WESTERN SILVER CORPORATION

ENVIRONMENTAL MONITORING PROGRAM UPDATE AND DATA SUMMARY – REVISION #1

CARMACKS COPPER PROJECT
YUKON TERRITORY

January 2006

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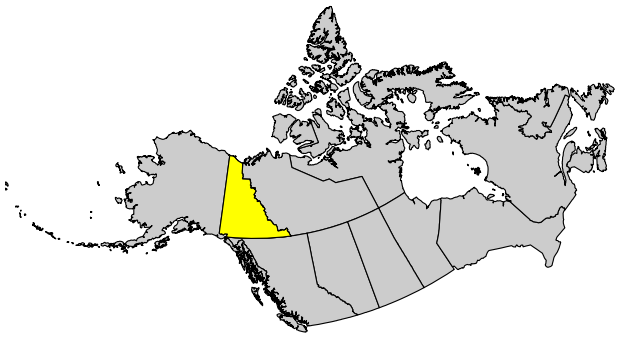
1.0 BACKGROUND & INTRODUCTION

The Carmacks Copper project is a proposed open pit copper mine and solvent extraction and electro winning (SX/EW) processing facility being developed by Western Silver Corporation (Western Silver). The orebody is located in the Yukon Territory (Figure 1), about 38 km northwest of the Village of Carmacks, or 192 km north of Whitehorse (Figure 2). The project site is located in the upper reaches of Williams Creek, approximately 9 km upstream of the confluence with the Yukon River. Williams Creek is a small tributary originating in the Dawson Range and draining northeast into the Yukon River downstream of Carmacks.

The Carmacks Copper project was originally presented to government for environmental assessment in 1995. An initial assessment of baseline environmental conditions was undertaken from 1992 to 1994, with periodic data collection in 1997 and 1999. The Project Description and Environmental Assessment Report (PD&EAR) was submitted to the Government of Yukon (June 2005) under the Yukon Environmental Assessment Act (YEAA). During the environmental assessment, concerns were raised with respect to the lack of current environmental baseline data and the need to demonstrate that the historic data can still be linked to present day information. As such, an environmental monitoring program was developed to update the baseline data to reflect current conditions at the site.

This report provides a summary of selected baseline studies previously completed as well as a discussion of the environmental monitoring program and planned efforts to update the baseline data for the site. Results from recent investigations have been included as appendices.



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Environmental Monitoring Program Update & Data Summary

Carmacks Copper Project Yukon Territory

Drawn By: HD/NS	**Figure 1**
Checked By: DC	Date: December, 2005

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Environmental Monitoring Program Update & Data Summary

Carmacks Copper Project Yukon Territory

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N

Hoochekoo Creek
Nancy Lee Creek
Williams Creek
McGregor Creek
Klondike Highway
Merrice Creek
Merrice Lake
Tatchun Lake
Tatchun River
Freegold Road
Yukon River
Crossing Creek
Murray Creek
Rowlinson Creek
Robert Campbell Highway
Carmacks

Legend:

- Town
- Ore Deposit
- Water Course
- Proposed Access Road
- Exploration Road
- Limited-used Road
- Road
- Trail
- Contour
- Water Body
- Environmental Assessment Study Area

UTM Zone 8 NAD83 Meters

Project Area Overview

Figure Number: **2**

Scale: 1:150,000

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Date: December, 2005	

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2.0 PREVIOUS INVESTIGATIONS

Results of previous baseline studies conducted at the Carmacks Copper property are summarized in the following sections.

2.1 WATER QUALITY SAMPLING

Monitoring station locations are described in Table 1 and shown in Figure 3.

Table 1 Monitoring Station Locations in the Williams Creek Watershed

Station	Description / Location
W-1	Tributary to Williams Creek
W-2	Williams Creek Downstream of W-1 Tributary
W-3	Tributary to Williams Creek - North Williams Creek (from Waste Rock Storage Area)
W-4	Williams Creek downstream of Confluence with W-3 Tributary
W-5	South East Tributary to Williams Creek
W-6	Williams Creek downstream of South East Tributary
W-7	Waste Rock Storage Area Tributary Near Road (Upstream of W-3)
W-8	Tributary to Williams Creek Near Access Road
W-9	Williams Creek Upstream of Access Road
W-10	Williams Creek Upstream of Yukon River
W-11	Nancy Lee Creek (Tributary of Williams Creek)
W-12	Williams Creek Downstream of Confluence with Nancy Lee Creek
W-13	Williams Creek Upstream of Confluence with Nancy Lee Creek

Samples have not been consistently collected from every location shown on Figure 3 due to the intermittent stream flow at some of the sites. Table 2 provides a listing of the sample stations and the dates when sampling occurred.

Reach 4: Average channel width of 4 m and gradient of 1.0% Pools - 30%; Riffles - 10%; Runs - 60%. Some undercut banks, some debris, overhanging vegetation. Bed material: fines - 80%; gravels - 20%; larges - 0%. No Fish.

Reach 2: NANCY LEE - Average channel width of 5 m and gradient of 1.5%. Pools - 20%; Riffles - 20%; Runs - 60%. Some debris with extensive overhanging vegetation. Bed material: fines - 20%; gravels - 40%; larges - 30%. No side channels. No Fish.

Reach 1: NANCY LEE - Average channel width of 7 m and gradient of 2.0%. Pools - 10%; Riffles - 10%; Runs - 80%. Some debris with extensive overhanging vegetation. Bed material: fines - 10%; gravels - 20%; larges - 70%. Bed rock out crops. No Fish.

Reach 3: Average channel width of 5 m and gradient of 2.5%. Pools - 20%; Riffles - 10%; Runs - 70%. Moderate undercut banks, some debris, overhanging vegetation. Bed material: fines - 30%; gravels - 20%; larges - 50%. No Fish.

Reach 2: Average channel width of 5 m and gradient of 1.5%. Pools - 20%; Riffles - 20%; Runs - 60%. Some debris with overhanging vegetation. Bed material: fines - 20%; gravels - 40%; larges - 30%. No side channels. No Fish.

Reach 1: Average channel width of 6 m and gradient of 1.5%. Pools - 30%; Riffles - 10%; Runs - 60%. Some undercut banks, some small debris, overhanging vegetation. Bed material: fines - 20%; gravels - 50%; larges - 30%. Chinook, Grayling, Sculpin, Sucker, Pike.

