

Water Quality Source Identification in the Kiskatinaw Watershed near Dawson Creek, B.C.

Interim Report

**Prepared by Gabi Matscha, James Jacklin and Dave Sutherland
Ministry of Environment (MOE)
Prince George, B.C.**

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Purpose and Objectives

The Province's *Drinking Water Protection Act*, enacted in October 2002, places the responsibility for drinking water quality protection with the B.C. Ministry of Health and local water purveyors. However, through the B.C. *Water Act* and *Environmental Management Act*, the British Columbia Ministry of Environment (MOE) is responsible for regulating activities in watersheds that have a potential to affect water quality. Accordingly, the Ministry plans to take an active role in protecting drinking water quality at its source.

MOE implemented a raw water quality and stream sediment monitoring program at selected communities in the Omineca-Peace Region in 2002. Community source watersheds were prioritized for the above sampling program using a risk matrix based on the following scoring factors:

- Surface water vs. ground water,
- Level of water treatment,
- Population size served,
- Potential for upstream diffuse and point-source pollution,
- Availability of current, high-quality and representative data on each raw water source,
- Reports of past outbreaks of waterborne illness, and
- Ability/willingness of local purveyors to assist with sampling.

The Dawson Creek community source water, part of the Kiskatinaw River watershed, was ranked as a high priority for raw water monitoring. Samples were collected six times between October 2002 and August 2003 from the raw water tap at the Arras pump house. Results of this one year monitoring program are summarized in Jacklin et al. (2003). The program indicates significant contamination with parasites, bacteria, organic carbon, suspended solids and turbidity. These data confirm results of previous monitoring programs, conducted by MOE and the City of Dawson Creek in the 1970s, the 1980s and 1990s (Matscha et al, 2003).

The Kiskatinaw Watershed provides the sole domestic source for about 12 000 residents of Dawson Creek (based on 2002 statistics), 6 schools and about 1000 residents in the community of Pouce Coupe. Alternative water supplies were considered, but rejected based on the high costs for these options. In addition, the watershed has a high current land use density and bears a high pressure for future development. In an effort to increase source water protection an Integrated Watershed Management Plan was developed for the Kiskatinaw Watershed in 1991. In 2001 the City of Dawson Creek initiated a series of stakeholder meetings resulting in an updated Kiskatinaw River Watershed Management Plan (Dobson, Urban Systems, 2003). The Plan, which is currently being updated again, calls for a number of protective measures, among them water quality monitoring and source identification.

In response to the 2002/2003 MOE study results and the City of Dawson Creek's interest in managing the watershed, MOE designed a contaminant source identification program for the Kiskatinaw watershed

upstream of the community water intake. The project was designed to identify sources of critical contaminants in the watershed. This document describes the program and summarizes the first year's source identification results.

Source identification is the second phase of a water quality management process. During this phase, the main land use sectors are identified and a monitoring program designed to determine the relative effects of these sectors. This phase also provides a baseline from which to identify the effects of future developments, and information on contamination timing and location for use in the next stage of a watershed management process.

The typical phases of a water quality management process are:

1st: Baseline monitoring and problem identification

In the Kiskatinaw, this phase included previous monitoring efforts at the community water intake in the 1970s, 1980s and 1990s (Matscha et al, 2003), the 2002/2003 MOE study (Jacklin et al, 2003), and MOE data, collected under an MOE watershed characterisation program 2002-2004 (unpublished).

2nd: Identification of sources of any water quality impacts.

The results of this phase are described in this document.

3rd: Source management, where required.

This phase will be directed by the final results of the 2nd phase.

4th: Performance monitoring and plan adjustment.

Purpose of this Report

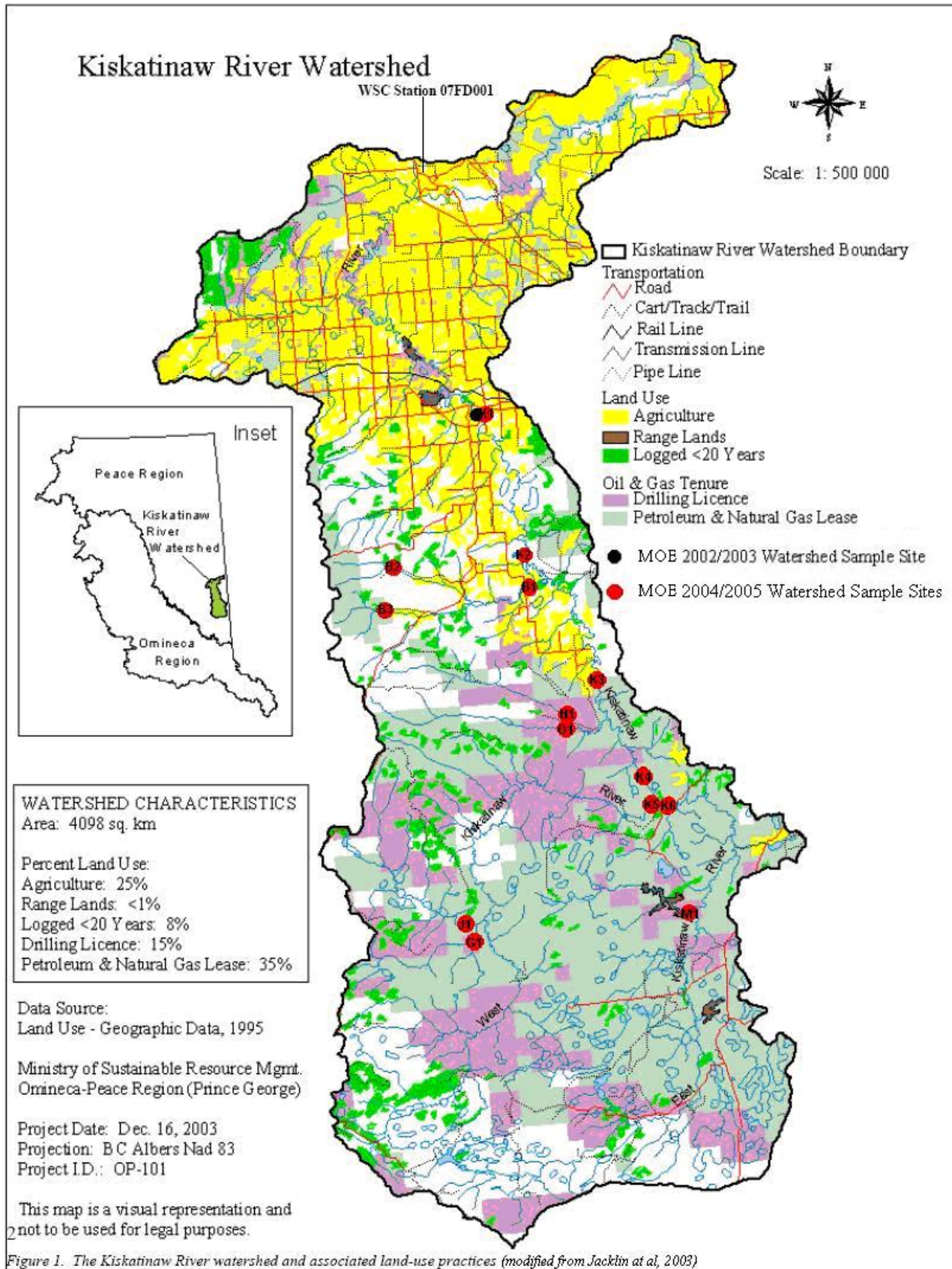
This document is an interim summary of first year results under the source identification project in the Kiskatinaw Watershed. 14 sites throughout the watershed have been sampled 6 times over one year. The report will compare these data to previous studies in the Kiskatinaw watershed and will draw preliminary conclusions on which additional work can be done. This exercise will focus on parameters that exceed or approach provincial drinking water quality and/or aquatic life guidelines.

Site Description

Overview

The Kiskatinaw River originates in the foothills of the Rocky Mountains near Tumbler Ridge and flows approximately 200 km north before joining the Peace River at the Alberta border in Northeast British Columbia. The main stem is formed from the convergence of two branches: the West Kiskatinaw River and the slightly longer East Kiskatinaw River, which drains Bearhole Lake. The watershed consists of nineteen major sub-basins (Berry, 1995) and drains 4,098 km² (Rex, 2003).

It is situated in the Boreal White and Black Spruce biogeoclimatic zone, which is characterized by rolling topography, long and cold winters and a landscape composed of black spruce bogs intermixed with stands of white spruce and trembling aspen at higher elevations (Ministry of Forests, 1998). While the watershed topography is generally low-gradient, sections of the channel are deeply entrenched into a highly erodible landscape. Exposed sloughing banks are common, suggesting that landscape characteristics have the potential to affect water quality.



Land use activities within the watershed include agriculture (including range), forestry, oil, gas, residential development, roads, and mineral exploration, with agriculture and range use concentrating downstream of the confluence of the East and West Kiskatinaw arms. Figure 1 depicts land use patterns in the watershed. Because the map is based on data from 1995, current land use activities initiated after this date may not be included and the extent of other land use, such as range tenures, have changed slightly.

No major waste disposal permits have been issued for the Kiskatinaw River basin. A small landfill permit exists at Fellers Heights and several sewage disposal permits for private residences and industrial camps have been issued by the Peace Liard Community Health Unit. The Northern Health Authority identified approximately 220 sewage lagoons in the watershed (Sheila Withrow personal communication April 2002). Lagoons are by far the most common means of sewage treatment in the drainage.

Eighteen water withdrawal licences exist in the watershed, of which the City of Dawson Creek's is the largest.

Hydrology

Stream flow data have been collected on a regular basis since 1966 by Water Survey of Canada at station number 07FD001, downstream from the community water supply pump house at the Alaska Highway crossing. This station is located below most major tributaries and incorporates a drainage area of 3,685 km² (Ministry of Forests, 1991).

Average flows are lowest during the winter months and generally highest during spring freshet. Shorter peak flows occur throughout the summer as a result of rain events and overland runoff, assisting potential impact of land use activities on water quality.

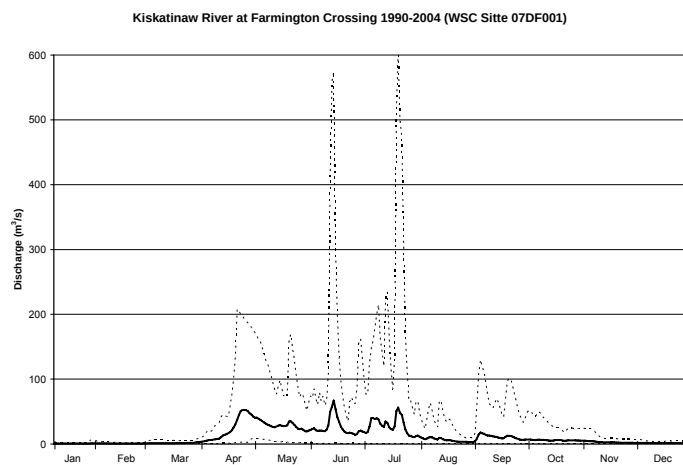


Figure 2: Lowest (bottom dashed line), average (middle solid line) and maximum (upper dashed line) daily flows observed in the Kiskatinaw River near Farmington over the period 1990 -2004.

Community Water Treatment System

The City of Dawson Creek draws its domestic water supply directly from the Kiskatinaw River near Arras, upstream of the Highway 97 crossing. From there the water is piped into settling reservoirs and later into a treatment facility, where it undergoes coagulation, filtration, chlorination (Sodium Hypochlorite disinfection) and UV treatment.

Project Description:

General Considerations

Prince George MOE staff conducted an air photo and helicopter reconnaissance (Aug11, 2004) to determine the locations and extent of various land use sectors, and of suitable sampling sites in the Kiskatinaw River and its tributaries. Additional land use and water user information was collected from the sources listed in Table 1.

Table 1: Sources of land and water use information considered for the Kiskatinaw Source Identification Project

Land use and water user information	Source
Range tenure locations	http://srmapps.gov.bc.ca/apps/mapview/ Version July 2004.
Main grazing areas approximate locations	Jim Forbes (Ministry of Agriculture), pers. communication, July 2004
Oil and gas drilling activities	McElleney Associates, North East British Columbia Road Atlas, updated March 2004
Oil and gas land farm sites	B.C. Government EMS and SITE information system July 2004.
Water Licences	Land and Water B.C. Inc., July 2004.
Waste Discharge Permits	B.C. Government EMS information system
General land use and water user information	Landuse – Geographic Data, 1995 (see map), Orthophotos (1997), others see Literature Cited.

Sample Sites, Frequency and Sample Matrix

Sample sites (Figure 1) were selected to divide the main stem into relatively large sections where oil and gas and forestry activities were separated from mostly agricultural. This resulted in four sample sites in the main stem (K1-K4) and one each at the mouths of the West (K5) and East Kiskatinaw (K6) Rivers. Additional sample sites were placed in tributaries with the highest density of each of the major land use activities (agriculture, oil and gas, forestry, residential, roads). These include Brassey Creek (B1-B3) (mainly agriculture and residential, some oil and gas), Oetata (O1) and Halfmoon (H1) Creeks (both forestry and range use, some oil and gas), Jackpine (J1), Hourglass (H1) and Ministik Creeks (M1) (last three: mainly oil and gas, roads, and some forestry) (Table 2, Figure 1).

Water samples were collected 5 times over one year, covering seasonal flow conditions, high and low fall flows (Sep and Oct 2004, respectively), low winter flows (Feb 2005, ice cover), spring freshet (April 2005) and low summer flows (Aug 2004). Sediment samples were collected once on August 15-16, 2005 from 2 sites in the main stem and from the mouth of each sampled tributary, and the East and West Kiskatinaw. Although sediment-bound contaminants may not be released into the water column, and thus may not play a role in downstream water quality, sediment data may help determine potential sources of waterborne contaminants. It should also be noted that compounds bound to the sediment may be released into the water column in areas where streambed or bank erosion occurs.

Water Quality Parameters

The water sample analysis included contaminants typically affected by land use sector types that are found in the Kiskatinaw watershed. The analysed parameters are listed in Appendix B for each site and include general ions, nutrients, total and dissolved metals, bacteria, parasites, extractable petroleum hydrocarbons (EPHs), oil and grease, and pesticides. A 16S-ribosomal DNA based bacteria source tracking (BST) method (Field et al, 2003) was applied to selected water samples to determine which hosts (human, ruminant, pig, dog, elk) the fecal bacteria originated from.

Table 2: Sample Site Description (D/s or d/s = downstream; U/s or u/s = upstream).
(For site locations see Figure 1).

Site Name	Stream Name	Location	Land Use
K1	Kiskatinaw main stem	Raw Water Tap, pump house.	D/S of agriculture, forestry, oil and gas, residential, roads, mineral exploration.
K2	Kiskatinaw main stem	Approx. 20km u/s pump house; d/s Brassey mouth.	See K1.
K3	Kiskatinaw main stem	About 40km u/s pump house, d/s Oetata + Halfmoon mouth.	U/s of most agriculture on priv. land, but d/s of range use, roads, forestry, oil and gas, residences at One Island Lake.
K4	Kiskatinaw main stem	Approx. 50km u/s pump house, d/s of E-and W-Kiskatinaw confluence.	U/s of most agricultural use, d/s of oil and gas, forestry, roads, residences at One Island Lake.
K5	West-Kiskatinaw mouth	50m u/s E- to W-Kiskatinaw confluence.	D/s of oil and gas, forestry, roads, some range in Jackpine Creek.
K6	East-Kiskatinaw mouth	20m u/s E- to W-Kiskatinaw confluence.	D/s of oil and gas, forestry, roads, residences at One Island Lake.
B1	Brassey, Tributary to Kiskatinaw main stem.	About 2 kms u/s mouth.	D/s of agriculture, residences, roads, oil and gas.
B2	Brassey	North-Arm about 5km d/s headwater.	D/s of oil and gas, roads.
B3	Brassey	South-Arm about 4km d/s headwater.	D/s of oil and gas, roads.
O1	Oetata, Tributary to Kiskatinaw main stem.	Directly u/s of confluence with Halfmoon.	D/s of oil and gas, forestry, range use.
H1	Halfmoon, Tributary to Oetata.	Directly u/s of confluence with Oetata.	D/s of oil and gas, forestry, range use.
M1	Ministik, Tributary to E-Kiskatinaw.	Directly at the mouth.	D/s of oil and gas, roads, forestry.
J1	Jackpine, Tributary to W-Kiskatinaw.	U/s of confluence with Hourglass.	D/s of oil and gas, roads, some forestry.
G1	Hourglass, Tributary into Jackpine.	U/S of confluence with Jackpine.	D/s of oil and gas, roads, some forestry.

Sediment samples were analysed for EPH, oil and grease, total organic carbon, metals, and selected pesticides.

Results are compared to B.C. Water Quality Guidelines (Nagpal et al, 2001) and the Summary of Guidelines for Canadian Drinking Water (Federal–Provincial–Territorial Committee on Drinking Water, 2003), which provide the benchmarks for judging acceptability. Discussion of the results also considers historic data (Matscha et al, 2003; Jacklin et al, 2003; water quality data from Brassey Creek collected under the Ministry of Environment Watershed Characterization Program between September 2002 and September 2004 (unpublished)).

Sampling and Analysis Methods

Water Quality

MOE staff collected water samples in laboratory certified container's (brown glass bottles for EPH and oil and grease analysis, sterilised polyethylene jars for bacteria, and polyethylene bottles for all other parameters). Representative grab samples were collected from the raw water tab at the pump house (K1) or directly from the Kiskatinaw River (all other sites). Samples were analysed for a total of about 70 contaminants, including physical conditions, general ions, nutrients, total and dissolved metals, fecal bacteria and parasites, as well as pesticides. A detailed list of all analysed parameters by site is included in Appendix B, Table B1-B10.

The monitored Creeks had sufficient flow to collect water samples at all sample sites in September and October 2004, and in April and August 2005. The February flows proved insufficient for sampling in the tributaries and at the East Kiskatinaw mouth (K6). All remaining samples were collected from flowing

water through an auger-drilled ice hole. During an additional site visit on April 06, 2005, samples were collected from the pump house and from the mouth and headwater sites in Brassey Creek, where the ice had receded and flows had significantly increased, while all other sites were still ice covered.

In 2004, *Giardia* cysts and *Cryptosporidium* oocysts were collected using a high volume filtering method, described in EPA (1995). Parasites were sampled in the Kiskatinaw main stem (K2-K4) and at the pump house (K1). Due to equipment failure, fall high flow samples (September 2004) were collected solely at K1, K2 and K3 and winter sampling was eliminated by equipment sensitivity to freezing temperatures. Filters were shipped by overnight courier in a cooler with ice packs to the BC Centre for Disease Control's Enhanced Water Laboratory for analysis. In 2005, 10L water samples were collected and sent to the BC Centre for Disease Control to be filtered and analysed for *Giardia* and *Cryptosporidium* using the USEPA Method 1623, which allows for increased sensitivity by utilizing an immunomagnetic separation (IMS) method. Due to the high suspended solids concentration in the sample water, field filtering (recommended 50L) was not possible using the new filter system. Additional 10L water samples were collected at Brassey Creek mouth in April and August 2005.

The detection limit in oocysts or cysts / 100L fluctuated between 10 and 136 for *Cryptosporidium* and 10 and 286 for *Giardia*. According to the BC Centre for Disease Control, detection limit changes with suspended solids (TSS) concentrations and turbidity, as well as with the filtering method and the amount of water filtered. Interpretation of the results needs to consider that fluctuating detection limits may result in non-detect values even if actual parasite concentrations are higher than detected counts on a different day, under different conditions. Although the filtering and analysis method used in 2005 had a higher sensitivity and may have resulted in higher recovery levels compared to 2004, the smaller amount of water filtered for the analysis in 2005 versus 2004 (10L vs. about 100L) may have limited this advantage to an unknown degree. These factors make the comparability of data difficult, particularly for *Cryptosporidium*, for which most results were at or below the detection limit. However, since the filtering method did not vary between sites on each particular sample date, and turbidity and TSS were somewhat comparable, it is believed that a limited spatial assessment can still deliver valuable information on parasite source locations.

Bottles used for general ion analysis were rinsed three times with source water prior to sample collection. Metal and bacterial sample bottles, as well as glass bottles for organic parameters, were not field rinsed. Metal samples were lab preserved with nitric acid and the dissolved fraction was lab filtered 24 hours after collection through a 0.45 µm membrane filter. Prior to sampling from the raw water tap, the source was flushed for five minutes in order to minimize contamination by system piping.

Water samples were shipped by overnight courier in coolers with ice packs to JR Laboratories Inc. and Pacific Environmental Science Centre (PESC) for bacteria and BST respectively, and to Maxxam Analytics Inc. (former PSC Environmental Services Ltd.) for chemistry.

Bacterial samples were analysed using membrane filtration (Part 9222 Franson et al., 2005). Metals analysis made use of ICPMS technology. Bacteria source tracking was carried out by the Pacific Environmental Science Centre (PESC). The technique has been adapted and developed based on the published articles of Dr. Katharine Field from Oregon State University, Corvallis, Oregon (Field et al, 2003). It is a genetic assay that detects 16-S ribosomal genomic DNA from the host-specific intestinal bacterial group *Bacteroides* and thereby identifies the organisms responsible for fecal contamination in water samples. Currently PESC is able to distinguish between fecal contamination from humans, ruminants, pigs, dogs, and elk; however, the ability to identify dog and elk contamination was added after April 2005, thus was only applied to the August 2005 samples.

Sediment Quality

At each site, composite samples were collected from several submerged depositional areas with fine sediments using two acetone washed stainless steel spoons for organic analysis, and acid washed plastic spoons for metal/grain size analysis.

A 2-3cm deep surface scrape was collected using a large spoon. This surface sample was then sub-divided into jars for grain size, total metals total organic carbon, hydrocarbons, and pesticides, using a second, smaller spoon. Sampling proceeded in an upstream direction with each depositional zone contributing a small amount of fine sediment to each container.

Quality Assurance/Quality Control (QA/QC)

The monitoring project included quality assurance and control (QA/QC) procedures to ensure acceptability of the data and precision from the field probes and laboratory analysis. Beside the development of sampling protocols, proper field staff training and calibration of field probes at the beginning of each sample trip, data quality samples, such as field blanks and duplicate samples, were submitted to the analyzing laboratory for each sampling event.

Field blanks provide a tool to evaluate analytical accuracy at the detection level and can help assess whether contamination occurred through sampling method effects, sampling equipment effects or other sources of contamination (e.g. micropore filters, sample bottles, lab). Replicates (samples taken side by side) help assess environmental or natural variability as well as sampling and laboratory analysis procedure consistency or precision.

Results and Discussion

Data Quality

Data quality was acceptable for most parameters; however, a few issues were detected and are summarized in Table 3: Blank results indicated repeated contamination with fecal streptococci and occasionally with nitrogen and a few total metals.

Table 3: Data Quality Issues for 2004/2005 analysis results

Matrix: Data Quality Issue Type	Parameters*	Date
Water Quality		
Contamination (as indicated by Field Blank Results)	Fecal Streptococci	September 14, 2004 April 06, 2005
	Nitrate and Nitrite Nitrogen	February 21, 2005 August 16, 2005
	Total and diss. Copper	February 21, 2005
	Total and diss. Manganese	April 19, 2005
	Total and diss. Strontium	Feb 21, 2005 (only total) April 19, 2005
	Diss. Zink	Feb 21, 2005
Unacceptable Precision (as indicated by Relative % Difference (RPD) of Duplicates)	E.coli	April 18, 2005
	Lab turbidity	February 21, 2005
	True Colour	September 13, 2004 April 18, 2005 August 16, 2005
	Non-filterable Residue (TSS)	August 16, 2005
	Nitrite and Nitrate	August 16, 2005
	Total Phosphorus	April 18, 2005
	Total Calcium	April 06, 2005
	Dissolved Manganese	April 19, 2005
	Dissolved Nickel	February 21, 2005
Sediment Quality		
Unacceptable Lab Recovery (as per Lab QA matrix spike recovery)	4,4'-methoxychlor	August 16, 2005 (batch included K3)
	Endrin	
	Heptachlor	
	Lindane (BHC), gamma	

* Diss. = dissolved

All blank chemical contamination was at least 2 orders of magnitude below the water quality guidelines, meaning this contamination source is unlikely to cause false guideline exceedances in ambient results. This is not true for fecal streptococci, where blank contamination exceeded the provincial guideline for untreated water (0 coliform forming units (CFU) / 100mL) on September 14, 2004 and April 06, 2005. Based on this observation, fecal streptococci values of these dates were not considered in the data summary statistic. Duplicate sample results point to potential precision issues for true colour and infrequently for some nutrients, metals, TSS and E.coli. Lab internal data quality assurance results indicate that spike recovery for 4,4'-methoxychlor, Endrin, Heptachlor and Lindane pesticides in sediment were below lab acceptance criteria, meaning that lab results for ambient samples in the same batch may not adequately represent concentrations of these parameters. This applies to K3. None of these pesticides were detected in any other ambient sediment sample collected in the Kiskatinaw on this day.

Water Quality

The sampled streams had a slightly alkaline pH and moderately high specific conductance and hardness, which were highest during the lower flows in the fall (Oct 2004) and winter (Feb 2005). No pesticides were detected and most analysed parameters were clearly within B.C. Water Quality Guidelines; however, 11 parameters exceeded these guidelines, some of them frequently:

- Bacteria concentrations surpassed B.C. Drinking Water Guidelines for untreated water at the City of Dawson Creek pump house on each sample date in 2004 and 2005. Since the community water for the City of Dawson Creek undergoes sufficient treatment, these guidelines do not apply; however, these levels indicate that there is potential for bacterial-related human illness should water treatment become ineffective.
- Cryptosporidium and giardia tests resulted in high numbers of giardia cysts during the open water period. As with bacteria, these concentrations pose a potential human health risk in case of a treatment system failure.
- True colour exceeded the aesthetic drinking water and recreation guidelines on most sample dates at most sites. Water colour as such does not place a health risk to consumers, but influences its aesthetic value.
- Hardness generally exceeded 200 mg/L CaCO₃, which – under the provincial guidelines – classifies drinking water quality as “poor”, but “tolerable”.
- Total and dissolved organic carbon at the pump house was consistently above the recommended 4 mg/L threshold for chlorination treatment. The threshold is based on acceptable levels of potentially toxic chlorination by-products that may form during the chlorination process in water with high organic carbon levels.
- Total cadmium concentrations typically exceeded provincial aquatic life guidelines during periods of higher flows (Sep 2004, spring 2005); however drinking water criteria were always met.
- A similar pattern was observed for total manganese and total iron, which frequently exceeded provincial aesthetic drinking water guidelines. Dissolved concentrations for all three of these metals (cadmium, iron, manganese) were significantly lower, suggesting introduction as particulates via erosion.
- Turbidity and TSS guidelines apply to induced values. Since this study does not include impact measurements from particular operations, but rather from stream sections (incl. anthropogenic and natural sources alike), these guidelines cannot be applied. However, high turbidity and TSS have a potential to impact drinking water quality and/or treatment.

Details for each of these contaminants, their importance for drinking water quality and aquatic life, a comparison to historic data, and potential sources are discussed in the following paragraphs.

Bacterial Contamination Sources

The 2004/05 bacterial data for the City of Dawson Creek raw water intake are summarised in Table 4.

Although numbers were reduced during late fall and winter sampling, bacteria counts consistently exceeded raw drinking water guidelines. Highest concentrations occurred during summer and early fall. Historic data collected at the City of Dawson Creek raw water intake show similar seasonal patterns (Table A1, Appendix A).

Table 4: Results of bacterial analysis of the City of Dawson Creek's raw water supply. (The grey marker indicates provincial raw drinking water (without treatment) guideline exceedances).

