010**	**0**	0.027	0.023	**16**	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**
Uranium T-U	0.000174	0.000171	**1.74**	0.000038	0.000036	**5.41**	0.000147	0.000150	**2.02**	0.000212	0.000215	**1.41**	0.000361	0.000372	**3**
Vanadium T-V	**<0.0010**	0.0010	**0.0000**	0.0051	0.0054	**5.71**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**
Zinc T-Zn	**<0.0010**	**<0.0010**	**0**	0.0052	0.0050	**3.92**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**
Dissolved Metals															
Aluminum D-Al	0.0061	0.0054	**12.2**	0.177	0.171	**3.45**	0.0032	0.0031	**3.17**	0.0018	0.0023	**24.4**	0.0074	0.0063	**16.1**
Antimony D-Sb	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**
Arsenic D-As	0.00015	0.00013	**14.3**	0.00154	0.00151	**1.97**	0.00028	0.00030	**6.9**	0.00016	0.00016	**0**	0.00053	0.00054	**1.87**
Barium D-Ba	0.00899	0.00887	**1.34**	0.0206	0.0199	**3.46**	0.0123	0.0128	**3.98**	0.0117	0.0117	**0**	0.0721	0.0728	**0.966**
Beryllium D-Be	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**
Bismuth D-Bi	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**
Boron D-B	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**	0.012	0.011	**8.7**
Cadmium D-Cd	**<0.000020**	**<0.000020**	**0**	**<0.000020**	**<0.000020**	**0**	**<0.000020**	**<0.000020**	**0**	**<0.000020**	**<0.000020**	**0**	**<0.000020**	**<0.000020**	**0**
Calcium D-Ca	32.9	32.3	**1.84**	12.5	12.2	**2.43**	32.1	33.9	**5.45**	35.1	35.0	**0.285**	30.0	30.0	**0**
Chromium D-Cr	**<0.00050**	**<0.00050**	**0**	0.00078	0.00056	**32.8**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	0.00052	**<0.00050**	**3.92**
Cobalt D-Co	**<0.00010**	**<0.00010**	**0**	0.00017	0.00016	**6.06**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**
Copper D-Cu	0.00025	0.00023	**8.33**	0.00081	0.00079	**2.5**	0.00037	0.00040	**7.79**	**<0.00050**	**<0.00050**	**0**	0.00096	0.00095	**1.05**
Iron D-Fe	**<0.030**	**<0.030**	**0**	0.129	0.123	**4.76**	0.036	0.036	**0**	**<0.030**	**<0.030**	**0**	0.036	0.044	**20**
Lead D-Pb	**<0.000050**	**<0.000050**	**0**	**<0.000050**	**<0.000050**	**0**	**<0.000050**	**<0.000050**	**0**	**<0.000050**	**<0.000050**	**0**	**<0.000050**	**<0.000050**	**0**
Lithium D-Li	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**
Magnesium D-Mg	3.78	3.71	**1.87**	2.02	1.97	**2.51**	4.69	4.94	**5.19**	2.08	2.09	**0.48**	4.79	4.77	**0.418**
Manganese D-Mn	0.000435	0.000429	**1.39**	0.00691	0.00664	**3.99**	0.00664	0.00711	**6.84**	0.00361	0.00362	**0.277**	0.0270	0.0268	**0.743**
Mercury D-Hg	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**
Molybdenum D-Mo	0.000465	0.000450	**3.28**	0.000345	0.000340	**1.46**	0.000688	0.000722	**4.82**	0.000971	0.000943	**2.93**	0.0124	0.0126	**1.6**
Nickel D-Ni	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**
Phosphorus D-P	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**
Potassium D-K	0.279	0.269	**3.65**	0.307	0.294	**4.33**	0.355	0.374	**5.21**	0.325	0.326	**0.307**	0.665	0.665	**0**
Selenium D-Se	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**	0.00085	0.00090	**5.71**	**<0.00050**	**<0.00050**	**0**
Silicon D-Si	2.97	3.00	**1.01**	1.17	1.20	**2.53**	3.12	3.06	**1.94**	2.65	2.67	**0.752**	2.21	2.53	**13.5**
Silver D-Ag	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**
Sodium D-Na	**<2.0**	**<2.0**	**0**	**<2.0**	**<2.0**	**0**	**<2.0**	**<2.0**	**0**	**<2.0**	**<2.0**	**0**	**<2.0**	**<2.0**	**0**
Strontium D-Sr	0.0561	0.0546	**2.71**	0.0569	0.0555	**2.49**	0.0656	0.0710	**7.91**	0.0478	0.0482	**0.833**	0.141	0.143	**1.41**
Thallium D-Tl	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**
Tin D-Sn	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**	**<0.00010**	**<0.00010**	**0**
Titanium D-Ti	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**
Uranium D-U	0.000169	0.000166	**1.79**	0.000016	0.000015	**6.45**	0.000137	0.000155	**12.3**	0.000195	0.000208	**6.45**	0.000366	0.000370	**1.09**
Vanadium D-V	**<0.0010**	**<0.0010**	**0**	0.0013	0.0013	**0**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**
Zinc D-Zn	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**
Organic Parameters															
Chemical Oxygen Demand COD	**<20**	**<20**	**0**	**<20**	**<20**	**0**	**<20**	**<20**	**0**						
Total Organic Carbon C	2.93	2.99	**2.03**	**<0.50**	**<0.50**	**0**	3.17	3.03	**4.52**	0.95	0.96	**1.05**	1.13	1.07	**5.45**

(continued)

Appendix 3.1-2
Relative Percent Difference (RPD) Duplicate Results for Stream Water Quality (continued)

Sample ID	SKC-1	SKC-1	RPD %	MC-9	MC-9	RPD %	HC-1	HC-1	RPD %	MC-4	MC-4	RPD %	MC-8-2	MC-8-2	RPD %
Date Sampled	5/9/2006	QC# 501833		11/21/2006	QC# 532936		12/1/2005	QC# 478538		12/1/2005	QC# 478539		10/5/2006	QC# 527360	
Time Sampled															
ALS Sample ID	14			9			3			9			5		
Nature	Water			Water			Water			Water			Water		
Physical Tests															
Colour (CU)	6.6	6.6	0	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0
Conductivity (uS/cm)	158	157	0.635	226	225	0.443	191	195	2.07	277	275	0.725	200	200	0
Total Dissolved Solids	93	89	4.4				113	113	0	146	158	7.89			
Hardness CaCO3	77.5	78.1	0.771	105	107	1.89	102	99.3	2.68	141	144	2.11	98.3	101	2.71
pH	7.97	7.96	0.126	8.14	8.13	0.123	7.79	7.92	1.65	8.20	8.20	0	8.16	8.16	0
Total Suspended Solids	<3.0	<3.0	0				<3.0	<3.0	0	11.2	13.8	20.8	<3.0	<3.0	0
Turbidity (NTU)	0.85	0.86	1.17	4.50	4.82	6.87	3.48	3.58	2.83	25.4	25.7	1.17	6.73	6.59	2.1
Dissolved Anions															
Acidity (to pH 8.3) CaCO3	1.5	1.5	0	1.4	1.4	0	-	-	-	2.5	2.3	8.33	1.3	1.3	0
Alkalinity-Total CaCO3	66.9	69.3	3.52	111	108	2.74	103	98.4	4.57	139	153	9.59	96.1	91.7	4.69
Bromide Br	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0	<0.050	<0.050	0
Chloride Cl	<0.50	<0.50	0	0.81	0.80	1.24	<0.50	<0.50	0	1.56	1.56	0	<0.50	<0.50	0
Fluoride F	0.023	0.022	4.44				<0.020	<0.020	0	0.070	0.070	0	0.020	<0.020	0.0000
Sulphate SO4	12.9	12.9	0	14.6	14.5	0.687	15.3	15.2	0.656	19.0	19.0	0	17.5	17.6	0.57
Nutrients															
Ammonia Nitrogen N	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0
Total Kjeldahl Nitrogen N	0.099	0.101	2	<0.050	<0.050	0	0.174	0.174	0	0.216	0.216	0	<0.050	<0.050	0
Nitrate Nitrogen N	0.0085	0.0091	6.82	0.0579	0.0583	0.688	0.0556	0.0551	0.903	0.0942	0.0941	0.106	0.0065	0.0067	3.03
Nitrite Nitrogen N	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0
Total Nitrogen N	0.090	0.110	20	0.090	0.090	0	0.230	0.230	0	0.310	0.310	0	<0.050	<0.050	0
Total Phosphate P	0.0032	0.0033	3.08	0.0184	0.0184	0	0.0028	0.0034	19.4	0.0293	0.0309	5.32	0.0040	0.0053	28
Total Metals															
Aluminum T-Al	0.0124	0.0104	17.5	0.0859	0.0887	3.21	0.102	0.100	1.98	0.890	1.02	13.6	0.0449	0.0404	10.6
Antimony T-Sb	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	0.00041	0.00038	7.59	<0.00010	<0.00010	0
Arsenic T-As	0.00034	0.00034	0	0.00039	0.00038	2.6	0.00120	0.00122	1.65	0.00195	0.00163	17.9	0.00026	0.00025	3.92
Barium T-Ba	0.00957	0.00932	2.65	0.0532	0.0545	2.41	0.0401	0.0400	0.25	0.117	0.113	3.48	0.0548	0.0551	0.546
Beryllium T-Be	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Bismuth T-Bi	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Boron T-B	<0.010	<0.010	0	0.020	0.020	0	0.011	0.010	9.52	0.038	0.037	2.67	<0.010	<0.010	0
Cadmium T-Cd	<0.000020	<0.000020	0	<0.000020	<0.000020	0	<0.000020	<0.000020	0	<0.000020	0.000021	4.88	<0.000020	<0.000020	0
Calcium T-Ca	28.0	26.8	4.38	28.3	28.6	1.05	31.5	31.5	0	38.3	37.0	3.45	20.7	21.0	1.44
Chromium T-Cr	<0.00050	<0.00050	0	<0.00050	<0.00050	0	0.00094	0.00105	11.1	0.00165	0.00088	60.9	<0.00050	<0.00050	0
Cobalt T-Co	<0.00010	<0.00010	0	<0.00010	<0.00010	0	0.00011	0.00010	9.52	0.00054	0.00043	22.7	<0.00010	<0.00010	0
Copper T-Cu	0.00082	0.00084	2.41	0.00071	0.00077	8.11	0.00164	0.00159	3.1	0.00269	0.00222	19.1	0.00062	0.00061	1.63
Iron T-Fe	0.153	0.137	11	0.145	0.139	4.23	0.080	0.081	1.24	0.892	0.596	39.8	0.107	0.106	0.939
Lead T-Pb	<0.000050	<0.000050	0	0.000063	0.000057	10	<0.000050	<0.000050	0	0.000225	0.000220	2.25	<0.000050	<0.000050	0
Lithium T-Li	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0
Magnesium T-Mg	2.46	2.34	5	8.31	8.34	0.36	5.24	5.25	0.191	16.0	15.5	3.17	11.4	11.5	0.873
Manganese T-Mn	0.0177	0.0170	4.03	0.0165	0.0169	2.4	0.00353	0.00346	2	0.0464	0.0427	8.31	0.00619	0.00622	0.483
Mercury T-Hg	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0
Molybdenum T-Mo	0.000645	0.000653	1.23	0.00221	0.00224	1.35	0.000698	0.000701	0.429	0.00127	0.00119	6.5	0.00154	0.00154	0
Nickel T-Ni	<0.00050	<0.00050	0	<0.00050	<0.00050	0	0.00054	0.00051	5.71	0.00320	0.00275	15.1	<0.00050	<0.00050	0
Phosphorus T-P	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0
Potassium T-K	0.484	0.454	6.4	1.33	1.35	1.49	0.528	0.527	0.19	1.24	1.14	8.4	0.419	0.425	1.42
Selenium T-Se	0.00069	0.00076	9.66	0.00050	0.00085	51.9	<0.00050	<0.00050	0	0.00090	0.00080	11.8	0.00061	0.00080	27
Silicon T-Si	2.49	2.28	8.81	5.79	5.65	2.45	2.50	2.51	0.399	3.95	3.39	15.3	1.26	1.23	2.41
Silver T-Ag	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0
Sodium T-Na	<2.0	<2.0	0	7.8	7.7	1.29	<2.0	<2.0	0	5.0	4.9	2.02	<2.0	<2.0	0
Strontium T-Sr	0.0431	0.0417	3.3	0.135	0.138	2.2	0.129	0.130	0.772	0.189	0.186	1.6	0.284	0.289	1.75
Thallium T-Tl	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0
Tin T-Sn	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	0.00012	<0.00010	18.2	<0.00010	<0.00010	0
Titanium T-Ti	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0	0.017	<0.010	51.9	<0.010	<0.010	0
Uranium T-U	0.000154	0.000140	9.52	0.000624	0.000655	4.85	0.000039	0.000041	5	0.000160	0.000144	10.5	0.000171	0.000178	4.01
Vanadium T-V	<0.0010	<0.0010	0	0.0016	0.0017	6.06	<0.0010	<0.0010	0	0.0020	0.0013	42.4	<0.0010	<0.0010	0
Zinc T-Zn	<0.0010	<0.0010	0	<0.0010	<0.0010	0	0.0018	0.0014	25	<0.0070	<0.0070	0	<0.0010	<0.0010	0
Dissolved Metals															
Aluminum D-Al	0.0039	0.0038	2.6	0.0083	0.0095	13.5	0.0146	0.0143	2.08	0.0221	0.0233	5.29	0.0039	0.0043	9.76
Antimony D-Sb	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	0.00030	0.00031	3.28	<0.00010	<0.00010	0
Arsenic D-As	0.00027	0.00029	7.14	0.00034	0.00032	6.06	0.00112	0.00113	0.889	0.00069	0.00071	2.86	0.00014	0.00016	13.3
Barium D-Ba	0.00915	0.00934	2.06	0.0515	0.0528	2.49	0.0387	0.0376	2.88	0.0999	0.102	2.08	0.0509	0.0524	2.9
Beryllium D-Be	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Bismuth D-Bi	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Boron D-B	<0.010	<0.010	0	0.020	0.020	0	0.011	0.011	0	0.033	0.034	2.99	<0.010	<0.010	0
Cadmium D-Cd	<0.000020	<0.000020	0	<0.000020	<0.000020	0	<0.000020	<0.000020	0	<0.000020	<0.000020	0	<0.000020	<0.000020	0
Calcium D-Ca	27.1	27.4	1.1	28.5	29.0	1.74	32.3	31.3	3.14	33.3	33.9	1.79	20.9	21.4	2.36
Chromium D-Cr	<0.00050	<0.00050	0	<0.00050	<0.00050	0	0.00097	0.00084	14.4	<0.00050	<0.00050	0	<0.00050	<0.00050	0
Cobalt D-Co	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0
Copper D-Cu	0.00075	0.00080	6.45	<0.00070	0.00077	9.52	0.00105	0.00108	2.82	0.00073	0.00076	4.03	0.00029	0.00029	0
Iron D-Fe	0.066	0.068	2.99	<0.030	<0.030	0	<0.030	<0.030	0	<0.030	<0.030	0	<0.030	<0.030	0
Lead D-Pb	<0.000050	<0.000050	0	<0.000050	<0.000050	0	<0.000050	<0.000050	0	<0.000050	<0.000050	0	<0.000050	<0.000050	0
Lithium D-Li	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0	<0.0050	<0.0050	0
Magnesium D-Mg	2.37	2.38	0.421	8.21	8.38	2.05	5.28	5.14	2.69	14.1	14.3	1.41	11.2	11.5	2.64
Manganese D-Mn	0.00638	0.00642	0.625	0.0111	0.0112	0.897	0.000912	0.000909	0.329	0.0174	0.0179	2.83	0.000264	0.000277	4.81
Mercury D-Hg	<0.000010	<0.000010	0	0.000010	0.000011	9.52	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0
Molybdenum D-Mo	0.000658	0.000665	1.06	0.00241	0.00244	1.24	0.000759	0.000748	1.46	0.00118	0.00117	0.851	0.00183	0.00187	2.16
Nickel D-Ni	<0.00050	<0.00050	0	<0.00050	<0.00050	0	<0.00050	<0.00050	0	0.00113	0.00118	4.33	<0.00050	<0.00050	0
Phosphorus D-P	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0	<0.30	<0.30	0
Potassium D-K	0.464	0.462	0.432	1.34	1.36	1.48	0.528	0.521	1.33	0.875	0.898	2.59	0.411	0.426	3.58
Selenium D-Se	0.00069	0.00067	2.94	0.00081	0.00112	32.1	<0.00050	<0.00050	0	0.00100	0.00050	66.7	<0.00050	<0.00050	0
Silicon D-Si	2.43	2.48	2.04	5.14	5.15	0.194	2.24	2.19	2.26	2.82	2.80	0.712	1.09	1.11	1.82
Silver D-Ag	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0	<0.000010	<0.000010	0
Sodium D-Na	<2.0	<2.0	0	7.1	7.1	0	<2.0	<2.0	0	4.8	4.8	0	<2.0	<2.0	0
Strontium D-Sr	0.0424	0.0426	0.471	0.137	0.139	1.45	0.133	0.130	2.28	0.168	0.171	1.77	0.281	0.292	3.84
Thallium D-Tl	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0
Tin D-Sn	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0	<0.00010	<0.00010	0
Titanium D-Ti	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0	<0.010	<0.010	0
Uranium D-U	0.000148	0.000147	0.678	0.000631	0.000668	5.7	0.000039	0.000038	2.6	0.000130	0.000133	2.28	0.000178	0.000185	3.86
Vanadium D-V	<0.0010	<0.0010	0	0.0015	0.0015	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0	<0.0010	<0.0010	0
Zinc D-Zn	0.0037	0.0033	11.4	<0.0010	0.0015	40	<0.0010	0.0014	33.3	0.0022	0.0023	4.44	<0.0010	<0.0010	0
Organic Parameters															
Chemical Oxygen Demand COD				<20	<20	0							<20	<20	0
Total Organic Carbon C	1.96	1.94	1.03	0.98	1.00	2.02	1.13	1.16	2.62	1.95	1.92	1.55	0.87	0.87	0