Yukon River Highest habitat capablilites in side channels. Moderate debris accumulations. Some undercut banks in side channels. High fines content. with largel cobble. Suspect low spawning capabilities, near confluence. Chinook, Grayling, Sculpins, Suckers.

R4 W9 MW-E MW-A MW-C MW-B MW-F Water Well MW-D W8 MW-K MW-J MW-G W7 MW-H W5 W1 MW-I W6 W2 W3 W4 R3 R2 R1 W13 W12 W11 W10

Merrice Creek
Merrice Lake
Williams Creek
Nancy Lee Creek
Yukon River
McGregor Creek
Klondike Highway #2

Environmental Monitoring Program Update & Data Summary

Carmacks Copper Project Yukon Territory

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Legend:

- Monitoring Well
- Sample Station
- Proposed Access Road
- Exploration Road
- Highway
- Contour
- Water Course
- Reach
- Water Body
- Environmental Assessment Study Area

Reach and Sample Site Locations obtained from:
"Western Copper Holding Williams Creek Copper Oxide Project Volume 1 Biophysical Assessment of the Williams Creek Mine Site"
Figure 3.6.1 Location of reach boundaries and summary of physical habitat chacteristics for the Williams Creek study area.

UTM Zone 8 NAD83 Meters

Monitoring Station Locations in the Williams Creek Watershed

Figure Number: **3**

Scale: 1:50,000

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Table 2 Sample Stations and Sampling Events Between 1989 and 2005

Sample Event	Sample Stations												
	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	W-11	W-12	W-13
Oct-89	yes	yes	yes	yes	yes	yes	yes	no flow	yes	no	no	no	no
Aug-91	yes	no flow	yes	yes	yes	no flow	yes	no flow	yes	yes	no	no	no
Dec-91	yes	no flow	no flow	yes	yes	no flow	yes	no flow	yes	yes	yes	no	no
May-92	yes	no flow	yes	yes	yes	no flow	yes	no flow	yes	yes	yes	no	no
Jul-92	yes	no flow	yes	yes	yes	no flow	yes	no flow	yes	yes	no	no	no
Oct-92	yes	no flow	yes	yes	yes	no flow	yes	no flow	yes	yes	yes	no	no
May-94	no	no	yes	yes	yes	no	yes	no flow	yes	no	no	no	no
Sep-97	no	no	yes	yes	no	no	no	no flow	yes	no	no	no	no
Oct-99	no	no	no	no	no	no	no	no flow	yes	yes	no	no	no
Aug-05	no flow	yes	yes	yes	no	no	yes	no flow	yes	no	no	no	no
Oct-05	no flow	yes	yes	yes	no	yes	yes	no flow	yes	yes	yes	yes	yes

Between October 1989 and October 1992, water samples were collected from Sites W-1, W-4, W-5, W-7, and W-9 on six occasions. Sites W-3 and W-10 were sampled five times during this period while single samples (October 1989) were collected from Sites W-2 and W-6. Site W-11 on Nancy Lee Creek was sampled three times. No samples were collected from W-8, W-12, and W-13.

Indian and Northern Affairs Canada undertook water quality sampling of Williams Creek in May 1994 at five of the established sample sites: W-3, W-4, W-5, W-7, and W-9.

In 1997 surface water quality samples were collected as part of a site investigation conducted by Access Consulting Group (Access). Samples were taken from stations W-3, W-4, and W-9.

Water samples were also collected from Williams Creek in 1999 by MDA Consulting. The samples were taken at the culvert for the access road near the west end of the camp and at the mouth of Williams Creek. These sample station locations are comparable to W9 and W10, respectively.

At each site, samples were collected and analyzed for physical parameters (pH, conductivity, total suspended solids, etc.), anions (alkalinity, sulphate, etc.), nutrients (ammonia, nitrate, nitrite, etc.), and total and dissolved metals.

Water quality data was collected from between 1989 and 1999 is presented in Appendix H of the PD&EAR.

2.2 SURFACE HYDROLOGY

Periodic flow data has been recorded at three locations on Williams Creek. Data from 1991 was obtained from a staff gauge located just downstream of the Williams Creek tributary where W-8 is located, near the access road. Data from 1992 was also obtained from a staff gauge located near W-9. 1993 and 1994 data was obtained using a Stevens automatic water level recorder located upstream of the confluence of north Williams Creek and Williams Creek. Monitoring locations and data are summarized in the report Hallam Knight Piésold Ltd. prepared in June 1995 entitled "Initial Environmental Evaluation Addendum."

2.3 HYDROGEOLOGY

Standpipe piezometer wells were installed at the Carmacks Copper site in 1992, 1995, and 1996 to measure groundwater levels and allow for the collection of water samples. In total, 36 piezometers were installed at the site between 1992 and 1996. The 1996 site investigation work included a program to investigate and establish the site hydrogeologic conditions. Standpipe piezometers were installed in drill holes to measure the water levels within specific intervals. Locations, completion details, monitoring record sheets, and falling head permeability calculation sheets for these piezometers are included in Knight and Piésold's report on "1996 Geotechnical and Hydrogeological Site Investigations."

2.4 SEDIMENT SAMPLING

Sediment samples were collected from six stations (W-4, W-9, W-10, W-11, W-12, and W-13) during the July 1992 survey. Duplicate sediment samples were collected from sites W-11, W-12, and W-13. Samples were collected from exposed portions of the bank, selecting the finest grained sediments available and analyzed for metal levels and

particle size. A composite sample was collected for three points of the channel cross section at Site W-10. The W-4 and W-9 samples were collected by selecting a composite of available sediments within a 10 m stretch of the stream bank.

A summary of the total metals analysis for sediment samples can be found in Appendix 3 of the "Initial Environmental Evaluation Volume I, Biophysical Assessment of the Williams Creek Mine Site" prepared by P.A. Harder and Associates Ltd. in 1994.

2.5 BENTHOS

Benthic invertebrate samples were collected from site W-10 in lower Williams Creek approximately 250 m upstream of the Yukon River confluence in 1991. This site was relocated approximately 1.2 km further upstream (W-12) during the 1992 study and two additional sites were also established; one site (W-13) was upstream of the Nancy Lee Creek confluence and the other site was in the lower reach of Nancy Lee Creek (W-11). Sample station locations are presented in Figure 3.