Date	Fecal Coliforms (CFU/100mL)	E.coli (CFU/100mL)	Fecal Streptococci (CFU/100mL)	Enterococci (CFU/100mL)
Provincial Guideline for raw (untreated) drinking water	0	0	No provincial guideline	0
Sep 14, 2004	38	30	76	28
Oct 26, 2004	8	3	3	<1
Feb 21, 2005	3	3	4	3
Apr 06, 2005	20	8	60	58
Apr 19, 2005	30	20	10	10
Aug 15, 2005	140	120	90	40

Seasonal changes in and spatial variation in fecal coliforms and fecal streptococci counts are summarized in Figure 3. Raw data for all tested bacteria groups are listed in Tables B1-B10 in Appendix B. There was little difference between fecal coliform and E.coli concentrations and between fecal streptococci and Enterococci concentrations, indicating the predominance of E.coli and Enterococci bacteria in these groups.

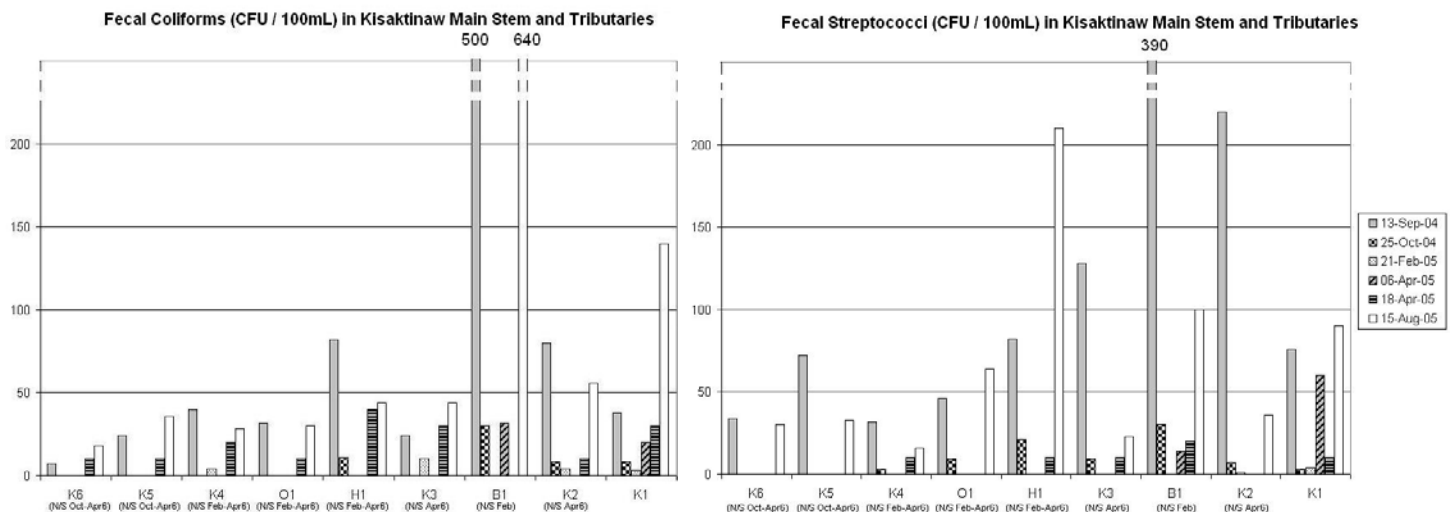


Figure 3: Fecal coliform and fecal streptococci counts in the Kiskatinaw River main stem and at the mouths of the monitored tributaries by date. Bars with grey background represent samples collected during higher than average flows, bars with white background represent samples collected during lower flows (N/S = not sampled).

Seasonal bacterial concentrations throughout the watershed are similar to those at the pump house; highest values were detected in late summer and early fall (Sep 2004, Aug 2005). Data collected by

MOE in Brassey Creek in 2002 – 2003 (unpublished, Table A2, Appendix A; n=10) confirm these patterns. Bacterial concentrations during the late summer/early fall season were highest in Brassey Creek, Hourglass Creek, and in the Kiskatinaw River downstream of these creeks. While fecal coliform numbers in Halfmoon Creek were generally lower than in Brassey Creek, fecal streptococci counts exceeded those in Brassey Creek on August 15, 2005. However, due to larger dilution, fecal contamination in Halfmoon Creek had a much less significant effect on the Kiskatinaw River than Brassey Creek contamination.

In an effort to segregate sources of high bacterial contamination, a source tracking method using *Bacteroides* (as described under Sample and Analysis Methods) was employed for samples from the Kiskatinaw River (K1-K3) and Brassey Creek (B1). A number of studies (Bernhard & Field, 2000; Bower et al., 2005; Kreader, 1995; Wang et al., 1996) indicate that *Bacteroides* spp. may be one of the most sensitive fecal indicator genetic markers present in fecal pollution at a much higher abundance than fecal coliforms. Table 5 summarises the results.

Table 5: Results of bacteria source tracking analysis at the City of Dawson Creek raw water intake and at upstream sample sites.

1=Analysed for human, ruminant and pig only. 2=Analysed for Human, ruminant, pig, dog, elk. 3= A faint result may be due to the following potential reasons: a) The method is at the edge of detection for this sample with respect to the amount of fecal matter for a particular species. b) Not every single organism may carry both markers in a herd and the detected fecal pollution was caused by one to two organisms. c) The fecal material inoculation is old and so the bacteria and DNA are degrading (bands can become smeared). 4=Samples were extremely silty and filtering difficult. Numerous pre-filtering necessary. 5=The level of confidence in a positive pig result is not as high as any of the other organisms because the pig primers for one of the markers have been noted to cross-prime with ruminant animal. 6=Water had yellow colour. Lab theorized that some component inhibited marker detection.

Sample Date	Kiskatinaw u/s of Brassey, d/s of Oetata and Halfmoon (K3)		Brassey Creek at the Mouth (B1)		Kiskatinaw down-stream (d/s) of Brassey (K2)		Dawson Creek Raw Water Intake (K1)	
	Bacteroides detected	Animal source marker(s) detected	Bacteroides detected	Animal source marker(s) detected	Bacteroides detected	Animal source marker(s) detected	Bacteroides detected	Animal source marker(s) detected
September 13, 2004 ¹	Not sampled		No ⁴		No ⁴		Yes (faint) ³	Human
October 25, 2004 ¹	Not sampled		No ⁶		Yes	Pig ⁵	Not sampled	
April 06, 2005 ¹	Not sampled		Yes	Human, Ruminant	Not sampled		Not sampled	
April 18, 2005 ¹	Not sampled		No		Yes	Human	Yes	No
August 15/16, 2005 ²	Yes	No	Yes	Human, Ruminant Dog	Yes	Human, Ruminant	Yes	Dog Human Ruminant

In spite of the high sensitivity of *Bacteroides* as fecal pollution indicators, their concentrations were insufficient for the r-DNA source tracking test on September 13, 2004, while fecal coliform and fecal streptococci counts peaked at the same sample sites (Table 5, Figure 3). The lab indicated that the sample water was very silty on that date and that filtering was difficult. Numerous pre-filtering was necessary. Insufficient numbers were also noted for Brassey Creek on October 25, 2004 and April 18, 2005, when fecal coliforms and/or fecal streptococci were detected. The lab noted a yellowish colour of these water samples and theorised that it may have an influence on the *Bacteroides* genetic marker detection. It should also be noted that total suspended solids (TSS) and turbidity were highest at all sites on September 13, 2004 and April 18, 2005 (Figures 11 and 12). However, *Bacteroides* were detected at K1 on April 18 with equally high TSS and turbidity.

Other factors, such as survival of the strictly anaerobic *Bacteroides* outside the digestive tract compared to the less specialised fecal coliforms, should be investigated. Bower et al. (2005) found human-specific *Bacteroides* spp. in Lake Michigan up to 8km from the harbour (that received sewage contaminated water from three rivers (Milwaukee, Menomonee and Kinnickinnic)), where *E.coli*

numbers were below 30 CFU/100mL or absent. On the other hand, ruminant-specific *Bacteroides* marker was detected in sewage samples from a wastewater treatment plant in an agricultural watershed only when *E.coli* levels were >50,000 CFU/100mL. He concludes that the use of these markers as a sole indicator of agricultural inputs is complicated and data interpretation needs to consider these findings.

The following limitations of the *Bacteroides* based BST are considered in the data interpretation below:

- Difficulties filtering water samples with high suspended solids concentrations.
- Water colour or chemistry may influence genetic marker detection.
- Potentially different survivability of ruminant-specific vs. human-specific *Bacteroides* vs. fecal coliforms.
- Capability to detect presence/absence, but not relative abundance of source specific genotypes.
- Markers have been identified for *Bacteroides* in general and specifically for those originating from human, ruminant, pig, dog, and elk fecal contamination. Other *Bacteroides* sources may contribute, but cannot yet be identified through this method.

As Table 5 shows, *Bacteroides* were detected in two of five samples from Brassey Creek mouth (B1). Results for both samples indicated human and ruminant fecal pollution, suggesting a frequent role of these sources in bacterial contamination in Brassey Creek. The dog marker in Brassey Creek on August 16, 2006 indicates dog, coyote or wolf impact. Human and ruminant fecal contamination are also detected in the Kiskatinaw River downstream of Brassey Creek (K2 and K1), but not upstream, indicating introduction from Brassey Creek or below. The only sample collected for BST analysis in the Kiskatinaw River upstream of Brassey Creek (K3, Aug 16, 2006) contained *Bacteroides*, but no marker for human, ruminant, pig, dog or elk fecal pollution. This indicates other *Bacteroides* sources, such as beaver, waterfowl, small rodents, or other wildlife. According to the lab, the level of confidence in the positive result for pig *Bacteroides* on October 25, 2004 is not as high as any of the other organisms because the pig primers for one of the markers have been noted to cross-prime with ruminant animal.

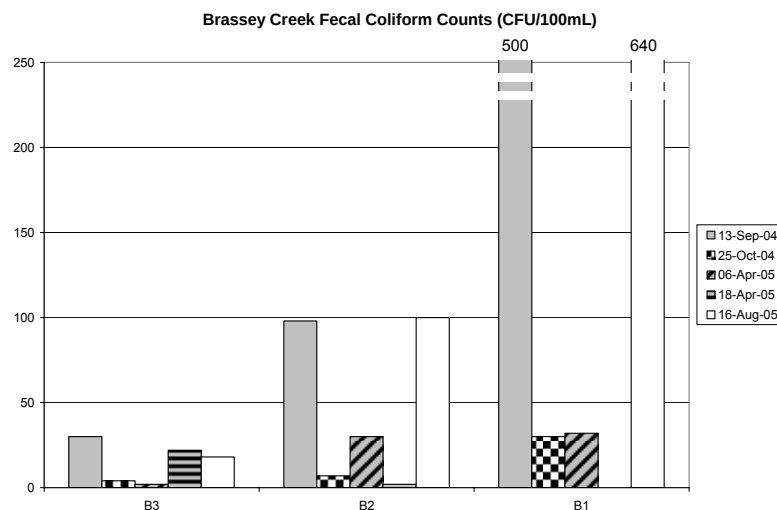


Figure 4: Fecal coliform counts in the headwaters of Brassey Creek (B2, B3) in comparison to the mouth (B1) in 2004/05

Although ruminant contamination does not exclude wildlife, such as deer and moose, the high numbers of cattle (some with access to the stream) and the comparably higher fecal coliform and fecal streptococci concentrations at Brassey mouth (B1) (below extended cattle operations) versus the

significantly lower bacteria values in Brassey headwaters (upstream of most agricultural activities) (B2 & B2) indicate significant introduction from pasture land (Figure 4). Potential sources for human fecal contamination (e.g. leaking lagoons or septic systems) in Brassey Creek and in the Kiskatinaw River below Brassey need to be mapped. Future sampling will focus up- and downstream of specific operations/areas with residences/oil and gas camps to further assess impact from sewage and agricultural activities.

Parasite Contamination Sources

Samples for parasite cyst and oocyst analysis were collected at four stations in the Kiskatinaw River main stem (K1-K4) and at Brassey Creek mouth (B1). K4 (upstream of most agriculture in the watershed) was not sampled in September 2004 and Brassey Creek (B1) samples were only collected in spring and summer 2005.

The Giardia and Cryptosporidium analysis results are summarised in Figure 5 and Table 6, showing Giardia cyst detection on all sample dates. Cryptosporidium oocysts were detected during two of four sampling events, September 13, 2004 and August 15-16, 2005.

Table 6: Parasite densities observed at the City of Dawson Creek's raw water supply, in the Kiskatinaw River main stem and in Brassey Creek over the period September 2004 to August, 2005. (N/S = not sampled on this date; d/s = downstream)

Sample Date	Parasite	Kiskatinaw u/s most agriculture (K4)	Kiskatinaw d/s of Oetata and Halfmoon (K3)	Brassey Creek at the Mouth (B1)	Kiskatinaw d/s of Brassey (K2)	Dawson Creek Raw Water Intake (K1)
September 13, 2004	Giardia cysts / 100L	N/S	<286.8	N/S	1311.1	1224.3
	Cryptosporidium oocysts / 100L	N/S	<286.8	N/S	<131	136
October 25, 2004	Giardia cysts / 100L	82.6	267	N/S	225.1	170.4
	Cryptosporidium oocysts / 100L	<82.6	<89	N/S	<112.5	<85.2
April 18, 2005	Giardia cysts / 100L	825	600	1890.2	1440	1015
	Cryptosporidium oocysts / 100L	<75	<75	<90	<120	<145
August 15/16, 2005	Giardia cysts / 100L	150	230	70	150	20
	Cryptosporidium oocysts / 100L	10	10	<10	20	10

Giardia cyst counts were highest during flush or high water conditions (in spring 2005 and fall 2004), indicating main introduction from land runoff or flushing of stagnant areas and beaver ponds. Cyst concentrations ranged from below the detection limit to 1890.2 cysts / 100L. On these dates, the high TSS and turbidity levels may have negatively impacted cyst detection, potentially resulting in an underestimation of Giardia concentrations. Spring cyst densities in the Brassey Creek (B1) and the Kiskatinaw River downstream of Brassey Creek (K1, K2) are clearly higher than those upstream of Brassey (K3, K4, not sampled in September). The fact that Brassey Creek produced the highest Giardia concentration on this date identifies Brassey Creek as an important source for the elevated values in the Kiskatinaw River below. However, the Giardia concentrations (>800 cysts / 100L during freshet) in the Kiskatinaw River upstream of most agricultural land use (K4), indicate that significant parasite sources, other than agriculture, must be present in the watershed. Additional sampling is recommended to distinguish between various land use sources and wildlife. Suitable methods are being explored in a joint project with the BC Centre for Disease Control.

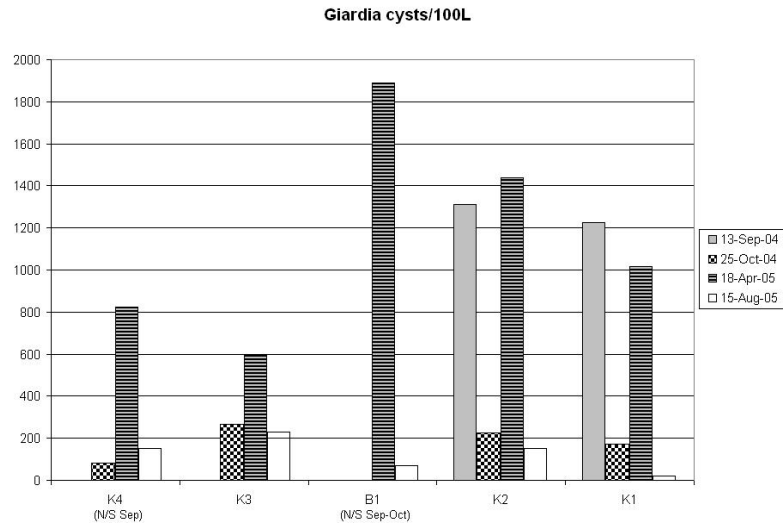


Figure 5: Giardia levels at sample sites in the Kiskatinaw River main stem and at Brassey Creek mouth (N/S = not sampled).

Other Contaminant Sources

True Colour

Colour is a measure of the dissolved colouring compounds (organic or inorganic materials) in water. Different materials absorb different light frequencies. Colour is expressed as Pt-Co units according to the platinum-cobalt scale. Water colour can naturally range from 0-300 Pt-Co. Higher values are often associated with swamps and bogs.

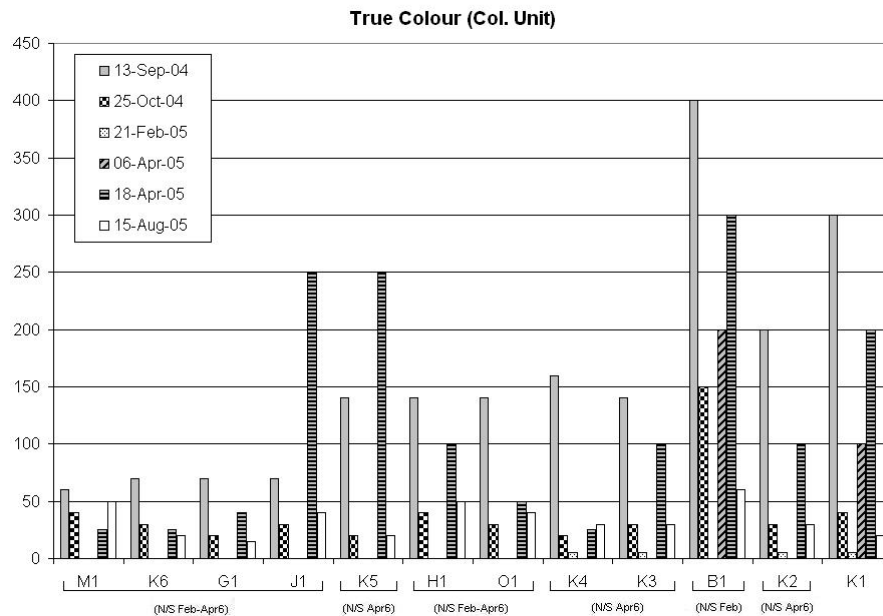


Figure 6: True Colour in the Kiskatinaw River main stem and at the mouths of the monitored tributaries by date. Bars with grey background represent samples collected during higher than average flows, bars with white background represent samples collected during lower flows (N/S = not sampled).

The colour guideline for raw drinking water is based on aesthetic considerations (most people can detect colour in water at 15 mg/L Pt), and applies to systems with a background colour of less than or equal to 15 mg/L Pt. The results of the 2004/05 sampling project (Figure 6) and historic data (Matscha et al., 2003; Jacklin et al., 2003) show that water colour consistently exceeded the 15 mg/L Pt at all sampled sites, indicating a background colour of > 15 mg/L Pt.; thus the aesthetic provincial raw drinking water guideline does not apply to the Kiskatinaw River watershed.

Water colour was generally more intense during higher than average flows with highest values in Brassey Creek, in the Kiskatinaw River downstream of Brassey, Jackpine Creek, and West Kiskatinaw River (Figure 6). The comparably lower values in the Brassey Creek Headwaters (upstream of most agricultural activities, Appendix B) imply that colouring compounds were introduced between headwaters and mouth, a section flowing through pasture land and containing a high density of beaver dams.

Total and dissolved organic carbon

Both, total (TOC) and dissolved organic carbon (DOC) levels consistently exceeded the recommended guidelines for chlorination treatment of 4 mg/L at the Dawson Creek raw water intake. All measured DOC levels in 2004/05 were within 84-98% of the TOC concentrations, meaning most of the detected TOC was dissolved.

Generally, potential sources for TOC may include natural sources (e.g. wetlands, vegetation), agricultural, residential and industrial waste discharges. TOC concentrations at most sites in the Kiskatinaw watersheds were higher in late summer and early fall than during other seasons (Figure 7). Flow levels do not appear to correlate with TOC levels. Variation between sample sites was relatively small, with highest concentrations in Ministik and Brassey Creek. TOC values in Brassey Creek Headwaters were comparable to or higher than data from the mouth, suggesting the main sources are upstream of the pasture land, such as natural sources, range use, forestry or oil and gas related activities.

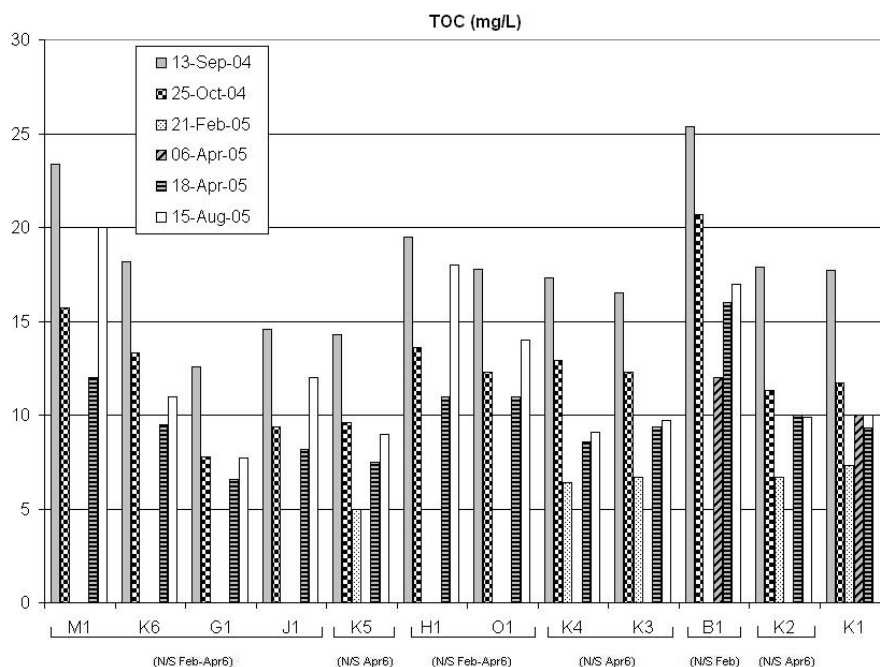


Figure 7: Total organic carbon in the Kiskatinaw River main stem and at the mouths of the monitored tributaries by date. Bars with grey background represent samples collected during higher

than average flows, bars with white background represent samples collected during lower flows (N/S = not sampled).

Metals

Selected samples were analysed for total and dissolved metals. These included samples from Dawson Creek's community intake (K1) as well as those collected downstream of oil and gas and forestry activities in the East (K6) and West (K5) Kiskatinaw and three of their tributaries (M1, J1, G1).

Total cadmium concentrations exceeded the hardness dependent B.C. working water aquatic life guidelines (Nagpal et al., 1998) at the intake during periods of higher flows (Sep 2004, spring 2005). However, values were one order of magnitude below the approved B.C. drinking water guideline of 5 ug/L, indicating a low risk to drinking water.

Cadmium has cumulative and highly toxic effects on aquatic life in all chemical forms. Other heavy metals such as zinc and copper are known to increase cadmium's toxicity. At high pH, cadmium precipitates from solution. Typical sources for cadmium include aerial inputs from emissions and mining.

It appears that cadmium concentrations consistently increased from the upper reaches and tributaries to the lower reaches (Figure 8). The West Kiskatinaw and its tributaries contributed higher concentrations to the main stem than the East Kiskatinaw. Concentrations during freshet were significantly higher (up to five times at the intake) than on the remaining sampling dates, suggesting introduction from runoff and or erosion. A comparison of the total cadmium values to the total suspended solids (TSS) concentrations shows a good correlation between the two parameters (Figure 8). In addition, the low dissolved fraction (non-detect or less than 51% of the total concentration; <5% on April 18, 2005) confirms that the cadmium guideline exceedances are due to particulate introduction from erosion.

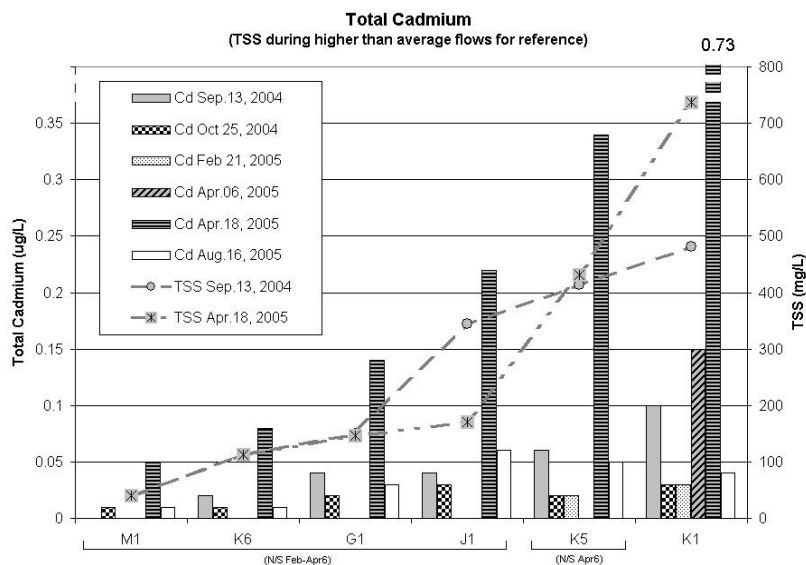


Figure 8: Total cadmium in comparison to TSS values in the Kiskatinaw River main stem and at the mouths of the tributaries monitored for metals by date. Bars with grey background represent samples collected during higher than average flows, bars with white background represent samples collected during lower flows (N/S = not sampled).

Analysis for iron was conducted for the water samples collected in 2004 as part of a metals analysis package. In 2005, the lab excluded iron from this package and as a result analysis for iron was missed in 2005. All total iron samples collected in the Kiskatinaw watershed in 2004 exceeded the preliminary aquatic life guideline and approved aesthetic drinking water guideline of 0.3 mg/L (Figure 9), above which iron can cause an astringent taste and may discolour clothing. It is not considered a toxic metal to mammals; however, high iron concentrations may fix elements required by plants and may precipitate on and impair benthic aquatic life. Dissolved iron always remained below the aquatic life guideline.

Due to the low sample frequency at each site, data interpretation is limited, particularly for temporal trends. Figure 9 shows that the September samples, collected after a heavy rain event, contained higher iron concentrations than the October samples, collected during low flows. The highest concentrations in September were detected at the mouth of the East Kiskatinaw River and at Dawson Creek's raw water intake.

Historic data at the pump house show iron concentrations exceeded both guidelines by up to two orders of magnitude during freshet 2003 (April 39.8 mg/L, May 13.8 mg/L) (Jacklin et al., 2003). Earlier data from 1991-1997 (Matscha et al., 2003) were generally lower than 2003 freshet values, but comparable to the 2004 concentrations. They also showed high variability within each season (incl. winter), and indicate that the total iron concentrations is sediment related. The low dissolved fraction of the 2004 Kiskatinaw data and the increase of total iron with TSS confirm latter. The high particulate fraction and the concentration increase during freshet or after rain events suggests introduction via surface or bank erosion.

Treatments, such as settling and filtration, are useful in removing the particulate iron.

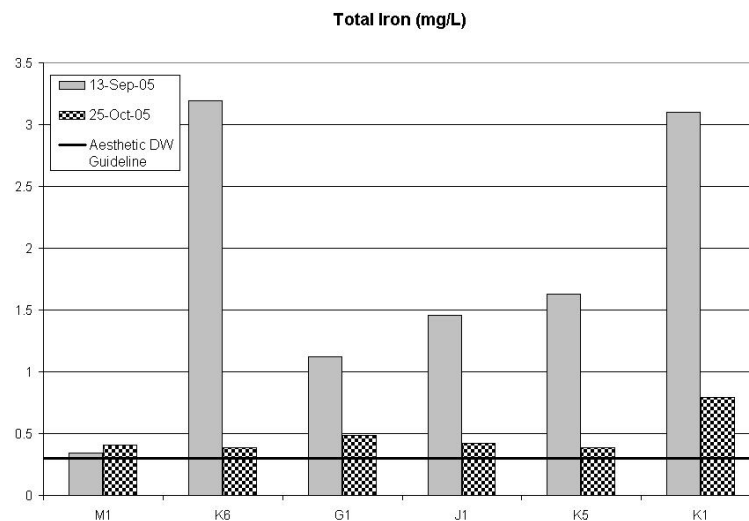


Figure 9: Total iron compared to the aesthetic drinking water and preliminary aquatic life guideline (both of 0.3 mg/L) in the Kiskatinaw River main stem and at the mouths of the tributaries monitored for metals by date. Bars with grey background represent samples collected during higher than average flows, bars with white background represent samples collected during lower flows (N/S = not sampled).