(continued)

Appendix 3.1-2
Relative Percent Difference (RPD) Duplicate Results for Stream Water Quality (completed)

Sample ID	SC-1	SC-1	RPD %	HC-1	HC-1	RPD %
Date Sampled	9/4/2006	QC# 521420		9/4/2006	QC# 521421	
Time Sampled						
ALS Sample ID	18			22		
Nature	Water			Water		
Physical Tests						
Colour (CU)	**<5.0**	**<5.0**	**0**	**<5.0**	**<5.0**	**0**
Conductivity (uS/cm)	62.3	62.0	**0.483**	75.5	75.5	**0**
Total Dissolved Solids						
Hardness CaCO3	30.0	30.0	**0**	37.4	37.1	**0.805**
pH	8.22	8.14	**0.978**	8.10	8.06	**0.495**
Total Suspended Solids	1290	1300	**0.772**	294	294	**0**
Turbidity (NTU)	770	786	**2.06**	212	213	**0.471**
Dissolved Anions						
Acidity (to pH 8.3) CaCO3	1.1	1.6	**37**	2.0	2.2	**9.52**
Alkalinity-Total CaCO3	30.1	30.7	**1.97**	34.8	34.1	**2.03**
Bromide Br	**<0.050**	**<0.050**	**0**	**<0.050**	**<0.050**	**0**
Chloride Cl	**<0.50**	**<0.50**	**0**	**<0.50**	**<0.50**	**0**
Fluoride F	**<0.020**	**<0.020**	**0**	**<0.020**	**<0.020**	**0**
Sulphate SO4	1.80	1.81	**0.554**	5.23	5.21	**0.383**
Nutrients						
Ammonia Nitrogen N	**<0.0050**	**<0.0050**	**0**	**<0.0050**	**<0.0050**	**0**
Total Kjeldahl Nitrogen N	0.14	0.14	**0**	**<0.050**	**<0.050**	**0**
Nitrate Nitrogen N	0.0091	0.0094	**3.24**	**<0.0050**	**<0.0050**	**0**
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**0**	**<0.0010**	**<0.0010**	**0**
Total Nitrogen N	0.15	0.15	**0**	**<0.056**	**<0.056**	**0**
Total Phosphate P	0.120	0.116	**3.39**	0.161	0.168	**4.26**
Total Metals						
Aluminum T-Al	23.0	24.8	**7.53**	5.03	4.42	**12.9**
Antimony T-Sb	0.00037	0.00040	**7.79**	0.00013	0.00012	**8**
Arsenic T-As	0.00689	0.00730	**5.78**	0.00391	0.00371	**5.25**
Barium T-Ba	0.431	0.458	**6.07**	0.0477	0.0458	**4.06**
Beryllium T-Be	**<0.0010**	**<0.0010**	**0**	**<0.00050**	**<0.00050**	**0**
Bismuth T-Bi	**<0.0010**	**<0.0010**	**0**	**<0.00050**	**<0.00050**	**0**
Boron T-B	**<0.020**	**<0.020**	**0**	**<0.010**	**<0.010**	**0**
Cadmium T-Cd	0.000132	0.000144	**8.7**	0.000066	0.000075	**12.8**
Calcium T-Ca	38.9	39.7	**2.04**	16.6	15.6	**6.21**
Chromium T-Cr	0.0176	0.0187	**6.06**	0.0269	0.0232	**14.8**
Cobalt T-Co	0.0144	0.0150	**4.08**	0.00885	0.00813	**8.48**
Copper T-Cu	0.0829	0.0874	**5.28**	0.0196	0.0187	**4.7**
Iron T-Fe	24.3	25.1	**3.24**	6.65	6.19	**7.17**
Lead T-Pb	0.00665	0.00677	**1.79**	0.00122	0.00115	**5.91**
Lithium T-Li	0.015	0.015	**0**	**<0.0050**	**<0.0050**	**0**
Magnesium T-Mg	13.9	14.5	**4.23**	9.06	8.28	**9**
Manganese T-Mn	0.931	0.959	**2.96**	0.197	0.180	**9.02**
Mercury T-Hg	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**
Molybdenum T-Mo	0.00194	0.00209	**7.44**	0.000347	0.000313	**10.3**
Nickel T-Ni	0.0146	0.0157	**7.26**	0.0208	0.0190	**9.05**
Phosphorus T-P	1.69	1.70	**0.59**	**<0.30**	**<0.30**	**0**
Potassium T-K	4.75	5.20	**9.05**	0.945	0.865	**8.84**
Selenium T-Se	0.00053	0.00232	**126**	-	-	**-**
Silicon T-Si	30.8	32.3	**4.75**	10.8	9.71	**10.6**
Silver T-Ag	0.000118	0.000116	**1.71**	**<0.000030**	**<0.000030**	**0**
Sodium T-Na	2.7	2.9	**7.14**	**<2.0**	**<2.0**	**0**
Strontium T-Sr	0.193	0.203	**5.05**	0.0687	0.0660	**4.01**
Thallium T-Tl	**<0.00020**	**<0.00020**	**0**	**<0.00010**	**<0.00010**	**0**
Tin T-Sn	0.00025	0.00022	**12.8**	**<0.00010**	**<0.00010**	**0**
Titanium T-Ti	1.10	1.20	**8.7**	0.263	0.242	**8.32**
Uranium T-U	0.00158	0.00158	**0**	0.000067	0.000063	**6.15**
Vanadium T-V	0.0670	0.0719	**7.06**	0.0186	0.0166	**11.4**
Zinc T-Zn	0.0637	0.0684	**7.12**	0.0180	0.0165	**8.7**
Dissolved Metals						
Aluminum D-Al	0.626	0.671	**6.94**	0.177	0.165	**7.02**
Antimony D-Sb	**<0.00020**	**<0.00020**	**0**	**<0.00010**	**<0.00010**	**0**
Arsenic D-As	0.00044	0.00038	**14.6**	0.00107	0.00108	**0.93**
Barium D-Ba	0.0652	0.0655	**0.459**	0.0179	0.0177	**1.12**
Beryllium D-Be	**<0.0010**	**<0.0010**	**0**	**<0.00050**	**<0.00050**	**0**
Bismuth D-Bi	**<0.0010**	**<0.0010**	**0**	**<0.00050**	**<0.00050**	**0**
Boron D-B	**<0.020**	**<0.020**	**0**	**<0.010**	**<0.010**	**0**
Cadmium D-Cd	**<0.000040**	**<0.000040**	**0**	**<0.000020**	**<0.000020**	**0**
Calcium D-Ca	10.0	9.96	**0.401**	12.0	11.9	**0.837**
Chromium D-Cr	**<0.0010**	**<0.0010**	**0**	0.00058	0.00064	**9.84**
Cobalt D-Co	**<0.00020**	**<0.00020**	**0**	0.00017	0.00017	**0**
Copper D-Cu	0.00151	0.00161	**6.41**	**<0.00070**	**<0.00070**	**0**
Iron D-Fe	0.365	0.374	**2.44**	0.133	0.131	**1.52**
Lead D-Pb	0.00016	0.00012	**28.6**	**<0.000050**	**<0.000050**	**0**
Lithium D-Li	**<0.010**	**<0.010**	**0**	**<0.0050**	**<0.0050**	**0**
Magnesium D-Mg	1.21	1.25	**3.25**	1.82	1.82	**0**
Manganese D-Mn	0.00972	0.0100	**2.84**	0.0101	0.00985	**2.51**
Mercury D-Hg	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**
Molybdenum D-Mo	0.00138	0.00134	**2.94**	0.000269	0.000270	**0.371**
Nickel D-Ni	**<0.0010**	**<0.0010**	**0**	**<0.00050**	**<0.00050**	**0**
Phosphorus D-P	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**
Potassium D-K	0.62	0.62	**0**	0.303	0.295	**2.68**
Selenium D-Se						
Silicon D-Si	1.55	1.64	**5.64**	0.934	0.963	**3.06**
Silver D-Ag	**<0.000020**	**<0.000020**	**0**	**<0.000010**	**<0.000010**	**0**
Sodium D-Na	**<2.0**	**<2.0**	**0**	**<2.0**	**<2.0**	**0**
Strontium D-Sr	0.0824	0.0832	**0.966**	0.0518	0.0518	**0**
Thallium D-Tl	**<0.00020**	**<0.00020**	**0**	**<0.00010**	**<0.00010**	**0**
Tin D-Sn	**<0.00020**	**<0.00020**	**0**	**<0.00010**	**<0.00010**	**0**
Titanium D-Ti	0.018	0.019	**5.41**	**<0.010**	**<0.010**	**0**
Uranium D-U	0.000141	0.000147	**4.17**	**<0.000010**	0.000013	**26.1**
Vanadium D-V	**<0.0020**	**<0.0020**	**0**	**<0.0010**	**<0.0010**	**0**
Zinc D-Zn	**<0.0020**	**<0.0020**	**0**	**<0.0010**	0.0010	**0.0000**
Organic Parameters						
Chemical Oxygen Demand COD	69	81	**16**	27	31	**13.8**
Total Organic Carbon C	**<0.50**	**<0.50**	**0**	**<0.50**	**<0.50**	**0**

APPENDIX 3.1-3
SCHAFT CREEK PROJECT RAW STREAM SEDIMENT DATA, 2006

Appendix 3.1-3
Schaft Creek Project Raw Stream Sediment Data, 2006

Sample ID	HC-1 Rep1			MC-5 Rep1			SC-5 Rep1			WC-1 Rep1						
Date Sampled	8/31/2006			9/1/2006			9/1/2006			9/1/2006						
Time Sampled	15:00	15:00	15:00	8:45	8:45	8:45	11:40	11:40	11:40	15:40	15:40	15:40				
ALS Sample ID	1	2	3	4	5	6	7	8	9	10	11	12	Avaliable Guideline Values			
Nature	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	LEL	SEL	ISQG	PEL
Physical Tests																
Moisture %	19.9	17.2	17.8	22.1	21.5	16.8	23.2	20.3	21.9	27.4	27.4	30.5				
pH	8.92	8.92	9.12	8.71	8.63	8.63	8.79	8.73	8.69	7.97	7.89	7.94				
Total Metals																
Aluminum T-Al	8320	7710	9500	10100	9690	9440	9880	10700	10400	15400	14800	17000				
Antimony T-Sb	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**				
Arsenic T-As	2.60	2.98	3.35	2.93	2.60	2.64	2.66	2.53	2.64	3.46	3.91	1.96	6	33	5.9	17
Barium T-Ba	13.0	13.6	28.0	55.5	50.9	60.3	78.6	70.8	79.2	92.5	79.5	95.7				
Beryllium T-Be	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	1.71	1.56	1.82				
Bismuth T-Bi	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**				
Cadmium T-Cd	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	0.45	0.45	0.83[1,3]	0.6	10	0.6	3.5
Calcium T-Ca	11900	9280	13700	10500	10800	9940	11200	11700	12600	6250	5670	6730				
Chromium T-Cr	326[1,2,3,4]	421[1,2,3,4]	319[1,2,3,4]	75.3[1,3]	178[1,2,34]	71[1,3]	228[1,2,3,4]	101[1,3,4]	111[1,2,3,4]	17.4	20.0	20.5	26	110	37.3	90
Cobalt T-Co	22.2	22.5	22.7	7.8	11.0	7.8	11.6	8.7	8.9	9.2	10.4	11.3				
Copper T-Cu	24.1	21.8	50.9[1,2]	22.3	25.1	23.3	24.7	25.9	26.1	10.6	10.7	12.4	16	110	35.7	197
Iron T-Fe	45500[1,2]	57100[1,2]	46500[1,2]	24900[1,2]	47000[1,2]	26400[1,2]	65200[1,2]	33900[1,2]	37500[1,2]	36700[1,2]	38100[1,2]	44200[1,2]	21,200	43,766		
Lead T-Pb	**<2**	**<2**	**<2**	2.8	2.9	3.0	3.0	2.8	3.1	5.8	5.4	6.8	31	250	35	91.3
Lithium T-Li	3.1	2.9	3.6	5.4	4.9	5.4	4.9	5.6	5.3	7.3	6.9	8.6				
Magnesium T-Mg	22800	17800	23500	8550	9400	8280	8700	8980	8780	5070	6890	6820				
Manganese T-Mn	363	324	396	385	404	372	391	387	389	1050	1060	1110				
Mercury T-Hg	**<0.005**	**<0.005**	**<0.005**	0.0067	0.0054	0.0121	0.0057	0.0057	0.0057	0.0406	0.0635	0.0459	0.2	2	0.17	0.486
Molybdenum T-Mo	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**				
Nickel T-Ni	66.2[1,]	66.3[1,]	68.9[1,]	20.8[1,]	30.6[1,]	19.9[1,]	30.8[1,]	22.6[1,]	22[1,]	22.7[1,]	28.1[1,]	29.1[1,]	16	75		
Phosphorus T-P	188	205	234	525	467	538	552	574	693	525	485	257				
Potassium T-K	360	270	420	1180	800	940	1010	1240	1140	1930	1670	1800				
Selenium T-Se	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	5			
Silver T-Ag	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**				
Sodium T-Na	280	280	330	370	320	360	320	370	370	1240	1140	1360				
Strontium T-Sr	26.4	23.9	33.4	41.6	46.1	38.9	48.0	47.2	49.1	48.7	47.6	54.8				
Thallium T-Tl	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**				
Tin T-Sn	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**				
Titanium T-Ti	892	819	943	925	1090	788	1050	899	771	1040	1040	691				
Vanadium T-V	146	200	151	85.1	168	84.5	241	118	132	43.2	43.8	48.7				
Zinc T-Zn	28.9	29.9	31.6	32.5	36.5	33.9	39.0	31.9	32.4	152[1,2]	136[1,2]	143[1,2]	120	820	123	315
Organic Parameters																
Total Organic Carbon C	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	**<0.05**	0.180	0.230	0.270	0.180				
Particle Size																
Gravel (>2.00m (%)	**<1**	13.3	7.60	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	12.1	8.20	5.20				
Sand (2.00mm - 0.063mm) (%)	96.1	84.3	88.8	91.1	99.2	87.5	90.4	80.4	74.7	79.8	82.4	86.6				
Silt (0.063mm - 4um) (%)	3.80	2.10	2.50	8.10	0.10	12.0	8.70	18.8	24.9	6.10	7.30	6.40				
Clay (<4um) (%)	0.10	0.30	1.10	0.80	0.70	0.50	0.90	0.80	0.40	2.00	2.10	1.80				

< = Less than the detection limit indicated.

(continued)

Results are expressed as milligrams per dry kilogram except where noted.

Total Organic Carbon results are expressed as percent, dry weight basis.