Benthic invertebrate samples were collected using three wire mesh basket samplers set at each site. Each basket was filled with cleaned rocks collected from the stream bottom. The baskets were secured in a deep run along an under-cut bank. The baskets were left to colonize over a five week period and then retrieved.

A summary of the benthic invertebrate data is found in Appendix 5 of P.A. Harder and Associates Ltd.'s "Initial Environmental Evaluation Volume I, Biophysical Assessment of the Williams Creek Mine Site."

2.6 FISHERIES INVESTIGATIONS

Between August 1991 and August 1992, three fisheries investigations including biophysical inventory, electrofishing, minnow traps, and spawning surveys, were completed to determine the distribution and abundance of fish in the project area. Williams Creek has been classified into four reaches based upon differing habitat characteristics. Figure 3 shows the location of reach boundaries and provides descriptions of the physical habitat characteristics for each reach. Results for the three

surveys are provided in P.A. Harder and Associates Ltd.'s "Initial Environmental Evaluation Volume I, Biophysical Assessment of the Williams Creek Mine Site."

2.7 WILDLIFE SURVEY

A wildlife field inspection was conducted in mid-August, 1992. Wildlife observations or signs recorded during the summer field reconnaissance and winter-spring observations are listed in P.A. Harder and Associates Ltd.'s "Initial Environmental Evaluation Volume I, Biophysical Assessment of the Williams Creek Mine Site." A fecal count survey was conducted in the project area in July 1994. Four transects were established at six locations. Pellets groups and scat were identified and quantified. Also, signs of ungulate browsing and all animal tracks were noted. Results from the survey are found in the Initial Environmental Evaluation Addendum to Volume 1 (Biophysical Assessment of the Carmacks Copper Mine Site) prepared by Hallam Knight Piésold Ltd. in 1994.

2.8 CLIMATE

Precipitation and temperature data were collected during the summer of 1992, and in 1994 Water Resources Division of DIAND established an automatic meteorological station at the site. The station monitors air and soil temperature, solar radiation, wind speed, and precipitation. The station is still being run by Government of Yukon, Water Resources Branch and continuous records are available from September 1994 to present, except where gaps occur due to equipment malfunctions.

3.0 ENVIRONMENTAL MONITORING PROGRAM – UPDATE

The following sections describe the ongoing and planned efforts to update baseline data for the Carmacks Copper site. Results from investigations completed in 2005 are also included.

3.1 WATER QUALITY SAMPLING

In August 2005, Access collected water samples from stations W-2, W-3, W-4, W-7, and W-9. In October 2005, the site was visited again and stations W-2, W-3, W-4, W-6, W-7, W-9, W-10, W-11, W-12, and W-13 were sampled for water quality. Samples were analyzed for physical parameters (pH, conductivity, total dissolved solids, etc.), anions (alkalinity, sulphate, etc.), nutrients (ammonia, nitrate, nitrite, etc.), and total and dissolved metals. A summary of compiled water quality data from 1989 to 2005 is included in Appendix A.

Further water quality monitoring programs are planned for late winter 2006 and spring, summer, and fall of 2006 at all stations. Two additional stations will be established in the Yukon River upstream and downstream of Williams Creek in spring 2006.

Environment Canada's "Guidance Document for the Sampling and Analysis of Metal Mining Effluents" will be adhered to where applicable.

3.2 SURFACE HYDROLOGY

During the water quality monitoring programs, flow will be recorded from each station. Data loggers at W-4 and W-10 will be re-established. Additionally, a winter low flow survey will take place in March 2006 in conjunction with the water quality survey.

Environment Canada's "Guidance Document for Flow Measurement of Metal Mining Effluents" will be adhered to where applicable.

3.3 HYDROGEOLOGY

A ground water survey is also planned to occur simultaneously with the water quality monitoring programs in the spring and fall of 2006. Standpipe piezometers have been installed at the following sites (Figure 3):

- Leach pad MW-A to E
- Water rock storage site MW-F to I
- Open pit MW-J and K

These standpipe piezometers will continue to be monitored for water level and ground water quality.

Protocols for monitoring will follow ASTM guides including the "Standard Guide for Sampling Ground-Water Monitoring Wells".

3.4 SEDIMENT SAMPLING

Sediment sampling was carried out concurrently with the August and October 2005 water quality sample programs. Samples collected in August 2005 were analyzed for total metals at the –10 and –100 mesh size fractions. In October, samples were collected in triplicate and analyzed for total organic and inorganic carbon, and total metals at the –100 mesh size fraction. Results of the sediment sample analysis for August and October 2005 are included in Appendix B.

Additional sediment sampling is again planned to take place at the same time as the fall 2006 water quality sampling program at all stations.

Environment Canada's "Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring" will be adhered to where applicable.

3.5 BENTHOS

Benthos sampling is planned for the summer of 2006. Benthic invertebrate samples will be collected using wire mesh basket samplers set at each site. Sample locations will include W-9 (Williams Creek control), W-11 (Nancy Lee Creek control), W-10, W-12, and

W-13. The basket will be filled with cleaned rocks collected from the stream bottom and secured in place. The baskets will be left to colonize over a five week period (end of July to beginning of September) and then retrieved.

Environment Canada's "Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring" will be adhered to where applicable.

3.6 FISHERIES INVESTIGATIONS

Fish and fish habitat investigations were conducted on October 16-18, 2005 at the same ten sample stations that were also sampled for water quality and sediments. Three gee traps were set at each site located in the lower Williams Creek watershed while only two traps were set at sites in the upper reaches near the mine site. All fish captured were identified, and enumerated. The summary report for this investigation is found in Appendix C. In general, fisheries utilization was consistent with results of previous fisheries investigations.

Another fisheries survey is planned for spring and summer of 2006 to reaffirm fish utilization in Williams Creek.

3.7 WILDLIFE SURVEY

A post-rut field survey took place on December 15, 2005 to study moose within the Carmacks Copper project area and to record other incidental observations of wildlife. The survey included the entire drainages of Merrice, Nancy Lee, and Williams Creek and included the adjacent tributaries and main stem of Hoochekoo and Crossing Creeks.

Moose tracks were evident in the upper reaches of all of the drainage basins flown. During three hours of flight survey a total of six (6) adult moose were observed in the sub alpine of Merrice Creek basin (5 adult male and 1 adult female). See Figure 4 for flight path and location of moose sightings and sign. No other wildlife was observed during the aerial survey.