Total manganese remained below the aesthetic drinking water guideline of 50 µg/L during the 2004/05 sampling period, except during freshet, when it exceeded the guideline at all sample sites, but Ministik Creek (Figure 10). All results were below the hardness dependent aquatic life guideline, which ranged between 1917 µg/L and 3019 µg/L for the 2004/05 samples in the Kiskatinaw watershed (Figure 10).

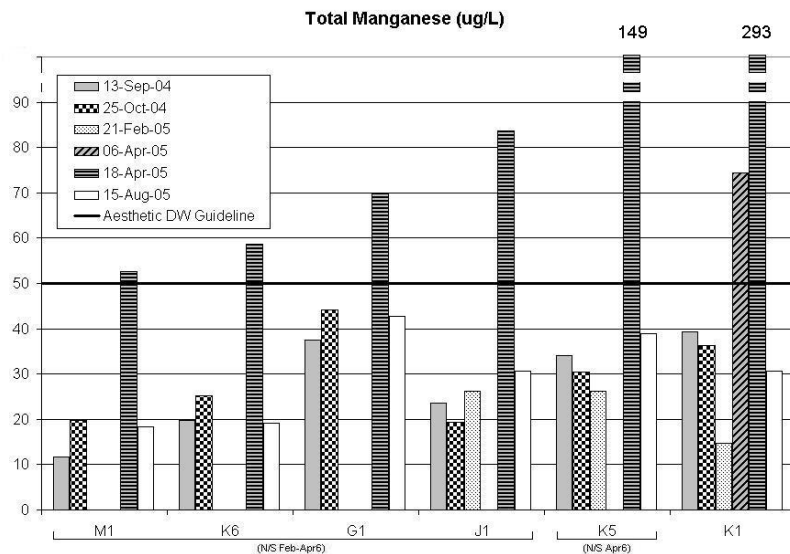


Figure 10: Total manganese compared to the aesthetic drinking water guideline in the Kiskatinaw River main stem and at the mouths of the tributaries monitored for metals by date. Bars with grey background represent samples collected during higher than average flows, bars with white background represent samples collected during lower flows (N/S = not sampled).

Historic data (Matscha et al., 2003; Jacklin et al., 2003) show equally high total manganese concentrations at the intake during spring flows. Concentrations in 2003 reached 538 $\mu\text{g/L}$, of which 90% was particulate.

Manganese is often found in association with iron. As with iron, manganese can impart an objectionable taste to drinking water and can stain clothing, but is not considered a toxic metal to mammals. Typical sources include mining activities, industrial wastes, corrosion of iron and steel and general soil disturbance. Naturally sloughing banks and anthropogenic soil disturbance should be considered as the main cause for the high total values in the Kiskatinaw watershed during freshet, when concentrations are closely related to TSS values in the river (Appendix B).

Turbidity and Total Suspended Solids (TSS)

Turbidity and TSS varied significantly throughout the year. Highest field turbidity was observed during spring freshet and during high flows in September 2004, especially in the sections closest to the City's drinking water intake. Since turbidity is a measure of suspended particles that interfere with the passage of light, it was to be expected that TSS concentrations showed similar spatial and temporal patterns (Figures 11 and 12).

The observed results confirm previously collected data in respect to timing and spatial distribution of turbidity and TSS peaks (Matscha et al., 2003; Jacklin et al., 2003).

Suspended solids provide available surface area upon which bacteria can grow. The solids can interfere with disinfection and be aesthetically unpleasant. High levels also decrease light penetration which can affect vegetation, algal growth, fish and invertebrate aquatic life. Increased introduction of fine sediment may lead to impact on fish habitat and spawning success.

Naturally sloughing banks may be one of the main sources for suspended particles in the Kiskatinaw River, but forest harvesting, road building, agriculture, livestock, urban development and other land use activities that lead to soil exposure and disturbance need to be considered on a section-by-section basis.

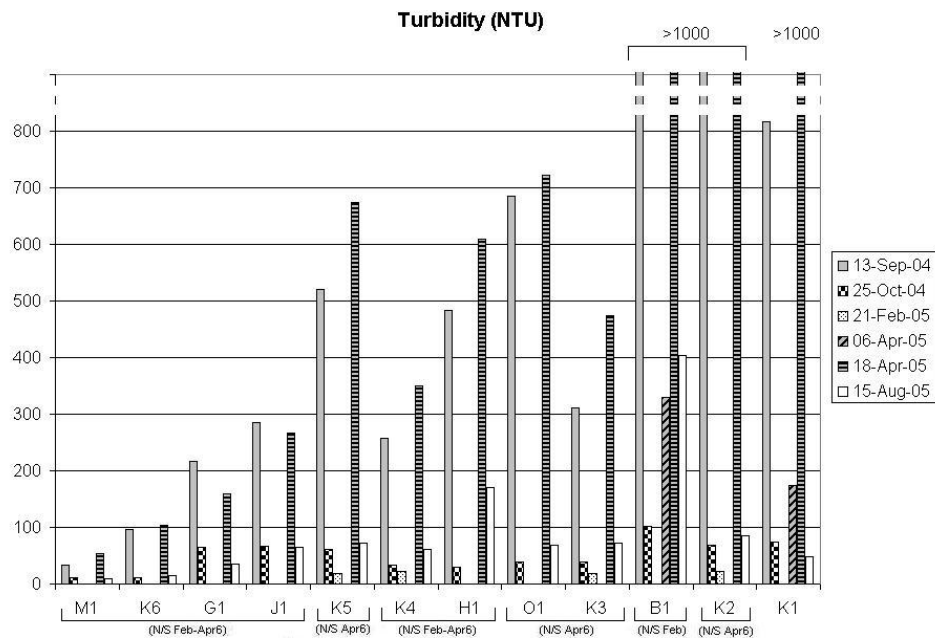


Figure 11: Turbidity in the Kiskatinaw River main stem and at the mouths of its tributaries by date. Bars with grey background represent samples collected during higher than average flows, bars with white background represent samples collected during lower flows (N/S = not sampled).

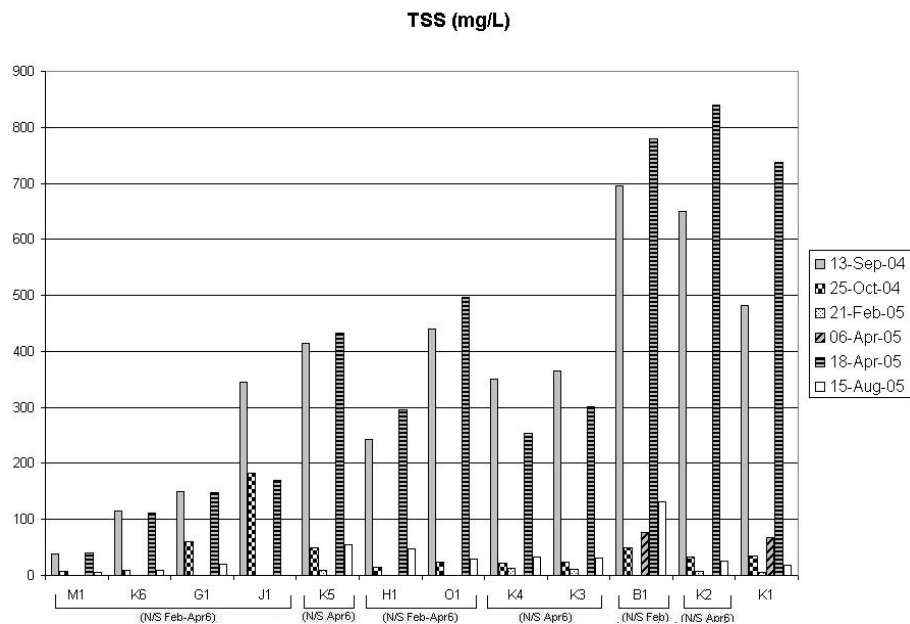


Figure 12: Total Suspended Solids (TSS) concentrations in the Kiskatinaw River main stem and at the mouths of its tributaries by date. Bars with grey background represent samples collected during higher than average flows, bars with white background represent samples collected during lower flows (N/S = not sampled).

Sediment Quality

All sediment samples collected in 2005 were analysed for organic carbons, hydrocarbons, particle size, and moisture. Brassey Creek and Kiskatinaw River sediments were also tested for about 130 pesticides. The results are summarised in Tables C1-C5 in Appendix C. Sample collection in the Kiskatinaw River focussed on the mouth of the East and West Kiskatinaw and on one site each below Oetata and Brassey Creeks. Collection sites in the tributaries (Brassey, Oetata, Halfmoon, Jackpine, Hourglass, and Ministik Creeks) were each situated at the mouth.

The collected samples ranged from heavy clay (at K2, downstream of Brassey Creek) to sandy loam (in Brassey and Ministik Creeks) (93.10 to 33.59% silt-clay fraction), with moisture contents of 23.3 to 44% and organic carbon concentrations of 9,800 to 21,000 mg/Kg.

No pesticides or extractable petroleum hydrocarbons (C10-32) were detected in the tested sediments.

Summary and Recommendations

- 1. High turbidity and TSS have a potential to impact drinking water quality and/or treatment.**
- 2. Bacterial results from various points in the watershed show highest fecal coliform and fecal streptococci concentrations (indicators for fecal contamination from warm-blooded animals) in Brassey Creek, indicating that the area is a primary contributor to the bacterial contamination at the Dawson Creek raw water intake.**
- 3. Bacterial Source Tracking has isolated markers from humans, ruminants and dogs as potential contributors to the high bacterial contamination from Brassey Creeks, but conclusions are tentative. More focused monitoring should be conducted to further identify contamination sources for management actions.**
- 4. Contamination with the parasite, Giardia, is more widely distributed throughout the watershed than bacterial contamination. The highest levels were found at the mouth of Brassey Creek. More investigation of the source of high Giardia levels, and of the health risk is recommended.**

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APPENDIX

Appendix A

Historic Data

*Table A1: Historic results of bacterial analysis for the City of Dawson Creek raw water supply.
(Exceedances of the provincial raw drinking water guidelines (0 for Fecal Coliforms, E.coli, and Enterococci; no guideline exists for Total Coliforms and Fecal Streptococci) are marked in grey.*

Data Source	Date	Total Coliforms (CFU/100mL)	Fecal Coliforms (CFU/100mL)	E.coli (CFU/100mL)	Fecal Streptococci (CFU/100mL)	Enterococci (CFU/100mL)
Jacklin et al, 2003 Historic Data	Nov 02, 1988	2400	<1.8	N/S	N/S	N/S
	Feb 16, 1989	<2	<2	N/S	N/S	N/S
	Oct 09, 1990	2	2	N/S	N/S	N/S
	Mar 05, 1991	33	<2	N/S	N/S	N/S
	Aug 07, 1991	N/S	1;5	N/S	N/S	N/S
	Aug 08, 1991	N/S	2	N/S	N/S	N/S
	Aug 28, 1991	N/S	22	N/S	N/S	N/S
	Aug 29, 1991	N/S	22	N/S	N/S	N/S
	Sep 10, 1991	N/S	<2	N/S	N/S	N/S
	Sep 18, 1991	N/S	3	N/S	N/S	N/S
	Sep 18, 1991	N/S	3;<2	N/S	N/S	N/S
	Sep 25, 1991	N/S	3	N/S	N/S	N/S
	Feb 06, 1992	N/S	<2	N/S	N/S	N/S
	Feb 17, 1992	N/S	3;1;<2	N/S	N/S	N/S
	Feb 24, 1992	N/S	<2	N/S	N/S	N/S
	May 13, 1992	N/S	<2;3;8;2	N/S	N/S	N/S
	May 20, 1992	N/S	14	N/S	N/S	N/S
	May 27, 1992	N/S	10	N/S	N/S	N/S
	Jun 02, 1992	N/S	10	N/S	N/S	N/S
	Jan 21, 1997	N/S	<1	N/S	N/S	N/S
	Mar 04, 1997	N/S	<1	N/S	N/S	N/S
	Sep 18, 1997	N/S	40;90	10;60	N/S	N/S
	Sep 25, 1997	N/S	<1	<1	N/S	N/S
	Oct 02, 1997	N/S	21	7	N/S	N/S
	Oct 09, 1997	N/S	4;12	1;4	N/S	N/S
	Oct 30, 1997	N/S	6	<1	N/S	N/S
	Nov 6, 1997	N/S	32;40	<1;26	N/S	N/S
Jacklin at al 2003 2002/03 MOE Data	Oct 02, 2002	4;3	2;<1	2;<1	N/S	18;10
	Jan 15, 2003	<1	<1	<1	N/S	<1
	Mar 05, 2003	<1	<1	<1	N/S	<1
	Apr 30, 2003	330;200	30;30	20;10	N/S	10;10
	May 28, 2003	270;140	<2;<2	<2;<2	N/S	210;370
	Aug 20, 2003	35	57	13	N/S	55

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

Table A2: Results of Brassey Creek Sampling Program under the Watershed Characterization Program, 2002-2003 by Ministry of Environment (Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Date and Locations																
			Sep 24, 2002	Oct 23, 2002	Nov 20, 2002	Dec 11, 2002	Apr 16, 2003	May 13, 2003	Jun 18, 2003	Jul 23, 2003	Aug 27, 2003	Aug 27, 2003	Dec 02, 2003	Apr 27, 2004	Aug 10, 2004		Sep 27, 2004		
			B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B3	B1	B3	B1	B3	B1
Field Data																			
Specific Conductance	µS/cm		454	391	532	619	199	143	334	449	535	N/S	654	179	224	327	302	191	194
Temp in Stream	°C		7.3	2.8	0.1	-0.1	0.1/0.4/1.1	6.5/5.7/5.7	15.9/15.6	19.3/19.1/19.4	12.3/12.0/11.8	N/S	0.1/0.0/-0.3	4.0/4.1/4.3	7.4/7.8/7.4	11.3/11.4/11.8	13.9/13.5/13.9	8.5/9.2/9.2	7.7/7.0/7.6
Turbidity	NTU		286	N/S	122/122	126/124	861/859	>1000/>1000	390/390	384/398	147/147	N/S	100/94.9	87/86	>1000/>1000	44.3/42.9	270/273	26.1/27.9	323/330
pH			9	N/S	9.32	N/S	7.9	8.05	8.1	8.2	8.5	N/S	7.8	7.7	7.85	8	8.2	8.2	8.2
Diss. Oxygen	mg/L		10.6	11.7	11.6	13.3	11.7	14.2	N/S	N/S	9.1	N/S	12.4	11.6	10.6	10	9.2	11.2	12.2
Lab Data																			
Biological																			
E.coli	1 CFU/100mL	N/S	<1	58	<1	<10	N/S	410	665	27	225	2	44	254	67	130	10	82	
Enterococci	1 CFU/100mL	N/S	<1	12	<1	70	N/S	21000	240	88	63	2	4	16	21	54	<1	5	
Fecal Coliforms	1 CFU/100mL	N/S	<1	12	<1	<10	N/S	400	103	10	27	2	44	263	30	120	5	63	
Fecal Streptococci	1 CFU/100mL	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Physical																			
pH	0.1 pH units	8.2	8.1	8.1	8.1	7.9	8.1	8.3	8.3	8.3	8.3	8.2	8	8	8.3	8.2	8	8	
Color True	5 Col.Unit	200	80	50	40	280	800	120	100	30	40	40	80	240	50	75	150	500	
Specific Conductance	1 µS/cm	390	388	522	592	205	155	332	450	523	523	601	181	224	327	301	189	194	
Residue Nonfilterable (TSS)	4 mg/L	65	24	32	52	292	1040	64	66	25	27	45	53	1410	11	89	10	152	
Residue Filterable 1.0u (TDS)	10 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Turbidity	0.1 NTU	244	161	77.3	110	528	2070	279	269	130	133	86.2	65.3	2040	27.6	208	21.9	161	
Hardness Total -T	mg/L	N/S	N/S	279	327	132	236	190	248	296	296	347	97.3	144	173	171	112	122	
Hardness Total -D	mg/L	N/S	N/S	N/S	316	84.5	78.1	169	232	289	286	324	95.2	113	178	158	105	103	
General Inorganics																			
Alkalinity Total as CaCO3	0.5 mg/L	192	165	223	265	78	70	148	195	228	227	280	80.7	103	160	137	90.5	88.6	
Cyanide (W.A.D)	0.0008 mg/L	<0.0005	0.0005	0.0018	<0.0005	0.0005	0.0009	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0006	0.0005	<0.0005	0.0008	0.0008	
Sulfide Total	0.005 mg/L	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Anions																			
Bromide Dissolved	0.1 mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Chloride Dissolved	0.5 mg/L	2	1.8	2.3	3	7.2	1.1	2	2.4	3.7	4	3.5	0.5	2	0.9	3	0.8	1.2	
Fluoride Dissolved	0.09 mg/L			0.17	0.19	0.06	0.07	0.15	0.15	0.14	0.15	0.12	0.09	0.09	0.17	0.14	0.09	0.09	
Carbon																			
Organic Carbon - Total	0.5 mg/L	11.4	13.3	13.4	13.1	15.9	22	13.4	15.2	14.3	14.2	12.1	14.3	15.6	17	20.6	21.2	24.1	
Inorganic Carbon	0.5 mg/L	47.6	36.9	50	61.3	17.5	15.6	33.3	42	48.7	46.4	49.2	17.9	20.9	34.2	28.1	16.7	16.3	
Nutrients																			
Total Kjeldahl Nitrogen (N)	mg/L	0.48	0.49	0.48	0.53	1.43	1.23	0.62	0.59	0.57	0.52	0.46	0.64	0.87	0.62	0.85	0.73	0.93	
Total Nitrogen	0.02 mg/L	0.48	0.49	0.49	0.52	1.55	1.33	0.64	0.59	0.57	0.52	0.47	0.75	1.23	0.63	0.85	0.81	0.93	
Total Organic Nitrogen (N)	mg/L	0.48	0.44	0.48	0.53	1.35	1.23	0.62	0.59	0.57	0.52	0.46	0.63	0.86	0.62	0.85	0.73	0.92	
Ammonia Nitrogen (N)	0.005 mg/L	<0.005	0.047	0.008	<0.005	0.074	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	0.011	<0.005	<0.005	0.006	0.005	
Nitrate Nitrogen Dissolved (N)	mg/L	<0.02	<0.02	<0.02	<0.02	0.09	0.09	<0.02	<0.02	<0.02	<0.02	<0.02	0.11	0.35	<0.002	0.003	0.076	0.005	
Nitrate+Nitrite (N)	0.002 mg/L	<0.002	<0.002	<0.002	<0.002	0.127	0.096	0.013	<0.002	<0.002	<0.002	0.007	0.117	0.36	0.004	0.008	0.079	0.008	
Nitrite Nitrogen (N)	0.002 mg/L	<0.002	<0.002	0.003	<0.002	0.038	0.005	0.003	<0.002	<0.002	0.002	0.006	0.004	0.005	0.004	0.005	0.003	0.003	
Ortho-Phosphorus (P)	0.001 mg/L	<0.001	0.006	0.004	0.007	0.144	0.001	0.003	0.002	0.009	0.008	0.002	0.003	0.002	0.007	0.009	0.007	0.004	
Phosphorus Total Dissolved (P)	0.002 mg/L	0.009	0.012	0.007	0.008	0.147	0.013	<0.002	0.007	0.008	0.01	0.004	0.012	0.008	0.009	0.015	0.011	0.007	
Phosphorus Total (P)	0.002 mg/L				0.075	0.641	0.231	0.126	0.221	0.074	0.045	0.052	0.109	2.19	0.047	0.207	0.03	0.201	
Sulfate	0.5 mg/L	43.9	39.5	58.9	67.9	13.2	9.1	30.7	37.6	55.8	55.8	63.5	10.7	20.1	13.6	18.8	10.1	10.6	
Total Metals																			
Aluminium	0.3 µg/L	262	329	347	266	6.54	20.8	3520	3850	640	638	232	157	359	77	269	894	1190	
Antimony	0.005 µg/L	0.158	0.145	0.1	0.173	<0.05	<0.05	0.277	0.39	0.284	0.275	0.152	0.113	0.179	0.136	0.204	0.151	0.18	
Arsenic	0.1 µg/L	1.3	1.4	1.1	1.1	<0.05	<0.05	2.1	2.2	1.1	1.1	0.9	0.7	1.2	1.5	1.4	0.9	0.9	
Barium	0.02 µg/L	161	165	177	195	0.237	0.76	211	237	170	172	193	132	129	226	170	159	131	
Beryllium	0.02 µg/L	0.1	0.04	0.07	0.06	0.0005	0.0014	0.21	0.21	0.09	0.09	0.06	0.02	0.15	0.06	0.14	0.03	0.12	
Bismuth	0.02 µg/L	<0.02	0.02	<0.02	<0.02	<0.05	<0.05	0.02	0.06	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.05	<0.02	<0.02	
Cadmium	0.01 µg/L	0.13	0.12	<0.01	0.03	<0.002	<0.002	0.24	0.19	0.12	0.11	0.08	0.03	0.3	0.03	0.15	0.03	0.09	
Calcium	0.05 mg/L			77.8	90.6	36	64.7	53.4	70.2	83.9	83.7	95.9	26.4	39.5	48.4	48.5	30.9	34.1	
Chromium	0.2 µg/L	<0.2	0.3	0.6	<0.2	0.013	0.038	1.3	9.6	1.4	1.4	0.6	0.2	0.2	0.2	0.5	1.8	2.1	

Table A2: Results of Brassey Creek Sampling Program under the Watershed Characterization Program, 2002-2003 by Ministry of Environment (Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Date and Locations																
			Sep 24, 2002	Oct 23, 2002	Nov 20, 2002	Dec 11, 2002	Apr 16, 2003	May 13, 2003	Jun 18, 2003	Jul 23, 2003	Aug 27, 2003	Aug 27, 2003	Dec 02, 2003	Apr 27, 2004	Aug 10, 2004		Sep 27, 2004		
Cobalt	0.005	µg/L	0.674	0.466	0.529	0.354	<0.005	<0.005	1.69	1.3	1.12	1.1	0.59	0.34	0.922	0.381	0.735	0.442	0.678
Copper	0.05	µg/L	4.17	3.11	2.65	3.06	0.018	0.048	7.04	6.52	4.84	4.99	2.63	1.9	8.35	1.66	5.1	2.16	3.93
Iron	0.005	µg/L	N/S	N/S	N/S	3.73	12.8	42	8.09	8.15	3.27	3.48	2.35	2.14	13.7	2.64	6.18	1.88	4.71
Lead	0.01	µg/L	1.8	1.41	1.15	1.08	<0.03	<0.03	3.11	2.73	1.28	1.31	0.79	0.41	3.06	0.33	1.65	0.37	1.14
Lithium	0.05	µg/L	5.48	5.34	6.91	8.54	N/S	N/S	8.46	9.41	8.94	9.03	9.14	3.19	3.76	5.83	5.7	4.1	5.04
Magnesium	0.05	mg/L	N/S	N/S	20.5	24.5	10.2	18.1	13.8	17.6	21	21.1	26.1	7.62	11.1	12.6	12.2	8.34	8.93
Manganese	0.008	µg/L	94.3	82.3	135	105	0.211	0.499	97.7	114	99.6	102	182	35	90	51.5	65.9	54.6	44.3
Molybdenum	0.05	µg/L	0.82	0.71	0.44	0.53	<0.005	<0.005	1.29	1.32	1.77	1.75	0.56	0.45	1.08	0.99	1.03	0.31	0.33
Nickel	0.05	µg/L	2.84	3.6	2.67	<0.05	0.024	0.064	7.26	5.52	4.99	5	3.87	2.49	4.25	3.53	5.43	3.95	5.44
Selenium	0.2	µg/L	0.3	0.4	0.8	0.4	<0.03	<0.03	0.7	0.8	0.7	0.6	0.7	0.3	0.6	0.2	<0.2	<0.2	<0.2
Silver	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	0.05	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.03
Sodium	0.05	mg/L	N/S	N/S	N/S	14.5	5.37	2.6	5.99	8.6	11	11	14.7	2.56	4.62	4.45	5.91	2.34	3.49
Strontium	0.005	µg/L	185	172	201	239	0.089	0.14	142	187	238	243	267	71.7	98.2	129	133	76	84.2
Thallium	0.002	µg/L	0.02	0.007	0.04	0.037	<0.03	<0.03	0.073	0.085	0.022	0.021	0.014	0.005	0.024	0.007	0.017	0.018	0.026
Tin	0.01	µg/L	<0.01	0.09	<0.01	0.02	<0.02	<0.02	0.09	0.13	0.01	0.02	0.01	<0.01	<0.01	0.01	<0.01	0.03	0.04
Uranium	0.002	µg/L	1.37	0.992	1.61	1.79	N/S	N/S	0.999	1.44	1.71	1.67	1.85	0.247	0.733	0.5	0.775	0.241	0.429
Vanadium	0.06	µg/L	2.63	2.02	1.53	1.72	0.023	0.074	13.3	15	2.38	2.41	1.08	0.68	1.94	0.87	1.84	3.43	4.41
Zinc	0.1	µg/L	7	7.8	7.4	7.5	0.069	0.206	17.1	13.1	7.9	8.4	4.7	2.7	9.7	1.1	4.8	3.2	5.1
Dissolved Metals																			
Aluminium Dissolved	0.3	µg/L	18.9	78	35.2	16.2	0.16	0.03	39.4	7.1	4.3	4.7	4.1	63	28.3	13.7	26.5	115	84.1
Antimony Dissolved	0.005	µg/L	0.149	0.134	0.093	0.159	<0.05	<0.05	0.22	0.289	0.273	0.279	0.129	0.111	0.189	0.136	0.187	0.144	0.152
Arsenic Dissolved	0.1	µg/L	0.5	0.4	0.5	0.6	<0.05	<0.05	0.7	0.9	0.7	0.7	0.3	0.5	0.5	1	0.8	0.8	0.5
Barium Dissolved	0.02	µg/L	122	126	148	173	0.047	0.04	110	146	131	144	145	109	59.3	207	115	149	88.2
Beryllium Dissolved	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.0002	<0.0002	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	0.05	0.07	<0.02	<0.02
Bismuth Dissolved	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Cadmium Dissolved	0.01	µg/L	0.01	<0.01	<0.01	<0.01	<0.002	<0.002	0.03	<0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.03
Calcium Dissolved	0.05	mg/L	N/S	N/S	N/S	87.3	23.7	23	47.5	65.7	81.7	80.9	90.4	26.1	31.6	49.3	44.4	29.7	29.6
Chromium Dissolved	0.2	µg/L	<0.2	<0.2	0.2	<0.2	<0.005	<0.005	<0.2	6.1	0.8	1	<0.2	<0.2	<0.2	<0.2	0.4	1	0.7
Cobalt Dissolved	0.005	µg/L	<0.005	<0.005	0.08	<0.005	<0.005	<0.005	0.165	0.143	0.176	0.186	0.227	0.238	0.208	0.271	0.248	0.338	0.344
Copper Dissolved	0.05	µg/L	2.34	1.76	1.47	1.9	<0.005	<0.005	2.76	3.27	2.67	2.77	1.35	1.56	3.64	1.34	3.47	1.84	2.56
Iron Dissolved	0.005	mg/L	N/S	N/S	N/S	0.053	0.289	0.236	0.121	0.031	0.018	0.021	0.057	0.398	0.198	1.2	0.259	1.1	0.504
Lead Dissolved	0.01	µg/L	<0.01	0.07	0.05	0.02	<0.03	<0.03	0.1	0.02	0.02	0.04	0.02	0.12	0.16	0.12	0.14	0.15	0.22
Lithium Dissolved	0.05	µg/L	4.36	5.14	6.39	7.1	N/S	N/S	5.23	6.59	7.34	7.74	7.38	3	3.57	5.52	5.37	3.38	3.57
Magnesium Dissolved	0.05	mg/L	N/S	N/S	N/S	23.8	6.14	5.02	12.3	16.6	20.6	20.5	23.8	7.29	8.24	13.4	11.4	7.49	6.99
Manganese Dissolved	0.008	µg/L	1.3	30.8	112	90	0.038	0.022	18.8	0.824	2.05	2.66	129	26.2	25.8	32.4	10.8	52.1	27.4
Molybdenum Dissolved	0.05	µg/L	1.03	1.05	0.83	0.81	<0.005	<0.005	0.86	1.32	1.44	1.53	0.53	0.33	0.57	0.73	0.72	0.32	0.33
Nickel Dissolved	0.05	µg/L	1.41	2.02	1.22	<0.05	<0.008	<0.008	2.41	2.55	2.12	2.14	2.19	2.08	2.37	3.15	4.14	3.48	3.86
Selenium Dissolved	0.2	µg/L	0.6	0.4	<0.7	0.5	<0.03	<0.03	0.7	0.7	0.6	0.5	0.3	0.2	0.4	<0.2	<0.2	<0.2	<0.2
Silver Dissolved	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium Dissolved			N/S	N/S	N/S	N/S	5.32	2.39	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Strontium Dissolved	0.005	µg/L	181	164	195	232	0.062	0.058	120	167	215	224	206	69.3	85.1	124	125	74.7	77.2
Thallium Dissolved	0.002	µg/L	0.006	<0.002	0.033	0.03	<0.03	<0.03	0.007	0.017	0.006	0.006	0.003	0.004	0.008	0.005	0.01	0.005	0.007
Tin Dissolved	0.01	µg/L	0.02	0.01	0.12	<0.01	<0.02	<0.02	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01
Uranium Dissolved	0.002	µg/L	1.22	0.916	1.56	1.72	N/S	N/S	0.704	1.2	1.5	1.52	1.46	0.228	0.441	0.478	0.654	0.205	0.331
Vanadium Dissolved	0.06	µg/L	1.48	0.53	0.28	0.66	<0.005	<0.005	1.25	2.11	0.57	0.65	0.58	0.46	0.43	0.42	0.63	0.61	0.52
Zinc Dissolved	0.1	µg/L	<0.1	0.4	0.4	1	<0.005	<0.005	0.7	0.4	0.4	0.5	0.8	1.1	2.5	<0.1	<0.1	1	0.7