[1, 2, 3, 4] **indicate guidelines exceeded by the metal concentration: 1 - BC LEL, 2 - BC SEL, 3 - CCME ISQG, 4 - CCME PEL**

Appendix 3.1-3
Schaft Creek Project Raw Stream Sediment Data, 2006 (continued)

Sample ID	MC-8 Rep1			MC-1 Rep1			MC-7 Rep1			MC-6 Rep1						
Date Sampled	9/2/2006			9/2/2006			9/2/2006			9/3/2006						
Time Sampled	8:45	8:45	8:45	12:30	12:30	12:30	14:30	14:30	14:30	8:30	8:30	8:30				
ALS Sample ID	13	14	15	16	17	18	19	20	21	22	23	24	Avaliable Guideline Values			
Nature	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	LEL	SEL	ISQG	PEL
Physical Tests																
Moisture %	20.7	27.5	21.8	23.5	21.0	24.8	23.4	24.7	17.6	26.1	17.1	20.6				
pH	8.42	8.37	8.45	8.32	8.33	8.48	8.43	8.43	8.58	8.37	8.48	8.49				
Total Metals																
Aluminum T-Al	16500	13600	14400	13300	18500	14300	15500	15300	12000	15300	12900	16800				
Antimony T-Sb	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**				
Arsenic T-As	18[1,3,4]	22.3[1,3,4]	16.4	43.6[1,2,3,4]	26[1,3,4]	53.6[1,2,3,4]	59.2[1,2,3,4]	57.5[1,2,3,4]	28.5[1,3,4]	30.1[1,3,4]	23.5[1,3,4]	26.4[1,3,4]	6	33	5.9	17
Barium T-Ba	156	145	127	85.0	147	154	84.1	193	118	178	108	172				
Beryllium T-Be	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**				
Bismuth T-Bi	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**				
Cadmium T-Cd	0.17	0.18	0.17	0.19	0.17	0.16	0.26	0.28	0.34	0.38	0.32	0.31	0.6	10	0.6	3.5
Calcium T-Ca	19300	20800	19100	24100	20200	24100	32400	28300	24100	27200	25100	27100				
Chromium T-Cr	41.9[1,3]	42.9[1,3]	34.5	38.3[1,3]	35.5	38.7[1,3]	58[1,3]	46.8[1,3]	38.4[1,3]	53.4[1,3]	58.4[1,3]	64.4[1,3]	26	110	37.3	90
Cobalt T-Co	17.9	17.8	16.0	22.5	19.3	22.6	27.5	22.8	18.0	17.7	16.6	17.9				
Copper T-Cu	47.8[1,3]	50.6[1,3]	42.8[1,3]	59.6[1,3]	47.8[1,3]	57.9[1,3]	78.3[1,3]	61[1,3]	47.4[1,3]	51.9[1,3]	50.3[1,3]	51.8[1,3]	16	110	35.7	197
Iron T-Fe	44100[1,2]	42800[1,2]	41400[1,2]	52900[1,2]	48700[1,2]	52500[1,2]	75400[1,2]	54700[1,2]	45300[1,2]	42300[1,]	431001,	46400[1,2]	21,200	43,766		
Lead T-Pb	4.5	5.2	4.5	4.5	3.7	4.7	6.9	6.3	4.6	8.4	6.9	7.6	31	250	35	91.3
Lithium T-Li	14.5	11.8	13.3	11.4	12.1	12.3	12.1	13.0	11.2	10.2	9.1	11.2				
Magnesium T-Mg	19500	18500	18000	21500	18400	20900	27200	24200	22000	19400	18300	19900				
Manganese T-Mn	848	907	888	951	1010	935	1090	977	912	888	881	912				
Mercury T-Hg	0.0232	0.0277	0.0278	0.205[1,]	0.129	0.191[3,]	0.152	0.174[3,]	0.111	0.115	0.0993	0.0966	0.2	2	0.17	0.486
Molybdenum T-Mo	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**				
Nickel T-Ni	40[1,]	40.1[1,]	34.4[1,]	50.7[1,]	40[1,]	49.8[1,]	67.5[1,]	58.9[1,]	49.2[1,]	52.5[1,]	48[1,]	51.7[1,]	16	75		
Phosphorus T-P	1210	1170	1050	1350	1320	1330	1450	1500	949	1140	1060	1150				
Potassium T-K	1640	1620	1310	1940	2670	2750	2610	2660	1620	2620	1880	3040				
Selenium T-Se	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	5			
Silver T-Ag	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**				
Sodium T-Na	200	**<200**	**<200**	250	340	270	370	340	220	370	290	370				
Strontium T-Sr	94.4	101	99.5	86.8	91.9	92.2	105	109	83.1	89.3	80.4	94.3				
Thallium T-Tl	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**				
Tin T-Sn	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**				
Titanium T-Ti	245	244	207	153	295	176	229	194	105	245	162	228				
Vanadium T-V	52.6	51.8	47.2	67.5	69.1	72.0	103	76.0	56.7	75.9	79.7	87.5				
Zinc T-Zn	68.8	60.0	62.2	57.4	60.7	52.9	80.8	66.4	68.1	60.2	55.9	61.3	120	820	123	315
Organic Parameters																
Total Organic Carbon C	0.280	0.310	0.280	0.110	0.520	0.200	0.090	0.140	0.090	0.170	0.080	0.110				
Particle Size																
Gravel (>2.00m (%)	6.40	3.10	3.80	2.40	3.30	**<1**	**<1**	3.70	8.20	**<1**	**<1**	**<1**				
Sand (2.00mm - 0.063mm) (%)	68.3	64.7	76.0	85.3	82.7	82.4	71.9	69.8	77.0	43.0	61.7	54.8				
Silt (0.063mm - 4um) (%)	23.3	32.1	17.5	10.3	11.2	17.5	25.8	24.5	12.5	53.5	34.2	43.0				
Clay (<4um) (%)	2.00	0.10	2.70	2.00	2.80	0.10	2.30	2.00	2.30	3.50	4.10	2.20				

< = Less than the detection limit indicated.

(continued)

Results are expressed as milligrams per dry kilogram except where noted.

Total Organic Carbon results are expressed as percent, dry weight basis.

[1, 2, 3, 4] indicate guidelines exceeded by the metal concentration: 1 - BC LEL, 2 - BC SEL, 3 - CCME ISQG, 4 - CCME PEL

Appendix 3.1-3
Schaft Creek Project Raw Stream Sediment Data, 2006 (continued)

Sample ID	MC-2 Rep1			MT-1 Rep1			SC-1 Rep1			SC-4 Rep1						
Date Sampled	9/3/2006			9/3/2006			9/3/2006			9/4/2006						
Time Sampled	11:00	11:00	11:00	13:30	13:30	13:30	15:30	15:30	15:30	9:00	9:00	9:00				
ALS Sample ID	25	26	27	28	29	30	31	32	33	34	35	36	Avaliable Guideline Values			
Nature	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	LEL	SEL	ISQG	PEL
Physical Tests																
Moisture %	21.8	32.2	26.8	17.3	19.0	17.7	13.6	19.9	21.5	19.1	23.5	18.4				
pH	8.50	8.30	8.43	8.39	8.70	8.79	9.02	8.95	8.93	8.74	8.72	8.77				
Total Metals																
Aluminum T-Al	17500	13900	14300	19500	20000	24000	11900	11400	11400	12100	15100	12600				
Antimony T-Sb	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**				
Arsenic T-As	22.6[1,3,4]	29.7[1,3,4]	21.2[1,3,4]	0.639	0.268	0.400	1.45	1.76	5.1	1.63	1.46	1.54	6	33	5.9	17
Barium T-Ba	308	144	199	50.4	47.4	61.6	195	118	177	92.4	99.8	81.1				
Beryllium T-Be	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**				
Bismuth T-Bi	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**				
Cadmium T-Cd	0.29	0.33	0.29	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	0.6	10	0.6	3.5
Calcium T-Ca	27900	24700	26500	18000	15600	20000	18500	14600	12000	14300	16200	14300				
Chromium T-Cr	60.2[1,3]	54.5[1,3]	51.7[1,3]	115[1,2,3,4]	160[1,2,3,4]	175[1,2,3,4]	53[1,3]	21.8	12.0	115[1,2,3,4]	116[1,2,3,4]	78.2[1,3]	26	110	37.3	90
Cobalt T-Co	18.5	18.3	17.9	19.3	19.5	22.2	8.4	6.8	5.2	11.3	12.6	10.2				
Copper T-Cu	55.2[1,3]	54.6[1,3]	51.7[1,3]	58.9[1,3]	63.5[1,3]	86.8[1,3]	42[1,3]	30.2	44.4[1,3]	35.6	39.6[1,3]	34.3	16	110	35.7	197
Iron T-Fe	47400[1,2]	44100[1,2]	44200[1,2]	45200[1,2]	53800[1,2]	60200[1,2]	50900[1,2]	23900[1,]	17000	41400[1,]	42100[1,]	30100[1,]	21,200	43,766		
Lead T-Pb	7.1	7.8	6.2	4.4	5.2	5.8	3.2	3.4	2.2	3.3	3.7	3.3	31	250	35	91.3
Lithium T-Li	11.8	9.8	10.3	14.1	14.9	17.0	7.7	7.5	5.8	7.4	8.7	7.6				
Magnesium T-Mg	21600	19300	20900	23700	21900	25300	6910	6380	5050	10100	11700	10200				
Manganese T-Mn	979	953	998	690	745	871	433	357	399	443	514	426				
Mercury T-Hg	0.0833	0.111	0.0952	**<0.005**	**<0.005**	**<0.005**	0.0169	0.0099	**<0.005**	0.0094	0.0106	0.0073	0.2	2	0.17	0.486
Molybdenum T-Mo	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**				
Nickel T-Ni	56.9[1,]	53.9[1,]	55.5[1,]	48.6[1,]	49.2[1,]	55.6[1,]	9.2	6.8	**<0.5**	24.8[1,]	27.5[1,]	22.8[1,]	16	75		
Phosphorus T-P	1210	1160	1100	269	149	185	429	592	537	444	396	417				
Potassium T-K	2990	1900	1900	1010	670	1090	1160	1220	2530	1040	1570	1250				
Selenium T-Se	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	5			
Silver T-Ag	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**				
Sodium T-Na	380	310	310	570	500	680	330	300	**<200**	400	540	430				
Strontium T-Sr	97.8	82.4	87.0	72.8	70.1	89.4	65.1	48.1	51.2	52.1	63.7	52.6				
Thallium T-Tl	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**				
Tin T-Sn	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**				
Titanium T-Ti	324	295	251	719	750	964	485	657	388	429	615	451				
Vanadium T-V	85.6	77.5	75.1	158	180	197	181	78.4	44.3	135	137	94.9				
Zinc T-Zn	63.9	60.4	60.2	58.7	59.7	68.3	32.6	29.6	25.3	35.7	41.2	33.8	120	820	123	315
Organic Parameters																
Total Organic Carbon C	0.270	0.330	0.420	**<0.05**	0.280	0.050	**<0.05**	**<0.05**	0.050	0.070	0.190	0.080				
Particle Size																
Gravel (>2.00m (%)	**<1**	**<1**	**<1**	1.50	2.50	1.80	0.50	**<1**	**<1**	**<1**	**<1**	2.70				
Sand (2.00mm - 0.063mm) (%)	65.0	37.2	69.7	85.1	86.1	77.5	85.9	84.5	88.4	62.2	58.6	64.5				
Silt (0.063mm - 4um) (%)	33.3	57.1	28.9	11.5	9.60	19.0	12.6	14.9	10.2	36.2	39.1	31.4				
Clay (<4um) (%)	1.70	5.70	1.40	1.90	1.80	1.70	1.00	0.60	1.40	1.60	2.30	1.40				

< = Less than the detection limit indicated.

(continued)

Results are expressed as milligrams per dry kilogram except where noted.

Total Organic Carbon results are expressed as percent, dry weight basis.

[1, 2, 3, 4] **indicate guidelines exceeded by the metal concentration: 1 - BC LEL, 2 - BC SEL, 3 - CCME ISQG, 4 - CCME PEL**

Appendix 3.1-3
Schaft Creek Project Raw Stream Sediment Data, 2006 (continued)

Sample ID	SC-3 Rep1			SC-2 Rep1			SKC-2 Rep1			SKC-3 Rep1						
Date Sampled	9/4/2006			9/4/2006			9/5/2006			9/5/2006						
Time Sampled	11:30	11:30	11:30	14:00	14:00	14:00	9:00	9:00	9:00	12:00	12:00	12:00				
ALS Sample ID	37	38	39	40	41	42	43	44	45	46	47	48	Avaliable Guideline Values			
Nature	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	LEL	SEL	ISQG	PEL
Physical Tests																
Moisture %	19.1	19.6	17.2	29.2	16.1	26.6	30.0	37.8	44.5	46.2	48.5	60.9				
pH	8.92	8.74	8.93	8.90	8.86	8.89	7.92	7.80	7.38	7.54	7.23	7.33				
Total Metals																
Aluminum T-Al	11600	12600	11500	10600	12300	11500	16200	21300	24500	16700	17000	17200				
Antimony T-Sb	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**				
Arsenic T-As	1.49	**<0.5**	2.26	2.76	2.39	2.77	8.8[1,2]	**<0.5**	9.4[1,2]	**<0.5**	7.4[1,2]	8[1,2]	6	33	5.9	17
Barium T-Ba	93.2	98.1	91.2	109	111	103	56.3	71.6	90.8	106	116	119				
Beryllium T-Be	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	0.86	0.82	0.92				
Bismuth T-Bi	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**				
Cadmium T-Cd	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	0.14	0.22	0.27	0.30	0.6	10	0.6	3.5
Calcium T-Ca	15200	15800	16400	15300	17600	17000	11600	14100	17900	9940	12400	16900				
Chromium T-Cr	113[1,2,3,4]	112[1,2,3,4]	121[1,2,3,4]	105[1,3,4]	78.4[1,3]	74.2[1,3]	84.2[1,3]	103[1,3,4]	122[1,2,3,4]	41.9[1,3]	57.5[1,3]	52.1[1,3]	26	110	37.3	90
Cobalt T-Co	11.1	11.4	11.3	10.0	10.0	10.0	12.9	16.1	19.3	9.3	11.9	10.0				
Copper T-Cu	35.1	36.2[1,3]	35.3	30.9	32.4	35.5	22.1	29.7	38.8[1,3]	181.0	20.9	24.1	16	110	35.7	197
Iron T-Fe	39500[1,]	40300[1,]	39400[1,]	40500[1,]	31600[1,]	31600[1,]	28300[1,]	35500[1,]	41700[1,]	31400[1,]	35000[1,]	32900[1,]	21,200	43,766		
Lead T-Pb	2.8	3.0	3.0	3.2	3.1	3.2	**<2**	2.5	3.1	2.8	2.9	3.2	31	250	35	91.3
Lithium T-Li	7.0	7.5	6.2	5.9	6.5	6.4	6.6	9.4	10.5	12.9	10.3	9.9				
Magnesium T-Mg	9930	10400	10500	8930	10000	10000	19800	24700	28100	11900	11900	9700				
Manganese T-Mn	415	434	433	435	449	456	629	746	843	1720	2100	1890				
Mercury T-Hg	0.0172	0.0276	0.0083	0.0092	0.0207	0.0091	0.0073	0.0108	0.0153	0.0162	0.0216	0.0386	0.2	2	0.17	0.486
Molybdenum T-Mo	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**				
Nickel T-Ni	24.2[1,]	24.4[1,]	24.9[1,]	19.9[1,]	19.4[1,]	19.6[1,]	95.4[1,2]	119[1,2]	141[1,2]	37.6	48.1[1,]	38.9[1,]	16	75		
Phosphorus T-P	427	338	589	727	676	801	548	365	681	453	547	643				
Potassium T-K	850	1060	1180	1100	1540	1200	790	900	1150	1370	1380	1400				
Selenium T-Se	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	5			
Silver T-Ag	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**				
Sodium T-Na	340	380	360	310	400	380	600	760	1080	1790	1560	1580				
Strontium T-Sr	50.7	54.2	52.8	52.1	59.4	53.2	54.3	69.7	82.1	44.9	58.3	73.1				
Thallium T-Tl	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**				
Tin T-Sn	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**				
Titanium T-Ti	439	432	924	973	864	1030	1470	965	1780	1470	1750	1930				
Vanadium T-V	132	137	145	145	111	110	76.3	92.9	111	84.6	97.5	95.2				
Zinc T-Zn	32.4	34.8	35.5	34.1	33.9	34.2	47.6	59.4	69.5	64.5	62.3	64.4	120	820	123	315
Organic Parameters																
Total Organic Carbon C	**<0.05**	0.060	**<0.05**	0.070	0.050	0.060	0.830	2.42	3.18	2.82	3.19	7.00				
Particle Size																
Gravel (>2.00m (%)	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	5.30	3.10	**<1**	8.20	12.4	9.80				
Sand (2.00mm - 0.063mm) (%)	87.4	86.4	88.4	77.0	72.9	78.2	82.6	83.4	87.0	80.6	74.9	72.4				
Silt (0.063mm - 4um) (%)	11.5	12.7	10.7	21.7	25.2	20.6	11.2	11.2	10.3	6.40	9.30	10.1				
Clay (<4um) (%)	1.10	0.90	0.90	1.30	1.90	1.20	0.90	2.30	2.70	4.80	3.40	7.70				

< = Less than the detection limit indicated.

(continued)

Results are expressed as milligrams per dry kilogram except where noted.

Total Organic Carbon results are expressed as percent, dry weight basis.