Additional aerial surveys are planned to monitor the density and abundance of moose near the access road and mine site.

Environmental Monitoring Program Update & Data Summary

Carmacks Copper Project
Yukon Territory

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Hoochekoo Creek
McGregor Creek
Klondike Highway
Old Cabin
Williams Creek
End
Old Cabin
Merrice Creek
1 Mature Bull
2 Mature Bulls
1 Cow
2 Mature Bulls
Merrice Lake
Freegold Road
Crossing Creek
Tatchun River
Yukon River
Murray Creek
Start

Legend:

- Ore Deposit
- Moose Sighting
- Old Cabin (location approximate)
- Flight Lines
- Water Course
- Contour
- Road
- Proposed Access Road
- Exploration Road
- Limited-used Road
- Water Body
- Older Intermittent Moose Sign

UTM Zone 8 NAD83 Meters

2005 Moose Survey Results

Figure Number:

4

Scale:

1:150,000

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3.8 CLIMATE

Meteorological data continues to be collected by the GY Water Resources Branch. This data will be obtained to ensure data is kept up to date.

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Environmental Monitoring Program Update and Data Summary

Carmacks Copper Project
Yukon Territory

Appendix A

Summary of Water Quality Data Collected Between 1989 and 2005

Water Quality Data for Station W-1 (Tributary to Williams Creek) from 1989 to 1992

Parameter	Units	Sample Date						Average	Range	CCME Guidelines Freshwater Aquatic Life*
		Oct-89	Aug-91	Dec-91	May-92	Jul-92	Oct-92			
Physical Parameters										
pH		7.7	7.9	8.1	7.9	7.9	7.5	7.8	7.5 - 8.1	6.5 - 9.0
Conductivity	umho/cm	462	410	450	389	350	475	423	350 - 475	
Total Suspended Solids	mg/L	20	17	100	<5	12	33		BD - 100	
Turbidity	NTU	----	3	12	2	1	3	4.2	1 - 12	
Hardness as $CaCO_3$	mg/L	184.2	208	215	196	180	207	198.4	180 - 215	
Anions										
Alkalinity as $CaCO_3$	mg/L	53	119	125	115	142	140	116	53 - 142	
Chloride	mg/L	4.7	----	----	----	----	----			
Fluoride	mg/L	3.3	----	----	----	----	----			
Sulphate	mg/L	129	112	102	95	93.9	83.9	102.6	83.9 - 129	
Nutrients										
Ammonia-Nitrogen	mg/L	0.1	<0.05	<0.05	<0.05	<0.05	<0.05		BD - 0.1	1.04 - 2.33[1]
Nitrate-Nitrogen	mg/L	<0.1	<0.5	0.6	1.1	<0.2	0.6		BD - 1.1	
Nitrite-Nitrogen	mg/L	<0.003	<0.003	<5.0	<0.03	<2.0	<2.0		BD	0.06
Total Phosphorous	mg/L	----	----	0.05	0.005	0.011	0.049	0.029	0.005 - 0.05	
Total Metals										
Aluminum	mg/L	0.03	<0.005	----	<0.005	<0.005	0.091		BD - 0.091	0.005 - 0.1
Antimony	mg/L	<0.005	<0.05	<0.05	<0.02	<0.02	<0.02		BD	
Arsenic	mg/L	<0.02	<0.05	**0.16**	<0.04	<0.04	<0.05		BD - 0.16	0.005
Barium	mg/L	0.146	0.087	0.186	0.054	0.068	0.385	0.154	0.054 - 0.385	
Beryllium	mg/L	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02		BD	
Boron	mg/L	0.004	----	----	----	----	----			
Cadmium	mg/L	<0.0002	<0.0003	<0.0003	<0.0003	<0.0003	0.0004		BD - 0.0004	0.000017
Calcium	mg/L	55.3	64.4	63.9	59	59	62	60.6	55.3 - 64.4	
Chromium	mg/L	**0.0066**	**0.002**	**0.009**	<0.001	<0.001	**0.002**		BD - 0.009	0.001[2]
Cobalt	mg/L	<0.0005	<0.001	0.002	<0.001	<0.001	0.003		BD - 0.003	
Copper	mg/L	<0.0005	<0.001	<0.001	<0.001	<0.001	**0.008**		BD - 0.008	0.002 - 0.004
Iron	mg/L	0.181	0.038	0.244	0.1	0.099	0.152	0.136	0.038 - 0.244	0.3
Lead	mg/L	<0.002	<0.004	<0.004	<0.004	<0.004	<0.005		BD	0.001 - 0.007
Lithium	mg/L	0.26	<0.05	<0.05	<0.05	<0.05	<0.05		BD - 0.26	
Magnesium	mg/L	11.2	13.7	13.2	14	13.4	14.2	13.3	11.2 - 14.2	
Manganese	mg/L	<0.001	0.003	0.01	<0.001	<0.001	0.005		BD - 0.01	
Mercury	mg/L	<0.005	----	----	----	----	----			0.0001
Molybdenum	mg/L	0.015	0.021	0.025	0.022	0.015	0.023	0.020	0.015 - 0.025	0.073
Nickel	mg/L	0.0009	<0.001	0.005	<0.001	0.003	0.002		BD - 0.005	0.025 - 0.15
Phosphorous	mg/L	<0.05	0.02	0.06	0.03	<0.02	0.08		BD - 0.08	
Potassium	mg/L	1.1	1.27	1.18	1.22	1.1	1.51	1.23	1.1 - 1.51	
Selenium	mg/L	<0.005	<0.01	<0.01	<0.02	<0.02	<0.02		BD	0.001
Silicon	mg/L	4.42	7.5	2.7	6.43	8.72	9.52	6.55	2.7 - 9.52	
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001		BD	0.0001
Sodium	mg/L	4.42	10.9	8.8	9.34	8.91	11.4	8.96	4.42 - 11.4	
Strontium	mg/L	0.644	0.74	0.62	0.82	0.75	0.75	0.721	0.62 - 0.82	
Thorium	mg/L	<0.01	<0.02	<0.02	<0.005	<0.005	<0.01		BD	
Titanium	mg/L	<0.001	<0.001	0.01	0.001	<0.001	<0.001		BD - 0.01	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		BD	
Vanadium	mg/L	<0.0002	0.0059	<0.0005	<0.001	<0.001	0.015		BD - 0. 015	
Zinc	mg/L	**0.0476**	0.008	<0.001	0.005	0.002	0.01		BD - 0.0476	0.03
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD	
Dissolved Metals										
Aluminum	mg/L	----	<0.005	<0.005	<0.005	<0.005	<0.005		BD	
Antimony	mg/L	----	<0.05	<0.05	<0.02	<0.02	<0.02		BD	
Arsenic	mg/L	----	<0.05	0.120	<0.04	<0.04	<0.05		BD - 0.120	
Barium	mg/L	----	0.057	0.065	0.041	0.066	0.067	0.059	0.041 - 0.067	
Beryllium	mg/L	----	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02		BD	
Cadmium	mg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004		BD	
Calcium	mg/L	----	61.80	64.70	57.90	52.80	59.90	59.42	52.80 - 64.70	
Chromium	mg/L	----	<0.001	0.001	<0.001	<0.001	<0.001		BD - 0.001	
Cobalt	mg/L	----	<0.001	0.001	<0.001	<0.001	0.002		BD - 0.002	
Copper	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD	
Iron	mg/L	----	<0.005	0.080	0.080	0.090	<0.004		BD - 0.090	
Lead	mg/L	----	<0.004	<0.004	<0.004	<0.004	<0.005		BD	
Lithium	mg/L	----	<0.05	<0.05	<0.05	<0.05	<0.05		BD	
Magnesium	mg/L	----	13.10	13.00	12.40	11.60	13.90	12.80	11.60 - 13.90	
Manganese	mg/L	----	0.003	0.003	<0.001	<0.001	0.002		BD - 0.003	
Molybdenum	mg/L	----	0.024	0.023	0.019	0.014	0.021	0.020	0.014 - 0.024	
Nickel	mg/L	----	<0.001	0.002	<0.001	<0.001	<0.001		BD - 0.002	
Phosphorous	mg/L	----	<0.02	0.030	0.020	0.020	0.050		BD - 0.050	
Potassium	mg/L	----	1.190	1.040	0.990	1.100	1.450	1.154	0.990 - 1.450	
Selenium	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02		BD	
Silicon	mg/L	----	6.800	2.600	6.360	8.640	9.470	6.774	2.600 - 9.470	
Silver	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD	
Sodium	mg/L	----	10.000	9.640	8.260	8.600	10.900	9.480	8.260 - 10.900	
Strontium	mg/L	----	0.690	0.610	0.730	0.680	0.700	0.682	0.610 - 0.730	
Thorium	mg/L	----	<0.02	<0.02	<0.005	<0.005	<0.01		BD	
Titanium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD	
Uranium	mg/L	----	<0.02	<0.02	<0.02	<0.02	<0.02		BD	
Vanadium	mg/L	----	0.004	<0.0005	<0.001	<0.001	0.015		BD - 0.015	
Zinc	mg/L	----	0.006	<0.001	0.002	0.002	0.010		BD - 0.010	
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD	