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and/or Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination >5 x DL

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

Appendix B

2004-2005 Water Chemistry Data

Table B1: 2004/05 sample parameters and analysis results for the Kiskatinaw main stem on September 13-14, 2004

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations						
			K6	K5	K4	K3	K2	K1	K1 (Dup)
Field Data									
Specific Conductance	µS/cm		233	283	257	261	257	260	N/S
Temp in Stream	°C		8.1/8.0/9.0	7.5/8.1/8.1	6.5/7.0	7.2/7.0/7.4	7.2	7.9	N/S
Turbidity	NTU		96.4/97.7	510/530	260/254	314/309	>1000	819/814	N/S
pH			7.2	7.2	8.1	8.3	8.3	8.2	N/S
Diss. Oxygen	mg/L		11.1	11.3	12.1	11.7	11.4	10.9	N/S
Lab Data									
Biological									
E.coli	1 CFU/100mL		5	6	16	24	60	30	38
Enterococci	1 CFU/100mL		30	32	26	28	140	28	22
Fecal Coliforms	1 CFU/100mL		7	24	40	24	80	38	36
Fecal Streptococci	1 CFU/100mL		34	72	32	128	220	76	82
Bacteria Source Tracking^{1,2,3,4}									
Bacteroides			N/S	N/S	N/S	N/S	No	faint	faint
Human fecal contamination			N/S	N/S	N/S	N/S	absent	absent	potential
Ruminant fecal contamination			N/S	N/S	N/S	N/S	absent	absent	absent
Pig fecal contamination			N/S	N/S	N/S	N/S	absent	N/S	N/S
Horse fecal contamination			N/S	N/S	N/S	N/S	absent	N/S	N/S
Dog fecal contamination			N/S	N/S	N/S	N/S	absent	N/S	N/S
Elk fecal contamination			N/S	N/S	N/S	N/S	absent	N/S	N/S
Parasites									
Cryptosporidium oocysts	oocysts/100L	K1:136,K2:131	N/S	N/S	N/S	<286.8	<131	136	K1+K2 sampled
Giardia cysts	cysts/100L	286.8	N/S	N/S	N/S	<286.8	1311.1	1224.3	K1+K2 sampled
Physical									
Temperature Arrival	0 Celsius		3	3	3	3	3	1	1
pH	0.1 pH units		8.3	8.3	8.3	8.3	8.3	8.3	8.3
Color True	5 Col.Unit		70	140	160	140	200	300	200
Specific Conductance	1 µS/cm		239	289	265	266	262	260	261
Residue Nonfilterable (TSS)	4 mg/L		115	414	350	366	650	482	470
Residue Filterable 1.0u (TDS)	10 mg/L		166	212	198	198	234	236	222
Turbidity	0.1 NTU		74	399	295	439	755	780	786
Hardness Total -T	mg/L		156	163	152	158	164	156	154
Hardness Total -D	mg/L		133	160	149	146	142	146	146
General Inorganics									
Alkalinity Total as CaCO3	0.5 mg/L		127	156	143	144	140	139	139
Sulfide Total	0.005 mg/L		< 0.005	< 0.005	N/S	N/S	N/S	< 0.005	< 0.005
Anions									
Bromide Dissolved	0.1 mg/L		< 0.1	< 0.1	N/S	N/S	N/S	< 0.1	< 0.1
Chloride Dissolved	0.5 mg/L		< 0.5	1		N/S	N/S	0.6	0.6
Langelier Index	None		0.6	0.7	0.6	0.7	0.7	0.6	0.6
Saturation pH	pH units		7.7	7.6	7.7	7.6	7.6	7.7	7.7
Carbon									
Organic Carbon - Total	0.5 mg/L		18.2	14.3	17.3	16.5	17.9	17.7	19.8
Dissolved Organic Carbon	0.5 mg/L		N/S	N/S	N/S	N/S	N/S	17.2	18.3
Nutrients									
Total Kjeldahl Nitrogen (N)	mg/L		0.57	0.46	0.52	0.53	0.64	0.62	0.61
Total Nitrogen	0.02 mg/L		0.57	0.47	0.52	0.53	0.65	0.63	0.62
Total Organic Nitrogen (N)	mg/L		0.56	0.46	0.52	0.53	0.63	0.62	0.61
Ammonia Nitrogen (N)	0.005 mg/L		0.011	< 0.005	< 0.005	< 0.005	0.012	< 0.005	< 0.005
Nitrate Nitrogen Dissolved (N)	mg/L		0.003	< 0.002	< 0.002	< 0.002	0.003	0.003	0.003
Nitrate+ Nitrite (N)	0.002 mg/L		0.005	0.002	< 0.002	< 0.002	0.007	0.007	0.007
Nitrite Nitrogen (N)	0.002 mg/L		0.002	0.004	0.002	0.003	0.004	0.004	0.004
Ortho-Phosphorus (P)	0.001 mg/L		0.002	0.002	0.002	0.003	0.004	0.002	0.002
Phosphorus Total Dissolved (P)	0.002 mg/L		< 0.002	0.004	0.005	0.008	0.008	0.007	0.012
Phosphorus Total (P)	0.002 mg/L		0.027	0.28	0.325	0.198	0.338	0.582	0.606
Sulfate	0.5 mg/L		1.2	2.1	N/S	N/S	N/S	3.2	3.4
Total Metals									
Aluminium	0.3 µg/L		1240	4370	N/S	N/S	N/S	304	321
Antimony	0.005 µg/L		0.076	0.175	N/S	N/S	N/S	0.103	0.109
Arsenic	0.1 µg/L		0.6	1.1	N/S	N/S	N/S	0.6	0.6
Barium	0.02 µg/L		109	161	N/S	N/S	N/S	121	118
Beryllium	0.02 µg/L		0.04	0.12	N/S	N/S	N/S	0.09	0.07
Bismuth	0.02 µg/L		< 0.02	0.02	N/S	N/S	N/S	0.04	0.02
Cadmium	0.01 µg/L		0.02	0.06	N/S	N/S	N/S	0.1	0.11
Calcium	0.05 mg/L		44.8	47	43.7	45.3	46.7	44.7	44.2
Chromium	0.2 µg/L		1.8	5.9	N/S	N/S	N/S	0.6	0.6

Parameter	Unit	MDL	Sample Locations						
			K6	K5	K4	K3	K2	K1	K1 (Dup)
Cobalt	0.005 µg/L		0.319	0.843	N/S	N/S	N/S	0.778	0.779
Copper	0.05 µg/L		1.4	3.85	N/S	N/S	N/S	4.41	4.52
Iron	0.005 mg/L		3.19	1.63	N/S	N/S	N/S	3.1	3.48
Lead	0.01 µg/L		0.39	1.19	N/S	N/S	N/S	1.4	1.42
Lithium	0.05 µg/L		2.52	4.01	N/S	N/S	N/S	2.37	2.44
Magnesium	0.05 mg/L		10.7	11.2	10.5	10.9	11.4	10.8	10.7
Manganese	0.008 µg/L		19.7	34	N/S	N/S	N/S	39.4	42.6
Molybdenum	0.05 µg/L		0.25	0.47	N/S	N/S	N/S	0.5	0.47
Nickel	0.05 µg/L		1.8	4.43	N/S	N/S	N/S	3.42	3.46
Selenium	0.2 µg/L		0.3	0.2	N/S	N/S	N/S	< 0.2	0.2
Silver	0.02 µg/L	< 0.02	0.04	N/S	N/S	N/S	N/S	< 0.02	< 0.02
Sodium	0.05 mg/L		3.78	3.7	N/S	N/S	N/S	4.32	3.69
Strontium	0.005 µg/L		118	240	N/S	N/S	N/S	178	175
Thallium	0.002 µg/L		0.021	0.066	N/S	N/S	N/S	0.019	0.02
Tin	0.01 µg/L		0.04	0.12	N/S	N/S	N/S	0.01	0.01
Uranium	0.002 µg/L		0.201	0.415	N/S	N/S	N/S	0.327	0.323
Vanadium	0.06 µg/L		3.52	12.7	N/S	N/S	N/S	1.46	1.49
Zinc	0.1 µg/L		2.3	7.6	N/S	N/S	N/S	5.7	5.8
Dissolved Metals									
Aluminium Dissolved	0.3 µg/L		10.7	9.4				9.8	10.1
Antimony Dissolved	0.005 µg/L		0.056	0.097				0.101	0.115
Arsenic Dissolved	0.1 µg/L		0.3	0.5				0.4	0.5
Barium Dissolved	0.02 µg/L		90.3	115				92.9	96.8
Beryllium Dissolved	0.02 µg/L	< 0.02	< 0.02					< 0.02	< 0.02
Bismuth Dissolved	0.02 µg/L	< 0.02	< 0.02					< 0.02	< 0.02
Cadmium Dissolved	0.01 µg/L	< 0.01	< 0.01					0.01	0.01
Calcium Dissolved	0.05 mg/L		38.1	45.9	42.7	41.8	40.7	42	42
Chromium Dissolved	0.2 µg/L		0.5	0.4				0.3	0.3
Cobalt Dissolved	0.005 µg/L		0.097	0.129				0.151	0.164
Copper Dissolved	0.05 µg/L		0.82	1.87				2.4	2.76
Iron Dissolved	0.005 mg/L		0.095	0.054				0.078	0.069
Lead Dissolved	0.01 µg/L		0.04	0.04				0.06	0.06
Lithium Dissolved	0.05 µg/L		1.55	1.09				1.89	1.92
Magnesium Dissolved	0.05 mg/L		9.1	11	10.2	10.1	9.83	10	10.1
Manganese Dissolved	0.008 µg/L		9.96	10				7.73	8.28
Molybdenum Dissolved	0.05 µg/L		0.21	0.33				0.31	0.31
Nickel Dissolved	0.05 µg/L		1.1	1.32				1.51	1.76
Selenium Dissolved	0.2 µg/L	< 0.2	0.4					< 0.2	0.5
Silver Dissolved	0.02 µg/L	< 0.02	< 0.02					< 0.02	< 0.02
Strontium Dissolved	0.005 µg/L		110	222				170	177
Thallium Dissolved	0.002 µg/L		0.004	0.005				0.005	0.006
Tin Dissolved	0.01 µg/L	< 0.01	0.01					0.01	0.01
Uranium Dissolved	0.002 µg/L		0.129	0.239				0.239	0.266
Vanadium Dissolved	0.06 µg/L		0.23	0.4				0.47	0.49
Zinc Dissolved	0.1 µg/L	< 0.1	< 0.1					< 0.1	< 0.1
Hydrocarbons									
TEH Extraction-Water		date	2004-09-20	2004-09-20	N/S	2004-09-20		2004-09-21	2004-09-21
EPHw C10-19	0.08 mg/L		< 0.08	< 0.08	N/S	< 0.08	0.08	< 0.08	< 0.08
EPHw C19-32	0.08 mg/L		< 0.08	< 0.08	N/S	< 0.08	0.08	< 0.08	< 0.08
Oil & Grease Total	1 mg/L		< 1	< 1	N/S	2	1	< 1	< 1
Pesticides									
2,4-D	0.2 µg/L		<0.2	<0.2	N/S	<0.2	<0.2	<0.2	<0.2
Silvex	0.05 µg/L		<0.05	<0.05	N/S	<0.05	<0.05	<0.05	<0.05
2,4,5-T	0.05 µg/L		<0.05	<0.05	N/S	<0.05	<0.05	<0.05	<0.05
Dicamba	0.2 µg/L		<0.2	<0.2	N/S	<0.2	<0.2	<0.2	<0.2
MCP	50 µg/L		<50	<50	N/S	<50	<50	<50	<50
MCPA	50 µg/L		<50	<50	N/S	<50	<50	<50	<50
Dichlorprop	0.05 µg/L		<0.05	<0.05	N/S	<0.05	<0.05	<0.05	<0.05
Dinoseb	0.05 µg/L		<0.05	<0.05	N/S	<0.05	<0.05	<0.05	<0.05
2,4-DB	0.05 µg/L		<0.05	<0.05	N/S	<0.05	<0.05	<0.05	<0.05

1 = "present" = positive result for both markers

2 = "absent" = fecal contamination from this species detected

3 = "potential" = positive result for one marker only (old material or caused by one animal

4 = "Yes" under bacteroides = bacteroides used to source track are in general present. "No" = they are not.

Dup = Duplicate sample

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination >5 x DL

bold underlined = field duplicate Relative Percent Difference (RPD) > 25% for this sampling event and > 5 x DL

Table B2: 2004/05 sample parameters and analysis results for the Kiskatinaw main stem on October 25-26, 2004

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations					
			K6	K5	K4	K3	K2	K1
Field Data								
Specific Conductance	µS/cm		308	374	335	344	342	356
Temp in Stream	°C		-0.1/-0.2	-0.1/-0.3	0.0/-0.2	0.0/-0.3	0.6/0.1	0.1/0.9
Turbidity	NTU		11.4/9.61	59.2/61.4	33.6/34.8	40.3/36.9	69/67	73.3/76.2
pH			6.8	7.3	8.5	8.5	8.6	N/S
Diss. Oxygen	mg/L		13.1	13.1	13.1	13.2	11.9	11.7
Lab Data								
Biological								
Bacteria								
E.coli	CFU/100mL	1	N/S	N/S	<1	<1	3	3
Enterococci	CFU/100mL	1	N/S	N/S	1	3	3	<1
Fecal Coliforms	CFU/100mL	1	N/S	N/S	<1	<1	8	8
Fecal Streptococci	CFU/100mL	1	N/S	N/S	3	9	7	3
Bacteria Source Tracking^{1,2,3,4}								
Bacteroides			N/S	N/S	N/S	N/S	Yes	N/S
Human fecal contamination			N/S	N/S	N/S	N/S	absent	N/S
Ruminant fecal contamination			N/S	N/S	N/S	N/S	absent	N/S
Pig fecal contamination			N/S	N/S	N/S	N/S	potential	N/S
Horse fecal contamination			N/S	N/S	N/S	N/S	N/S	N/S
Dog fecal contamination			N/S	N/S	N/S	N/S	N/S	N/S
Elk fecal contamination			N/S	N/S	N/S	N/S	N/S	N/S
Parasites								
Cryptosporidium oocysts	oocysts/100L	<82.6-<112.5	N/S	N/S	<82.6	<89	<112.5	<85.2
Giardia cysts	cysts/100L	<82.6-<112.5	N/S	N/S	82.6	267	225.1	170.4
Physical								
Temperature Arrival	0 Celsius		1	1	1	1	1	1
pH	0.1 pH units		8	8.1	8.1	8	8.1	8.2
Color True	5 Col.Unit		30	20	20	30	30	40
Specific Conductance	1 µS/cm		294	362	336	343	344	342
Residue Nonfilterable (TSS)	4 mg/L		10	49	22	24	33	34
Residue Filterable 1.0u (TDS)	10 mg/L		184	212	198	208	202	210
Turbidity	0.1 NTU		10.6	52.5	34.6	25.6	60	65
Hardness Total -T	mg/L		163	194	182	194	188	187
Hardness Total -D	mg/L		160	202	183	191	188	182
General Inorganics								
Alkalinity Total as CaCO3	0.5 mg/L		159	198	181	185	183	183
Sulfide Total	0.005 mg/L		0.006	< 0.005	N/S	N/S	N/S	< 0.005
Anions								
Bromide Dissolved	0.1 mg/L		< 0.1	< 0.1	N/S	N/S	N/S	< 0.1
Chloride Dissolved	0.5 mg/L		< 0.5	0.5	N/S	N/S	N/S	0.7
Langelier Index	None		0.4	0.7	0.6	0.6	0.6	0.7
Saturation pH	pH units		7.6	7.4	7.5	7.4	7.5	7.5
Carbon								
Organic Carbon - Total	0.5 mg/L		13.3	9.6	12.9	12.3	11.3	11.7
Dissolved Organic Carbon	0.5 mg/L		N/S	N/S	N/S	N/S	N/S	N/S
Nutrients								
Total Kjeldahl Nitrogen (N)	mg/L		0.4	0.29	0.34	0.36	0.43	0.42
Total Nitrogen	0.02 mg/L		0.39	0.28	0.33	0.35	0.43	0.43
Total Organic Nitrogen (N)	mg/L		0.4	0.29	0.34	0.36	0.43	0.42
Ammonia Nitrogen (N)	0.005 mg/L		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Nitrate Nitrogen Dissolved (N)	mg/L		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002
Nitrate+ Nitrite (N)	0.002 mg/L		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.004
Nitrite Nitrogen (N)	0.002 mg/L		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002
Ortho-Phosphorus (P)	0.001 mg/L		0.001	0.002	0.001	0.001	0.004	< 0.001
Phosphorus Total Dissolved (P)	0.002 mg/L		0.003	0.005	0.004	0.004	0.007	0.005
Phosphorus Total (P)	0.002 mg/L		0.013	0.022	0.03	0.033	0.057	0.053
Sulfate	0.5 mg/L		2.3	4.6	N/S	N/S	N/S	6.3
Total Metals								
Aluminium	0.3 µg/L		133	149	N/S	N/S	N/S	50.3
Antimony	0.005 µg/L		0.051	0.092	N/S	N/S	N/S	0.1
Arsenic	0.1 µg/L		0.3	0.3	N/S	N/S	N/S	0.5
Barium	0.02 µg/L		112	134	N/S	N/S	N/S	134
Beryllium	0.02 µg/L		< 0.02	< 0.02	N/S	N/S	N/S	< 0.02
Bismuth	0.02 µg/L		< 0.02	0.03	N/S	N/S	N/S	< 0.02
Cadmium	0.01 µg/L		0.01	0.02	N/S	N/S	N/S	0.03
Calcium	0.05 mg/L		47.2	55.5	52.5	55.5	54	53.5
Chromium	0.2 µg/L		< 0.2	< 0.2	N/S	N/S	N/S	< 0.2
Cobalt	0.005 µg/L		0.091	0.158	N/S	N/S	N/S	0.207
Copper	0.05 µg/L		0.55	1.25	N/S	N/S	N/S	1.98
Iron	0.005 mg/L		0.389	0.389	N/S	N/S	N/S	0.794

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations					
			K6	K5	K4	K3	K2	K1
Lead	0.01 µg/L		0.08	0.27	N/S	N/S	N/S	0.38
Lithium	0.05 µg/L		1.94	1.8	N/S	N/S	N/S	2.07
Magnesium	0.05 mg/L		11	13.4	12.4	13.4	13	13
Manganese	0.008 µg/L		25.2	30.5	N/S	N/S	N/S	36.2
Molybdenum	0.05 µg/L		0.25	0.74	N/S	N/S	N/S	0.51
Nickel	0.05 µg/L		0.56	0.72	N/S	N/S	N/S	1.19
Selenium	0.2 µg/L	< 0.2	< 0.2	N/S	N/S	N/S	N/S	< 0.2
Silver	0.02 µg/L	< 0.02	< 0.02	N/S	N/S	N/S	N/S	< 0.02
Sodium	0.05 mg/L		4.91	5.32	N/S	N/S	N/S	5.03
Strontium	0.005 µg/L		119	232	N/S	N/S	N/S	171
Thallium	0.002 µg/L		0.003	0.007	N/S	N/S	N/S	0.006
Tin	0.01 µg/L		0.01	0.02	N/S	N/S	N/S	< 0.01
Uranium	0.002 µg/L		0.184	0.336	N/S	N/S	N/S	0.361
Vanadium	0.06 µg/L		0.43	0.69	N/S	N/S	N/S	0.52
Zinc	0.1 µg/L		0.2	0.7	N/S	N/S	N/S	0.8
Dissolved Metals								
Aluminium Dissolved	0.3 µg/L		3.8	3.3	N/S	N/S	N/S	6.2
Antimony Dissolved	0.005 µg/L		0.053	0.078	N/S	N/S	N/S	0.092
Arsenic Dissolved	0.1 µg/L		0.3	0.3	N/S	N/S	N/S	0.4
Barium Dissolved	0.02 µg/L		110	138	N/S	N/S	N/S	134
Beryllium Dissolved	0.02 µg/L	< 0.02	< 0.02	N/S	N/S	N/S	N/S	< 0.02
Bismuth Dissolved	0.02 µg/L	< 0.02	0.02	N/S	N/S	N/S	N/S	< 0.02
Cadmium Dissolved	0.01 µg/L	< 0.01	0.01	N/S	N/S	N/S	N/S	0.01
Calcium Dissolved	0.05 mg/L		46.5	58	52.9	55	53.9	52.1
Chromium Dissolved	0.2 µg/L	< 0.2	< 0.2	N/S	N/S	N/S	N/S	< 0.2
Cobalt Dissolved	0.005 µg/L		0.068	0.09	N/S	N/S	N/S	0.129
Copper Dissolved	0.05 µg/L		0.5	0.99	N/S	N/S	N/S	2.04
Iron Dissolved	0.005 mg/L		0.2	0.025	N/S	N/S	N/S	0.057
Lead Dissolved	0.01 µg/L		0.03	0.02	N/S	N/S	N/S	0.04
Lithium Dissolved	0.05 µg/L		1.9	1.67	N/S	N/S	N/S	2.17
Magnesium Dissolved	0.05 mg/L		10.7	14	12.4	13	13	12.6
Manganese Dissolved	0.008 µg/L		22.9	25.4	N/S	N/S	N/S	28.1
Molybdenum Dissolved	0.05 µg/L		0.24	0.39	N/S	N/S	N/S	0.36
Nickel Dissolved	0.05 µg/L		0.44	0.64	N/S	N/S	N/S	1.12
Selenium Dissolved	0.2 µg/L	< 0.2	< 0.2	N/S	N/S	N/S	N/S	< 0.2
Silver Dissolved	0.02 µg/L	< 0.02	< 0.02	N/S	N/S	N/S	N/S	< 0.02
Strontium Dissolved	0.005 µg/L		120	243	N/S	N/S	N/S	181
Thallium Dissolved	0.002 µg/L		0.002	0.004	N/S	N/S	N/S	0.004
Tin Dissolved	0.01 µg/L		0.01	0.02	N/S	N/S	N/S	< 0.01
Uranium Dissolved	0.002 µg/L		0.187	0.342	N/S	N/S	N/S	0.352
Vanadium Dissolved	0.06 µg/L		0.08	0.2	N/S	N/S	N/S	0.34
Zinc Dissolved	0.1 µg/L	< 0.1	< 0.1	N/S	N/S	N/S	N/S	< 0.1
Hydrocarbons								
TEH Extraction-Water		date	N/S	N/S	N/S	N/S	N/S	N/S
EPHw C10-19	0.08 mg/L		N/S	N/S	N/S	N/S	N/S	N/S
EPHw C19-32	0.08 mg/L		N/S	N/S	N/S	N/S	N/S	N/S
Oil & Grease Total	1 mg/L		N/S	N/S	N/S	N/S	N/S	N/S
Pesticides								
2,4-D	0.2 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Silvex	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
2,4,5-T	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Dicamba	0.2 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
MCP	50 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
MCPA	50 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Dichlorprop	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Dinoseb	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
2,4-DB	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S

1 = "present" = positive result for both markers

2 = "absent" = fecal contamination from this species detected

3 = "potential" = positive result for one marker only (old material or caused by one animal)

Dup = Duplicate sample

4 = "Yes" under bacteroides = bacteroides used to source track are in general present. "No" = they are not.