[1, 2, 3, 4] indicate guidelines exceeded by the metal concentration: 1 - BC LEL, 2 - BC SEL, 3 - CCME ISQG, 4 - CCME PEL

Appendix 3.1-3
Schaft Creek Project Raw Stream Sediment Data, 2006 (completed)

Sample ID	SKC-1 Rep1			WL-8 Rep1								
Date Sampled	9/5/2006			9/6/2006								
Time Sampled	14:45	14:45	14:45	9:00	9:00	9:00	Dup Blind1	Dup Blind2				
ALS Sample ID	49	50	51	52	53	54	55	56	Avaliable Guideline Values			
Nature	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	LEL	SEL	ISQG	PEL
Physical Tests												
Moisture %	38.9	24.9	27.8	18.9	20.3	26.0	23.3	19.8				
pH	7.65	8.34	8.43	8.77	8.87	8.89	8.68	8.86				
Total Metals												
Aluminum T-Al	31800	23700	24300	19700	21300	21900	12500	11800				
Antimony T-Sb	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**				
Arsenic T-As	5.7	27.1[1,3,4]	3.36	0.460	0.248	0.517	2.20	2.06	6	33	5.9	17
Barium T-Ba	58.8	135	156	23.6	22.7	22.9	95.8	99.1				
Beryllium T-Be	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**				
Bismuth T-Bi	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**				
Cadmium T-Cd	0.39	0.76[1,3]	0.92[1,3]	**<1**	**<1**	**<1**	**<1**	**<1**	0.6	10	0.6	3.5
Calcium T-Ca	15600	37200	42600	26200	27800	28300	15700	17000				
Chromium T-Cr	55.4[1,2]	48[1,2]	52[1,2]	116[1,2,3,4]	90.6[1,2,3]	105[1,2,3]	110[1,2,3,4]	114[1,2,3,4]	26	110	37.3	90
Cobalt T-Co	20.0	18.7	20.1	13.7	14.5	14.8	11.6	11.5				
Copper T-Cu	122[1,2,3]	101[1,3]	112[1,2,3]	71.1[1,3]	71[1,3]	76.2[1,3]	36.3[1,3]	36.3[1,3]	16	110	35.7	197
Iron T-Fe	54200[1,2]	46100[1,2]	45900[1,2]	48400[1,2]	42200[1,]	47700[1,2]	37800[1,]	39300[1,]	21,200	43,766		
Lead T-Pb	4.5	10.4	11.8	3.8	3.6	3.8	3.6	3.2	31	250	35	91.3
Lithium T-Li	17.1	12.7	13.2	11.0	11.6	11.9	7.1	6.9				
Magnesium T-Mg	23600	17500	17800	13600	15100	15200	11100	10900				
Manganese T-Mn	1520	1510	1530	455	480	503	473	444				
Mercury T-Hg	0.0075	0.0051	0.0051	**<0.005**	**<0.005**	**<0.005**	0.0098	0.0097	0.2	2	0.17	0.486
Molybdenum T-Mo	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**	**<4**				
Nickel T-Ni	31.3[1,]	28.1[1,]	31.2[1,]	24.5[1,]	24.9[1,]	26.1[1,]	25.2[1,]	24.6[1,]	16	75		
Phosphorus T-P	678	968	1110	275	197	326	659	607				
Potassium T-K	1350	1740	2010	540	660	710	1440	1140				
Selenium T-Se	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	5			
Silver T-Ag	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**				
Sodium T-Na	480	390	440	330	380	400	490	370				
Strontium T-Sr	54.7	54.6	57.8	127	135	143	55.0	53.0				
Thallium T-Tl	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**				
Tin T-Sn	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**				
Titanium T-Ti	686	898	1040	1380	1180	1590	916	839				
Vanadium T-V	175	125	129	174	157	181	132	141				
Zinc T-Zn	117	131[1,2]	143[1,2]	34.3	36.3	36.6	37.5	35.3	120	820	123	315
Organic Parameters												
Total Organic Carbon C	1.22	0.100	**<0.05**	**<0.05**	0.060	0.050	0.070	**<0.05**				
Particle Size												
Gravel (>2.00m (%)	12.5	5.50	**<1**	3.40	1.10	**<1**	**<1**	**<1**				
Sand (2.00mm - 0.063mm) (%)	79.3	59.6	52.6	68.9	84.6	85.4	57.7	87.6				
Silt (0.063mm - 4um) (%)	5.00	32.4	44.2	26.2	12.6	13.3	39.8	10.2				
Clay (<4um) (%)	3.20	2.50	3.20	1.50	1.70	1.30	2.50	2.20				

< = Less than the detection limit indicated.

Results are expressed as milligrams per dry kilogram except where noted.

Total Organic Carbon results are expressed as percent, dry weight basis.

[1, 2, 3, 4] indicate guidelines exceeded by the metal concentration: 1 - BC LEL, 2 - BC SEL, 3 - CCME ISQG, 4 - CCME PEL

APPENDIX 3.1-4
SCHAFT CREEK PROJECT RAW WETLAND AND LAKE WATER QUALITY DATA, 2006

Appendix 3.1-4
Schaft Creek Project Wetland and Lake Raw Water Quality Data, 2006

Sample ID	WL-6	L-1	WL-2	WL-5	Field Blank	Travel Blank	WL-8	L-3	WL-4	L-5	WL-1	WL-3	WL-7	L-4	L-2
Date Sampled							8/18/2006	8/18/2006	8/17/2006	8/17/2006					
Time Sampled															
ALS Sample ID	1	2	3	4	5	6	1	2	3	4	1	2	3	4	5
Nature	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Physical Tests															
Colour (CU)	19.3	**<5.0**	12.7	**<5.0**	**<5.0**	**<5.0**	5.2	**<5.0**	**<5.0**	**<5.0**	15.9	30.9	33.1	**<5.0**	5.7
Conductivity (uS/cm)	131	184	2480	185	**<2.0**	**<2.0**	94.6	201	150	157	147	114	101	185	205
Total Dissolved Solids	64	98	1760	86	**<10**	**<10**	48	94	74	82	92	74	80	113	126
Hardness CaCO3	68.1	87.9	594	87.5	**<0.50**	**<0.50**	46.2	106	73.0	77.6	74.7	55.8	48.0	90.4	99.7
Moisture %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	8.47	8.04	8.15	8.19	5.67	5.68	7.96	8.16	7.81	8.01	7.57	7.78	7.81	8.14	8.08
Total Suspended Solids	4.5	11.0	44.0	78.5	**<3.0**	**<3.0**	24.0	**<3.0**	13.0	**<3.0**	3.8	22.3	**<3.0**	**<3.0**	**<3.0**
Turbidity (NTU)	6.81	29.5	23.3	79.6	0.10	**<0.10**	35.8	0.72	4.89	11.2	6.30	15.0	0.73	0.37	0.48
Dissolved Anions															
Acidity (to pH 8.3) CaCO3	**<1.0**	2.2	5.2	1.3	2.1	2.1	2.2	1.7	2.7	2.0	3.7	2.8	2.6	1.9	2.3
Alkalinity-Total CaCO3	59.5	70.1	672	58.8	**<2.0**	**<2.0**	37.8	81.8	59.0	54.7	70.0	55.0	50.7	89.0	96.8
Bromide Br	**<0.050**	**<0.050**	**<0.25**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**	**<0.050**
Chloride Cl	**<0.50**	0.58	115	0.57	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**
Fluoride F	0.029	0.072	1.72	0.024	**<0.020**	**<0.020**	**<0.020**	**<0.020**	0.024	0.023	0.043	0.096	0.043	0.058	0.037
Sulphate SO4	4.08	14.0	607	12.2	**<0.50**	**<0.50**	8.45	19.1	20.7	20.4	3.15	**<0.50**	3.01	4.00	20.2
Nutrients															
Ammonia Nitrogen N	0.0087	0.0110	**<0.0050**	0.0206	-	-	0.030	0.021	**<0.020**	**<0.020**	0.0180	0.0160	0.0120	**<0.0050**	0.0053
Available Phosphorus P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen N	0.381	**<0.050**	0.594	0.074	-	-	**<0.050**	**<0.050**	0.077	**<0.050**	0.149	0.151	0.468	0.248	0.056
Nitrate Nitrogen N	**<0.0050**	0.0241	**<0.025**	0.0235	**<0.0050**	**<0.0050**	0.0179	**<0.0050**	0.0073	0.0257	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	0.0604
Nitrite Nitrogen N	**<0.0010**	**<0.0010**	**<0.0050**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Total Nitrogen N	0.381	**<0.056**	0.594	0.098	-	-	**<0.056**	**<0.056**	0.084	**<0.056**	0.149	0.151	0.468	0.248	0.116
Total Phosphate P	0.0275	0.0136	0.0317	0.0688	**<0.0020**	0.0024	0.0579	0.0023	0.0198	0.0058	0.0085	**<0.0020**	0.0050	0.0040	0.0032
Cyanides															
Total Cyanide CN	0.0034	**<0.0010**	0.0028	**<0.0010**	-	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	0.0023	0.0045	0.0066	0.0020	0.0016
Total Metals															
Aluminum T-Al	0.109	0.877	0.0565	2.43	**<0.0010**	**<0.0010**	1.25	0.0153	0.397	0.191	0.703	0.265	0.0143	**<0.0040**	**<0.0040**
Antimony T-Sb	0.00038	0.00051	**<0.00050**	0.00073	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00020	**<0.00010**	0.00393	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic T-As	0.00560	0.00150	0.00079	0.00382	**<0.00010**	**<0.00010**	0.00036	0.00010	0.00256	0.00091	0.00141	0.00046	0.00011	0.00015	0.00015
Barium T-Ba	0.0538	0.0702	0.0507	0.0982	**<0.000050**	**<0.000050**	0.0172	0.0642	0.0126	0.0147	0.100	0.180	0.0223	0.0237	0.0115
Beryllium T-Be	**<0.00050**	**<0.00050**	**<0.0025**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**<0.0025**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron T-B	0.028	0.023	2.52	0.018	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	0.026	**<0.010**	**<0.010**
Cadmium T-Cd	**<0.000020**	0.000033	**<0.00010**	0.000035	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	0.000037	0.000038	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium T-Ca	13.5	22.7	174	23.0	**<0.020**	**<0.020**	17.7	22.4	26.3	28.6	25.9	19.1	13.4	28.8	32.4
Chromium T-Cr	**<0.00050**	0.00155	**<0.0025**	0.00484	**<0.00050**	**<0.00050**	0.00269	**<0.00050**	0.00126	**<0.00050**	0.00104	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Cobalt T-Co	0.00032	0.00051	**<0.00050**	0.00206	**<0.00010**	**<0.00010**	0.00104	**<0.00010**	0.00045	0.00024	0.00066	0.00059	**<0.00010**	**<0.00010**	**<0.00010**
Copper T-Cu	0.00250	0.00219	**<0.00050**	0.00549	**<0.00010**	**<0.00010**	0.00725	0.00024	0.00700	0.00194	0.00293	0.00114	0.00185	**<0.00040**	**<0.00040**
Iron T-Fe	1.06	0.803	0.175	3.88	**<0.030**	**<0.030**	1.16	**<0.030**	1.12	0.489	2.19	3.65	0.261	**<0.030**	**<0.030**
Lead T-Pb	0.000108	0.000340	**<0.00025**	0.000827	**<0.000050**	**<0.000050**	0.000225	**<0.000050**	0.000992	0.000176	0.000337	0.000386	**<0.000050**	**<0.000050**	**<0.000050**
Lithium T-Li	**<0.0050**	**<0.0050**	0.377	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium T-Mg	9.06	9.37	39.2	10.7	**<0.0050**	**<0.0050**	2.16	12.2	2.23	1.87	3.22	2.24	4.20	4.59	4.36
Manganese T-Mn	0.0287	0.0442	0.121	0.0882	**<0.000050**	**<0.000050**	0.0659	0.00360	0.0289	0.0246	0.197	0.745	0.00586	0.00422	0.00282
Mercury T-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum T-Mo	0.00164	0.000874	0.00090	0.000767	**<0.000050**	**<0.000050**	0.000687	0.00269	0.00101	0.000809	0.00132	0.000892	0.000641	0.00184	0.000671
Nickel T-Ni	0.00189	0.00269	**<0.0025**	0.00779	**<0.00050**	**<0.00050**	0.00187	**<0.00050**	0.00104	**<0.00050**	0.00122	**<0.00050**	0.00186	**<0.00050**	**<0.00050**
Phosphorus T-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium T-K	0.380	1.08	16.4	1.64	**<0.050**	**<0.050**	0.343	0.408	0.337	0.286	0.521	0.834	0.639	0.596	0.345
Selenium T-Se	**<0.00050**	0.00064	**<0.00050**	0.00062	**<0.00050**	**<0.00050**	**<0.00050**	0.00136	**<0.00050**	0.00072	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00088
Silicon T-Si	1.41	3.00	9.10	4.65	**<0.050**	**<0.050**	3.39	1.58	2.57	2.53	4.43	3.11	3.15	3.03	2.74
Silver T-Ag	**<0.000040**	**<0.000020**	**<0.000050**	**<0.000050**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	0.000020	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium T-Na	**<2.0**	2.2	420	2.1	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	2.2	**<2.0**
Strontium T-Sr	0.0482	0.0964	2.49	0.0973	**<0.00010**	**<0.00010**	0.0838	0.430	0.0486	0.0451	0.115	0.158	0.0596	0.0686	0.0612
Thallium T-Tl	**<0.00010**	**<0.00010**	**<0.00050**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin T-Sn	**<0.00010**	**<0.00010**	**<0.00050**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	0.00461	**<0.00010**	**<0.00010**	0.00017	**<0.00010**	**<0.00010**	**<0.00010**
Titanium T-Ti	**<0.010**	0.019	**<0.010**	0.061	**<0.010**	**<0.010**	0.078	**<0.010**	0.015	0.012	0.029	0.015	**<0.010**	**<0.010**	**<0.010**
Uranium T-U	0.000051	0.000122	0.000210	0.000128	**<0.000010**	**<0.000010**	0.000054	0.000109	0.000154	0.000216	0.000287	0.00105	**<0.000010**	0.000059	0.000168
Vanadium T-V	**<0.0010**	0.0023	**<0.0050**	0.0079	**<0.0010**	**<0.0010**	0.0044	**<0.0010**	0.0022	0.0010	0.0018	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc T-Zn	0.0028	0.0067	**<0.0050**	0.0114	**<0.0010**	**<0.0010**	**<0.0050**	**<0.0010**	0.0066	0.0024	**<0.0050**	**<0.0040**	**<0.0010**	**<0.0010**	**<0.0010**
Dissolved Metals															
Aluminum D-Al	0.0038	0.0467	0.0065	0.0199	-	-	0.0718	0.0026	**<0.0010**	0.0077	0.0060	0.0057	0.0086	0.0022	0.0024
Antimony D-Sb	0.00032	0.00032	**<0.00050**	0.00034	-	-	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Arsenic D-As	0.00371	0.00053	0.00065	0.00054	-	-	**<0.00010**	**<0.00010**	0.00050	0.00053	0.00065	0.00018	**<0.00010**	0.00013	0.00016
Barium D-Ba	0.0434	0.0550	0.0489	0.0602	-	-	0.00960	0.0642	0.0100	0.0128	0.0840	0.151	0.0212	0.0232	0.0116
Beryllium D-Be	**<0.00050**	**<0.00050**	**<0.0025**	**<0.00050**	-	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Bismuth D-Bi	**<0.00050**	**<0.00050**	**<0.0025**	**<0.00050**	-	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Boron D-B	0.013	0.017	2.59	0.014	-	-	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	0.025	**<0.010**	**<0.010**
Cadmium D-Cd	**<0.000020**	**<0.000020**	**<0.00010**	**<0.000020**	-	-	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**	**<0.000020**
Calcium D-Ca	12.4	21.1	173	20.5	-	-	16.5	22.2	26.0	28.2	25.2	18.7	12.7	28.7	32.7
Chromium D-Cr	**<0.00050**	**<0.00050**	**<0.0025**	**<0.00050**	-	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**
Cobalt D-Co	0.00014	**<0.00010**	**<0.00050**	**<0.00010**	-	-	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Copper D-Cu	0.00169	0.00024	**<0.00050**	0.00033	-	-	0.00081	0.00016	0.00040	0.00048	0.00073	0.00036	0.00160	0.00026	0.00037
Iron D-Fe	0.111	**<0.030**	0.169	**<0.030**	-	-	0.062	**<0.030**	**<0.030**	**<0.030**	0.205	0.407	0.153	**<0.030**	**<0.030**
Lead D-Pb	**<0.000050**	**<0.000050**	**<0.00025**	**<0.000050**	-	-	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**	**<0.000050**
Lithium D-Li	**<0.0050**	**<0.0050**	0.365	**<0.0050**	-	-	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**	**<0.0050**
Magnesium D-Mg	9.03	8.55	39.3	8.79	-	-	1.22	12.2	1.96	1.75	2.85	2.18	3.95	4.54	4.37
Manganese D-Mn	0.00151	0.0209	0.0540	0.00161	-	-	0.0111	0.000087	0.00703	0.000741	0.00315	0.449	0.000614	**<0.000050**	0.000076
Mercury D-Hg	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	-	-	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Molybdenum D-Mo	0.00112	0.000754	0.00090	0.000707	-	-	0.000630	0.00266	0.000970	0.000976	0.00135	0.00112	0.000626	0.00184	0.000711
Nickel D-Ni	0.00128	**<0.00050**	**<0.0025**	0.00064	-	-	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	0.00176	**<0.00050**	**<0.00050**
Phosphorus D-P	**<0.30**	**<0.30**	**<0.30**	**<0.30**	-	-	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**	**<0.30**
Potassium D-K	0.323	0.593	16.4	0.494	-	-	0.189	0.402	0.267	0.262	0.341	0.745	0.598	0.591	0.347
Selenium D-Se	**<0.00050**	**<0.00050**	**<0.00050**	**<0.00050**	-	-	**<0.00050**	0.00144	**<0.00050**	0.00068	**<0.00050**	**<0.00050**	0.00057	**<0.00050**	0.00077
Silicon D-Si	1.19	1.78	8.74	1.27	-	-	1.31	1.48	1.90	1.79	3.05	2.65	3.09	2.97	2.66
Silver D-Ag	**<0.000010**	**<0.000010**	**<0.000050**	**<0.000010**	-	-	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**	**<0.000010**
Sodium D-Na	**<2.0**	2.1	398	**<2.0**	-	-	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	2.2	**<2.0**
Strontium D-Sr	0.0484	0.0883	2.49	0.0893	-	-	0.0774	0.433	0.0476	0.0446	0.110	0.154	0.0573	0.0666	0.0623
Thallium D-Tl	**<0.00010**	**<0.00010**	**<0.00050**	**<0.00010**	-	-	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Tin D-Sn	**<0.00010**	**<0.00010**	**<0.00050**	**<0.00010**	-	-	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**	**<0.00010**
Titanium D-Ti	**<0.010**	**<0.010**	**<0.010**	**<0.010**	-	-	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**	**<0.010**
Uranium D-U	0.000041	0.000108	0.000236	0.000083	-	-	0.000035	0.000104	0.000123	0.000211	0.000242	0.000720	**<0.000010**	0.000060	0.000174
Vanadium D-V	**<0.0010**	**<0.0010**	**<0.0050**	**<0.0010**	-	-	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Zinc D-Zn	**<0.0010**	**<0.0010**	**<0.0050**	**<0.0010**	-	-	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**	**<0.0010**
Organic Parameters (a)															
Chemical Oxygen Demand COD	35	**<20**	24	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	**<20**	26	57	35	24
Total Organic Carbon C	6.32	**<0.50**	4.58	0.91	**<0.50**	**<0.50**	0.67	**<0.50**	0.61	0.57	2.57	3.03	14.6	5.36	1.58