Note: < Denotes that sample is below the laboratory detection limit

[1] Range is based on a average pH of 8.0 and a temperature range of 0 to 10°C

[2] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below detection

Water Quality Data for Station W-2 (Williams Creek D/S of W-1 Tributary) for 1989 and 2005

Parameter	Units	Sample Date			Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Aug-05	Oct-05			
In-Situ Parameters							
pH		----	----	8.0			6.5 - 9.0
Conductivity	umho/cm	----	----	260			
Physical Parameters							
pH		7.7	7.97	7.9	7.9	7.7 - 7.97	6.5 - 9.0
Conductivity	umho/cm	431	308	252	330.3	252 - 431	
Total Suspended Solids	mg/L	8	----	----			
Total Dissolved Solids	mg/L	----	170	140	155	140 - 170	
Hardness as $CaCO_3$	mg/L	133.1	144	123	133.4	133.1 - 144	
Anions							
Alkalinity as $CaCO_3$	mg/L	100	128	101	110	100 - 128	
Chloride	mg/L	3.6	0.9	1.1	2	0.9 - 3.6	
Fluoride	mg/L	1.1	----	----			
Sulphate	mg/L	76	31.6	29	45.5	29 - 76	
Nutrients							
Ammonia-Nitrogen	mg/L	0.06	<0.05	<0.05		<0.05 - 0.06	1.04 - 2.33[1]
Nitrate-Nitrogen	mg/L	<0.1	0.03	0.02		<0.1 - 0.03	
Nitrite-Nitrogen	mg/L	<0.003	<0.005	<0.005		BD	0.06
Total Phosphorous	mg/L	----	0.1	0.1	0.1		
Orthophosphate	mg/L	----	0.08	0.1	0.09	0.08 - 0.1	
Total Metals							
Aluminum	mg/L	<0.02	0.079	0.035		<0.02 - 0.079	0.005 - 0.1
Antimony	mg/L	<0.005	<0.0002	<0.0002		BD	
Arsenic	mg/L	<0.02	0.0006	0.0005		<0.02 - 0.0006	0.005
Barium	mg/L	0.035	0.043	0.033	0.037	0.035 - 0.043	
Beryllium	mg/L	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.0005	<0.0005		BD	
Boron	mg/L	<0.001	0.01	0.007		<0.001 - 0.01	
Cadmium	mg/L	<0.0002	<0.00001	<0.00001		BD	0.000017
Calcium	mg/L	44.2	39.8	34	39.3	34 - 44.2	
Chromium	mg/L	<0.0002	<0.0005	0.0005		<0.0002 - 0.0005	0.001[2]
Cobalt	mg/L	<0.0005	<0.001	<0.0001		BD	
Copper	mg/L	<0.0005	0.001	0.002		<0.0005 - 0.002	0.002 - 0.004
Iron	mg/L	**0.371**	**0.4**	0.3	0.357	0.371 - 0.4	0.3
Lead	mg/L	<0.002	<0.0001	<0.0001		BD	0.001 - 0.007
Lithium	mg/L	0.3	0.001	0.001	0.101	0.001 - 0.3	
Magnesium	mg/L	12.8	10.8	8.9	10.8	8.9 - 12.8	
Manganese	mg/L	0.068	0.026	0.029	0.041	0.026 - 0.068	
Mercury	mg/L	<0.005	----	----			0.0001
Molybdenum	mg/L	0.003	0.003	0.002	0.003	0.002 - 0.003	0.073
Nickel	mg/L	0.0015	0.0009	0.0008	0.0011	0.0008 - 0.0015	0.025 - 0.15
Phosphorous	mg/L	<0.05	----	----			
Potassium	mg/L	0.9	0.5	0.4	0.6	0.4 - 0.9	
Selenium	mg/L	<0.005	<0.0002	<0.0002		BD	0.001
Silicon	mg/L	3.99	8.39	8.37	6.92	3.99 - 8.39	
Silver	mg/L	<0.002	<0.0001	<0.0001		BD	0.0001
Sodium	mg/L	12.8	10.5	9.1	10.8	9.1 - 12.8	
Strontium	mg/L	0.444	0.396	0.322	0.387	0.322 - 0.444	
Titanium	mg/L	<0.001	0.0038	<0.0005		<0.0005 - 0.0038	
Uranium	mg/L	<0.02	<0.0005	<0.0005		BD	
Vanadium	mg/L	<0.0002	0.0015	0.0011		<0.0002 - 0.0015	
Zinc	mg/L	**0.033**	0.001	0.001	0.012	0.001 - 0.033	0.03
Zirconium	mg/L	----	<0.001	<0.001		BD	
Dissolved Metals							
Aluminum	mg/L		0.02	0.019	0.0195	0.019 - 0.02	
Antimony	mg/L		<0.0002	<0.0002		BD	
Arsenic	mg/L		0.0005	0.0005	0.0005	0.0005	
Barium	mg/L		0.03	0.034	0.032	0.03 - 0.034	
Beryllium	mg/L		<0.0001	<0.0001		BD	
Bismuth	mg/L		<0.0005	<0.0005		BD	
Boron	mg/L		0.003	0.005	0.004	0.003 - 0.005	
Cadmium	mg/L		<0.00001	<0.00001		BD	
Calcium	mg/L		38.1	32.9	35.500	32.9 - 38.1	
Chromium	mg/L		<0.0005	<0.0005		BD	
Cobalt	mg/L		<0.0001	<0.0001		BD	
Copper	mg/L		0.001	<0.001		BD - 0.001	
Iron	mg/L		0.34	0.25	0.295	0.25 - 0.34	
Lead	mg/L		<0.0001	<0.0001		BD	
Lithium	mg/L		<0.001	0.001		BD - 0.001	
Magnesium	mg/L		11.9	10	10.95	10 - 11.9	
Manganese	mg/L		0.005	0.019	0.012	0.005 - 0.019	
Molybdenum	mg/L		<0.001	0.002		BD - 0.002	
Nickel	mg/L		0.0007	<0.0005		BD - 0.0007	
Potassium	mg/L		0.6	0.4	0.500	0.4 - 0.6	
Selenium	mg/L		<0.0002	<0.0002		BD	
Silicon	mg/L		9.83	9.46	9.645	9.46 - 9.83	
Silver	mg/L		<0.0001	<0.0001		BD	
Sodium	mg/L		10.5	8.9	9.700	8.9 - 10.5	
Strontium	mg/L		0.141	0.32	0.231	0.141 - 0.32	
Titanium	mg/L		0.0014	0.0017	0.002	0.0014 - 0.0017	
Uranium	mg/L		<0.0005	<0.0005		BD	
Vanadium	mg/L		0.0006	0.0011	0.0009	0.0006 - 0.0011	
Zinc	mg/L		<0.001	<0.001		BD	

Note: < Denotes that sample is below the laboratory detection limit

[1] Range is based on a average pH of 8.0 and a temperature range of 0 to 10 °C

[2] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-3 (Tributary to Williams Creek, from WRSA) from 1989 to 2005