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination >5 x DL

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

Table B3: 2004/05 sample parameters and analysis results for the Kiskatinaw main stem on February 21, 2005

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations						
			K6	K5	K5 (dup)	K4	K3	K2	K1
Field Data									
Specific Conductance	µS/cm		N/S	381	N/S	515	230	523	N/S
Temp in Stream	°C		N/S	0.0/0.5	N/S	0.1/-0.5	0.0/-0.6	0.0/-0.6	N/S
Turbidity	NTU		N/S	18.3/18.7	N/S	21.9/20.8	18.5/20.0	19.1/25.4	N/S
pH			N/S	7.5	N/S	7.5	7.5	7.4	N/S
Diss. Oxygen	mg/L		N/S	13.7	N/S	N/S	14	12.7	N/S
Lab Data									
Biological									
E.coli	1 CFU/100mL	N/S	N/S	N/S	4	6	2	3	
Enterococci	1 CFU/100mL	N/S	N/S	N/S	<1	<1	<1	3	
Fecal Coliform	1 CFU/100mL	N/S	N/S	N/S	4	10	4	3	
Fecal Streptococci	1 CFU/100mL	N/S	N/S	N/S	<1	<1	1	4	
Bacteria Source Tracking ^{1,2,3,4}									
Bacteroides		N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Human fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Ruminant fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Pig fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Horse fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Dog fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Elk fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Physical									
Temperature Arrival	0 Celsius	N/S	2	2	1	1	1	2	
pH	0.1 pH units	N/S	8.3	8.2	8.3	8.3	8.2	8.2	
Color True	5 Col.Unit	N/S	<5	<5	5	5	5	5	
Specific Conductance	1 µS/cm	N/S	521	523	498	500	504	510	
Residue Nonfilterable (TSS)	4 mg/L	N/S	10	11	12.8	11.3	7	6	
Residue Filterable 1.0u (TDS)	10 mg/L	N/S	290	290	288	298	306	280	
Turbidity	0.1 NTU	N/S	14.6	20.8	14.6	10.9	12.7	12.4	
Hardness Total -T	mg/L	N/S	300	300	290	290	290	290	
Hardness Total -D	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	
General Inorganics									
Alkalinity Total as CaCO3	0.5 mg/L	N/S	284	285	275	277	275	273	
Sulfide Total	0.005 mg/L	N/S	<0.005	<0.005	N/S	N/S	N/S	<0.005	
Anions									
Bromide Dissolved	0.1 mg/L	N/S	<0.1	<0.1	N/S	N/S	N/S	<0.1	
Chloride Dissolved	0.5 mg/L	N/S	<0.5	0.8	N/S	N/S	N/S	0.9	
Langlier Index	None	N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Saturation pH	pH units	N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Carbon									
Organic Carbon - Total	0.5 mg/L	N/S	5	5.4	6.4	6.7	6.7	7.3	
Dissolved Organic Carbon	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	6.3	
Nutrients									
Total Kjeldahl Nitrogen (N)	mg/L	N/S	0.2	0.2	0.27	0.27	0.29	0.27	
Total Nitrogen	0.02 mg/L	N/S	0.243	0.246	0.325	0.328	0.35	0.339	
Total Organic Nitrogen (N)	mg/L	N/S	0.2	0.2	0.27	0.27	0.29	0.27	
Ammonia Nitrogen (N)	0.005 mg/L	N/S	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	
Nitrate Nitrogen Dissolved (N)	mg/L	N/S	0.05	0.04	0.05	0.06	0.06	0.06	
Nitrate+ Nitrite (N)	0.002 mg/L	N/S	0.045	0.044	0.058	0.059	0.06	0.065	
Nitrite Nitrogen (N)	0.002 mg/L	N/S	<0.002	<0.002	0.004	0.004	0.005	0.002	
Ortho-Phosphate (P)	0.001 mg/L	N/S	0.003	0.004	0.002	0.002	0.003	0.007	
Phosphorus Total Dissolved (P)	0.002 mg/L	N/S	0.003	0.003	<0.002	0.003	<0.002	0.005	
Phosphorus Total (P)	0.002 mg/L	N/S	0.013	0.014	0.015	0.012	0.017	0.021	
Sulfate	0.5 mg/L	N/S	8	8	N/S	N/S	N/S	10.7	
Total Metals									
Aluminium	0.3 µg/L	N/S	75.8	68.7	N/S	N/S	N/S	183	
Antimony	0.005 µg/L	N/S	0.084	0.08	N/S	N/S	N/S	0.087	
Arsenic	0.1 µg/L	N/S	0.3	0.3	N/S	N/S	N/S	0.4	
Barium	0.02 µg/L	N/S	217	249	N/S	N/S	N/S	211	
Beryllium	0.02 µg/L	N/S	<0.02	<0.02	N/S	N/S	N/S	0.03	
Bismuth	0.02 µg/L	N/S	<0.02	<0.02	N/S	N/S	N/S	<0.02	
Cadmium	0.01 µg/L	N/S	0.02	0.02	N/S	N/S	N/S	0.03	
Calcium	0.05 mg/L	N/S	N/S	N/S	87.1	87.3	87.4	85	
Chromium	0.2 µg/L	N/S	0.7	0.7	N/S	N/S	N/S	0.7	
Cobalt	0.005 µg/L	N/S	0.096	0.114	N/S	N/S	N/S	0.094	
Copper	0.05 µg/L	N/S	0.87	0.9	N/S	N/S	N/S	2.2	
Iron	0.005 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	
Lead	0.01 µg/L	N/S	0.27	0.25	N/S	N/S	N/S	0.19	
Lithium	0.05 µg/L	N/S	3.05	3.3	N/S	N/S	N/S	3.58	

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations						
			K6	K5	K5 (dup)	K4	K3	K2	K1
Magnesium	0.05	mg/L	N/S	N/S	N/S	19.1	19.3	19.5	19.3
Manganese	0.008	µg/L	N/S	26.3	25.8	N/S	N/S	N/S	14.7
Molybdenum	0.05	µg/L	N/S	0.52	0.52	N/S	N/S	N/S	0.47
Nickel	0.05	µg/L	N/S	1.03	1.22	N/S	N/S	N/S	1.33
Selenium	0.2	µg/L	N/S	<0.2	<0.2	N/S	N/S	N/S	0.3
Silver	0.02	µg/L	N/S	<0.02	<0.02	N/S	N/S	N/S	<0.02
Sodium	0.05	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Strontium	0.005	µg/L	N/S	362	361	N/S	N/S	N/S	311
Thallium	0.002	µg/L	N/S	0.007	0.008	N/S	N/S	N/S	0.008
Tin	0.01	µg/L	N/S	0.02	0.02	N/S	N/S	N/S	0.04
Uranium	0.002	µg/L	N/S	0.636	0.63	N/S	N/S	N/S	0.626
Vanadium	0.06	µg/L	N/S	0.42	0.4	N/S	N/S	N/S	0.73
Zinc	0.1	µg/L	N/S	<0.1	<0.1	N/S	N/S	N/S	0.7
Dissolved Metals									
Aluminium Dissolved	0.3	µg/L	N/S	2	2	N/S	N/S	N/S	3.1
Antimony Dissolved	0.005	µg/L	N/S	0.07	0.073	N/S	N/S	N/S	0.074
Arsenic Dissolved	0.1	µg/L	N/S	0.2	0.2	N/S	N/S	N/S	0.2
Barium Dissolved	0.02	µg/L	N/S	190	200	N/S	N/S	N/S	192
Beryllium Dissolved	0.02	µg/L	N/S	<0.02	<0.02	N/S	N/S	N/S	<0.02
Bismuth Dissolved	0.02	µg/L	N/S	<0.02	<0.02	N/S	N/S	N/S	<0.02
Cadmium Dissolved	0.01	µg/L	N/S	<0.01	0.01	N/S	N/S	N/S	0.01
Calcium Dissolved	0.05	mg/L	N/S			83.9	84.7	84.9	84.8
Chromium Dissolved	0.2	µg/L	N/S	0.4	0.8	N/S	N/S	N/S	0.3
Cobalt Dissolved	0.005	µg/L	N/S	0.037	0.038	N/S	N/S	N/S	0.028
Copper Dissolved	0.05	µg/L	N/S	0.63	0.79	N/S	N/S	N/S	1.92
Iron Dissolved	0.005	mg/L	N/S			N/S	N/S	N/S	
Lead Dissolved	0.01	µg/L	N/S	<0.01	<0.01	N/S	N/S	N/S	<0.01
Lithium Dissolved	0.05	µg/L	N/S	2.54	2.92	N/S	N/S	N/S	3.08
Magnesium Dissolved	0.05	mg/L	N/S			18.5	18.8	19	19.4
Manganese Dissolved	0.008	µg/L	N/S	18.5	19.9	N/S	N/S	N/S	9.67
Molybdenum Dissolved	0.05	µg/L	N/S	0.49	0.51	N/S	N/S	N/S	0.46
Nickel Dissolved	0.05	µg/L	N/S	0.67	0.87	N/S	N/S	N/S	0.98
Selenium Dissolved	0.2	µg/L	N/S	0.2	0.3	N/S	N/S	N/S	<0.2
Silver Dissolved	0.02	µg/L	N/S	<0.02	<0.02	N/S	N/S	N/S	<0.02
Strontium Dissolved	0.005	µg/L	N/S	327	343	N/S	N/S	N/S	287
Thallium Dissolved	0.002	µg/L	N/S	0.004	0.005	N/S	N/S	N/S	0.005
Tin Dissolved	0.01	µg/L	N/S	<0.01	0.01	N/S	N/S	N/S	0.03
Uranium Dissolved	0.002	µg/L	N/S	0.549	0.586	N/S	N/S	N/S	0.582
Vanadium Dissolved	0.06	µg/L	N/S	0.13	0.15	N/S	N/S	N/S	0.17
Zinc Dissolved	0.1	µg/L	N/S	<0.1	<0.1	N/S	N/S	N/S	<0.1
Hydrocarbons									
TEH Extraction-Water		date							
EPHw C10-19	0.08	mg/L	N/S	<0.08	<0.08	N/S	<0.08	<0.08	<0.08
EPHw C19-32	0.08	mg/L	N/S	<0.08	<0.08	N/S	<0.08	<0.08	<0.08
Oil & Grease Total	1	mg/L	N/S	1	<1	N/S	<1	<1	<1
Pesticides									
2,4-D	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Silvex	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
2,4,5-T	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Dicamba	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
MCP	50	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
MCPA	50	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Dichlorprop	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Dinoseb	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
2,4-DB	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S

1 = "present" = positive result for both markers

2 = "absent" = fecal contamination from this species detected

3 = "potential" = positive result for one marker only (old material or caused by one animal

4 = "Yes" under bacteroides = bacteroides used to source track are in general present. "No" = they are not.

Dup = Duplicate sample

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination >5 x DL

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

Table B4: 2004/05 sample parameters and analysis results for the Kiskatinaw main stem on April 06, 2005

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations					
			K6	K5	K4	K3	K2	K1
Field Data								
Specific Conductance	µS/cm		N/S	N/S	N/S	N/S	N/S	295
Temp in Stream	°C		N/S	N/S	N/S	N/S	N/S	0.3/1.1
Turbidity	NTU		N/S	N/S	N/S	N/S	N/S	177/171
pH			N/S	N/S	N/S	N/S	N/S	7.98
Diss. Oxygen	mg/L		N/S	N/S	N/S	N/S	N/S	12
Lab Data								
Biological								
E.coli	1 CFU/100mL	N/S	N/S	N/S	N/S	N/S	N/S	8
Enterococci	1 CFU/100mL	N/S	N/S	N/S	N/S	N/S	N/S	58
Fecal Coliforms	1 CFU/100mL	N/S	N/S	N/S	N/S	N/S	N/S	20
Fecal Streptococci	1 CFU/100mL	N/S	N/S	N/S	N/S	N/S	N/S	60
Bacteria Source Tracking ^{1,2,3,4}								
Bacteroides		N/S	N/S	N/S	N/S	N/S	N/S	N/S
Human fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S
Ruminant fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S
Pig fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S
Horse fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S
Dog fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S
Elk fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S
Parasites								
Cryptosporidium oocysts	oocysts/100L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Giardia cysts	cysts/100L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Physical								
Temperature Arrival	0 Celsius	N/S	N/S	N/S	N/S	N/S	N/S	3
pH	0.1 pH units	N/S	N/S	N/S	N/S	N/S	N/S	8
Color True	5 Col.Unit	N/S	N/S	N/S	N/S	N/S	N/S	100
Specific Conductance	1 µS/cm	N/S	N/S	N/S	N/S	N/S	N/S	290
Residue Nonfilterable (TSS)	4 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	67
Residue Filterable 1.0µ (TDS)	10 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	194
Turbidity	0.1 NTU	N/S	N/S	N/S	N/S	N/S	N/S	104
Hardness Total -T	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Hardness Total -D	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	160
General Inorganics								
Alkalinity Total as CaCO3	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	142
Sulfide Total	0.005 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	<0.005
Anions								
Bromide Dissolved	0.1 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	<0.1
Chloride Dissolved	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	1.6
Langelier Index	None	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Saturation pH	pH units	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Carbon								
Organic Carbon - Total	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	10
Dissolved Organic Carbon	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	8.4
Nutrients								
Total Kjeldahl Nitrogen (N)	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.63
Total Nitrogen	0.02 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.67
Total Organic Nitrogen (N)	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.55
Ammonia Nitrogen (N)	0.005 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.08
Nitrate Nitrogen Dissolved (N)	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	<0.02
Nitrate+ Nitrite (N)	0.002 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.039
Nitrite Nitrogen (N)	0.002 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.023
Ortho-Phosphorus (P)	0.001 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.028
Phosphorus Total Dissolved (P)	0.002 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.086
Phosphorus Total (P)	0.002 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.15
Sulfate	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	9.9
Total Metals								
Aluminium	0.3 µg/L	N/S	N/S	N/S	N/S	N/S	N/S	728
Antimony	0.005 µg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.083
Arsenic	0.1 µg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.8
Barium	0.02 µg/L	N/S	N/S	N/S	N/S	N/S	N/S	141
Beryllium	0.02 µg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.07
Bismuth	0.02 µg/L	N/S	N/S	N/S	N/S	N/S	N/S	<0.02
Cadmium	0.01 µg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.15
Calcium	0.05 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	47.2
Chromium	0.2 µg/L	N/S	N/S	N/S	N/S	N/S	N/S	0.4
Cobalt	0.005 µg/L	N/S	N/S	N/S	N/S	N/S	N/S	1.1
Copper	0.05 µg/L	N/S	N/S	N/S	N/S	N/S	N/S	3.44

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations					
			K6	K5	K4	K3	K2	K1
Iron	0.005	mg/L	N/S	N/S	N/S	N/S	N/S	3.83
Lead	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	1.61
Lithium	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	3.53
Magnesium	0.05	mg/L	N/S	N/S	N/S	N/S	N/S	12.4
Manganese	0.008	µg/L	N/S	N/S	N/S	N/S	N/S	74.3
Molybdenum	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	0.5
Nickel	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	4.58
Selenium	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	0.4
Silver	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	<0.02
Sodium	0.05	mg/L	N/S	N/S	N/S	N/S	N/S	5.36
Strontium	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	176
Thallium	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	0.024
Tin	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	<0.01
Uranium	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	0.488
Vanadium	0.06	µg/L	N/S	N/S	N/S	N/S	N/S	2.33
Zinc	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	10.1
Dissolved Metals								
Aluminium Dissolved	0.3	µg/L	N/S	N/S	N/S	N/S	N/S	26.1
Antimony Dissolved	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	0.086
Arsenic Dissolved	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	0.3
Barium Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	95.9
Beryllium Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	<0.02
Bismuth Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	<0.02
Cadmium Dissolved	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	0.02
Calcium Dissolved	0.05	mg/L	N/S	N/S	N/S	N/S	N/S	44.9
Chromium Dissolved	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	<0.2
Cobalt Dissolved	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	0.116
Copper Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	1.75
Iron Dissolved	0.005	mg/L	N/S	N/S	N/S	N/S	N/S	0.12
Lead Dissolved	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	0.08
Lithium Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	2.29
Magnesium Dissolved	0.05	mg/L	N/S	N/S	N/S	N/S	N/S	11.3
Manganese Dissolved	0.008	µg/L	N/S	N/S	N/S	N/S	N/S	5.34
Molybdenum Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	0.38
Nickel Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	1.61
Selenium Dissolved	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	<0.2
Silver Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	<0.02
Strontium Dissolved	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	160
Thallium Dissolved	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	0.008
Tin Dissolved	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	<0.01
Uranium Dissolved	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	0.377
Vanadium Dissolved	0.06	µg/L	N/S	N/S	N/S	N/S	N/S	0.27
Zinc Dissolved	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	0.7
Hydrocarbons								
TEH Extraction-Water		date	N/S	N/S	N/S	N/S	N/S	N/A
EPHw C10-19	0.08	mg/L	N/S	N/S	N/S	N/S	N/S	<0.08
EPHw C19-32	0.08	mg/L	N/S	N/S	N/S	N/S	N/S	<0.08
Oil & Grease Total	1	mg/L	N/S	N/S	N/S	N/S	N/S	<1
Pesticides								
2,4-D	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S
Silvex	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S
2,4,5-T	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S
Dicamba	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S
MCPP	50	µg/L	N/S	N/S	N/S	N/S	N/S	N/S
MCPA	50	µg/L	N/S	N/S	N/S	N/S	N/S	N/S
Dichlorprop	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S
Dinoseb	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S
2,4-DB	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S

1 = "present" = positive result for both markers

2 = "absent" = fecal contamination from this species detected

3 = "potential" = positive result for one marker only (old material or caused by one animal

4 = "Yes" under bacteroides = bacteroides used to source track are in general present. "No" = they are not.

Dup = Duplicate sample

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination >5 x DL

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

Table B5: 2004/05 sample parameters and analysis results for the Kiskatinaw main stem on April 19-19, 2005

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations						
			K6	K5	K4	K3	K2	K1	K1 (Dup)
Field Data									
Specific Conductance	µS/cm		235	315	273	282	278	269	N/S
Temp in Stream	°C		0.9/1.5	0.1/0.8	1.1/1.5	1.8/2.3	3.3/2.8	3.2/4.3	N/S
Turbidity	NTU		103/103	671/677	352/347	479/470	>1000/>1000	>1000/>1000	N/S
pH			8.2	8.3	8.2	N/A	8.2	8.2	N/S
Diss. Oxygen	mg/L		12.8	12.8	12.9	12.9	12.7	11.5	N/S
Lab Data									
Biological									
E.coli	1 CFU/100mL	<10	<10	<10	<10	<10	<10	20	40
Enterococci	1 CFU/100mL	<10	10	10	10	10	10	10	10
Fecal Coliforms	1 CFU/100mL	10	10	20	30	10	30	30	40
Fecal Streptococci	1 CFU/100mL	<10	<10	10	10	<10	10	<10	<10
Bacteria Source Tracking^{1,2,3,4}									
Bacteroides		N/S	N/S	N/S	N/S	Yes	Yes	N/S	N/S
Human fecal contamination		N/S	N/S	N/S	N/S	potential	absent	N/S	N/S
Ruminant fecal contamination		N/S	N/S	N/S	N/S	absent	absent	N/S	N/S
Pig fecal contamination		N/S	N/S	N/S	N/S	absent	absent	N/S	N/S
Horse fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Dog fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Elk fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Parasites									
Cryptosporidium oocysts	oocysts/100L	<75-<145	N/S	N/S	<75	<75	<120	<145	N/S
Giardia cysts	cysts/100L	<75-<145	N/S	N/S	825	600	1440	1015	N/S
Physical									
Temperature Arrival	0 Celsius	5	5	5	5	5	5	12	12
pH	0.1 pH units	8.2	8.3	8.2	8.2	8.2	8.2	8.2	8.2
Color True	5 Col.Unit	25	250	25	100	100	200	200	150
Specific Conductance	1 µS/cm	235	314	270	278	277	257	264	264
Residue Nonfilterable (TSS)	4 mg/L	112	432	254	302	840	738	730	730
Residue Filterable 1.0u (TDS)	10 mg/L	152	184	170	176	160	206	176	176
Turbidity	0.1 NTU	101	475	268	376	1050	1050	1020	1020
Hardness Total -T	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Hardness Total -D	mg/L	130	180	150	160	160	150	150	150
General Inorganics									
Alkalinity Total as CaCO3	0.5 mg/L	126	171	147	151	148	150	151	151
Sulfide Total	0.005 mg/L	0.01	<0.005	N/S	N/S	N/S	<0.005	<0.005	<0.005
Anions									
Bromide Dissolved	0.1 mg/L	<0.1	<0.1	N/S	N/S	N/S	<0.1	<0.1	<0.1
Chloride Dissolved	0.5 mg/L	<0.5	<0.5	N/S	N/S	N/S	1	2.8	2.8
Langelier Index	None	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Saturation pH	pH units	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Carbon									
Organic Carbon - Total	0.5 mg/L	9.5	7.5	8.6	9.4	10	9.3	9.4	9.4
Dissolved Organic Carbon	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	9	9.2	9.2
Nutrients									
Total Kjeldahl Nitrogen (N)	mg/L	0.46	0.28	0.43	0.47	0.6	0.44	0.45	0.45
Total Nitrogen	0.02 mg/L	0.47	0.3	0.44	0.48	0.63	0.47	0.49	0.49
Total Organic Nitrogen (N)	mg/L	0.46	0.28	0.43	0.47	0.59	0.44	0.45	0.45
Ammonia Nitrogen (N)	0.005 mg/L	0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005
Nitrate Nitrogen Dissolved (N)	0.02 mg/L	<0.02	<0.02	<0.02	<0.02	0.03	0.04	0.04	0.04
Nitrate+ Nitrite (N)	0.002 mg/L	0.006	0.013	0.009	0.014	0.031	0.037	0.038	0.038
Nitrite Nitrogen (N)	0.002 mg/L	<0.002	<0.002	<0.002	<0.002	0.002	0.002	0.002	0.002
Ortho-Phosphorus (P)	0.001 mg/L	0.002	0.004	0.002	0.001	0.002	0.002	0.002	0.002
Phosphorus Total Dissolved (P)	0.002 mg/L	0.009	0.007	0.004	0.006	0.006	0.007	0.007	0.007
Phosphorus Total (P)	0.002 mg/L	0.13	0.42	0.19	0.3	0.65	0.31	0.17	0.17
Sulfate	0.5 mg/L	1.5	3	N/S	N/S	N/S	6.7	7	7
Total Metals									
Aluminium	0.3 µg/L	438	510	N/S	N/S	N/S	1050	1220	1220
Antimony	0.005 µg/L	0.054	0.098	N/S	N/S	N/S	0.121	0.155	0.155
Arsenic	0.1 µg/L	0.6	0.9	N/S	N/S	N/S	1.5	1.6	1.6
Barium	0.02 µg/L	128	242	N/S	N/S	N/S	301	315	315
Beryllium	0.02 µg/L	0.03	0.16	N/S	N/S	N/S	0.3	0.3	0.3
Bismuth	0.02 µg/L	<0.02	<0.02	N/S	N/S	N/S	<0.02	<0.02	<0.02
Cadmium	0.01 µg/L	0.08	0.34	N/S	N/S	N/S	0.73	0.75	0.75
Calcium	0.05 mg/L	48.1	87.6	62.4	68.4	98.7	90.5	57.7	57.7
Chromium	0.2 µg/L	<0.2	<0.2	N/S	N/S	N/S	1.4	1.6	1.6
Cobalt	0.005 µg/L	0.373	1.09	N/S	N/S	N/S	3.23	3.55	3.55
Copper	0.05 µg/L	1.68	5.16	N/S	N/S	N/S	12.1	12.8	12.8
Iron	0.005 mg/L	N/S	N/A	N/S	N/S	N/S	N/A	N/A	N/A
Lead	0.01 µg/L	0.89	3.21	N/S	N/S	N/S	6.24	6.71	6.71
Lithium	0.05 µg/L	2.08	2.04	N/S	N/S	N/S	4.2	4.37	4.37
Magnesium	0.05 mg/L	10.9	19	13.5	14.7	20.4	19	23.7	23.7

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations						
			K6	K5	K4	K3	K2	K1	K1 (Dup)
Manganese	0.008 µg/L		58.7	149	N/S	N/S	N/S	293	307
Molybdenum	0.05 µg/L		0.36	0.52	N/S	N/S	N/S	0.64	0.51
Nickel	0.05 µg/L		1.33	2.84	N/S	N/S	N/S	8.86	9.61
Selenium	0.2 µg/L		0.2	0.5	N/S	N/S	N/S	0.5	0.3
Silver	0.02 µg/L		<0.02	<0.02	N/S	N/S	N/S	0.02	0.03
Sodium	0.05 mg/L		N/S	N/A	N/S	N/S	N/S	N/A	N/A
Strontium	0.005 µg/L		114	259	N/S	N/S	N/S	206	208
Thallium	0.002 µg/L		0.013	0.032	N/S	N/S	N/S	0.048	0.05
Tin	0.01 µg/L		0.04	<0.01	N/S	N/S	N/S	0.01	<0.01
Uranium	0.002 µg/L		0.249	0.583	N/S	N/S	N/S	0.838	0.854
Vanadium	0.06 µg/L		1.36	2.31	N/S	N/S	N/S	5.58	5.95
Zinc	0.1 µg/L		2.9	8.6	N/S	N/S	N/S	26.1	30.4
Dissolved Metals									
Aluminium Dissolved	0.3 µg/L		8.2	5.5	N/S	N/S	N/S	11.8	11.2
Antimony Dissolved	0.005 µg/L		0.048	0.086	N/S	N/S	N/S	0.11	0.115
Arsenic Dissolved	0.1 µg/L		0.3	0.3	N/S	N/S	N/S	0.5	0.4
Barium Dissolved	0.02 µg/L		101	142	N/S	N/S	N/S	100	102
Beryllium Dissolved	0.02 µg/L		<0.02	<0.02	N/S	N/S	N/S	<0.02	<0.02
Bismuth Dissolved	0.02 µg/L		<0.02	<0.02	N/S	N/S	N/S	<0.02	<0.02
Cadmium Dissolved	0.01 µg/L		<0.01	<0.01	N/S	N/S	N/S	0.01	0.01
Calcium Dissolved	0.05 mg/L		38.7	51.7	44.7	45.7	45.1	42.9	42.7
Chromium Dissolved	0.2 µg/L		<0.2	<0.2	N/S	N/S	N/S	<0.2	<0.2
Cobalt Dissolved	0.005 µg/L		0.063	0.055	N/S	N/S	N/S	0.127	0.102
Copper Dissolved	0.05 µg/L		0.89	1.66	N/S	N/S	N/S	2.61	2.95
Iron Dissolved	0.005 mg/L		N/S	N/S	N/S	N/S	N/S	N/A	N/A
Lead Dissolved	0.01 µg/L		0.06	0.02	N/S	N/S	N/S	0.05	0.05
Lithium Dissolved	0.05 µg/L		1.66	1.55	N/S	N/S	N/S	2.09	2.06
Magnesium Dissolved	0.05 mg/L		8.82	12.2	10.4	10.8	10.7	10.4	10.4
Manganese Dissolved	0.008 µg/L		4.74	7.6	N/S	N/S	N/S	12.1	7.11
Molybdenum Dissolved	0.05 µg/L		0.32	0.37	N/S	N/S	N/S	0.41	0.41
Nickel Dissolved	0.05 µg/L		0.66	0.81	N/S	N/S	N/S	1.43	1.42
Selenium Dissolved	0.2 µg/L		<0.2	0.3	N/S	N/S	N/S	0.5	0.3
Silver Dissolved	0.02 µg/L		<0.02	<0.02	N/S	N/S	N/S	<0.02	<0.02
Strontium Dissolved	0.005 µg/L		108	227	N/S	N/S	N/S	160	159
Thallium Dissolved	0.002 µg/L		0.003	0.005	N/S	N/S	N/S	0.008	0.01
Tin Dissolved	0.01 µg/L		0.02	<0.01	N/S	N/S	N/S	0.02	0.01
Uranium Dissolved	0.002 µg/L		0.192	0.389	N/S	N/S	N/S	0.422	0.428
Vanadium Dissolved	0.06 µg/L		0.16	0.19	N/S	N/S	N/S	0.25	0.25
Zinc Dissolved	0.1 µg/L		<0.1	<0.1	N/S	N/S	N/S	<0.1	0.1
Hydrocarbons									
TEH Extraction-Water		date	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EPHw C10-19	0.08 mg/L		<0.08	<0.08	N/S	<0.08	<0.08	<0.08	<0.08
EPHw C19-32	0.08 mg/L		<0.08	<0.08	N/S	<0.08	<0.08	<0.08	<0.08
Oil & Grease Total	1 mg/L		1	<1	N/S		1	2	3
Pesticides									
2,4-D	0.2 µg/L		N/S	<0.2	N/S	<0.2	<0.2	N/S	N/S
Silvex	0.05 µg/L		N/S	<0.05	N/S	<0.05	<0.05	N/S	N/S
2,4,5-T	0.05 µg/L		N/S	<0.05	N/S	<0.05	<0.05	N/S	N/S
Dicamba	0.2 µg/L		N/S	<0.2	N/S	<0.2	<0.2	N/S	N/S
MCPP	50 µg/L		N/S	<50	N/S	<50	<50	N/S	N/S
MCPA	50 µg/L		N/S	<50	N/S	<50	<50	N/S	N/S
Dichlorprop	0.05 µg/L		N/S	<0.05	N/S	<0.05	<0.05	N/S	N/S
Dinoseb	0.05 µg/L		N/S	<0.05	N/S	<0.05	<0.05	N/S	N/S
2,4-DB	0.05 µg/L		N/S	<0.05	N/S	<0.05	<0.05	N/S	N/S
Bromoxynil	0.5 µg/L		N/S	<0.5	N/S	<0.5	<0.5	N/S	N/S
Picloram	0.05 µg/L		N/S	<0.05	N/S	<0.05	<0.05	N/S	N/S
Diclofop methyl	0.2 µg/L		N/S	<0.2	N/S	<0.2	<0.2	N/S	N/S

1 = "present" = positive result for both markers

2 = "absent" = fecal contamination from this species detected

3 = "potential" = positive result for one marker only (old material or caused by one animal)

4 = "Yes" under bacteroides = bacteroides used to source track are in general present. "No" = they are not.