< = Less than the detection limit indicated.

Water samples only - Results are expressed as milligrams per litre except where noted.

APPENDIX 3.1-5
SCHAFT CREEK PROJECT RELATIVE PERCENT DIFFERENCE RESULTS FOR WETLAND AND LAKE WATER QUALITY, 2006

Appendix 3.1-5
Schaft Creek Project Relative Percent Difference Results for Wetland and Lake Water Quality, 2006

Sample ID	WL-2	WL-2 QC# 517609	RPD %	WL-7	WL-7 QC# 518086	RPD %
Date Sampled						
Time Sampled						
ALS Sample ID	3			3		
Nature	Water			Water		
Physical Tests						
Colour (CU)	12.7	12.8	**0.784**			
Conductivity (uS/cm)	2480	2500	**0.803**			
Total Dissolved Solids	1760	1740	**1.14**			
Moisture %				-	-	**-**
Hardness CaCO3	594	609	**2.49**	48.0	46.9	**2.32**
pH	8.15	8.19	**0.49**	-	-	**-**
Total Suspended Solids	44.0	44.0	**0**			
Turbidity (NTU)	23.3	21.6	**7.57**	0.73	0.70	**4.2**
Dissolved Anions						
Acidity (to pH 8.3) CaCO3	5.2	4.6	**12.2**			
Alkalinity-Total CaCO3	672	673	**0.149**	50.7	53.8	**5.93**
Bromide Br	**<0.25**	**<0.25**	**0**			
Chloride Cl	115	115	**0**			
Fluoride F	1.72	1.66	**3.55**			
Sulphate SO4	607	603	**0.661**			
Nutrients						
Ammonia Nitrogen N	**<0.0050**	**<0.0050**	**0**			
Nitrate Nitrogen N	**<0.025**	**<0.025**	**0**			
Nitrite Nitrogen N	**<0.0050**	**<0.0050**	**0**			
Total Phosphate P	0.0317	0.0337	**6.12**	0.0050	0.0069	**31.9**
Total Metals						
Aluminum T-Al	0.0565	0.0566	**0.177**	0.0143	0.0159	**10.6**
Antimony T-Sb	**<0.00050**	**<0.00050**	**0**	**<0.00010**	**<0.00010**	**0**
Arsenic T-As	0.00079	0.00087	**9.64**	0.00011	0.00010	**9.52**
Barium T-Ba	0.0507	0.0492	**3**	0.0223	0.0217	**2.73**
Beryllium T-Be	**<0.0025**	**<0.0025**	**0**	**<0.00050**	**<0.00050**	**0**
Bismuth T-Bi	**<0.0025**	**<0.0025**	**0**	**<0.00050**	**<0.00050**	**0**
Boron T-B	2.52	2.48	**1.6**	0.026	0.025	**3.92**
Cadmium T-Cd	**<0.00010**	**<0.00010**	**0**	**<0.000020**	**<0.000020**	**0**
Calcium T-Ca	174	170	**2.33**	13.4	12.8	**4.58**
Chromium T-Cr	**<0.0025**	**<0.0025**	**0**	**<0.00050**	**<0.00050**	**0**
Cobalt T-Co	**<0.00050**	**<0.00050**	**0**	**<0.00010**	**<0.00010**	**0**
Copper T-Cu	**<0.00050**	**<0.00050**	**0**	0.00185	0.00176	**4.99**
Iron T-Fe	0.175	**<0.030**	**141**	0.261	0.262	**0.382**
Lead T-Pb	**<0.00025**	**<0.00025**	**0**	**<0.000050**	**<0.000050**	**0**
Lithium T-Li	0.377	0.359	**4.89**	**<0.0050**	**<0.0050**	**0**
Magnesium T-Mg	39.2	38.1	**2.85**	4.20	4.06	**3.39**
Manganese T-Mn	0.121	0.119	**1.67**	0.00586	0.00571	**2.59**
Mercury T-Hg	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**
Molybdenum T-Mo	0.00090	0.00078	**14.3**	0.000641	0.000616	**3.98**
Nickel T-Ni	**<0.0025**	**<0.0025**	**0**	0.00186	0.00174	**6.67**
Phosphorus T-P	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**
Potassium T-K	16.4	16.0	**2.47**	0.639	0.612	**4.32**
Selenium T-Se	**<0.00050**	**<0.00050**	**0**	**<0.00050**	**<0.00050**	**0**
Silicon T-Si	9.10	8.80	**3.35**	3.15	3.12	**0.957**
Silver T-Ag	**<0.000050**	**<0.000050**	**0**	**<0.000010**	**<0.000010**	**0**
Sodium T-Na	420	409	**2.65**	**<2.0**	**<2.0**	**0**
Strontium T-Sr	2.49	2.42	**2.85**	0.0596	0.0575	**3.59**
Thallium T-Tl	**<0.00050**	**<0.00050**	**0**	**<0.00010**	**<0.00010**	**0**
Tin T-Sn	**<0.00050**	**<0.00050**	**0**	**<0.00010**	**<0.00010**	**0**
Titanium T-Ti	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**
Uranium T-U	0.000210	0.000205	**2.41**	**<0.000010**	**<0.000010**	**0**
Vanadium T-V	**<0.0050**	**<0.0050**	**0**	**<0.0010**	**<0.0010**	**0**
Zinc T-Zn	**<0.0050**	**<0.0050**	**0**	**<0.0010**	**<0.0010**	**0**
Dissolved Metals						
Aluminum D-Al	0.0065	0.0053	**20.3**	0.0086	0.0085	**1.17**
Antimony D-Sb	**<0.00050**	**<0.00050**	**0**	**<0.00010**	**<0.00010**	**0**
Arsenic D-As	0.00065	0.00081	**21.9**	**<0.00010**	**<0.00010**	**0**
Barium D-Ba	0.0489	0.0505	**3.22**	0.0212	0.0204	**3.85**
Beryllium D-Be	**<0.0025**	**<0.0025**	**0**	**<0.00050**	**<0.00050**	**0**
Bismuth D-Bi	**<0.0025**	**<0.0025**	**0**	**<0.00050**	**<0.00050**	**0**
Boron D-B	2.59	2.59	**0**	0.025	0.024	**4.08**
Cadmium D-Cd	**<0.00010**	**<0.00010**	**0**	**<0.000020**	**<0.000020**	**0**
Calcium D-Ca	173	178	**2.85**	12.7	12.4	**2.39**
Chromium D-Cr	**<0.0025**	**<0.0025**	**0**	**<0.00050**	**<0.00050**	**0**
Cobalt D-Co	**<0.00050**	**<0.00050**	**0**	**<0.00010**	**<0.00010**	**0**
Copper D-Cu	**<0.00050**	**<0.00050**	**0**	0.00160	0.00159	**0.627**
Iron D-Fe	0.169	**<0.030**	**140**	0.153	0.157	**2.58**
Lead D-Pb	**<0.00025**	**<0.00025**	**0**	**<0.000050**	**<0.000050**	**0**
Lithium D-Li	0.365	0.379	**3.76**	**<0.0050**	**<0.0050**	**0**
Magnesium D-Mg	39.3	40.0	**1.77**	3.95	3.86	**2.3**
Manganese D-Mn	0.0540	0.0553	**2.38**	0.000614	0.000594	**3.31**
Mercury D-Hg	**<0.000010**	**<0.000010**	**0**	**<0.000010**	**<0.000010**	**0**
Molybdenum D-Mo	0.00090	0.00083	**8.09**	0.000626	0.000614	**1.94**
Nickel D-Ni	**<0.0025**	**<0.0025**	**0**	0.00176	0.00168	**4.65**
Phosphorus D-P	**<0.30**	**<0.30**	**0**	**<0.30**	**<0.30**	**0**
Potassium D-K	16.4	16.8	**2.41**	0.598	0.582	**2.71**
Selenium D-Se	**<0.00050**	**<0.00050**	**0**	0.00057	**<0.00050**	**13.1**
Silicon D-Si	8.74	9.27	**5.89**	3.09	3.10	**0.323**
Silver D-Ag	**<0.000050**	**<0.000050**	**0**	**<0.000010**	**<0.000010**	**0**
Sodium D-Na	398	420	**5.38**	**<2.0**	**<2.0**	**0**
Strontium D-Sr	2.49	2.57	**3.16**	0.0573	0.0565	**1.41**
Thallium D-Tl	**<0.00050**	**<0.00050**	**0**	**<0.00010**	**<0.00010**	**0**
Tin D-Sn	**<0.00050**	**<0.00050**	**0**	**<0.00010**	**<0.00010**	**0**
Titanium D-Ti	**<0.010**	**<0.010**	**0**	**<0.010**	**<0.010**	**0**
Uranium D-U	0.000236	0.000221	**6.56**	**<0.000010**	**<0.000010**	**0**
Vanadium D-V	**<0.0050**	**<0.0050**	**0**	**<0.0010**	**<0.0010**	**0**
Zinc D-Zn	**<0.0050**	**<0.0050**	**0**	**<0.0010**	**<0.0010**	**0**
Organic Parameters						
Chemical Oxygen Demand COD	24	22	**8.7**	57	58	**1.74**
Total Organic Carbon C	4.58	4.56	**0.438**	14.6	14.8	**1.36**

APPENDIX 3.1-6
SCHAFT CREEK PROJECT RAW LIMNOLOGY DATA, AUGUST 2006

Appendix 3.1-6
Schaft Creek Project Raw Limnology Data

Lake	Sample Date	Max Depth (m)	Secchi Depth (m)	Surface pH	Depth (m)	DO (mg/L)	DO (%)	Cond 1	Cond 2	Temp (°C)	Salinity (ppt)
L-1	Aug. 14, 2006	7	0.5	7.7	0	8.71	76.40	132.00	187.20	9.60	0.1
					1	8.56	74.80	131.80	187.70	9.50	0.1
					2	8.73	76.50	131.70	187.60	9.40	0.1
					3	8.49	72.70	131.30	187.40	9.30	0.1
					4	8.60	74.50	129.40	184.50	9.30	0.1
					5	8.87	76.60	128.60	184.60	9.10	0.1
					6	8.99	77.80	127.60	184.00	9.00	0.1
L-2	Aug. 15, 2006	9	7	8.3	0	8.40	79..2	160.10	208.20	12.90	0.1
					1	8.08	77.40	160.20	209.10	12.80	0.1
					2	8.26	76.50	159.70	208.80	12.70	0.1
					3	8.43	77.90	159.60	208.80	12.70	0.1
					4	7.89	77.30	159.60	208.60	12.70	0.1
					5	8.06	75.30	159.30	208.70	12.60	0.1
					6	8.36	75.60	159.20	209.70	12.50	0.1
					7	8.21	79.8	159.5	210.2	12.4	0.1
					8	8.02	77.2	157.5	208.1	12.3	0.1
L-3	Aug. 19, 2006	7	4	8.6	0	8.70	78.10	143.60	202.90	9.90	0.1
					1	8.79	77.20	144.60	202.80	9.90	0.1
					2	8.85	76.40	144.60	203.70	9.80	0.1
					3	8.62	75.90	144.70	203.90	9.80	0.1
					4	8.29	77.80	145.30	204.90	9.80	0.1
					5	8.60	75.10	146.10	206.60	9.60	0.1
					6	8.54	75.20	146.30	207.80	9.50	0.1
L-4	16-Aug-06	6	4	8.7	0	7.77	75.70	152.80	188.80	15.00	0.1
					1	7.62	79.00	152.80	189.10	15.00	0.1
					2	7.04	76.70	152.80	188.70	14.90	0.1
					3	7.00	69.10	152.10	188.70	14.80	0.1
					4	7.07	64.00	151.70	190.10	14.70	0.1
					5	7.85	77.30	151.80	189.20	14.70	0.1
L-5	17-Aug-06	9	0.5	8.6	0	8.56	77.10	116.50	157.80	11.30	0.1
					1	8.46	78.20	117.50	159.30	11.30	0.1
					2	8.60	80.00	118.10	160.40	11.20	0.1
					3	8.42	77.80	118.10	160.30	11.20	0.1
					4	8.38	76.30	117.90	160.60	11.10	0.1
					5	8.33	75.70	117.80	160.60	11.10	0.1
					6	8.29	73.80	117.50	160.50	11.00	0.1
					7	8.54	75.7	116.7	160.4	10.7	0.1
					8	8.42	75.6	116.5	161.2	10.6	0.1