Parameter	Units	Sample Date									Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Aug-91	May-92	Jul-92	Oct-92	May-94	Sep-97	Aug-05	Oct-05			
In-Situ Parameters													
pH		----	----	----	----	----	----	7.4	----	8.5	7.95	7.4 - 8.5	6.5 - 9.0
Conductivity	umho/cm	----	----	----	----	----	----	200	330	320	283	200 - 330	
Physical Parameters													
pH		7.5	8.2	7.9	7.5	7.4	7.7	7.35	7.51	7.66	7.6	7.35 - 8.2	6.5 - 9.0
Conductivity	umho/cm	380	263	114	210	340	240	216	367	318	272.0	114 - 380	
Total Suspended Solids	mg/L	<5	<5	<5	<5	<5	<5	2	----	----		BD - 2	
Total Dissolved Solids	mg/L	----	----	----	----	----	188	----	210	180	192.7	180 - 210	
Turbidity	NTU	----	<1	1	1	<1	1	----	----	----		BD - 1	
Hardness as $CaCO_3$	mg/L	167.4	150	50.3	109	162	107.5	129	181	164	135.6	50.3 - 181	
Anions													
Alkalinity as $CaCO_3$	mg/L	130	153	57	152	160	112	159	177	143	138.1	57 - 177	
Hydroxide as $CaCO_3$	mg/L	----	----	----	----	----	<5	<1	<5	<5		BD	
Carbonate as $CaCO_3$	mg/L	----	----	----	----	----	<5	<1	<6	<6		BD	
Bicarbonate as $CaCO_3$	mg/L	----	----	----	----	----	112	159	216	174	165.3	112 - 216	
Chloride	mg/L	2.8	----	----	----	----	0.83	1.4	1.8	1.1	1.6	0.83 - 2.8	
Fluoride	mg/L	<1	----	----	----	----	<1	0.18	----	----		BD - 0.18	
Sulphate	mg/L	21	8.1	3.6	9.5	16.8	14	20	26	22	15.7	3.6 - 26	
Nutrients													
Ammonia-Nitrogen	mg/L	0.08	<0.05	<0.05	<0.05	0.07	<0.05	----	<0.05	<0.05		BD - 0.08	1.04 - 2.33[1]
Nitrate-Nitrogen	mg/L	<0.1	<0.1	<0.05	<0.2	<0.2	<0.05	0.017	<0.01	0.01		BD - 0.017	
Nitrite-Nitrogen	mg/L	<0.003	<0.003	<0.03	<2.0	<2	<0.5	0.001	<0.005	<0.005		BD - 0.001	0.06
Total Phosphorous	mg/L	----	----	0.02	0.013	0.01	0.008	----	<0.01	0.1		0.008 - 0.1	
Orthophosphate	mg/L	----	----	----	----	----	----	----	0.07	0.09	0.08	0.07 - 0.09	
Total Metals													
Aluminum	mg/L	<0.02	<0.005	0.091	0.067	0.03	0.04	**0.197**	0.037	0.01		BD - 0.197	0.005 - 0.1
Antimony	mg/L	<0.005	<0.05	<0.02	<0.02	<0.02	<0.02	0.00006	<0.0002	<0.0002		BD - 0.00006	
Arsenic	mg/L	<0.02	<0.05	<0.04	<0.04	<0.05	<0.02	0.0007	0.0004	0.0004		BD - 0.0007	0.005
Barium	mg/L	0.037	0.051	0.019	0.038	0.092	0.04	0.0429	0.047	0.042	0.0454	0.019 - 0.092	
Beryllium	mg/L	<0.0001	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	<0.001	----	----	----	----	----	0.003	0.006	0.005		BD - 0.006	
Cadmium	mg/L	<0.0002	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.00005	<0.00001	<0.00001		BD	0.000017
Calcium	mg/L	52.4	48.3	15	39.8	53.3	33.9	51.6	55.5	50.1	44.4	15 - 55.5	
Chromium	mg/L	**0.0024**	**0.009**	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005		BD - 0.0024	0.001[2]
Cobalt	mg/L	<0.0005	<0.001	<0.001	<0.001	0.002	<0.001	0.0002	<0.0001	<0.0001		BD - 0.002	
Copper	mg/L	<0.0005	<0.001	<0.001	**0.009**	**0.013**	**0.028**	0.0017	0.001	0.001		BD - 0.028	0.002 - 0.004
Iron	mg/L	0.084	0.088	0.171	0.172	0.261	**0.38**	**0.6**	0.2	0.1	0.228	0.084 - 0.6	0.3
Lead	mg/L	<0.002	<0.004	<0.004	<0.004	<0.005	<0.01	0.00015	<0.0001	<0.0001		BD - 0.00015	0.001 - 0.007
Lithium	mg/L	0.34	<0.05	<0.05	<0.05	<0.05	<0.002	<0.001	0.001	0.002		BD - 0.34	
Magnesium	mg/L	8.89	8.74	3.56	7.3	11.1	6	9.27	9.3	8.4	8.06	3.56 - 11.1	
Manganese	mg/L	0.57	0.004	0.004	0.159	0.361	0.124	0.293	0.128	0.132	0.197	0.004 - 0.57	
Mercury	mg/L	<0.005	----	----	----	----	----	<0.00005	----	----		BD	0.0001
Molybdenum	mg/L	<0.001	<0.005	<0.003	<0.003	<0.004	<0.005	0.00087	<0.001	<0.001		BD - 0.00087	0.073
Nickel	mg/L	0.0009	<0.001	<0.001	0.005	0.006	0.005	0.0014	0.0007	0.0007		BD - 0.007	0.025 - 0.15
Phosphorous	mg/L	<0.05	<0.02	0.03	0.03	0.03	<0.05	<0.3	----	----		BD - 0.1	
Potassium	mg/L	0.8	0.38	1.26	0.69	0.96	1.4	<2	0.5	0.5		BD - 1.4	
Selenium	mg/L	<0.005	<0.01	<0.02	<0.02	<0.02	<0.02	<0.001	<0.0005	<0.0002		BD	0.001