Dup = Duplicate sample

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination >5 x DL

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

Table B6: 2004/05 sample parameters and analysis results for the Kiskatinaw main stem on August 15-16, 2005

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations					
			K6	K5	K4	K3	K2	K1
Field Data								
Specific Conductance	µS/cm		375	437	422	428	428	435
Temp in Stream	°C		10.4/11.3	11.1/12.0	11.3/12.0	11.8/12.2	13.1/13.8	16.0/15.6
Turbidity	NTU		14.1/13.8	69.8/73.5	59.0/61.6	70.4/72.2	84.0/85.0	45.1/50.2
pH			8.35	8.4	8.4	8.7	8.5	8.4
Diss. Oxygen	mg/L		10.4	10.2	10.3	10	9.7	8.6
Lab Data								
Biological								
E.coli	1 CFU/100mL		16	21	12	14	42	120
Enterococci	1 CFU/100mL		<1	26	12	23	22	40
Fecal Coliforms	1 CFU/100mL		18	36	28	44	56	140
Fecal Streptococci	1 CFU/100mL		30	33	16	23	36	90
Bacteria Source Tracking ^{1,2,3,4}								
Bacteroides			N/S	N/S	N/S	Yes	Yes	Yes
Human fecal contamination			N/S	N/S	N/S	absent	potential	potential
Ruminant fecal contamination			N/S	N/S	N/S	absent	potential	potential
Pig fecal contamination			N/S	N/S	N/S	absent	absent	absent
Horse fecal contamination			N/S	N/S	N/S	absent	absent	absent
Dog fecal contamination			N/S	N/S	N/S	absent	absent	present
Elk fecal contamination			N/S	N/S	N/S	absent	absent	absent
Parasites								
Cryptosporidium oocysts	oocysts/100L	10	N/S	N/S	10	10	20	10
Giardia cysts	cysts/100L	10	N/S	N/S	150	230	150	20
Physical								
Temperature Arrival	0 Celsius		7	7	7	7	7	7
pH	0.1 pH units		8.4	8.4	8.5	8.5	8.5	8.5
Color True	5 Col.Unit		20	20	30	30	30	20
Specific Conductance	1 µS/cm		368	430	411	419	422	424
Residue Nonfilterable (TSS)	4 mg/L		9	55	33	31	26	19
Residue Filterable 1.0u (TDS)	10 mg/L		226	268	286	278	274	312
Turbidity	0.1 NTU		10.5	63.3	54	63.5	92.1	47.5
Hardness Total -T	mg/L		180	230	210	220	220	210
Hardness Total -D	mg/L		180	230	210	220	220	210
General Inorganics								
Alkalinity Total as CaCO3	0.5 mg/L		204	241	143	235	234	235
Sulfide Total	0.005 mg/L		0.009	<0.005	N/S	N/S	N/S	<0.005
Anions								
Bromide Dissolved	0.1 mg/L		<0.1	<0.1	N/S	N/S	N/S	<0.1
Chloride Dissolved	0.5 mg/L		<0.5	<0.5	N/S	N/S	N/S	<0.5
Langelier Index	None		N/S	N/S	N/S	N/S	N/S	N/S
Saturation pH	pH units		N/S	N/S	N/S	N/S	N/S	N/S
Carbon								
Organic Carbon - Total	0.5 mg/L		11	9	9.1	9.7	9.9	10
Dissolved Organic Carbon	0.5 mg/L		N/S	N/S	N/S	N/S	N/S	9.8
Nutrients								
Total Kjeldahl Nitrogen (N)	mg/L		0.32	0.28	0.3	0.33	0.33	0.31
Total Nitrogen	0.02 mg/L		0.35	0.3	0.33	0.34	0.34	0.34
Total Organic Nitrogen (N)	mg/L		0.32	0.28	0.3	0.33	0.33	0.3
Ammonia Nitrogen (N)	0.005 mg/L		<0.005	<0.005	<0.005	<0.005	<0.005	0.009
Nitrate Nitrogen Dissolved (N)	0.02 mg/L		0.03	<0.02	<0.02	<0.02	<0.02	0.02
Nitrate+Nitrite (N)	0.002 mg/L		0.033	0.016	0.026	0.012	0.008	0.038
Nitrite Nitrogen (N)	0.002 mg/L		0.006	0.005	0.009	0.005	0.004	0.015
Ortho-Phosphorus (P)	0.001 mg/L		0.003	0.004	0.004	0.004	0.003	0.02
Phosphorus Total Dissolved (P)	0.002 mg/L		0.003	<0.002	0.005	0.003	0.002	0.027
Phosphorus Total (P)	0.002 mg/L		0.01	0.033	0.022	0.036	0.042	0.029
Sulfate	0.5 mg/L		2.5	5.4	N/S	N/S	N/S	7.3
Total Metals								
Aluminium	0.3 µg/L		32.1	71.6	N/S	N/S	N/S	64.3
Antimony	0.005 µg/L		0.068	0.088	N/S	N/S	N/S	0.109
Arsenic	0.1 µg/L		0.4	0.5	N/S	N/S	N/S	0.5
Barium	0.02 µg/L		164	185	N/S	N/S	N/S	181
Beryllium	0.02 µg/L		<0.02	<0.02	N/S	N/S	N/S	<0.02
Bismuth	0.02 µg/L		<0.02	<0.02	N/S	N/S	N/S	0.03
Cadmium	0.01 µg/L		0.01	0.05	N/S	N/S	N/S	0.04
Calcium	0.05 mg/L		51.9	71.2	59.1	63.3	59.7	64.6
Chromium	0.2 µg/L		<0.2	<0.2	N/S	N/S	N/S	<0.2
Cobalt	0.005 µg/L		0.076	0.215	N/S	N/S	N/S	0.191
Copper	0.05 µg/L		0.68	1.51	N/S	N/S	N/S	1.73
Iron	0.005 mg/L		N/S	N/S	N/S	N/S	N/S	N/S

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Locations					
			K6	K5	K4	K3	K2	K1
Lead	0.01 µg/L		0.11	0.53	N/S	N/S	N/S	0.38
Lithium	0.05 µg/L		2.12	2.16	N/S	N/S	N/S	2.68
Magnesium	0.05 mg/L		11.4	16.6	13.7	14.7	14	15.3
Manganese	0.008 µg/L		19.1	38.9	N/S	N/S	N/S	30.6
Molybdenum	0.05 µg/L		0.43	0.72	N/S	N/S	N/S	0.78
Nickel	0.05 µg/L		0.84	1.15	N/S	N/S	N/S	1.16
Selenium	0.2 µg/L	<0.2		0.2	N/S	N/S	N/S	<0.2
Silver	0.02 µg/L	<0.02		<0.02	N/S	N/S	N/S	<0.02
Sodium	0.05 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Strontium	0.005 µg/L		149	314	N/S	N/S	N/S	277
Thallium	0.002 µg/L		0.005	0.01	N/S	N/S	N/S	0.008
Tin	0.01 µg/L		0.02	0.02	N/S	N/S	N/S	0.02
Uranium	0.002 µg/L		0.302	0.481	N/S	N/S	N/S	0.529
Vanadium	0.06 µg/L		0.25	0.56	N/S	N/S	N/S	0.52
Zinc	0.1 µg/L	<0.1		1.2	N/S	N/S	N/S	0.8
Dissolved Metals								
Aluminium Dissolved	0.3 µg/L		1.7	2.5	N/S	N/S	N/S	2.9
Antimony Dissolved	0.005 µg/L		0.061	0.085	N/S	N/S	N/S	0.11
Arsenic Dissolved	0.1 µg/L		0.3	0.4	N/S	N/S	N/S	0.4
Barium Dissolved	0.02 µg/L		173	186	N/S	N/S	N/S	184
Beryllium Dissolved	0.02 µg/L	<0.02	<0.02	N/S	N/S	N/S	<0.02	
Bismuth Dissolved	0.02 µg/L	<0.02	<0.02	N/S	N/S	N/S	0.04	
Cadmium Dissolved	0.01 µg/L	<0.01	<0.01	N/S	N/S	N/S	<0.01	
Calcium Dissolved	0.05 mg/L		53.4	65.7	60.6	62.9	62.6	59.7
Chromium Dissolved	0.2 µg/L	<0.2	<0.2	N/S	N/S	N/S	<0.2	
Cobalt Dissolved	0.005 µg/L		0.037	0.055	N/S	N/S	N/S	0.047
Copper Dissolved	0.05 µg/L		0.64	1.05	N/S	N/S	N/S	1.8
Iron Dissolved	0.005 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	
Lead Dissolved	0.01 µg/L		0.03	0.01	N/S	N/S	N/S	<0.01
Lithium Dissolved	0.05 µg/L		2.05	1.94	N/S	N/S	N/S	2.74
Magnesium Dissolved	0.05 mg/L		11.6	15.3	13.7	14.4	14.4	14.3
Manganese Dissolved	0.008 µg/L		1.79	6.94	N/S	N/S	N/S	0.991
Molybdenum Dissolved	0.05 µg/L		0.44	0.59	N/S	N/S	N/S	0.67
Nickel Dissolved	0.05 µg/L		0.65	0.66	N/S	N/S	N/S	0.81
Selenium Dissolved	0.2 µg/L	<0.2	<0.2	N/S	N/S	N/S	<0.2	
Silver Dissolved	0.02 µg/L	<0.02	<0.02	N/S	N/S	N/S	<0.02	
Strontium Dissolved	0.005 µg/L		155	330	N/S	N/S	N/S	306
Thallium Dissolved	0.002 µg/L		0.002	0.004	N/S	N/S	N/S	0.007
Tin Dissolved	0.01 µg/L	<0.01		0.01	N/S	N/S	N/S	<0.01
Uranium Dissolved	0.002 µg/L		0.289	0.469	N/S	N/S	N/S	0.523
Vanadium Dissolved	0.06 µg/L		0.09	0.23	N/S	N/S	N/S	0.25
Zinc Dissolved	0.1 µg/L	<0.1	<0.1	N/S	N/S	N/S	<0.1	
Hydrocarbons								
TEH Extraction-Water		date	N/S	N/S	N/S	N/S	N/S	N/S
EPHw C10-19	0.08 mg/L		<0.08	<0.08	N/S	<0.08	<0.08	<0.08
EPHw C19-32	0.08 mg/L		<0.08	<0.08	N/S	<0.08	<0.08	<0.08
Oil & Grease Total	1 mg/L		3	<1	N/S	3	2	2
Pesticides								
2,4-D	0.2 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Silvex	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
2,4,5-T	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Dicamba	0.2 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
MCPP	50 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
MCPA	50 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Dichlorprop	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Dinoseb	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
2,4-DB	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Bromoxynil	0.5 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Picloram	0.05 µg/L		N/S	N/S	N/S	N/S	N/S	N/S
Diclofop methyl	0.2 µg/L		N/S	N/S	N/S	N/S	N/S	N/S

1 = "present" = positive result for both markers

2 = "absent" = fecal contamination from this species detected

3 = "potential" = positive result for one marker only (old material or caused by one animal)

4 = "Yes" under bacteroides = bacteroides used to source track are in general present. "No" = they are not.

Dup = Duplicate sample

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination >5 x DL

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Date and Locations												Apr. 06, 2005			Apr. 18, 2005			Aug. 16, 2005			
			Sep. 13, 2004			Oct. 25, 2004			Feb. 21, 2005															
			B3	B2	B1	B3	B2	B1	B3	B2	B1	B3	B2	B1	B3	B2	B1	B3	B2	B1	B3	B2	B1	B1 (Dup)
Field Data																								
Specific Conductance	µS/cm		131	65	153	240	109	277	N/S	N/S	N/S	276	143	227	145	80	193	312	153	381	N/S			
Temp in Stream	°C		5.3/5.9/5.9	5.4/5.5/5.0	6.0/5.6/6.2	2.0/1.1/-0.1	0.0/0.1/-0.2	0.0/0.1/-0.2	N/S	N/S	N/S	0.2/0.8	0.3/0.7	1.8/0.2	3.9/3.2	1.0/2.5	2.7/3.5	11.0/11.1	10.5/10.3	12.3/12.3	N/S			
Turbidity	NTU		45.9/36.3	78.7/75.4	>1000	5.94/8.29	17.8/14.1	106/99.4	N/S	N/S	N/S	33.7/34.5	138/142	332/329	38.6/41.5	N/S	>1000/>1000	23.9/24.7	59.4/63.8	408/398	N/S			
pH			6.8	6.6	8.2	7.7	8.6	8.4	N/S	N/S	N/S	8	7.9	8	7.9	7.5	8.1	7.9	7.7	8.3	N/S			
Diss. Oxygen	mg/L		11.9	12	12.3	12.7	12.6	12.9	N/S	N/S	N/S	12.6	12.8	12.6	12.1	12.5	12.8	9.9	10.1	9.9	N/S			
Lab Data																								
Biological																								
E.coli	1 CFU/100m		24	32	430	4	9	30	N/S	N/S	N/S	2	4	4	16	4	<10	14	98	180	170			
Enterococci	1 CFU/100m		14	42	120	<1	<1	4	N/S	N/S	N/S	<2	16	<1	<2	<2	10	48	120	100	80			
Fecal Coliforms	1 CFU/100m		30	98	500	4	7	30	N/S	N/S	N/S	2	30	32	22	2	<10	18	100	640	690			
Fecal Streptococci	1 CFU/100m		46	180	390	4	134	30	N/S	N/S	N/S	16	18	14	<2	8	20	58	120	100	110			
Bacteria Source Tracking ^{1,2,3,4}																								
Bacteroides		N/S	N/S	No	N/S	N/S	No	N/S	N/S	N/S	N/S	N/S	N/S	Yes	N/S	N/S	No	N/S	N/S	Yes	Yes			
Human fecal contamination		N/S	N/S	absent	N/S	N/S	absent	N/S	N/S	N/S	N/S	N/S	N/S	present	N/S	N/S	absent	N/S	N/S	present	present			
Ruminant fecal contamination		N/S	N/S	absent	N/S	N/S	absent	N/S	N/S	N/S	N/S	N/S	N/S	present	N/S	N/S	absent	N/S	N/S	present	present			
Pig fecal contamination		N/S	N/S	absent	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	absent	N/S	N/S	absent	absent			
Horse fecal contamination		N/S	N/S	absent	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	absent	absent			
Dog fecal contamination		N/S	N/S	absent	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	absent	N/S	N/S	present	present			
Elk fecal contamination		N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	absent	absent			
Parasites																								
Cryptosporidium oocysts	oocysts/100	<10-<90	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<90	N/S	N/S	<10	N/S			
Giardia cysts	cysts/100L	<10-<90	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	1890.2	N/S	N/S	70	N/S			
Physical																								
Temperature Arrival	0 Celsius	3	3	3	1	1	1	N/S	N/S	N/S	3	3	3	5	5	5	7	7	7	7				
pH	0.1 pH units	8	7.5	8.1	7.7	7.1	7.8	N/S	N/S	N/S	7.9	7.5	7.8	7.7	7.2	7.9	8	7.3	8.3	8.3				
Color True	5 Col.Unit	140	150	400	60	100	150	N/S	N/S	N/S	50	100	200	50	100	300	70	200	60	200				
Specific Conductance	1 µS/cm	135	68	176	240	111	277	N/S	N/S	N/S	272	149	224	150	81	196	309	157	376	377				
Residue Nonfilterable (TSS)	4 mg/L	40	49	696	< 4	4	49	N/S	N/S	N/S	14	33	76	36	188	780	N/S	N/S	132	56				
Residue Filterable 1.0µ (TDS)	10 mg/L	156	126	316 (1)	174	102	200	N/S	N/S	N/S	170	106	148	110	88	166	246	122	266	270				
Turbidity	0.1 NTU	35.3	52.6	1450	4.86	13.8	79	N/S	N/S	N/S	28.4	105	241	53	108	1540	19.2	48.8	327	330				
Hardness Total -T	mg/L	80.4	40.3	110	127	57	150	N/S	N/S	N/S	N/S	N/S	N/A	N/S	N/S	N/S	150	72	170	180				
Hardness Total -D	mg/L	78.2	38.2	97.3	130	56.4	147	N/S	N/S	N/S	150	73	120	85	42	110	150	72	170	180				
General Inorganics																								
Alkalinity Total as CaCO3	0.5 mg/L	63.4	27.8	82.4	117	48	125	N/S	N/S	N/S	130	63.5	98.5	70.8	34.2	92.2	152	69.3	177	178				
Cyanide (W.A.D)	0.0008 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S				
Sulfide Total	0.005 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S				
Anions																								
Bromide Dissolved	0.1 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S				
Chloride Dissolved	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S				
Fluoride Dissolved	0.09 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S				
Langelier Index	None	-0.3	-1.5	0	-0.1	-1.5	0.1	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S				
Saturation pH	pH units	8.3	9	8.1	7.8	8.6	7.7	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S				
Carbon																								
Organic Carbon - Total	0.5 mg/L	25.3	28.1	25.4	16.9	20.7	20.7	N/S	N/S	N/S	11	13	12	15.3	16	16	16	20	17	17				
Dissolved Organic Carbon	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S				
Inorganic Carbon	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S				
Nutrients																								
Total Kjeldahl Nitrogen (N)	mg/L	0.95	1.1	1.1	0.52	0.73	0.72	N/S	N/S	N/S	0.25	0.57	0.52	0.67	0.9	0.75	0.44	0.69	0.68	0.71				
Total Nitrogen	0.02 mg/L	0.96	1.16	1.13	0.52	0.78	0.72	N/S	N/S	N/S	0.543	0.864	0.809	0.76	1.15	0.92	0.46	0.72	0.72	0.73				
Total Organic Nitrogen (N)	mg/L	0.94	1.09	1.09	0.52	0.72	0.72	N/S	N/S	N/S	0.25	0.53	0.47	0.67	0.89	0.74	0.44	0.69	0.68	0.71				
Ammonia Nitrogen (N)	0.005 mg/L	0.006	0.011	0.008	< 0.005	0.008	< 0.005	N/S	N/S	N/S	0.005	0.032	0.05	0.008	0.011	0.013	<0.005	<0.005	<0.005	<0.005				
Nitrate Nitrogen Dissolved (N)	mg/L	0.005	0.056	0.033	< 0.002	0.048	0.002	N/S	N/S	N/S	0.12	0.15	0.12	0.09	0.25	0.17	<0.02	0.02	0.03	<0.02				
Nitrate+ Nitrite (N)	0.002 mg/L	0.009	0.064	0.04	0.002	0.05	0.004	N/S	N/S	N/S	0.29	0.299	0.286	0.088	0.248	0.002	0.026	0.028	0.034	0.016				
Nitrite Nitrogen (N)	0.002 mg/L	0.004	0.008	0.007	0.002	0.002	0.002	N/S	N/S	N/S	0.168	0.145	0.162	0.003	0.002	0.003	0.008	0.006	0.008	0.005				
Ortho-Phosphorus (P)	0.001 mg/L	0.005	0.006	0.003	0.005	0.009	0.008	N/S	N/S	N/S	0.005	0.006	0.004	0.004	0.005	0.004	0.005	0.009	0.004	0.003				
Phosphorus Total Dissolved (P)	0.002 mg/L	0.018	0.03	0.021	0.007	0.021	0.01	N/S	N/S	N/S	0.033	0.13	0.05	0.01	0.015	0.015	0.007	0.017	0.008	0.008				
Phosphorus Total (P)	0.002 mg/L	0.051	0.074	0.565	0.017	0.041	0.097	N/S	N/S	N/S	0.06	0.15	0.27	0.075	0.22	0.72	0.024	0.064	0.117	0.113				
Sulfate	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S				

Parameter	Unit	MDL	Sample Date and Locations																					
			Sep. 13, 2004							Oct. 25, 2004			Feb. 21, 2005			Apr. 06, 2005			Apr. 18, 2005			Aug. 16, 2005		
Total Metals																								
Aluminium	0.3	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Antimony	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Arsenic	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Barium	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Beryllium	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Bismuth	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Cadmium	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Calcium	0.05	mg/L	< 0.02	11.1	31.3	34.8	15.4	41.5	N/S	N/S	N/S	N/S	41.8	21.9	39.1	23.9	12.9	65.1	40	17.6	53.6	54.2		
Chromium	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Cobalt	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Copper	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Iron	0.005	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Lead	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Lithium	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Magnesium	0.05	mg/L	5.95	3.05	7.82	9.8	4.51	11.2	N/S	N/S	N/S	N/S	11.6	5.67	9.82	6.38	3.51	13.2	11.2	5.35	12.8	12.9		
Manganese	0.008	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Molybdenum	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Nickel	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Selenium	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Silver	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Sodium	0.05	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Strontium	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Thallium	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Tin	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Uranium	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Vanadium	0.06	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Zinc	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Dissolved Metals																								
Aluminium Dissolved	0.3	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Antimony Dissolved	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Arsenic Dissolved	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Barium Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Beryllium Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Bismuth Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Cadmium Dissolved	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Calcium Dissolved	0.05	mg/L	21.7	10.6	28.3	35.7	15.3	40.9	N/S	N/S	N/S	N/S	42.4	20.6	32.5	23.7	11.3	30	42.4	19.4	49.7	50.6		
Chromium Dissolved	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Cobalt Dissolved	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Copper Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Iron Dissolved	0.005	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Lead Dissolved	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Lithium Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Magnesium Dissolved	0.05	mg/L	5.82	2.86	6.46	10	4.42	11	N/S	N/S	N/S	N/S	11.9	5.19	8.7	6.33	3.31	7.57	11.5	5.72	12	12.2		
Manganese Dissolved	0.008	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Molybdenum Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Nickel Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Selenium Dissolved	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Silver Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Strontium Dissolved	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Thallium Dissolved	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Tin Dissolved	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Uranium Dissolved	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Vanadium Dissolved	0.06	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Zinc Dissolved	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Hydrocarbons																								
TEH Extraction-Water		date	2004-09-20	2004-09-20	2004-09-20	N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
EPHw C10-19	0.08	mg/L	< 0.08	< 0.08	< 0.08	N/S	N/S	N/S	N/S	N/S	N/S	N/S	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
EPHw C19-32	0.08	mg/L	< 0.08	< 0.08	< 0.08	N/S	N/S	N/S	N/S	N/S	N/S	N/S	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Oil & Grease Total	1	mg/L	< 1	< 1	< 1	N/S	N/S	N/S	N/S	N/S	N/S	N/S	< 1	< 1	N/S		2	2	N/S		2	2	2	3

Parameter	Unit	MDL	Sample Date and Locations																		
			Sep. 13, 2004			Oct. 25, 2004			Feb. 21, 2005			Apr. 06, 2005			Apr. 18, 2005			Aug. 16, 2005			
Pesticides																					
2,4-D	0.2	µg/L	N/S	N/S	<0.2	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<0.2	N/S	N/S	N/S	N/S
Silvex	0.05	µg/L	N/S	N/S	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S	N/S
2,4,5-T	0.05	µg/L	N/S	N/S	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S	N/S
Dicamba	0.2	µg/L	N/S	N/S	<0.2	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<0.2	N/S	N/S	N/S	N/S
MCPP	50	µg/L	N/S	N/S	<50	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<50	N/S	N/S	N/S	N/S
MCPA	50	µg/L	N/S	N/S	<50	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<50	N/S	N/S	N/S	N/S
Dichlorprop	0.05	µg/L	N/S	N/S	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S	N/S
Dinoseb	0.05	µg/L	N/S	N/S	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S	N/S
2,4-DB	0.05	µg/L	N/S	N/S	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S	N/S
Bomoxynil	0.5	µg/L	N/S	N/S	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<0.5	N/S	N/S	N/S	N/S
Picloram	0.05	µg/L	N/S	N/S	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S	N/S
Diclofop methyl	0.2	µg/L	N/S	N/S	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	<0.2	N/S	N/S	N/S	N/S

1 = "present" = positive result for both markers

2 = "absent" = fecal contamination from this species detected

3 = "potential" = positive result for one marker only (old material or caused by one animal

4 = "Yes" under bacteroides = bacteroides used to source track are in general present. "No" = they are not.