APPENDIX 3.1-7
SCHAFT CREEK PROJECT RAW WETLAND AND LAKE SEDIMENT DATA, 2006

Appendix 3.1-7
Schaft Creek Project Raw Wetland and Lake Sediment Data, 2006

Sample ID	WL1			WL-2			WL3			WL-4						
Date Sampled																
Time Sampled																
ALS Sample ID	9	10	11	10	11	12	12	13	14	7	8	9	Available Guideline Values			
Nature	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	LEL	SEL	ISQG	PEL
Physical Tests																
Moisture %	63.1	69.3	55.3	57.5	66.0	53.9	32.6	42.0	59.5	79.2	76.6	59.5				
pH	6.33	5.96	6.25	8.23	8.27	7.89	7.33	5.97	5.73	6.83	6.17	6.63				
Nutrients																
Available Phosphorus P	0.50	0.50	0.50	**<0.20**	**<0.20**	**<0.20**	**<0.20**	0.50	**<0.20**	0.70	1.00	1.20				
Total Nitrogen N	0.350	0.410	0.200	0.420	0.510	0.330	0.020	0.030	0.080	0.590	0.560	0.410				
Cyanides																
Total Cyanide CN	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**				
Total Metals																
Aluminum T-Al	27600	25600	21300	7790	11400	17300	4960	7150	14600	41300	40000	31500				
Antimony T-Sb	**<20**	**<40**	**<20**	**<40**	**<20**	**<20**	**<20**	**<20**	**<20**	**<40**	**<40**	**<20**				
Arsenic T-As	20.4[1,3,4]	20.3[1,3,4]	18.2[1,3,4]	2.17	3.42	4.15	1.50	2.23	5.15	193[1,2,3,4]	96.7[1,2,3,4]	71.4[1,2,3,4]	6	33	5.9	17
Barium T-Ba	248	248	215	104	107	93.8	97.3	149	241	123	111	84.0				
Beryllium T-Be	0.85	**<1.0**	0.50	1.4	1.47	1.78	**<0.50**	**<0.50**	0.92	1.0	**<1.0**	0.85				
Bismuth T-Bi	**<20**	**<40**	**<20**	**<40**	**<20**	**<20**	**<20**	**<20**	**<20**	**<40**	**<40**	**<20**				
Cadmium T-Cd	0.23	0.24	0.13	0.14	0.21	0.20	**<0.10**	**<0.10**	**<0.10**	1.06[1,3]	1.43[1,3]	0.94[1,3]	0.6	10	0.6	3.5
Calcium T-Ca	11700	11000	11100	248000	163000	96200	2120	2470	3350	18100	16000	17300				
Chromium T-Cr	57.4[1,3]	59.2[1,3]	63.6[1,3]	8.5	12.2	21.8	7.2	7.9	12.7	98.6[1,3,4]	97.7[1,3,4]	94.9[1,3,4]	26	110	37.3	90
Cobalt T-Co	19.2	19.2	15.1	4.7	5.7	9.8	2.7	3.6	6.1	35.5	31.5	28.0				
Copper T-Cu	73[1,3]	68.1[1,3]	49.1[1,3]	9.1	11.7	14.8	6.1	7.3	12.8	256[1,2,3,4]	251[1,2,3,4]	187[1,2,3,4]	16	110	35.7	197
Iron T-Fe	34100[1,]	41500[1,]	50400[1,2]	15900	19300	29800[1,]	13100	25000[1,]	40000[1,]	72000	71100[1,2]	58500[1,2]	21,200	43,766		
Lead T-Pb	8.7	8.8	3.9	3.3	5.4	6.4	2.3	3.1	6.8	15.6	19.6	17.9	31	250	35	91.3
Lithium T-Li	15.7	15.5	9.0	25.6	19.5	19.9	5.7	7.7	12.9	30.6	28.2	25.2				
Magnesium T-Mg	17000	16300	13600	6900	5640	5730	2230	2840	4870	23600	24300	21300				
Manganese T-Mn	800	984	1650	788	1020	870	359	366	536	1250	1200	1450				
Mercury T-Hg	0.0260	0.0281	0.0188	0.0215	0.0284	0.0384	0.0055	0.0082	0.0155	0.0759	0.0934	0.0868	0.2	2	0.17	0.486
Molybdenum T-Mo	6.1	**<8.0**	**<4.0**	**<8.0**	**<4.0**	**<4.0**	**<4.0**	**<4.0**	6.0	**<8.0**	**<8.0**	**<4.0**				
Nickel T-Ni	37.9[1,]	36[1,]	24.7[1,]	12	13.3	19.6[1,]	**<5.0**	**<5.0**	6.3	58[1,]	57[1,]	54.5[1,]	16	75		
Phosphorus T-P	827	920	953	430	661	558	336	358	473	1270	1360	1210				
Potassium T-K	3670	2760	1430	1410	1920	2070	1060	1490	2850	2950	2270	1510				
Selenium T-Se	**<50**	**<100**	**<50**	**<100**	**<50**	**<50**	**<50**	**<50**	**<50**	**<100**	**<100**	**<50**				
Silver T-Ag	**<2.0**	**<4.0**	**<2.0**	**<4.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<4.0**	**<4.0**	**<2.0**	5			
Strontium T-Sr	59.2	59.9	68.3	2450	1590	916	18.7	22.7	38.9	79.9	66.3	64.8				
Thallium T-Tl	**<50**	**<100**	**<50**	**<100**	**<50**	**<50**	**<50**	**<50**	**<50**	**<100**	**<100**	**<50**				
Tin T-Sn	**<10**	**<20**	**<10**	**<20**	**<10**	**<10**	**<10**	**<10**	**<10**	**<20**	**<20**	**<10**				
Titanium T-Ti	1530	1530	1610	805	926	1700	413	514	780	1990	2020	1710				
Vanadium T-V	102	109	124	16.9	27.6	47.2	21.2	24.9	39.2	229	232	186				
Zinc T-Zn	82.0	81.0	61.8	48.0	61.6	88.7	22.3	31.4	54.3	187[1,3]	201[1,3]	153[1,3]	120	820	123	315
Organic Parameters (a)																
Total Organic Carbon C	6.25	6.37	4.20	5.82	6.49	4.26	0.390	0.570	1.18	8.55	7.63	5.74				
Particle Size (b)																
Gravel (>2.00mm) (%)	**<0.10**	**<0.10**	**<0.10**	**<0.10**	**<0.10**	**<0.10**	**<0.10**	**<0.10**	**<0.10**	**<0.10**	**<0.10**	**<0.10**				
Sand (2.00mm - 0.063mm) (%)	0.70	1.10	49.5	34.3	26.0	33.6	37.8	17.2	1.20	0.40	0.20	0.90				
Silt (0.063mm - 4um) (%)	28.6	46.5	35.2	44.9	47.9	41.8	59.5	68.2	64.7	35.2	39.0	61.7				
Clay (<4um) (%)	70.7	52.4	15.3	20.8	26.1	24.6	2.70	14.6	34.1	64.4	60.8	37.4				

< = Less than the detection limit indicated.

(continued)

Results are expressed as milligrams per dry kilogram except where noted.

Total Organic Carbon results are expressed as percent, dry weight basis.

[1, 2, 3, 4] indicate guidelines exceeded by the metal concentration: 1 - BC LEL, 2 - BC SEL, 3 - CCME ISQG, 4 - CCME PEL

Appendix 3.1-7
Schaft Creek Project Raw Wetland and Lake Sediment Data, 2006 (continued)

Sample ID	WL-5			WL6			WL7			L1						
Date Sampled																
Time Sampled																
ALS Sample ID	13	14	15	6	7	8	15	17	18	5	6	7	Available Guideline Values			
Nature	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	LEL	SEL	ISQG	PEL
Physical Tests																
Moisture %	15.2	10.6	20.6	62.5	68.6	67.5	92.4	87.3	83.9	28.3	41.2	30.7				
pH	8.70	8.77	8.21	6.01	6.97	6.47	6.19	6.42	6.13	8.20	8.25	8.40				
Nutrients																
Available Phosphorus P	0.50	1.00	1.20	**<0.20**	**<0.20**	**<0.20**	2.10	2.10	1.90	0.50	0.50	0.50				
Total Nitrogen N	0.030	0.010	0.040	0.210	0.220	0.280	1.14	1.16	0.150	0.040	0.040	0.040				
Cyanides																
Total Cyanide CN	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**				
Total Metals																
Aluminum T-Al	10800	8350	11300	30600	25900	34000	8380	11200	9360	11500	22200	10200				
Antimony T-Sb	**<20**	**<20**	**<20**	**<20**	**<40**	**<40**	**<100**	**<40**	**<40**	**<20**	**<20**	**<20**				
Arsenic T-As	15.8[1,3]	12.7[1,3]	22.3[1,3,4]	69.2[1,2,3,4]	107[1,2,3,4]	93.5[1,2,3,4]	1.11	0.968	0.685	31.2[1,3,4]	48.9[1,2,3,4]	31.6[1,3,4]	6	33	5.9	17
Barium T-Ba	121	129	228	323	475	561	100	103	109	256	407	217				
Beryllium T-Be	**<0.50**	**<0.50**	**<0.50**	0.68	**<1.0**	**<1.0**	**<2.5**	1.6	**<1.0**	0.96	1.39	0.83				
Bismuth T-Bi	**<20**	**<20**	**<20**	**<20**	**<40**	**<40**	**<100**	**<40**	**<40**	**<20**	**<20**	**<20**				
Cadmium T-Cd	0.16	0.14	0.22	0.25	0.17	0.34	**<0.30**	**<0.20**	**<0.20**	0.28	0.55	0.33	0.6	10	0.6	3.5
Calcium T-Ca	20400	23700	24200	7660	6140	9670	9590	10200	11800	17600	24100	18800				
Chromium T-Cr	56.8[1,3]	31.8[1,]	48.1[1,3]	89.3[1,3]	73.6[1,3]	95.5[1,3,4]	25	19.7	24.6	42.2[1,3]	75.7[1,3]	43.9[1,3]	26	110	37.3	90
Cobalt T-Co	14.1	10.8	15.7	29.7	24.1	29.0	**<10**	**<4.0**	**<4.0**	15.4	27.2	15.0				
Copper T-Cu	23.4[1,]	24.1[1,]	43.3[1,3]	69.9[1,3]	61.9[1,3]	87.9[1,3]	196[1,2,3]	93.3[1,3]	90[1,3]	41.4[1,3]	75.6[1,3]	40.3[1,3]	16	110	35.7	197
Iron T-Fe	34400[1,]	28700[1,]	36500[1,]	61000[1,2]	63000[1,2]	61000[1,2]	9890	15900	23700[1,]	38600[1,]	63100[1,]	39200[1,]	21,200	43,766		
Lead T-Pb	2.0	2.8	4.2	8.0	6.5	10.8	**<2.0**	2.2	**<2.0**	7.4	13.5	7.6	31	250	35	91.3
Lithium T-Li	8.6	6.5	8.1	18.3	16.1	19.9	**<10**	4.2	**<4.0**	8.6	16.1	7.6				
Magnesium T-Mg	17900	14500	18000	23000	18800	24600	2430	2150	2400	14900	26400	15000				
Manganese T-Mn	848	781	897	793	623	895	120	172	206	1020	1480	974				
Mercury T-Hg	0.0226	0.0216	0.0696	0.100	0.0981	0.118	0.0367	0.0235	0.0516	0.0915	0.138	0.0819	0.2	2	0.17	0.486
Molybdenum T-Mo	**<4.0**	**<4.0**	**<4.0**	**<4.0**	**<8.0**	**<8.0**	20	8.5	**<8.0**	**<4.0**	**<4.0**	**<4.0**				
Nickel T-Ni	58.2[1,]	33[1,]	51.3[1,]	111[1,2]	87[1,2]	110[1,2]	54[1,]	47[1,]	33[1,]	45.6[1,]	84.7[1,2]	44.4[1,]	16	75		
Phosphorus T-P	715	594	862	864	770	830	370	350	440	781	1200	833				
Potassium T-K	600	680	1440	5280	4700	5910	1100	1700	820	1680	2550	1360				
Selenium T-Se	**<50**	**<50**	**<50**	**<50**	**<100**	**<100**	**<250**	**<100**	**<100**	**<50**	**<50**	**<50**				
Silver T-Ag	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<4.0**	**<4.0**	**<10**	**<4.0**	**<4.0**	**<2.0**	**<2.0**	**<2.0**	5			
Strontium T-Sr	58.3	63.1	75.5	47.7	45.3	56.9	57.4	87.4	84.4	58.8	85.6	59.5				
Thallium T-Tl	**<50**	**<50**	**<50**	**<50**	**<100**	**<100**	**<250**	**<100**	**<100**	**<50**	**<50**	**<50**				
Tin T-Sn	**<10**	**<10**	**<10**	**<10**	**<20**	**<20**	**<50**	**<20**	**<20**	**<10**	**<10**	**<10**				
Titanium T-Ti	178	156	303	258	201	252	529	685	538	308	388	285				
Vanadium T-V	72.5	54.1	72.2	116	93.2	119	33	21.7	27.2	65.3	107	66.2				
Zinc T-Zn	44.4	38.2	50.1	88.7	77.0	93.2	35.9	41.0	44.5	106	157[1,3]	96.9	120	820	123	315
Organic Parameters (a)																
Total Organic Carbon C	0.270	0.240	0.960	2.37	2.72	3.82	24.4	21.0	23.4	0.390	0.370	0.420				
Particle Size (b)																
Gravel (>2.00mm) (%)	84.9	41.1	16.3	**<0.10**	**<0.10**	**<0.10**	N/A	N/A	**<0.10**	**<0.10**	**<0.10**	**<0.10**				
Sand (2.00mm - 0.063mm) (%)	14.9	56.2	61.5	1.40	1.80	0.30	N/A	N/A	25.2	8.70	2.10	38.6				
Silt (0.063mm - 4um) (%)	0.10	2.20	20.0	36.8	34.2	31.3	N/A	N/A	31.4	76.7	67.5	51.8				
Clay (<4um) (%)	0.10	0.50	2.20	61.8	64.0	68.4	N/A	N/A	43.4	14.6	30.4	9.60				

< = Less than the detection limit indicated.

(continued)

Results are expressed as milligrams per dry kilogram except where noted.

Total Organic Carbon results are expressed as percent, dry weight basis.

[1, 2, 3, 4] indicate guidelines exceeded by the metal concentration: 1 - BC LEL, 2 - BC SEL, 3 - CCME ISQG, 4 - CCME PEL

Appendix 3.1-7
Schaft Creek Project Raw Wetland and Lake Sediment Data, 2006 (continued)

Sample ID	L2			L3			L4			L5						
Date Sampled																
Time Sampled																
ALS Sample ID	8	10	11	12	13	14	15	16	17	18	19	20	Available Guideline Values			
Nature	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	Sediment/Soil	LEL	SEL	ISQG	PEL
Physical Tests																
Moisture %	82.2	89.1	78.0	42.9	42.9	35.1	73.3	95.6	96.1	55.9	52.9	38.2				
pH	7.83	6.90	7.07	8.40	8.14	8.22	7.62	7.32	7.32	8.00	7.93	8.24				
Nutrients																
Available Phosphorus P	2.40	1.20	1.20	0.20	0.50	1.00	0.90	2.10	1.20	**<0.20**	**<0.20**	2.10				
Total Nitrogen N	0.450	0.830	0.470	0.040	0.040	0.040	0.320	1.73	1.69	0.050	0.050	0.030				
Cyanides																
Total Cyanide CN	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	**<3.0**	3.1	**<3.0**	**<3.0**	**<3.0**				
Total Metals																
Aluminum T-Al	42100	37700	39600	22500	24400	23300	11800	16000	15900	57400	45500	31300				
Antimony T-Sb	**<40**	**<60**	**<20**	**<20**	**<20**	**<20**	**<40**	**<120**	**<160**	**<20**	**<20**	**<20**				
Arsenic T-As	6.21[1,3]	9.21[1,3]	98.2[1,2,3,4]	16.3[1,3]	17.9[1,3,4]	23.7[1,3,4]	0.901	2.45	2.85	46.6[1,2,3,4]	39.7[1,2,3,4]	26.1[1,3,4]	6	33	5.9	17
Barium T-Ba	185	140	354	251	311	285	137	205	225	184	152	119				
Beryllium T-Be	1.1	**<1.5**	0.72	**<0.50**	**<0.50**	**<0.50**	1.5	**<3.0**	**<4.0**	0.65	0.50	**<0.50**				
Bismuth T-Bi	**<40**	**<60**	**<20**	**<20**	**<20**	**<20**	**<40**	**<120**	**<160**	**<20**	**<20**	**<20**				
Cadmium T-Cd	0.57	0.41	0.62[1,3]	**<0.10**	0.11	0.13	0.27	**<0.40**	**<0.50**	0.81[1,3]	0.68[1,3]	0.51	0.6	10	0.6	3.5
Calcium T-Ca	17700	16800	22200	9690	9860	17500	5560	17100	17800	16100	17300	19900				
Chromium T-Cr	150[1,2,3,4]	84.7[1,3]	83.2[1,3]	155[1,2,3,4]	131[1,2,3,4]	112[1,2,3,4]	15.3	39[1,3]	44[1,3]	90.5[1,3,4]	68.6[1,3]	51.2[1,2]	26	110	37.3	90
Cobalt T-Co	27.1	20.7	23.8	24.1	21.2	26.3	**<4.0**	**<12**	**<16**	33.0	26.1	22.4				
Copper T-Cu	119[1,2,3]	125[1,2,3]	153[1,2,3]	50.2[1,3]	47.3[1,3]	62.3[1,3]	15.3	93.1[1,3]	104[1,3]	2191,2,3,4	176[1,2,3]	147[1,2,3]	16	110	35.7	197
Iron T-Fe	47700[1,2]	50900[1,2]	82900[1,2]	44900[1,2]	42800[1,]	53200[1,2]	11300	16300	21400[1,]	76500[1,2]	60700[1,2]	49200[1,2]	21,200	43,766		
Lead T-Pb	10.3	9.1	12.8	3.8	5.7	5.6	2.6	3.9	4.0	11.4	9.5	7.2	31	250	35	91.3
Lithium T-Li	20.1	19.2	16.3	17.4	17.0	17.9	4.2	**<12**	**<16**	29.6	21.8	17.6				
Magnesium T-Mg	27900	16800	18100	18800	17000	21300	2320	5890	6630	31500	23000	18600				
Manganese T-Mn	772	883	6480	811	978	961	341	584	940	2970	2570	1750				
Mercury T-Hg	0.0762	0.0396	0.0667	0.0527	0.0440	0.0497	0.0155	0.0338	0.0269	0.0187	0.0148	0.0142	0.2	2	0.17	0.486
Molybdenum T-Mo	**<8.0**	**<12**	4.4	**<4.0**	**<4.0**	**<4.0**	**<8.0**	**<24**	**<32**	**<4.0**	**<4.0**	**<4.0**				
Nickel T-Ni	194[1,2]	93[1,2]	102[1,2]	80.8[1,2]	67.2[1,]	67.9[1,]	17[1,]	79[1,2]	93[1,2]	50[1,]	36.1[1,]	28.3[1,]	16	75		
Phosphorus T-P	740	870	2000	594	591	1060	200	1060	1110	1110	1030	715				
Potassium T-K	3970	2970	2700	4670	6200	4140	3220	**<1200**	**<1600**	4700	4490	1630				
Selenium T-Se	**<100**	**<150**	**<50**	**<50**	**<50**	**<50**	**<100**	**<300**	**<400**	**<50**	**<50**	**<50**				
Silver T-Ag	**<4.0**	**<6.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<4.0**	**<12**	**<16**	**<2.0**	**<2.0**	**<2.0**	5			
Strontium T-Sr	90.6	93.3	121	66.2	68.6	97.3	22.9	58.6	60.1	68.7	74.8	58.5				
Thallium T-Tl	**<100**	**<150**	**<50**	**<50**	**<50**	**<50**	**<100**	**<300**	**<400**	**<50**	**<50**	**<50**				
Tin T-Sn	**<20**	**<30**	**<10**	**<10**	**<10**	**<10**	**<20**	**<60**	**<80**	**<10**	**<10**	**<10**				
Titanium T-Ti	1860	1830	1950	192	193	253	965	868	851	1520	1550	766				
Vanadium T-V	157	164	166	82.2	81.5	88.2	19.0	25	57	267	222	161				
Zinc T-Zn	118	123[1,3]	126[1,3]	68.3	65.1	77.5	49.0	70.9	69.7	247[1,3]	184[1,3]	148[1,3]	120	820	123	315
Organic Parameters (a)																
Total Organic Carbon C	7.15	11.3	7.53	0.490	0.580	0.480	4.09	25.0	27.7	0.700	0.750	0.340				
Particle Size (b)																
Gravel (>2.00mm) (%)	**<0.10**	N/A	**<0.10**	**<0.10**	**<0.10**	**<0.10**	7.30	N/A	N/A	**<0.10**	**<0.10**	**<0.10**				
Sand (2.00mm - 0.063mm) (%)	11.5	N/A	10.2	0.10	0.10	4.70	85.1	N/A	N/A	0.10	0.30	3.70				
Silt (0.063mm - 4um) (%)	35.6	N/A	64.6	64.1	61.9	73.0	6.80	N/A	N/A	35.0	54.4	67.1				
Clay (<4um) (%)	52.9	N/A	25.2	35.8	38.0	22.3	0.80	N/A	N/A	64.9	45.3	29.2				