Silicon	mg/L	4.33	13	5.19	10.2	12.6	6.23	8.16	7.59	7.37	8.30	4.33 - 13	
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00001	<0.0001	<0.0001		BD	0.0001
Sodium	mg/L	7.32	8.06	2.36	6.44	8.51	5.41	8	8.2	7.3	6.84	2.36 - 8.51	
Strontium	mg/L	0.481	0.27	0.11	0.36	0.46	0.235	0.383	0.458	0.419	0.353	0.11 - 0.481	
Sulfur	mg/L	----	----	----	----	----	3.92	----	8.8	7.2	6.64	3.92 - 8.8	
Tin	mg/L	----	----	----	----	----	<0.01	<0.0001	<0.001	<0.001		BD	
Thallium	mg/L	----	----	----	----	----	----	<0.00005	<0.00005	<0.00005		BD	0.0008
Thorium	mg/L	<0.01	<0.02	<0.005	<0.005	<0.01	<0.01	----	----	----		BD	
Titanium	mg/L	<0.001	<0.001	0.002	<0.001	<0.001	0.005	<0.01	0.001	<0.0005		BD - 0.005	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	0.00028	<0.0005	<0.0005		BD - 0.00028	
Vanadium	mg/L	<0.0002	0.0032	<0.001	<0.001	0.006	<0.002	0.001	0.0006	0.0005		BD - 0.006	
Zinc	mg/L	**0.0523**	0.002	0.005	0.004	0.009	<0.005	0.002	0.001	<0.001		BD - 0.0523	0.03
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	----	<0.001	<0.001		BD	
Dissolved Metals													
Aluminum	mg/L	----	<0.005	0.046	0.066	<0.005	<0.01	0.011	<0.005	0.006		BD - 0.066	
Antimony	mg/L	----	<0.05	<0.02	<0.02	<0.02	<0.02	0.0001	<0.0002	<0.0002		BD - 0.0001	
Arsenic	mg/L	----	<0.05	<0.04	<0.04	<0.05	<0.02	0.0005	0.0004	0.0004		BD - 0.0005	
Barium	mg/L	----	0.05	0.017	0.036	0.046	0.039	0.0377	0.047	0.042	0.039	0.017 - 0.05	
Beryllium	mg/L	----	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	----	----	----	----	----	----	0.002	0.006	0.004	0.004	0.002 - 0.006	
Cadmium	mg/L	----	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.00005	<0.00001	<0.00001		BD	
Calcium	mg/L	----	45.8	14.4	33.6	46	33.9	49.2	55.6	51.4	41.2	14.4 - 55.6	
Chromium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005		BD	
Cobalt	mg/L	----	<0.001	<0.001	<0.001	0.002	<0.001	0.0001	<0.0001	<0.0001		BD - 0.002	
Copper	mg/L	----	<0.001	<0.001	<0.001	0.002	0.023	0.0015	<0.001	<0.001		BD - 0.023	
Iron	mg/L	----	0.064	0.11	0.11	0.26	0.16	0.07	0.08	0.08	0.117	0.064 - 0.26	
Lead	mg/L	----	<0.004	<0.004	<0.004	<0.005	<0.01	<0.00005	<0.0001	<0.0001		BD	
Lithium	mg/L	----	<0.05	<0.05	<0.05	<0.05	<0.002	<0.001	0.001	0.001		BD - 0.001	
Magnesium	mg/L	----	8.6	3.4	5.9	11.2	5.96	8.67	10.2	8.7	7.83	3.4 - 11.2	
Manganese	mg/L	----	0.004	0.002	0.154	0.36	0.097	0.305	0.106	0.116	0.143	0.002 - 0.36	
Molybdenum	mg/L	----	<0.005	<0.003	<0.003	<0.004	<0.005	0.00107	<0.001	<0.001		BD - 0.00107	
Nickel	mg/L	----	<0.001	<0.001	0.003	0.003	0.005	0.0012	<0.0005	<0.0005		BD - 0.005	
Phosphorous	mg/L	----	<0.02	0.02	<0.02	0.02	<0.05	<0.3	----	----		BD - 0.02	
Potassium	mg/L	----	0.34	1.1	0.7	0.91	1.4	<2	<0.4	0.5		BD - 1.4	
Selenium	mg/L	----	<0.01	<0.02	<0.02	<0.02	<0.02	<0.001	<0.0002	<0.0002		BD	
Silicon	mg/L	----	9	5.08	7.9	9	6.17	8.12	8.38	7.75	7.68	5.08 - 9	
Silver	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00001	<0.0001	<0.0001		BD	
Sodium	mg/L	----	7.42	2.33	6.16	8.01	5.37	7	7.8	7.7	6.47	2.33 - 8.01	
Strontium	mg/L	----	0.26	0.1	0.31	0.4	0.248	0.322	0.494	0.432	0.321	0.1 - 0.494	
Sulfur	mg/L	----	----	----	----	----	3.93	----	8.5	7.5	6.64	3.93 - 8.5	
Tin	mg/L	----	----	----	----	----	<0.01	<0.0001	<0.001	<0.001		BD	
Thallium	mg/L	----	----	----	----	----	----	<0.00005	<0.00005	<0.00005		BD	
Thorium	mg/L	----	<0.02	<0.005	<0.005	<0.01	<0.01	----	----	----		BD	
Titanium	mg/L	----	<0.001	<0.001	<0.001	<0.001	0.002	<0.01	0.0007	0.0007		BD - 0.002	
Uranium	mg/L	----	<0.02	<0.02	<0.02	<0.02	<0.06	0.00031	<0.0005	<0.0005		BD - 0.00031	
Vanadium	mg/L	----	0.0016	<0.001	<0.001	0.006	<0.002	<0.001	0.0004	0.0006		BD - 0.006	
Zinc	mg/L	----	0.002	0.003	0.002	0.008	<0.005	0.001	<0.001	<0.001		BD - 0.008	
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	----	----	----		BD	