Dup = Duplicate sample

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination >5 x DL

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Date and Locations									
			Sep. 13, 2004		Oct. 25, 2004		Feb. 21, 2005		Apr. 18, 2005		Aug. 16, 2005	
			H1	O1	H1	O1	H1	O1	H1	O1	H1	O1
Field Data												
Specific Conductance	µS/cm		280	276	394	411	N/S	N/S	311	315	481	470
Temp in Stream	°C		6.8/7.1	6.3/5.6/6.2	0.8/0.1	0.0/0.5/-0.2	N/S	N/S	3.1/3.2	0.8/0.2	11.1/11.8	10.5/11.1
Turbidity	NTU		482/485	684/687	30.5/29.6	42/37	N/S	N/S	614/605	743/714	169/173	69.3/67.4
pH			7.4	7	8.6	8.5	N/S	N/S	8.2	8.2	8.3	8.3
Diss. Oxygen	mg/L		11.7	10.8	12.9	13	N/S	N/S	12.4	12.7	10.2	10.4
Lab Data												
Biological												
E.coli	1	CFU/100m	70	22	5	<1	N/S	N/S	50	10	40	28
Enterococci	1	CFU/100m	8	42	6	1	N/S	N/S	<10	<10	110	58
Fecal Coliforms	1	CFU/100m	82	32	11	<1	N/S	N/S	40	10	44	30
Fecal Streptococci	1	CFU/100m	82	46	21	9	N/S	N/S	10	<10	210	64
Physical												
Temperature Arrival	0	Celsius	3	3	1	1	N/S	N/S	5	5	7	7
pH	0.1	pH units	8.3	8.3	8.1	8.1	N/S	N/S	8.2	8.2	8.4	8.4
Color True	5	Col.Unit	140	140	40	30	N/S	N/S	100	50	50	40
Specific Conductance	1	µS/cm	286	280	392	409	N/S	N/S	307	310	471	459
Residue Nonfilterable (TSS)	4	mg/L	242	440	14	24	N/S	N/S	296	496	47	30
Residue Filterable 1.0u (TDS)	10	mg/L	218	220	246	250	N/S	N/S	204	186	394	302
Turbidity	0.1	NTU	328	451	26.5	31.5	N/S	N/S	456	572	124	57.1
Hardness Total -T		mg/L	165	169	222	229	N/S	N/S	N/S	N/S	260	250
Hardness Total -D		mg/L	158	156	224	234	N/S	N/S	180	180	260	250
General Inorganics												
Alkalinity Total as CaCO3	0.5	mg/L	140	144	198	214	N/S	N/S	153	163	259	255
Cyanide (W.A.D)	0.0008	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Sulfide Total	0.005	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Anions												
Bromide Dissolved	0.1	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Chloride Dissolved	0.5	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Fluoride Dissolved	0.09	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Langelier Index		None	0.7	0.7	0.7	0.8	N/S	N/S	N/S	N/S	N/S	N/S
Saturation pH		pH units	7.6	7.6	7.4	7.3	N/S	N/S	N/S	N/S	N/S	N/S
Carbon												
Organic Carbon - Total	0.5	mg/L	19.5	17.8	13.6	12.3	N/S	N/S	11	11	18	14
Dissolved Organic Carbon	0.5	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Inorganic Carbon	0.5	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Nutrients												
Total Kjeldahl Nitrogen (N)		mg/L	0.74	0.67	0.5	0.38	N/S	N/S	0.71	0.44	0.66	0.48
Total Nitrogen	0.02	mg/L	0.74	0.68	0.5	0.38	N/S	N/S	0.78	0.5	0.68	0.49
Total Organic Nitrogen (N)		mg/L	0.74	0.67	0.5	0.38	N/S	N/S	0.71	0.44	0.66	0.47
Ammonia Nitrogen (N)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	N/S	N/S	0.008	<0.005	<0.005	0.012
Nitrate Nitrogen Dissolved (N)		mg/L	0.005	0.003	< 0.002	< 0.002	N/S	N/S	0.07	0.06	<0.02	<0.02
Nitrate+Nitrite (N)	0.002	mg/L	0.008	0.007	< 0.002	< 0.002	N/S	N/S	0.07	0.059	0.016	0.014
Nitrite Nitrogen (N)	0.002	mg/L	0.003	0.004	< 0.002	< 0.002	N/S	N/S	<0.002	<0.002	0.007	0.006
Ortho-Phosphorus (P)	0.001	mg/L	0.005	0.005	0.003	0.002	N/S	N/S	0.004	0.002	0.003	0.004
Phosphorus Total Dissolved (P)	0.002	mg/L	0.009	0.007	0.008	0.007	N/S	N/S	0.013	0.006	0.007	0.005
Phosphorus Total (P)	0.002	mg/L	0.134	0.123	0.04	0.056	N/S	N/S	0.31	0.45	0.068	0.043
Sulfate	0.5	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Total Metals												
Aluminium	0.3	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Antimony	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Arsenic	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Barium	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Beryllium	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Bismuth	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Cadmium	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Calcium	0.05	mg/L	47.4	48.6	63	65	N/S	N/S	65.5	76.7	70.8	67.4
Chromium	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Cobalt	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Copper	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Iron	0.005	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Lead	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Lithium	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Magnesium	0.05	mg/L	11.3	11.6	15.8	16.1	N/S	N/S	14.6	16.7	17.5	15.9
Manganese	0.008	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Molybdenum	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Nickel	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S

Parameter	Unit	MDL	Sample Date and Locations									
			Sep. 13, 2004		Oct. 25, 2004		Feb. 21, 2005		Apr. 18, 2005		Aug. 16, 2005	
			H1	O1	H1	O1	H1	O1	H1	O1	H1	O1
Selenium	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Silver	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Sodium	0.05	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Strontium	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Thallium	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Tin	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Uranium	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Vanadium	0.06	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Zinc	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Dissolved Metals												
Aluminium Dissolved	0.3	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Antimony Dissolved	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Arsenic Dissolved	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Barium Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Beryllium Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Bismuth Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Cadmium Dissolved	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Calcium Dissolved	0.05	mg/L	45.6	44.9	63.5	66.7	N/S	N/S	50.4	51.2	75.1	74
Chromium Dissolved	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Cobalt Dissolved	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Copper Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Iron Dissolved	0.005	mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Lead Dissolved	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Lithium Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Magnesium Dissolved	0.05	mg/L	10.8	10.6	15.9	16.5	N/S	N/S	12.1	12.8	18.2	16.9
Manganese Dissolved	0.008	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Molybdenum Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Nickel Dissolved	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Selenium Dissolved	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Silver Dissolved	0.02	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Strontium Dissolved	0.005	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Thallium Dissolved	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Tin Dissolved	0.01	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Uranium Dissolved	0.002	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Vanadium Dissolved	0.06	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Zinc Dissolved	0.1	µg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Hydrocarbons												
TEH Extraction-Water		date	2004-09-20	2004-09-20	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
EPHw C10-19	0.08	mg/L	< 0.08	< 0.08	N/S	N/S	N/S	N/S	<0.08	<0.08	<0.08	<0.08
EPHw C19-32	0.08	mg/L	< 0.08	< 0.08	N/S	N/S	N/S	N/S	<0.08	<0.08	<0.08	<0.08
Oil & Grease Total	1	mg/L	< 1	< 1	N/S	N/S	N/S	N/S	<1	<1	3	2
Pesticides												
2,4-D	0.2	µg/L	<0.2	<0.2	N/S	N/S	N/S	N/S	<0.2	N/S	N/S	N/S
Silvex	0.05	µg/L	<0.05	<0.05	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S
2,4,5-T	0.05	µg/L	<0.05	<0.05	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S
Dicamba	0.2	µg/L	<0.2	<0.2	N/S	N/S	N/S	N/S	<0.2	N/S	N/S	N/S
MCPP	50	µg/L	<50	<50	N/S	N/S	N/S	N/S	<50	N/S	N/S	N/S
MCPA	50	µg/L	<50	<50	N/S	N/S	N/S	N/S	<50	N/S	N/S	N/S
Dichlorprop	0.05	µg/L	<0.05	<0.05	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S
Dinoseb	0.05	µg/L	<0.05	<0.05	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S
2,4-DB	0.05	µg/L	<0.05	<0.05	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S
Bromoxynil	0.5	µg/L	<0.05	<0.05	N/S	N/S	N/S	N/S	<0.5	N/S	N/S	N/S
Picloram	0.05	µg/L	<0.05	<0.05	N/S	N/S	N/S	N/S	<0.05	N/S	N/S	N/S
Diclofop methyl	0.2	µg/L	<0.05	<0.05	N/S	N/S	N/S	N/S	<0.2	N/S	N/S	N/S

1 = "present" = positive result for both markers

2 = "absent" = fecal contamination from this species detected

3 = "potential" = positive result for one marker only (old material or caused by one animal)

4 = "Yes" under bacteroides = bacteroides used to source track are in general present. "No" = they are not.

Dup = Duplicate sample

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination >5 x DL

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

Table B9: 2004/05 sample parameters and analysis results for the Hourglas and Jackpine Creeks

(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Date and Locations									
			Sep. 13, 2004		Oct. 25, 2004		Feb. 21, 2005		Apr. 18, 2005		Aug. 16, 2005	
			G1	J1	G1	J1	G1	J1	G1	J1	G1	J1
Field Data												
Specific Conductance	µS/cm		238	354	1001??	420	N/S	N/S	326	368	392	466
Temp in Stream	°C		8.8/8.8/7.8	7.3/7.1	0.0/-0.2	0.0/-0.2	N/S	N/S	1.1/0.1	0.6/0.1	8.7/9.3	8.8/9.4
Turbidity	NTU		217/216	276/294	67.7/62.9	66.5/65.4	N/S	N/S	155/164	272/263	35.1/34.9	64.9/65.4
pH			7.2	8.3	8.2	8.4	N/S	N/S	8.3	8.3	8.4	8.4
Diss. Oxygen	mg/L		10.8	10.7	13.1	12.9	N/S	N/S	12.7	12.6	10.8	10.7
Lab Data												
Biological												
E.coli	1 CFU/100m	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Enterococci	1 CFU/100m	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Fecal Coliforms	1 CFU/100m	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Fecal Streptococci	1 CFU/100m	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Physical												
Temperature Arrival	0 Celsius		3	3	1	1	N/S	N/S	5	5	7	7
pH	0.1 pH units		8.3	8.4	8.1	8.1	N/S	N/S	8.3	8.3	8.4	8.4
Color True	5 Col.Unit		70	70	20	30	N/S	N/S	40	250	15	40
Specific Conductance	1 µS/cm		243	362	315	417	N/S	N/S	325	368	386	453
Residue Nonfilterable (TSS)	4 mg/L		150	345	60	183	N/S	N/S	147	170	20	N/S
Residue Filterable 1.0u (TDS)	10 mg/L		158	240	184	234	N/S	N/S	190	224	230	338
Turbidity	0.1 NTU		170	213	109	87.7	N/S	N/S	148	219	33	56.5
Hardness Total -T	mg/L		141	207	172	225	N/S	N/S	N/S	N/S	180	220
Hardness Total -D	mg/L		133	201	176	228	N/S	N/S	190	210	180	220
General Inorganics												
Alkalinity Total as CaCO3	0.5 mg/L		129	198	171	225	N/S	N/S	175	198	215	260
Cyanide (W.A.D)	0.0008 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Sulfide Total	0.005 mg/L	N/S	< 0.005	< 0.005	< 0.005	< 0.005	N/S	N/S	<0.005	<0.005	0.006	0.035
Anions												
Bromide Dissolved	0.1 mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	N/S	N/S	<0.1	<0.1	<0.1	<0.1
Chloride Dissolved	0.5 mg/L		1.1	< 0.5		0.9	0.5	N/S	N/S	1.3	<0.5	0.5
Fluoride Dissolved	0.09 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Langelier Index	None		0.6	1	0.6	0.8	N/S	N/S	N/S	N/S	0.6	N/S
Saturation pH	pH units		7.7	7.4	7.5	7.3	N/S	N/S	N/S	N/S	7.5	N/S
Carbon												
Organic Carbon - Total	0.5 mg/L		12.6	14.6	7.8	9.4	N/S	N/S	6.6	8.2	7.7	12
Dissolved Organic Carbon	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Inorganic Carbon	0.5 mg/L	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Nutrients												
Total Kjeldahl Nitrogen (N)	mg/L		0.4	0.45	0.25	0.33	N/S	N/S	0.23	0.39	0.21	0.38
Total Nitrogen	0.02 mg/L		0.4	0.45	0.24	0.32	N/S	N/S	0.24	0.4	0.23	0.39
Total Organic Nitrogen (N)	mg/L		0.4	0.45	0.25	0.33	N/S	N/S	0.22	0.39	0.21	0.38
Ammonia Nitrogen (N)	0.005 mg/L	< 0.005	< 0.005	< 0.005	< 0.005	N/S	N/S	0.007	<0.005	<0.005	<0.005	<0.005
Nitrate Nitrogen Dissolved (N)	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	N/S	N/S	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate+Nitrite (N)	0.002 mg/L	< 0.002	0.003	< 0.002	< 0.002	N/S	N/S	0.014	0.006	0.018	0.01	0.01
Nitrite Nitrogen (N)	0.002 mg/L	< 0.002	0.002	< 0.002	< 0.002	N/S	N/S	<0.002	<0.002	0.006	0.004	0.004
Ortho-Phosphorus (P)	0.001 mg/L		0.005	0.004	0.004	0.005	N/S	N/S	0.002	0.003	0.004	0.004
Phosphorus Total Dissolved (P)	0.002 mg/L	< 0.002		0.004	0.002	0.012	N/S	N/S	<0.002	0.005	<0.002	0.004
Phosphorus Total (P)	0.002 mg/L		0.117	0.096	0.067	0.089	N/S	N/S	0.14	0.21	0.018	0.064
Sulfate	0.5 mg/L		1.1	3.8	2.3	7.3	N/S	N/S	1.5	4.5	2.5	6.1
Total Metals												
Aluminium	0.3 µg/L		2980	2860	199	141	N/S	N/S	282	467	63.6	99.7
Antimony	0.005 µg/L		0.138	0.141	0.077	0.108	N/S	N/S	0.068	0.096	0.07	0.092
Arsenic	0.1 µg/L		0.7	1	0.3	0.4	N/S	N/S	0.5	0.9	0.4	0.6
Barium	0.02 µg/L		118	158	109	147	N/S	N/S	161	217	154	188
Beryllium	0.02 µg/L		0.1	0.09	< 0.02	< 0.02	N/S	N/S	0.05	0.06	<0.02	<0.02
Bismuth	0.02 µg/L		0.02	< 0.02	0.02	0.02	N/S	N/S	<0.02	<0.02	<0.02	<0.02
Cadmium	0.01 µg/L		0.04	0.04	0.02	0.03	N/S	N/S	0.14	0.22	0.03	0.06
Calcium	0.05 mg/L		41.5	59.5	51	64.3	N/S	N/S	66.3	75.1	60.6	67.3
Chromium	0.2 µg/L		3.9	4.5	< 0.2	< 0.2	N/S	N/S	<0.2	<0.2	<0.2	0.5
Cobalt	0.005 µg/L		0.572	0.596	0.125	0.159	N/S	N/S	0.506	0.844	0.17	0.286
Copper	0.05 µg/L		2.45	2.56	0.96	1.11	N/S	N/S	2.28	3.33	1.01	1.45
Iron	0.005 mg/L		1.12	1.46	0.486	0.424	N/S	N/S	N/S	N/S	N/S	N/S
Lead	0.01 µg/L		0.8	0.85	0.2	0.26	N/S	N/S	1.27	2.19	0.3	0.59
Lithium	0.05 µg/L		2.46	3.79	0.97	2.48	N/S	N/S	1.25	2.82	1.36	2.89
Magnesium	0.05 mg/L		8.96	14.2	10.9	15.7	N/S	N/S	13.8	17.3	12.6	16
Manganese	0.008 µg/L		37.6	23.5	44.2	19.4	N/S	N/S	69.7	83.6	42.8	30.7
Molybdenum	0.05 µg/L		0.37	0.52	0.45	0.46	N/S	N/S	0.42	0.62	0.59	0.77
Nickel	0.05 µg/L		2.93	3.28	0.46	1.08	N/S	N/S	1.57	2.83	0.64	1.33

Parameter	Unit	MDL	Sample Date and Locations									
			Sep. 13, 2004		Oct. 25, 2004		Feb. 21, 2005		Apr. 18, 2005		Aug. 16, 2005	
			G1	J1	G1	J1	G1	J1	G1	J1	G1	J1
Selenium	0.2 µg/L		0.3	0.5	< 0.2	< 0.2	N/S	N/S	0.3	0.4	<0.2	<0.2
Silver	0.02 µg/L		0.03	0.03	< 0.02	< 0.02	N/S	N/S	<0.02	<0.02	<0.02	<0.02
Sodium	0.05 mg/L		2.68	4.91	4.12	5.67	N/S	N/S	N/S	N/S	N/S	N/S
Strontium	0.005 µg/L		152	333	177	311	N/S	N/S	199	311	237	385
Thallium	0.002 µg/L		0.048	0.046	0.006	0.007	N/S	N/S	0.016	0.024	0.004	0.01
Tin	0.01 µg/L		0.08	0.08	0.01	0.02	N/S	N/S	0.02	<0.01	0.02	0.04
Uranium	0.002 µg/L		0.27	0.439	0.264	0.456	N/S	N/S	0.419	0.594	0.351	0.574
Vanadium	0.06 µg/L		8.63	8.26	0.69	0.65	N/S	N/S	1.12	1.98	0.39	0.75
Zinc	0.1 µg/L		5.4	5.5	0.7	0.8	N/S	N/S	3.7	6.8	1	2.2
Dissolved Metals												
Aluminium Dissolved	0.3 µg/L		9	5.8	3.9	3.5	N/S	N/S	5.1	5.8	3	4.1
Antimony Dissolved	0.005 µg/L		0.076	0.092	0.064	0.109	N/S	N/S	0.064	0.086	0.065	0.087
Arsenic Dissolved	0.1 µg/L		0.3	0.5	0.2	0.3	N/S	N/S	0.3	0.4	0.3	0.4
Barium Dissolved	0.02 µg/L		92.3	125	106	138	N/S	N/S	125	151	138	164
Beryllium Dissolved	0.02 µg/L		0.02	< 0.02	< 0.02	< 0.02	N/S	N/S	<0.02	<0.02	<0.02	<0.02
Bismuth Dissolved	0.02 µg/L		< 0.02	< 0.02	< 0.02	< 0.02	N/S	N/S	<0.02	<0.02	<0.02	<0.02
Cadmium Dissolved	0.01 µg/L		< 0.01	< 0.01	< 0.01	0.01	N/S	N/S	<0.01	0.01	<0.01	<0.01
Calcium Dissolved	0.05 mg/L		39.1	57.7	52.4	65.3	N/S	N/S	55.9	60.5	54.3	62.5
Chromium Dissolved	0.2 µg/L		0.3	0.9	< 0.2	< 0.2	N/S	N/S	<0.2	<0.2	<0.2	<0.2
Cobalt Dissolved	0.005 µg/L		0.1	0.104	0.047	0.077	N/S	N/S	0.039	0.058	0.042	0.048
Copper Dissolved	0.05 µg/L		1.27	1.23	0.69	0.83	N/S	N/S	1	1.06	0.71	0.9
Iron Dissolved	0.005 mg/L		0.048	0.04	0.046	0.031	N/S	N/S	N/S		N/S	N/S
Lead Dissolved	0.01 µg/L		0.04	0.02	0.02	0.01	N/S	N/S	0.03	0.03	0.02	0.02
Lithium Dissolved	0.05 µg/L		0.61	1.8	0.89	2.46	N/S	N/S	0.97	2.2	0.94	2.53
Magnesium Dissolved	0.05 mg/L		8.57	13.9	11	15.7	N/S	N/S	11.9	14.7	11.1	15.4
Manganese Dissolved	0.008 µg/L		21.1	5.4	38	13.8	N/S	N/S	8.98	3.77	20.8	3.88
Molybdenum Dissolved	0.05 µg/L		0.28	0.42	0.33	0.47	N/S	N/S	0.33	0.5	0.48	0.63
Nickel Dissolved	0.05 µg/L		0.9	1.31	0.3	0.69	N/S	N/S	0.46	1.03	0.37	0.84
Selenium Dissolved	0.2 µg/L		0.3	0.4	< 0.2	< 0.2	N/S	N/S	0.4	0.3	<0.2	<0.2
Silver Dissolved	0.02 µg/L		< 0.02	< 0.02	< 0.02	< 0.02	N/S	N/S	<0.02	<0.02	<0.02	<0.02
Strontium Dissolved	0.005 µg/L		143	327	177	311	N/S	N/S	192	310	227	352
Thallium Dissolved	0.002 µg/L		0.004	0.006	0.003	0.004	N/S	N/S	0.003	0.006	<0.002	0.003
Tin Dissolved	0.01 µg/L		< 0.01	< 0.01	< 0.01	< 0.01	N/S	N/S	0.01	<0.01	0.01	0.02
Uranium Dissolved	0.002 µg/L		0.16	0.297	0.248	0.44	N/S	N/S	0.341	0.456	0.325	0.512
Vanadium Dissolved	0.06 µg/L		0.25	0.29	0.09	0.15	N/S	N/S	0.12	0.19	0.14	0.22
Zinc Dissolved	0.1 µg/L		< 0.1	< 0.1	< 0.1	< 0.1	N/S	N/S	<0.1	<0.1	<0.1	<0.1
Hydrocarbons												
TEH Extraction-Water		date	2004-09-20	2004-09-20	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
EPHw C10-19	0.08 mg/L		< 0.08	< 0.08	N/S	N/S	N/S	N/S	<0.08	<0.08	<0.08	<0.08
EPHw C19-32	0.08 mg/L		< 0.08	< 0.08	N/S	N/S	N/S	N/S	<0.08	<0.08	<0.08	<0.08
Oil & Grease Total	1 mg/L		1	< 1	N/S	N/S	N/S	N/S	<1	<1	2	1
Pesticides												
2,4-D	0.2 µg/L		<0.2	<0.2	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Silvex	0.05 µg/L		<0.05	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
2,4,5-T	0.05 µg/L		<0.05	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Dicamba	0.2 µg/L		<0.2	<0.2	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
MCP	50 µg/L		<50	<50	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
MCPA	50 µg/L		<50	<50	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Dichlorprop	0.05 µg/L		<0.05	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Dinoseb	0.05 µg/L		<0.05	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
2,4-DB	0.05 µg/L		<0.05	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Bomoxynil	0.5 µg/L		<0.05	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Picloram	0.05 µg/L		<0.05	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Diclofop methyl	0.2 µg/L		<0.05	<0.05	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S

1 = "present" = positive result for both markers

2 = "absent" = fecal contamination from this species detected

3 = "potential" = positive result for one marker only (old material or caused by one animal)

4 = "Yes" under bacteroides = bacteroides used to source track are in general present. "No" = they are not.

Dup = Duplicate sample

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination > 5 x DL

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

Table B10: 2004/05 sample parameters and analysis results for the Ministik Creek
(Exceedances of the provincial drinking water or aquatic life guidelines are marked as indicated in the footnote.)

Parameter	Unit	MDL	Sample Date and Locations					
			Sep. 13, 2004	Oct. 25, 2004	M1 (Dup)	Feb. 21, 2005	Apr. 18, 2005	Aug. 16, 2005
			M1	M1	M1 (Dup)	M1	M1	M1
Field Data								
Specific Conductance	µS/cm		242	296	N/S	N/S	233	356
Temp in Stream	°C		9.2/8.9	0.0/-0.1	N/S	N/S	0.1/1.6	10.2/11.1
Turbidity	NTU		34.4/33.7	12.9/10.5	N/S	N/S	51.9/54.9	8.91/8.47
pH			7.2	5.6??	N/S	N/S	8.0	8.3
Diss. Oxygen	mg/L		10.7	13.1	N/S	N/S	12.5	10
Lab Data								
Biological								
E.coli		1 CFU/100m	N/S	N/S	N/S	N/S	N/S	N/S
Enterococci		1 CFU/100m	N/S	N/S	N/S	N/S	N/S	N/S
Fecal Coliforms		1 CFU/100m	N/S	N/S	N/S	N/S	N/S	N/S
Fecal Streptococci		1 CFU/100m	N/S	N/S	N/S	N/S	N/S	N/S
Physical								
Temperature Arrival	0 Celsius		3	1	1	N/S	4	7
pH	0.1 pH units		8.3	7.9	8	N/S	8.2	8.3
Color True	5 Col.Unit		60	40	40	N/S	25	50
Specific Conductance	1 µS/cm		250	288	289	N/S	234	352
Residue Nonfilterable (TSS)	4 mg/L		38	8	8	N/S	40	5
Residue Filterable 1.0u (TDS)	10 mg/L		178	186	186	N/S	144	208
Turbidity	0.1 NTU		29.9	10.5	11	N/S	48.4	7.6
Hardness Total -T	mg/L		138	149	148	N/S	N/S	210
Hardness Total -D	mg/L		136	157	158	N/S	130	210
General Inorganics								
Alkalinity Total as CaCO3	0.5 mg/L		134	156	157	N/S	126	194
Cyanide (W.A.D)	0.0008 mg/L		N/S	N/S	N/S	N/S	N/S	N/S
Sulfide Total	0.005 mg/L		< 0.005	< 0.005	< 0.005 (1)	N/S	<0.005	0.006
Anions								
Bromide Dissolved	0.1 mg/L		< 0.1	< 0.1	< 0.1	N/S	<0.1	<0.1
Chloride Dissolved	0.5 mg/L		< 0.5	0.6	< 0.5	N/S	0.6	<0.5
Fluoride Dissolved	0.09 mg/L		N/S	N/S	N/S	N/S	N/S	N/S
Langlier Index	None		0.6	0.3	0.4	N/S	N/S	N/S
Saturation pH	pH units		7.7	7.6	7.6	N/S	N/S	N/S
Carbon								
Organic Carbon - Total	0.5 mg/L		23.4	15.7	16	N/S	12	20
Dissolved Organic Carbon	0.5 mg/L		N/S	N/S	N/S	N/S	N/S	N/S
Inorganic Carbon	0.5 mg/L		N/S	N/S	N/S	N/S	N/S	N/S
Nutrients								
Total Kjeldahl Nitrogen (N)	mg/L		0.63	0.51	0.5	N/S	0.49	0.6
Total Nitrogen	0.02 mg/L		0.63	0.51	0.49	N/S	0.5	0.62
Total Organic Nitrogen (N)	mg/L		0.63	0.51	0.5	N/S	0.48	0.6
Ammonia Nitrogen (N)	0.005 mg/L		< 0.005	< 0.005	< 0.005	N/S	0.007	<0.005
Nitrate Nitrogen Dissolved (N)	mg/L		< 0.002	< 0.002	< 0.002	N/S	<0.02	<0.02
Nitrate+Nitrite (N)	0.002 mg/L		0.002	< 0.002	< 0.002	N/S	0.008	0.012
Nitrite Nitrogen (N)	0.002 mg/L		0.003	< 0.002	< 0.002	N/S	0.002	0.005
Ortho-Phosphorus (P)	0.001 mg/L		0.004	0.004	0.002	N/S	0.004	0.001
Phosphorus Total Dissolved (P)	0.002 mg/L		0.011	0.01	0.009	N/S	0.012	0.005
Phosphorus Total (P)	0.002 mg/L		0.045	0.023	0.023	N/S	0.079	0.015
Sulfate	0.5 mg/L		< 0.5	0.9	0.9	N/S	0.8	1.3
Total Metals								
Aluminum	0.3 µg/L		467	136	149	N/S	465	36.7
Antimony	0.005 µg/L		0.053	0.052	0.057	N/S	0.05	0.087
Arsenic	0.1 µg/L		0.4	0.4	0.3	N/S	0.5	0.6
Barium	0.02 µg/L		71.2	73.6	73.7	N/S	94	115
Beryllium	0.02 µg/L		0.03	< 0.02	< 0.02	N/S	0.05	0.02
Bismuth	0.02 µg/L		< 0.02	< 0.02	< 0.02	N/S	<0.02	0.05
Cadmium	0.01 µg/L		< 0.01	0.01	0.01	N/S	0.05	0.01
Calcium	0.05 mg/L		39.6	42.5	42.6	N/S	39.5	51.9
Chromium	0.2 µg/L		0.8	< 0.2	< 0.2	N/S	<0.2	<0.2
Cobalt	0.005 µg/L		0.137	0.114	0.11	N/S	0.335	0.096
Copper	0.05 µg/L		0.66	0.52	0.5	N/S	1.2	0.98
Iron	0.005 mg/L		0.34	0.407	0.403	N/S	N/S	N/S
Lead	0.01 µg/L		0.14	0.07	0.07	N/S	0.56	0.1
Lithium	0.05 µg/L		1.75	1.89	1.85	N/S	1.86	2.49
Magnesium	0.05 mg/L		9.41	10.3	10.2	N/S	9.38	11.8
Manganese	0.008 µg/L		11.6	19.8	20.6	N/S	52.6	18.4
Molybdenum	0.05 µg/L		0.19	0.2	0.21	N/S	0.29	0.38
Nickel	0.05 µg/L		1.23	0.74	0.66	N/S	1.2	1.2