< = Less than the detection limit indicated.

(continued)

Results are expressed as milligrams per dry kilogram except where noted.

Total Organic Carbon results are expressed as percent, dry weight basis.

[1, 2, 3, 4] indicate guidelines exceeded by the metal concentration: 1 - BC LEL, 2 - BC SEL, 3 - CCME ISQG, 4 - CCME PEL

Appendix 3.1-7
Schaft Creek Project Raw Wetland and Lake Sediment Data, 2006 (completed)

Sample ID	WL7-1b	L2-1b				
Date Sampled						
Time Sampled						
ALS Sample ID	16	9	Available Guideline Values			
Nature	Sediment/Soil	Sediment/Soil	LEL	SEL	ISQG	PEL
Physical Tests						
Moisture %	92.0	82.2				
pH	6.13	7.90				
Nutrients						
Available Phosphorus P	3.10	2.10				
Total Nitrogen N	1.31	0.480				
Cyanides						
Total Cyanide CN	**<3.0**	**<3.0**				
Total Metals						
Aluminum T-Al	8000	41700				
Antimony T-Sb	**<80**	**<40**				
Arsenic T-As	1.07	5.89	6	33	5.9	17
Barium T-Ba	97.5	186				
Beryllium T-Be	**<2.0**	1.1				
Bismuth T-Bi	**<80**	**<40**				
Cadmium T-Cd	**<0.30**	0.39	0.6	10	0.6	3.5
Calcium T-Ca	10000	17600				
Chromium T-Cr	25.0	148[1,2,3,4]	26	110	37.3	90
Cobalt T-Co	**<8.0**	26.6				
Copper T-Cu	232[1,2,3,4]	119[1,2,3]	16	110	35.7	197
Iron T-Fe	9390	46600[1,2]	21,200	43,766		
Lead T-Pb	**<2.0**	7.3	31	250	35	91.3
Lithium T-Li	**<8.0**	21.3				
Magnesium T-Mg	2420	27200				
Manganese T-Mn	115	767				
Mercury T-Hg	0.0554	0.0554	0.2	2	0.17	0.486
Molybdenum T-Mo	22	**<8.0**				
Nickel T-Ni	63[1,]	188[1,2]	16	75		
Phosphorus T-P	360	760				
Potassium T-K	940	4330				
Selenium T-Se	**<200**	**<100**				
Silver T-Ag	**<8.0**	**<4.0**	5			
Strontium T-Sr	60.1	88.9				
Thallium T-Tl	**<200**	**<100**				
Tin T-Sn	**<40**	**<20**				
Titanium T-Ti	498	1850				
Vanadium T-V	39.3	149				
Zinc T-Zn	33.6	120[1,]	120	820	123	315
Organic Parameters (a)						
Total Organic Carbon C	25.4	7.46				
Particle Size (b)						
Gravel (>2.00mm) (%)	N/A	**<0.10**				
Sand (2.00mm - 0.063mm) (%)	N/A	9.50				
Silt (0.063mm - 4um) (%)	N/A	41.6				
Clay (<4um) (%)	N/A	48.9				

< = Less than the detection limit indicated.

Results are expressed as milligrams per dry kilogram except where noted.

Total Organic Carbon results are expressed as percent, dry weight basis.

[1, 2, 3, 4] indicate guidelines exceeded by the metal concentration: 1 - BC LEL, 2 - BC SEL, 3 - CCME ISQG, 4 - CCME PEL

APPENDIX 3.1-8
SCHAFT CREEK PROJECT RELATIVE PERCENT DIFFERENCE RESULTS FOR WETLAND SEDIMENT DATA, 2006

Appendix 3.1-8
Schaft Creek Project Relative Percent Difference Results for Wetland Sediment Data, 2006

Sample ID	WL-7	WL-7	RPD %	WL3-1	WL3-1	RPD %
Date Sampled		QC# 518086			QC# 518087	
Time Sampled						
ALS Sample ID	3			12		
Nature	Water			Sediment/Soil		
Physical Tests						
Hardness CaCO3	48.0	46.9	**2.32**	-	-	**-**
Moisture %	-	-	**-**	32.6	32.8	**0.612**
pH	-	-	**-**	7.33	7.32	**0.137**
Turbidity (NTU)	0.73	0.70	**4.2**	-	-	**-**
Dissolved Anions						
Alkalinity-Total CaCO3	50.7	53.8	**5.93**	-	-	**-**
Nutrients						
Total Kjeldahl Nitrogen N	0.468	0.467	**0.214**	-	-	**-**
Total Phosphate P	0.0050	0.0069	**31.9**	-	-	**-**
Total Metals						
Aluminum T-Al	0.0143	0.0159	**10.6**	4960	5830	**16.1**
Antimony T-Sb	**<0.00010**	**<0.00010**	**0**	**<20**	**<20**	**0**
Arsenic T-As	0.00011	0.00010	**9.52**	1.50	1.63	**8.31**
Barium T-Ba	0.0223	0.0217	**2.73**	97.3	106	**8.56**
Beryllium T-Be	**<0.00050**	**<0.00050**	**0**	**<0.50**	**<0.50**	**0**
Bismuth T-Bi	**<0.00050**	**<0.00050**	**0**	**<20**	**<20**	**0**
Boron T-B	0.026	0.025	**3.92**	-	-	**-**
Cadmium T-Cd	**<0.000020**	**<0.000020**	**0**	**<0.10**	**<0.10**	**0**
Calcium T-Ca	13.4	12.8	**4.58**	2120	2370	**11.1**
Chromium T-Cr	**<0.00050**	**<0.00050**	**0**	7.2	7.8	**8**
Cobalt T-Co	**<0.00010**	**<0.00010**	**0**	2.7	2.8	**3.64**
Copper T-Cu	0.00185	0.00176	**4.99**	6.1	6.1	**0**
Iron T-Fe	0.261	0.262	**0.382**	13100	14300	**8.76**
Lead T-Pb	**<0.000050**	**<0.000050**	**0**	2.3	2.8	**19.6**
Lithium T-Li	**<0.0050**	**<0.0050**	**0**	5.7	6.2	**8.4**
Magnesium T-Mg	4.20	4.06	**3.39**	2230	2430	**8.58**
Manganese T-Mn	0.00586	0.00571	**2.59**	359	389	**8.02**
Mercury T-Hg	**<0.000010**	**<0.000010**	**0**	0.0055	0.0069	**22.6**
Molybdenum T-Mo	0.000641	0.000616	**3.98**	**<4.0**	**<4.0**	**0**
Nickel T-Ni	0.00186	0.00174	**6.67**	**<5.0**	**<5.0**	**0**
Phosphorus T-P	**<0.30**	**<0.30**	**0**	336	362	**7.45**
Potassium T-K	0.639	0.612	**4.32**	1060	1210	**13.2**
Selenium T-Se	**<0.00050**	**<0.00050**	**0**	**<50**	**<50**	**0**
Silicon T-Si	3.15	3.12	**0.957**	-	-	**-**
Silver T-Ag	**<0.000010**	**<0.000010**	**0**	**<2.0**	**<2.0**	**0**
Sodium T-Na	**<2.0**	**<2.0**	**0**	-	-	**-**
Strontium T-Sr	0.0596	0.0575	**3.59**	18.7	23.1	**21.1**
Thallium T-Tl	**<0.00010**	**<0.00010**	**0**	**<50**	**<50**	**0**
Tin T-Sn	**<0.00010**	**<0.00010**	**0**	**<10**	**<10**	**0**
Titanium T-Ti	**<0.010**	**<0.010**	**0**	413	470	**12.9**
Uranium T-U	**<0.000010**	**<0.000010**	**0**	-	-	**-**
Vanadium T-V	**<0.0010**	**<0.0010**	**0**	21.2	23.5	**10.3**
Zinc T-Zn	**<0.0010**	**<0.0010**	**0**	22.3	24.4	**8.99**
Dissolved Metals						
Aluminum D-Al	0.0086	0.0085	**1.17**	-	-	**-**
Antimony D-Sb	<0.00010	<0.00010	**0**	-	-	**-**
Arsenic D-As	<0.00010	<0.00010	**0**	-	-	**-**
Barium D-Ba	0.0212	0.0204	**3.85**	-	-	**-**
Beryllium D-Be	<0.00050	<0.00050	**0**	-	-	**-**
Bismuth D-Bi	<0.00050	<0.00050	**0**	-	-	**-**
Boron D-B	0.025	0.024	**4.08**	-	-	**-**
Cadmium D-Cd	<0.000020	<0.000020	**0**	-	-	**-**
Calcium D-Ca	12.7	12.4	**2.39**	-	-	**-**
Chromium D-Cr	<0.00050	<0.00050	**0**	-	-	**-**
Cobalt D-Co	<0.00010	<0.00010	**0**	-	-	**-**
Copper D-Cu	0.00160	0.00159	**0.627**	-	-	**-**
Iron D-Fe	0.153	0.157	**2.58**	-	-	**-**
Lead D-Pb	<0.000050	<0.000050	**0**	-	-	**-**
Lithium D-Li	<0.0050	<0.0050	**0**	-	-	**-**
Magnesium D-Mg	3.95	3.86	**2.3**	-	-	**-**
Manganese D-Mn	0.000614	0.000594	**3.31**	-	-	**-**
Mercury D-Hg	<0.000010	<0.000010	**0**	-	-	**-**
Molybdenum D-Mo	0.000626	0.000614	**1.94**	-	-	**-**
Nickel D-Ni	0.00176	0.00168	**4.65**	-	-	**-**
Phosphorus D-P	<0.30	<0.30	**0**	-	-	**-**
Potassium D-K	0.598	0.582	**2.71**	-	-	**-**
Selenium D-Se	0.00057	<0.00050	**13.1**	-	-	**-**
Silicon D-Si	3.09	3.10	**0.323**	-	-	**-**
Silver D-Ag	<0.000010	<0.000010	**0**	-	-	**-**
Sodium D-Na	<2.0	<2.0	**0**	-	-	**-**
Strontium D-Sr	0.0573	0.0565	**1.41**	-	-	**-**
Thallium D-Tl	<0.00010	<0.00010	**0**	-	-	**-**
Tin D-Sn	<0.00010	<0.00010	**0**	-	-	**-**
Titanium D-Ti	<0.010	<0.010	**0**	-	-	**-**
Uranium D-U	<0.000010	<0.000010	**0**	-	-	**-**
Vanadium D-V	<0.0010	<0.0010	**0**	-	-	**-**
Zinc D-Zn	<0.0010	<0.0010	**0**	-	-	**-**
Organic Parameters						
Chemical Oxygen Demand COD	57	58	**1.74**	-	-	**-**
Total Organic Carbon C	14.6	14.8	**1.36**	-	-	**-**

APPENDIX 3.1-9
SCHAFT CREEK PROJECT RAW PHYTOPLANKTON DATA, AUGUST 2006

Appendix 3.1-9
Schaft Creek Project Raw Phytoplankton Data, August 2006

TAXON		L-1-1		L-1-2		L-1-3		L-2-1		L-2-2		L-2-3	
		cells x 10^3 / L	u^3 x 10^6 / L	cells x 10^3 / L	u^3 x 10^6 / L	cells x 10^3 / L	u^3 x 10^6 / L	cells x 10^3 / L	u^3 x 10^6 / L	cells x 10^3 / L	u^3 x 10^6 / L	cells x 10^3 / L	u^3 x 10^6 / L
CYANOPHYTA			0.00		0.00		0.00		0.00		0.00		0.00
Aphanocapsa elachista		0.00	0.00	0.00	0.00	0.00	0.00	119.61	0.24	91.63	0.18	185.44	0.37
Chroococcus sp.		0.00	0.00	0.00	0.00	0.00	0.00	68.09	6.81	48.87	4.89	30.00	3.00
CHLOROPHYTA		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ankistrodesmus falcatus		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ankistrodesmus sp.		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crucigenia rectangularis		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elakatothrix gelatinosa		0.00	0.00	0.00	0.00	0.00	0.00	5.52	0.33	0.00	0.00	1.82	0.11
Oocystis lacustris		0.00	0.00	0.00	0.00	0.00	0.00	7.36	1.47	1.75	0.35	0.00	0.00
Tetraedron sp.		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ulothrix sp.	/mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	19.63
CHRYSOPHYTA		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diceras sp.		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dinobryon bavaricum		0.00	0.00	0.00	0.00	0.00	0.00	29.44	47.11	8.73	13.96	21.82	34.91
Dinobryon spp.		0.00	0.00	0.00	0.00	0.00	0.00	6.44	8.37	0.00	0.00	0.91	1.18
CHRYSOPHYTA - DIATOMS		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Achnanthes minutissima		0.00	0.00	1.82	0.13	1.76	0.12	0.00	0.00	0.87	0.06	10.00	0.70
Achnanthes sp.		5.45	0.44	10.91	0.87	4.40	0.35	31.28	2.50	10.47	0.84	73.63	5.89
Amphora ovalis		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anomoeoneis vitrea		0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.39	0.00	0.00	0.91	0.38
Asterionella formosa		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cocconeis placentula		0.00	0.00	9.09	8.18	0.00	0.00	3.68	3.31	0.87	0.79	22.73	20.45
Cyclotella comta		0.00	0.00	0.00	0.00	0.00	0.00	15.64	16.58	5.24	5.55	14.54	15.42
Cyclotella sp.		0.91	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyclotella sp. B		0.00	0.00	0.00	0.00	0.00	0.00	11.04	6.62	3.49	2.09	6.36	3.82
Cymbella ventricosa		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diatoma tenue v. elongatum		0.00	0.00	4.55	0.82	0.00	0.00	0.00	0.00	2.62	0.47	3.64	0.65
Fragilaria construens v. construens		0.00	0.00	0.00	0.00	7.04	1.27	0.00	0.00	0.00	0.00	3.64	0.65
Fragilaria construens v. venter		0.00	0.00	0.00	0.00	2.64	0.50	0.00	0.00	17.45	3.32	0.00	0.00
Fragilaria crotonensis		0.00	0.00	0.00	0.00	0.00	0.00	1.84	1.27	0.00	0.00	0.00	0.00
Fragilaria sp.		0.00	0.00	3.64	0.91	3.52	0.88	0.00	0.00	0.00	0.00	3.64	0.91
Fragilaria vaucheriae		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frustulia rhomboides		0.00	0.00	0.91	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gomphonema olivaceum		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.44
Gomphonema sp.		0.91	0.45	5.45	2.73	0.88	0.44	0.00	0.00	4.36	2.18	3.64	1.82
Hannaea arcus		0.91	1.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Meridion circulare		0.91	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula pupula		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.33	0.00	0.00
Navicula sp.		0.00	0.00	0.00	0.00	0.88	0.44	0.92	0.46	0.00	0.00	0.00	0.00
Neidium sp.		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	1.38	0.00	0.00
Nitzschia sp.		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.21	6.36	1.53
Synedra delicatissma		0.00	0.00	0.00	0.00	0.00	0.00	0.92	5.76	0.00	0.00	0.00	0.00
Synedra sp.		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Synedra ulna		0.00	0.00	0.00	0.00	0.00	0.00	0.92	2.74	0.87	2.60	0.00	0.00
Tabellaria flocculosa		0.00	0.00	0.00	0.00	0.00	0.00	3.68	3.31	0.00	0.00	0.00	0.00
CRYPTOPHYTA		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chroomonas acuta		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.09	0.00	0.00
PYRRHOPHYTA		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gymnodinium sp.		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Peridinium sp.		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL		9.09	3.16	36.37	15.69	21.12	4.00	307.30	107.27	200.70	39.29	389.99	92.23
TOTAL mm	/mm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	19.63