Parameter	Unit	MDL	Sample Date and Locations					
			Sep. 13, 2004	Oct. 25, 2004		Feb. 21, 2005	Apr. 18, 2005	Aug. 16, 2005
			M1	M1	M1 (Dup)	M1	M1	M1
Selenium	0.2	µg/L	0.2	< 0.2	< 0.2	N/S	0.2	<0.2
Silver	0.02	µg/L	< 0.02	< 0.02	< 0.02	N/S	<0.02	<0.02
Sodium	0.05	mg/L	5.55	6.93	7.05	N/S	N/S	N/S
Strontium	0.005	µg/L	173	171	175	N/S	150	233
Thallium	0.002	µg/L	0.008	0.003	0.003	N/S	0.009	0.002
Tin	0.01	µg/L	0.02	0.01	0.01	N/S	0.02	0.02
Uranium	0.002	µg/L	0.104	0.116	0.119	N/S	0.193	0.21
Vanadium	0.06	µg/L	1.35	0.49	0.52	N/S	1.4	0.31
Zinc	0.1	µg/L	0.9	0.5	0.5	N/S	2.8	<0.1
Dissolved Metals								
Aluminum Dissolved	0.3	µg/L	7.6	4.9	5	N/S	9.6	18.6
Antimony Dissolved	0.005	µg/L	0.047	0.051	0.048	N/S	0.041	0.07
Arsenic Dissolved	0.1	µg/L	0.4	0.4	0.4	N/S	0.3	0.5
Barium Dissolved	0.02	µg/L	68.4	70.6	71.7	N/S	77.1	115
Beryllium Dissolved	0.02	µg/L	< 0.02	< 0.02	< 0.02	N/S	<0.02	<0.02
Bismuth Dissolved	0.02	µg/L	< 0.02	< 0.02	< 0.02	N/S	<0.02	<0.02
Cadmium Dissolved	0.01	µg/L	< 0.01	< 0.01	< 0.01	N/S	<0.01	<0.01
Calcium Dissolved	0.05	mg/L	39	45.2	45.3	N/S	37.2	61.7
Chromium Dissolved	0.2	µg/L	< 0.2	< 0.2	< 0.2	N/S	<0.2	<0.2
Cobalt Dissolved	0.005	µg/L	0.083	0.083	0.089	N/S	0.078	0.066
Copper Dissolved	0.05	µg/L	0.49	0.43	0.43	N/S	0.52	0.94
Iron Dissolved	0.005	mg/L	0.108	0.237	0.25	N/S	N/S	N/S
Lead Dissolved	0.01	µg/L	0.02	0.03	0.03	N/S	0.05	0.04
Lithium Dissolved	0.05	µg/L	1.64	1.76	1.7	N/S	1.64	2.12
Magnesium Dissolved	0.05	mg/L	9.4	10.8	10.9	N/S	9.02	13.6
Manganese Dissolved	0.008	µg/L	8.45	18	18.2	N/S	7.23	3.87
Molybdenum Dissolved	0.05	µg/L	0.18	0.21	0.21	N/S	0.25	0.39
Nickel Dissolved	0.05	µg/L	0.9	0.64	0.61	N/S	0.6	1.12
Selenium Dissolved	0.2	µg/L	0.2	< 0.2	< 0.2	N/S	<0.2	<0.2
Silver Dissolved	0.02	µg/L	< 0.02	< 0.02	< 0.02	N/S	<0.02	<0.02
Strontium Dissolved	0.005	µg/L	174	170	174	N/S	141	235
Thallium Dissolved	0.002	µg/L	0.002	0.002	< 0.002	N/S	0.002	<0.002
Tin Dissolved	0.01	µg/L	< 0.01	0.01	< 0.01	N/S	0.01	0.01
Uranium Dissolved	0.002	µg/L	0.082	0.113	0.118	N/S	0.156	0.207
Vanadium Dissolved	0.06	µg/L	0.18	< 0.06	< 0.06	N/S	0.13	0.2
Zinc Dissolved	0.1	µg/L	< 0.1	0.1	< 0.1	N/S	<0.1	<0.1
Hydrocarbons								
TEH Extraction-Water		date	2004-09-20	N/S	N/S	N/S	N/S	N/S
EPHw C10-19	0.08	mg/L	< 0.08	N/S	N/S	N/S	<0.08	<0.08
EPHw C19-32	0.08	mg/L	< 0.08	N/S	N/S	N/S	<0.08	<0.08
Oil & Grease Total	1	mg/L	< 1	N/S	N/S	N/S	<1	1
Pesticides								
2,4-D	0.2	µg/L	<0.2	N/S	N/S	N/S	N/S	N/S
Silvex	0.05	µg/L	<0.05	N/S	N/S	N/S	N/S	N/S
2,4,5-T	0.05	µg/L	<0.05	N/S	N/S	N/S	N/S	N/S
Dicamba	0.2	µg/L	<0.2	N/S	N/S	N/S	N/S	N/S
MCP	50	µg/L	<50	N/S	N/S	N/S	N/S	N/S
MCPA	50	µg/L	<50	N/S	N/S	N/S	N/S	N/S
Dichlorprop	0.05	µg/L	<0.05	N/S	N/S	N/S	N/S	N/S
Dinoseb	0.05	µg/L	<0.05	N/S	N/S	N/S	N/S	N/S
2,4-DB	0.05	µg/L	<0.05	N/S	N/S	N/S	N/S	N/S
Bromoxynil	0.5	µg/L	N/S	N/S	N/S	N/S	N/S	N/S
Picloram	0.05	µg/L	N/S	N/S	N/S	N/S	N/S	N/S
Diclofop methyl	0.2	µg/L	N/S	N/S	N/S	N/S	N/S	N/S

(1) Lab spike failed due to matrix interference.

1 = "present" = positive result for both markers

2 = "absent" = fecal contamination from this species detected

3 = "potential" = positive result for one marker only (old material or caused by one animal

4 = "Yes" under bacteroides = bacteroides used to source track are in general present. "No" = they are not.

Dup = Duplicate sample

MDL = Method Detection Limit

N/S = Not sampled

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

yellow shaded value = exceeding the Working Water Quality Guidelines, but < 5x DL

bold italic = blank for this sample event shows contamination >5 x DL

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

Appendix C

2004-2005 Sediment Chemistry Data

Table C1: August 2005 Sediment sample parameters and analysis results for the Kiskatinaw main stem

(Exceedances of the provincial sediment guidelines are marked as indicated in the footnote.)

Parameter	MDL	Unit	Sample Date and Locations					
			K6	K5	K4	K3	K2	K1
Nutrients								
Total Phosphorus (P)	10	mg/kg	797	886	N/S	730	2640	N/S
Carbon								
Organic Carbon - Total	1000	mg/kg	14000	9800	N/S	14000	21000	N/S
Inorganic Carbon - Total	500	mg/kg	10800	18900	N/S	10800	9440	N/S
Carbon - Total	1000	mg/kg	25000	29000	N/S	25000	30000	N/S
Hydrocarbons								
EPHw C10-19	100	mg/kg	<100	<100	N/S	<100	<100	N/S
EPHw C19-32	100	mg/kg	<100	<100	N/S	<100	<100	N/S
Oil & Grease Total	100	ug/g	240	210	N/S	230	360	N/S
Surrogate Recovery: O-Terphenyl		%	106	106	N/S	106	101	N/S
Moisture								
Moisture	0.3	%	<u>32.8</u>	<u>23.6</u>	N/S	<u>23.6</u>	<u>44</u>	N/S
Pesticides								
Base Neutrals								
Diphenylamine	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Pentachloronitrobenzene	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Pronamide	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Chlorobenzenes								
Hexachlorobenzene	0.03	ug/g	<0.03	<0.03	N/S	<0.03	<0.03	N/S
FOOD GROUP PARAMETERS								
Bromophos	0.01	ug/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Chlorothalonil (Daconil)	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Dichlobenil	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Dicofol	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Malaoxon	0.1	ug/g	<0.1	<0.1	N/S	<0.1	<0.1	N/S
Phosalone	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Parameter								
2,4'-DDT	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
4,4'-DDE	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
4,4'-DDT	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
4,4'-methoxychlor	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
a-Chlordane	0.01	ug/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Azinophos methyl (Guthion)	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Bromacil	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Chlorpyrifos	0.01	ug/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Disulfoton (Di-Syston)	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Endosulfan I	0.1	ug/g	<0.1	<0.1	N/S	<0.1	<0.1	N/S
Endosulfan II	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
g-Chlordane	0.01	ug/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Mevinphos (Phosdrin)	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Parathion methyl	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Phorate (Thimet)	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Stirophos	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Organophosphorus Pest.								
Alachlor	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Atrazine	0.03	ug/g	<0.03	<0.03	N/S	<0.03	<0.03	N/S
Butylate	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Captan	0.1	ug/g	<0.1	<0.1	N/S	<0.1	<0.1	N/S
Chlorpropham	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Cyanazine (Bladex)	0.03	ug/g	<0.03	<0.03	N/S	<0.03	<0.03	N/S
Desethyl-atrazine	0.03	ug/g	<0.03	<0.03	N/S	<0.03	<0.03	N/S
Diazinon	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Dichloran	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Dimethoate	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Ethion	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Fenitrothion	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Fenthion	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Folpet	0.1	ug/g	<0.1	<0.1	N/S	<0.1	<0.1	N/S
Fonofos	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Malathion	0.01	ug/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Methamidophos	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Methidathion	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Metolachlor	0.02	ug/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Metribuzin (Sencor)	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Parathion	0.05	ug/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S

(Exceedances of the provincial sediment guidelines are marked as indicated in the footnote.)

Parameter	MDL	Unit	Sample Date and Locations					
			K6	K5	K4	K3	K2	K1
Phosmet	0.03	µg/g	<0.03	<0.03	N/S	<0.03	<0.03	N/S
Phosphamidon	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Prometryn	0.03	µg/g	<0.03	<0.03	N/S	<0.03	<0.03	N/S
Propazine	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Simazine	0.01	µg/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Terbufos	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Trifluralin	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Vinclozolin	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Organochlorine Pesticides								
a-BHC	0.01	µg/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Acephate	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Aldrin	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Aspon	0.01	µg/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Azinphos ethyl	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
b-BHC	0.01	µg/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Benfluralin	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Bromophos-ethyl	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Carbophenothion	0.01	µg/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Chlorbenside	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Chlorfenson(ovex)	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Chlorfenvinphos(e/z)	0.01	µg/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Chlormephos	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Chlorpyrifos-methyl	0.03	µg/g	<0.03	<0.03	N/S	<0.03	<0.03	N/S
Chlorthiophos	0.03	µg/g	<0.03	<0.03	N/S	<0.03	<0.03	N/S
Cyanophos	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Dacthal	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Demeton	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Desmetryn	0.03	µg/g	<0.03	<0.03	N/S	<0.03	<0.03	N/S
Diallate(e/z)	0.01	µg/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Dichlofenthion	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Dichlofluanid	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Dichlorvox + Naled	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Dicrotophos	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Dieldrin	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Dioxathion	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Endosulfan Sulfate	0.01	µg/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Endrin	0.1	µg/g	<0.1	<0.1	N/S	<0.1	<0.1	N/S
EPN	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Eptam	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Ethalfuralin	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Fensulfothion	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Heptachlor	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Hexazinone	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Iodofenphos	0.01	µg/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Isofenphos	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Lindane (BHC), gamma-	0.01	µg/g	<0.01	<0.01	N/S	<0.01	<0.01	N/S
Metalaxyl	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Mirex	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Nitrofen	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Omethoate	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Permethrin	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Pirimicarb	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Pirimiphos-ethyl	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Pirimiphos-methyl	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Procydon	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Profenophos	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Profluralin	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Pyrazophos	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Quinalophos	0.03	µg/g	<0.03	<0.03	N/S	<0.03	<0.03	N/S
Ronnel	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Sulfotepp	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Tecnazene	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Terbutylazine	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Terbutryne	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Tetradifon	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S
Tolylfluanid	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Triadimefon	0.05	µg/g	<0.05	<0.05	N/S	<0.05	<0.05	N/S
Triallate	0.02	µg/g	<0.02	<0.02	N/S	<0.02	<0.02	N/S

(Exceedances of the provincial sediment guidelines are marked as indicated in the footnote.)

Parameter	MDL	Unit	Sample Date and Locations					
			K6	K5	K4	K3	K2	K1
Surrogate Recovery (%)								
p,p'-DDE13C12 (sur.)		%	92	93	N/S	100	94	N/S
Phenoxy Acid Herbicides								
2,4,5-T	0.1	µg/g	<0.1	<0.1	N/S	<0.1	<0.1	N/S
2,4,5-TP (Silvex)	0.1	µg/g	<0.1	<0.1	N/S	<0.1	<0.1	N/S
2,4-D	0.1	µg/g	<0.1	<0.1	N/S	<0.1	<0.1	N/S
2,4-D (BEE)	0.2	µg/g	<0.2	<0.2	N/S	<0.2	<0.2	N/S
2,4-DB	0.1	µg/g	<0.1	<0.1	N/S	<0.1	<0.1	N/S
2,4-DP (Dichlorprop)	0.1	µg/g	<0.1	<0.1	N/S	<0.1	<0.1	N/S
Dicamba	0.2	µg/g	<0.2	<0.2	N/S	<0.2	<0.2	N/S
MCPA	0.2	µg/g	<0.2	<0.2	N/S	<0.2	<0.2	N/S
MCP	0.2	µg/g	<0.2	<0.2	N/S	<0.2	<0.2	N/S
Picloram	0.2	µg/g	<0.2	<0.2	N/S	<0.2	<0.2	N/S
Surrogate Recovery (%)								
2,4-Dichlorophenyl Acetic Acid		%	76	50	N/S	60	43	N/S
2,5-Dibromobenzoic Acid		%	66	45	N/S	56	40	N/S
4,4-Dibromobiphenyl		%	72	43	N/S	63	41	N/S
Particle Size Distribution								
<i>Entire sample:</i>								
>2.00 mm - gravel		%	0.01	0.04	N/S	0	0.24	N/S
0.053-2mm - sand		%	18.39	21.04	N/S	52.32	6.66	N/S
0.002-0.053mm - silt		%	49.19	69.87	N/S	37.2	32.08	N/S
<0.002mm clay		%	32.41	9.06	N/S	10.48	61.02	N/S
<i><2mm fraction:</i>								
0.053-2mm - sand		%	18.39	21.05	N/S	52.32	6.68	N/S
0.002-0.053mm - silt		%	49.2	69.89	N/S	37.2	32.16	N/S
<0.002mm clay		%	32.41	9.06	N/S	10.48	61.17	N/S

MDL = Method Detection Limit

bold italic = Lab Quality Assurance (QA) matrix spike recovery too low (matrix interference)

bold underlined = field duplicate Relative Percent Difference (RPD) > 25% for this sampling event and > 5 x DL

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

Table C2: August 2005 Sediment sample parameters and analysis results for Brassey Creek
(Exceedances of the provincial sediment guidelines are marked as indicated in the footnote.)

Parameter	MDL	Unit	Sample Locations	
			B1	B1 (Dup)
Nutrients				
Total Phosphorus (P)	10	mg/kg	N/S	N/S
Carbon				
Organic Carbon - Total	1000	mg/kg	10000	12000
Inorganic Carbon - Total	500	mg/kg	7550	6990
Carbon - Total	1000	mg/kg	18000	19000
Hydrocarbons				
EPHw C10-19	100	mg/kg	<100	<100
EPHw C19-32	100	mg/kg	<100	<100
Oil & Grease Total	100	µg/g	180	140
Surrogate Recovery: O-Terphenyl		%	106	106
Moisture				
Moisture	0.3	%	23.3	30.1
Pesticides				
Base Neutrals				
Diphenylamine	0.05	µg/g	<0.05	<0.05
Pentachloronitrobenzene	0.05	µg/g	<0.05	<0.05
Pronamide	0.05	µg/g	<0.05	<0.05
Chlorobenzenes				
Hexachlorobenzene	0.03	µg/g	<0.03	<0.03
FOOD GROUP PARAMETERS				
Bromophos	0.01	µg/g	<0.01	<0.01
Chlorothalonil (Daconil)	0.02	µg/g	<0.02	<0.02
Dichlobenil	0.05	µg/g	<0.05	<0.05
Dicofol	0.05	µg/g	<0.05	<0.05
Malaoxon	0.1	µg/g	<0.1	<0.1
Phosalone	0.05	µg/g	<0.05	<0.05
Parameter				
2,4'-DDT	0.02	µg/g	<0.02	<0.02
4,4'-DDE	0.05	µg/g	<0.05	<0.05
4,4'-DDT	0.02	µg/g	<0.02	<0.02
4,4'-methoxychlor	0.05	µg/g	<0.05	<0.05
α-Chlordane	0.01	µg/g	<0.01	<0.01
Azinophos methyl (Guthion)	0.05	µg/g	<0.05	<0.05
Bromacil	0.02	µg/g	<0.02	<0.02
Chlorpyrifos	0.01	µg/g	<0.01	<0.01
Disulfoton (Di-Syston)	0.02	µg/g	<0.02	<0.02
Endosulfan I	0.1	µg/g	<0.1	<0.1
Endosulfan II	0.02	µg/g	<0.02	<0.02
γ-Chlordane	0.01	µg/g	<0.01	<0.01
Mevinphos (Phosdrin)	0.05	µg/g	<0.05	<0.05
Parathion methyl	0.02	µg/g	<0.02	<0.02
Phorate (Thimet)	0.02	µg/g	<0.02	<0.02
Stirophos	0.02	µg/g	<0.02	<0.02
Organophosphorus Pest.				
Alachlor	0.05	µg/g	<0.05	<0.05
Atrazine	0.03	µg/g	<0.03	<0.03
Butylate	0.02	µg/g	<0.02	<0.02
Captan	0.1	µg/g	<0.1	<0.1
Chlorpropham	0.02	µg/g	<0.02	<0.02
Cyanazine (Bladex)	0.03	µg/g	<0.03	<0.03
Desethyl-atrazine	0.03	µg/g	<0.03	<0.03
Diazinon	0.02	µg/g	<0.02	<0.02
Dichloran	0.05	µg/g	<0.05	<0.05
Dimethoate	0.02	µg/g	<0.02	<0.02
Ethion	0.05	µg/g	<0.05	<0.05
Fenitrothion	0.02	µg/g	<0.02	<0.02
Fenthion	0.02	µg/g	<0.02	<0.02
Folpet	0.1	µg/g	<0.1	<0.1
Fonofos	0.05	µg/g	<0.05	<0.05
Malathion	0.01	µg/g	<0.01	<0.01
Methamidophos	0.05	µg/g	<0.05	<0.05
Methidathion	0.02	µg/g	<0.02	<0.02
Metolachlor	0.02	µg/g	<0.02	<0.02
Metribuzin (Sencor)	0.05	µg/g	<0.05	<0.05
Parathion	0.05	µg/g	<0.05	<0.05
Phosmet	0.03	µg/g	<0.03	<0.03
Phosphamidon	0.05	µg/g	<0.05	<0.05
Prometryn	0.03	µg/g	<0.03	<0.03

Parameter	MDL	Unit	Sample Locations	
			B1	B1 (Dup)
Propazine	0.02	µg/g	<0.02	<0.02
Simazine	0.01	µg/g	<0.01	<0.01
Terbufos	0.05	µg/g	<0.05	<0.05
Trifluralin	0.05	µg/g	<0.05	<0.05
Vinclozolin	0.02	µg/g	<0.02	<0.02
Organochlorine Pesticides				
a-BHC	0.01	µg/g	<0.01	<0.01
Acephate	0.05	µg/g	<0.05	<0.05
Aldrin	0.05	µg/g	<0.05	<0.05
Aspon	0.01	µg/g	<0.01	<0.01
Azinphos ethyl	0.05	µg/g	<0.05	<0.05
b-BHC	0.01	µg/g	<0.01	<0.01
Benfluralin	0.02	µg/g	<0.02	<0.02
Bromophos-ethyl	0.05	µg/g	<0.05	<0.05
Carbophenothion	0.01	µg/g	<0.01	<0.01
Chlorbenside	0.05	µg/g	<0.05	<0.05
Chlorfenson(ovex)	0.02	µg/g	<0.02	<0.02
Chlorfenvinphos(e/z)	0.01	µg/g	<0.01	<0.01
Chlormephos	0.05	µg/g	<0.05	<0.05
Chlorpyrifos-methyl	0.03	µg/g	<0.03	<0.03
Chlorthiophos	0.03	µg/g	<0.03	<0.03
Cyanophos	0.05	µg/g	<0.05	<0.05
Dacthal	0.05	µg/g	<0.05	<0.05
Demeton	0.02	µg/g	<0.02	<0.02
Desmetryn	0.03	µg/g	<0.03	<0.03
Diallate(e/z)	0.01	µg/g	<0.01	<0.01
Dichlofenthion	0.02	µg/g	<0.02	<0.02
Dichlofuanid	0.02	µg/g	<0.02	<0.02
Dichlorvox + Naled	0.05	µg/g	<0.05	<0.05
Dicrotophos	0.05	µg/g	<0.05	<0.05
Dieldrin	0.02	µg/g	<0.02	<0.02
Dioxathion	0.02	µg/g	<0.02	<0.02
Endosulfan Sulfate	0.01	µg/g	<0.01	<0.01
Endrin	0.1	µg/g	<0.1	<0.1
EPN	0.05	µg/g	<0.05	<0.05
Eptam	0.05	µg/g	<0.05	<0.05
Ethalfuralin	0.05	µg/g	<0.05	<0.05
Fensulfothion	0.02	µg/g	<0.02	<0.02
Heptachlor	0.02	µg/g	<0.02	<0.02
Hexazinone	0.05	µg/g	<0.05	<0.05
Iodofenphos	0.01	µg/g	<0.01	<0.01
Isofenphos	0.02	µg/g	<0.02	<0.02
Lindane (BHC), gamma-	0.01	µg/g	<0.01	<0.01
Metalaxyl	0.02	µg/g	<0.02	<0.02
Mirex	0.02	µg/g	<0.02	<0.02
Nitrofen	0.05	µg/g	<0.05	<0.05
Omethoate	0.05	µg/g	<0.05	<0.05
Permethrin	0.05	µg/g	<0.05	<0.05
Pirimicarb	0.05	µg/g	<0.05	<0.05
Pirimiphos-ethyl	0.02	µg/g	<0.02	<0.02
Pirimiphos-methyl	0.02	µg/g	<0.02	<0.02
Procymidone	0.05	µg/g	<0.05	<0.05
Profenophos	0.05	µg/g	<0.05	<0.05
Profluralin	0.02	µg/g	<0.02	<0.02
Pyrazophos	0.02	µg/g	<0.02	<0.02
Quinalophos	0.03	µg/g	<0.03	<0.03
Ronnel	0.05	µg/g	<0.05	<0.05
Sulfotepp	0.02	µg/g	<0.02	<0.02
Tecnazene	0.05	µg/g	<0.05	<0.05
Terbutylazine	0.02	µg/g	<0.02	<0.02
Terbutryne	0.02	µg/g	<0.02	<0.02
Tetradifon	0.02	µg/g	<0.02	<0.02
Tolylfluanid	0.05	µg/g	<0.05	<0.05
Triadimefon	0.05	µg/g	<0.05	<0.05
Triallate	0.02	µg/g	<0.02	<0.02
Surrogate Recovery (%)				
p,p'-DDE13C12 (sur.)		%	90	97

Parameter	MDL	Unit	Sample Locations	
			B1	B1 (Dup)
Phenoxy Acid Herbicides				
2,4,5-T	0.1	µg/g	<0.1	<0.1
2,4,5-TP (Silvex)	0.1	µg/g	<0.1	<0.1
2,4-D	0.1	µg/g	<0.1	<0.1
2,4-D (BEE)	0.2	µg/g	<0.2	<0.2
2,4-DB	0.1	µg/g	<0.1	<0.1
2,4-DP (Dichlorprop)	0.1	µg/g	<0.1	<0.1
Dicamba	0.2	µg/g	<0.2	<0.2
MCPA	0.2	µg/g	<0.2	<0.2
MCPP	0.2	µg/g	<0.2	<0.2
Picloram	0.2	µg/g	<0.2	<0.2
Surrogate Recovery (%)				
2,4-Dichlorophenyl Acetic Acid		%	67	80
2,5-Dibromobenzoic Acid		%	66	78
4,4-Dibromobiphenyl		%	63	72
Particle Size Distribution				
<i>Entire sample:</i>				
>2.00 mm - gravel		%	0.4	0.58
0.053-2mm - sand		%	58.66	51.53
0.002-0.053mm - silt		%	25.46	26.55
<0.002mm clay		%	15.49	21.35
<i><2mm fraction:</i>				
0.053-2mm - sand		%	58.9	51.83
0.002-0.053mm - silt		%	25.56	26.7
<0.002mm clay		%	15.55	21.47

MDL = Method Detection Limit

Dup = Duplicate sample

bold italic = Lab QA matrix spike recovery too low (matrix interference)

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

Table C3: August 2005 Sediment sample parameters and analysis results for Halfmoon and Oetate Creeks
(Exceedances of the provincial sediment guidelines are marked as indicated in the footnote.)

Parameter	MDL	Unit	Sample Locations	
			H1	O1
Carbon				
Organic Carbon - Total	1000	mg/kg	17000	20000
Inorganic Carbon - Total	500	mg/kg	5850	5480
Carbon - Total	1000	mg/kg	22000	26000
Hydrocarbons				
EPHw C10-19	100	mg/kg	<100	<100
EPHw C19-32	100	mg/kg	<100	<100
Oil & Grease Total	100	µg/g	190	240
Surrogate Recovery: O-Terphenyl		%	98	98
Moisture				
Moisture	0.3	%	34	37.7
Pesticides			N/S	N/S
Particle Size Distribution				
<i>Entire sample:</i>				
>2.00 mm - gravel		%	0.94	0.88
0.053-2mm - sand		%	38.41	49.26
0.002-0.053mm - silt		%	36.45	31.1
<0.002mm clay		%	24.19	18.76
<i><2mm fraction:</i>				
0.053-2mm - sand		%	38.78	49.7
0.002-0.053mm - silt		%	36.8	31.38
<0.002mm clay		%	24.42	18.93

MDL = Method Detection Limit

bold italic = Lab QA matrix spike recovery too low (matrix interference)

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

Table C4: August 2005 Sediment sample parameters and analysis results for Hourglass and Jackpine
(Exceedances of the provincial sediment guidelines are marked as indicated in the footnote.)

Parameter	MDL	Unit	Sample Locations	
			G1	J1
Carbon				
Organic Carbon - Total	1000	mg/kg	16000	13000
Inorganic Carbon - Total	500	mg/kg	13200	11900
Carbon - Total	1000	mg/kg	29000	25000
Hydrocarbons				
EPHw C10-19	100	mg/kg	<100	<100
EPHw C19-32	100	mg/kg	<100	<100
Oil & Grease Total	100	µg/g	170	310
Surrogate Recovery: O-Terphenyl		%	100	100
Moisture				
Moisture	0.3	%	23.8	26.6
Pesticides			N/S	N/S
Particle Size Distribution				
<i>Entire sample:</i>				
>2.00 mm - gravel		%	0.64	0
0.053-2mm - sand		%	45.24	35.86
0.002-0.053mm - silt		%	47.07	58.01
<0.002mm clay		%	7.05	6.13
<i><2mm fraction:</i>				
0.053-2mm - sand		%	45.53	35.86
0.002-0.053mm - silt		%	47.38	58.01
<0.002mm clay		%	7.09	6.13

MDL = Method Detection Limit

bold italic = Lab QA matrix spike recovery too low (matrix interference)

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines

Table C5: August 2005 Sediment sample parameters and analysis results for Ministik Creek
(Exceedances of the provincial sediment guidelines are marked as indicated in the footnote.)

Parameter	MDL	Unit	Sample Location
			M1
Carbon			
Organic Carbon - Total	1000	mg/kg	15000
Inorganic Carbon - Total	500	mg/kg	5290
Carbon - Total	1000	mg/kg	21000
Hydrocarbons			
EPHw C10-19	100	mg/kg	<100
EPHw C19-32	100	mg/kg	<100
Oil & Grease Total	100	µg/g	170
Surrogate Recovery: O-Terphenyl		%	100
Moisture			
Moisture	0.3	%	<u>30.3</u>
Pesticides			
			N/S
Particle Size Distribution			
<i>Entire sample:</i>			
>2.00 mm - gravel		%	2.16
0.053-2mm - sand		%	64.25
0.002-0.053mm - silt		%	22.68
<0.002mm clay		%	10.91
<i><2mm fraction:</i>			
0.053-2mm - sand		%	65.67
0.002-0.053mm - silt		%	23.18
<0.002mm clay		%	11.15

MDL = Method Detection Limit

bold italic = Lab QA matrix spike recovery too low (matrix interference)

bold underlined = field duplicate RPD > 25% for this sampling event and > 5 x DL

grey shaded value = exceeding the B.C. Approved and Working Water Quality Guidelines