(continued)

Appendix 3.1-9
Schaft Creek Project Raw Phytoplankton Data, August 2006 (continued)

	L-3-1		L-3-2		L-3-3		L-4-1		L-4-2		L-4-3	
TAXON	**cells x 10^3 / L**	**u^3 x 10^6 / L**	**cells x 10^3 / L**	**u^3 x 10^6 / L**	**cells x 10^3 / L**	**u^3 x 10^6 / L**	**cells x 10^3 / L**	**u^3 x 10^6 / L**	**cells x 10^3 / L**	**u^3 x 10^6 / L**	**cells x 10^3 / L**	**u^3 x 10^6 / L**
CYANOPHYTA		0.00		0.00		0.00		0.00		0.00		0.00
Aphanocapsa elachista	0.00	0.00	0.00	0.00	0.00	0.00	519.44	1.04	205.65	0.41	213.05	0.43
Chroococcus sp.	0.00	0.00	0.00	0.00	0.00	0.00	118.17	11.82	89.41	8.94	72.44	7.24
CHLOROPHYTA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ankistrodesmus falcatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ankistrodesmus sp.	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.19	1.79	0.27	0.00	0.00
Crucigenia rectangularis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.46	0.86	0.00	0.00
Elakatothrix gelatinosa	0.00	0.00	0.00	0.00	0.00	0.00	2.60	0.16	1.79	0.11	7.67	0.46
Oocystis lacustris	0.00	0.00	0.00	0.00	0.00	0.00	15.58	3.12	10.73	2.15	13.64	2.73
Tetraedron sp.	0.00	0.00	0.00	0.00	0.00	0.00	5.19	0.52	2.68	0.27	2.56	0.26
Ulothrix sp.	0.00	0.00	0.00	0.00	0.00	0.00	0.77	45.97	0.71	42.38	0.83	49.60
CHRYSOPHYTA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diceras sp.	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.39	0.89	0.27	1.70	0.51
Dinobryon bavaricum	0.00	0.00	0.00	0.00	0.00	0.00	3.90	6.23	0.89	1.43	5.97	9.54
Dinobryon spp.	5.07	6.60	2.68	3.49	0.85	1.11	9.09	11.82	6.26	8.14	8.52	11.08
CHRYSOPHYTA - DIATOMS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Achnanthes minutissima	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.06
Achnanthes sp.	3.38	0.27	0.00	0.00	4.26	0.34	10.39	0.83	14.31	1.14	0.00	0.00
Amphora ovalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anomoeoneis vitrea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.36
Asterionella formosa	0.00	0.00	0.00	0.00	0.00	0.00	16.88	10.13	0.00	0.00	4.26	2.56
Cocconeis placentula	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.58	3.22	0.00	0.00
Cyclotella comta	0.00	0.00	0.00	0.00	0.00	0.00	14.28	15.14	15.20	16.11	7.67	8.13
Cyclotella sp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyclotella sp. B	0.00	0.00	0.00	0.00	0.00	0.00	20.78	12.47	16.09	9.66	12.78	7.67
Cymbella ventricosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diatoma tenue v. elongatum	0.00	0.00	0.89	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fragilaria construens v. construens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fragilaria construens v. venter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fragilaria crotonensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.52	8.64	0.00	0.00
Fragilaria sp.	0.85	0.21	1.79	0.45	4.26	1.07	3.90	0.97	5.36	1.34	4.26	1.07
Fragilaria vaucheriae	0.00	0.00	0.00	0.00	1.70	0.58	0.00	0.00	0.00	0.00	0.00	0.00
Frustulia rhomboides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gomphonema olivaceum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gomphonema sp.	0.00	0.00	0.00	0.00	0.85	0.43	0.00	0.00	0.00	0.00	0.00	0.00
Hannaea arcus	1.69	3.21	0.89	1.70	1.70	3.24	0.00	0.00	0.00	0.00	0.00	0.00
Meridion circulare	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula pupula	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula sp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Neidium sp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitzschia sp.	21.14	5.07	6.26	1.50	0.00	0.00	0.00	0.00	3.58	0.86	2.56	0.61
Synedra delicatissma	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Synedra sp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Synedra ulna	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tabellaria flocculosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRYPTOPHYTA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chroomonas acuta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PYRRHOPHYTA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gymnodinium sp.	5.07	10.15	1.79	3.58	0.00	0.00	1.30	2.60	1.79	3.58	2.56	5.11
Peridinium sp.	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.78	0.00	0.00	1.70	1.02
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	37.20	25.51	14.30	10.88	13.62	6.77	745.40	78.21	413.98	67.40	363.04	58.84
TOTAL mm	0.00	0.00	0.00	0.00	0.00	0.00	0.77	45.97	0.71	42.38	0.83	49.60

(continued)

Appendix 3.1-9
Schaft Creek Project Raw Phytoplankton Data, August 2006 (completed)

	L-5-1		L-5-2		L-5-3	
TAXON	**cells x 10^3 / L**	**u^3 x 10^6 / L**	**cells x 10^3 / L**	**u^3 x 10^6 / L**	**cells x 10^3 / L**	**u^3 x 10^6 / L**
CYANOPHYTA		0.00		0.00		0.00
Aphanocapsa elachista	0.00	0.00	0.00	0.00	0.00	0.00
Chroococcus sp.	0.00	0.00	0.00	0.00	0.00	0.00
CHLOROPHYTA	0.00	0.00	0.00	0.00	0.00	0.00
Ankistrodesmus falcatus	0.00	0.00	3.44	0.34	0.00	0.00
Ankistrodesmus sp.	0.00	0.00	0.00	0.00	0.00	0.00
Crucigenia rectangularis	0.00	0.00	0.00	0.00	0.00	0.00
Elakatothrix gelatinosa	0.00	0.00	0.00	0.00	0.00	0.00
Oocystis lacustris	0.00	0.00	0.00	0.00	0.00	0.00
Tetraedron sp.	0.00	0.00	0.00	0.00	0.00	0.00
Ulothrix sp.	0.00	0.00	0.00	0.00	0.00	0.00
CHRYSOPHYTA	0.00	0.00	0.00	0.00	0.00	0.00
Diceras sp.	0.00	0.00	0.00	0.00	0.00	0.00
Dinobryon bavaricum	0.00	0.00	0.00	0.00	0.00	0.00
Dinobryon spp.	0.00	0.00	0.00	0.00	0.00	0.00
CHRYSOPHYTA - DIATOMS	0.00	0.00	0.00	0.00	0.00	0.00
Achnanthes minutissima	0.83	0.06	0.00	0.00	0.00	0.00
Achnanthes sp.	0.00	0.00	0.00	0.00	4.20	0.34
Amphora ovalis	0.00	0.00	0.00	0.00	0.84	2.52
Anomoeoneis vitrea	0.00	0.00	0.00	0.00	0.00	0.00
Asterionella formosa	0.00	0.00	0.00	0.00	0.00	0.00
Cocconeis placentula	0.00	0.00	0.00	0.00	0.00	0.00
Cyclotella comta	0.00	0.00	0.00	0.00	0.00	0.00
Cyclotella sp.	0.00	0.00	0.00	0.00	0.00	0.00
Cyclotella sp. B	9.09	5.45	12.02	7.21	5.03	3.02
Cymbella ventricosa	0.00	0.00	0.86	0.42	0.84	0.41
Diatoma tenue v. elongatum	0.83	0.15	0.86	0.15	0.84	0.15
Fragilaria construens v. construens	0.00	0.00	0.00	0.00	0.00	0.00
Fragilaria construens v. venter	0.00	0.00	0.00	0.00	10.07	1.91
Fragilaria crotonensis	0.00	0.00	0.00	0.00	0.00	0.00
Fragilaria sp.	6.61	1.65	2.58	0.64	0.84	0.21
Fragilaria vaucheriae	0.00	0.00	0.00	0.00	0.00	0.00
Frustulia rhomboides	0.00	0.00	0.00	0.00	0.00	0.00
Gomphonema olivaceum	0.00	0.00	0.00	0.00	0.00	0.00
Gomphonema sp.	0.00	0.00	0.00	0.00	0.84	0.42
Hannaea arcus	0.00	0.00	0.00	0.00	0.00	0.00
Meridion circulare	0.00	0.00	0.00	0.00	0.00	0.00
Navicula pupula	0.00	0.00	0.00	0.00	0.00	0.00
Navicula sp.	0.00	0.00	0.00	0.00	0.00	0.00
Neidium sp.	0.00	0.00	0.00	0.00	0.00	0.00
Nitzschia sp.	0.83	0.20	0.00	0.00	1.68	0.40
Synedra delicatissma	0.00	0.00	0.00	0.00	0.00	0.00
Synedra sp.	0.00	0.00	0.00	0.00	0.84	1.51
Synedra ulna	0.00	0.00	0.00	0.00	0.00	0.00
Tabellaria flocculosa	0.00	0.00	0.00	0.00	0.00	0.00
CRYPTOPHYTA	0.00	0.00	0.00	0.00	0.00	0.00
Chroomonas acuta	0.00	0.00	0.00	0.00	0.00	0.00
PYRRHOPHYTA	0.00	0.00	0.00	0.00	0.00	0.00
Gymnodinium sp.	1.65	3.31	0.00	0.00	0.00	0.00
Peridinium sp.	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	19.84	10.82	19.76	8.76	26.02	10.89
TOTAL mm	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX 3.1-10
SCHAFT CREEK PROJECT PHYTOPLANKTON BIOMASS DATA, AUGUST 2006

Appendix 3.1-10
Periphyton Biomass Data

Sample ID	Date Sampled	Chlorophyll a	vol filtered (L)	Biomass (ug/L)
L 1-1	13/08/2006	0.00451	0.1	0.0451
L 1-2	13/08/2006	0.00530	0.15	0.035333333
L 1-3	13/08/2006	0.00380	0.15	0.025333333
L 2-1	15/08/2006	0.0725	0.15	0.483333333
L 2-2	15/08/2006	0.0756	0.25	0.3024
L 2-3	15/08/2006	0.0821	0.25	0.3284
L 4-1	16/08/2006	0.125	0.2	0.625
L 4-2	16/08/2006	0.210	0.5	0.42
L 4-3	16/08/2006	0.298	0.5	0.596
L 5-1	17/08/2006	0.223	0.5	0.446
L 5-2	17/08/2006	0.214	0.25	0.856
L 5-3	17/08/2006	0.143	0.25	0.572
L 3-1	18/08/2006	0.0340	0.25	0.136
L 3-2	18/08/2006	0.0818	0.5	0.1636
L 3-3	18/08/2006	0.0707	0.5	0.1414

APPENDIX 3.1-11
SCHAFT CREEK PROJECT RAW ZOOPLANKTON DATA, AUGUST 2006

Appendix 3.1-11
Raw Schaft Creek Zooplankton Data

TAXON	STAGE	No. of individuals	L1-1	L1-2	L1-3	L2-1	L2-2	L2-3	L3-1	L3-2	L3-3	L4-1	L4-2	L4-3	L5-1	L5-2	L5-3
ROTIFERA																	
Kellicottia longispina		*26720*				5800	3500	10900	150	200	120	320	4000	1100	30	400	200
Keratella cochlearis		*200*					100	100									
Conochilus sp.	colony	*41*				4							30	7			
Brachionus sp.		*1*	1														
CLADOCERA																	
Daphnidae																	
Daphnia middendorffiana		*294*	4	2		26	57	190				1	10	4			
Bosminidae																	
Bosmina longirostris		*19*	1												14	1	3
Chydoridae																	
Chydorus sphaericus		*1*	1														
COPEPODA																	
Calanoida																	
Diaptomidae																	
Leptodiaptomus pribilofensis	M	*1495*	1			70	210	170	1			45	270	720	7	1	
Leptodiaptomus pribilofensis	F	*1197*				60	25	330	1			23	280	470	5		3
Leptodiaptomus sp.	C5	*3192*				700	700	1300	25		1	18	150	130	11	27	130
Leptodiaptomus sp.	C4	*3147*				600	600	1700	15	1	2	17	90	70	3	9	40
Leptodiaptomus sp.	C3	*3201*	1			1400	330	1400		1	1	5		60		3	
Leptodiaptomus sp.	C2	*1566*				600	260	600	10			6	50		10	10	20
Leptodiaptomus sp.	C1	*1707*				300	190	900				7	30	40	60	10	170
Temoridae																	
Heterocope septentrionalis	M	*92*				3	8	18					14	14	1	8	26
Heterocope septentrionalis	F	*146*				4	4	42					40	23	3	7	23
Unidentified Calanoida	nauplius	*1575*				70	70	400				5	100		150	80	700
Cyclopoida																	
Cyclops bicuspidatus thomasi	M	*31*							20	4	7						
Cyclops bicuspidatus thomasi	F	*457*							350	13	26		20	40	7		1
Cyclops scutifer	M	*1*														1	
Cyclops scutifer	F	*42*				8	2	30									2
Unidentified Cyclopoida	copepodite	*26032*	5	1		1200	720	2600	3350	4900	820	6	10	20	3900	3700	4800
Unidentified Cyclopoida	nauplius	*176402*	2	6	4	3500	330	14700	1300	1800	430	1130	37000	27000	16400	48000	24800
INSECTA																	
Diptera																	
Chaoborus sp.	larvae	*94*				7		29					49	9			
Total		***247653***	**16**	**9**	**4**	**14352**	**7106**	**35409**	**5222**	**6919**	**1407**	**1583**	**42143**	**29707**	**20601**	**52257**	**30918**

C stands for copepodite stages 1 through 5

M = male; F = female

APPENDIX 3.1-12
SCHAFT CREEK PROJECT ZOOPLANKTON HAUL DEPTH AND QUALITY, AUGUST 2006

Appendix 3.1-12
Zooplankton Field Notes

Site	Rep	# of hauls composited	Haul Depth (m)	Hor/Vert	Position in Lake
L1-1	1	3	6	Hor	centre
L1-2	2	3	8	Hor	N end
L1-3	3	3	5	Hor	S end
L2-1	1	3	6.5	Hor	SW shallow
L2-2	2	3	2	Hor	centre
L2-3	3	3	12	Hor	near S inflow
L3-1	1	3	5.5	Hor	S end
L3-2	2	3	6.5	Hor	centre
L3-3	3	3	7	Hor	N end
L4-1	1	3	3	Hor	NW end
L4-2	2	3	8.5	Hor	centre
L4-3	3	3	7.5	Hor	SE end
L5-1	1	3	7.5	Hor	SE end
L5-2	2	3	3.5	Hor	centre
L5-3	3	3	6.5	Hor	NW end

Hor = horizontal haul; Vert = vertical haul