Note: < Denotes that sample is below the laboratory detection limit

No flow at W-3 in December 1991.

[1] Range is based on a average pH of 8.0 and a temperature range of 0 to 10 ^{o}C

[2] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-4 (Williams Creek D/S of Confluence with W-3 Tributary) from 1989 to 2005

Parameter	Units	Sample Date										Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Aug-91	Dec-91	May-92	Jul-92	Oct-92	May-94	Sep-97	Aug-05	Oct-05			
In-Situ Parameters														
pH		----	----	----	----	----	----	----	7.8	----	7.73	7.77	7.73 - 7.8	6.5 - 9.0
Conductivity	umho/cm	----	----	----	----	----	----	----	160	300	280	247	160 - 300	
Physical Parameters														
pH		7.7	8	8.1	7.4	7.8	7.5	7.8	7.71	7.98	7.95	7.8	7.4 - 8.1	6.5 - 9.0
Conductivity	umho/cm	395	210	465	98	210	370	207	178	309	257	270	98 - 465	
Total Suspended Solids	mg/L	<5	37	<5	253	258	<5	<5	3	----	----		BD - 258	
Total Dissolved Solids	mg/L	----	----	----	----	----	----	179	----	170	140	163.0	140 - 179	
Turbidity	NTU	----	4	1	14	25	1	2	----	----	----	7.8	1 - 25	
Hardness as $CaCO_3$	mg/L	145.1	111	216	28.3	103	159	85.6	129	144	120	124.1	28.3 - 216	
Anions														
Alkalinity as $CaCO_3$	mg/L	120	103	169	28	94	125	79	111	140	106	108	28 - 169	
Hydroxide as $CaCO_3$	mg/L	----	----	----	----	----	----	<5	<1	<5	<5		BD	
Carbonate as $CaCO_3$	mg/L	----	----	----	----	----	----	<5	<1	<6	<6		BD	
Bicarbonate as $CaCO_3$	mg/L	----	----	----	----	----	----	79	111	170	129	122.3	79 - 170	
Chloride	mg/L	3.6	----	----	----	----	----	0.78	1.3	1.2	0.5	1.5	0.5 - 3.6	
Fluoride	mg/L	<1	----	----	----	----	----	<1	0.2	----	----		BD - 0.2	
Sulphate	mg/L	47	20.7	80.6	3.5	8.9	59.8	18.6	24	29	27	31.9	3.5 - 80.6	
Nutrients														
Ammonia-Nitrogen	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.07	----	<0.05	<0.05		BD - 0.07	1.04 - 2.33[1]
Nitrate-Nitrogen	mg/L	<0.1	<0.1	<0.5	0.05	<0.1	<0.02	<0.05	<0.005	0.02	0.02		BD - 0.05	
Nitrite-Nitrogen	mg/L	<0.0003	<0.003	<5	<0.03	<1	<2.0	<0.5	0.001	<0.005	<0.005		BD - 0.001	0.06
Total Phosphorous	mg/L	----	----	0.032	0.018	0.173	0.017	0.04	----	0.1	0.1	0.069	0.017 - 0.173	
Orthophosphate	mg/L	----	----	----	----	----	----	----	----	0.08	0.09	0.085	0.08 - 0.09	
Total Metals														
Aluminum	mg/L	<0.02	**0.154**	<0.005	**2.75**	**3.89**	0.036	0.03	0.033	0.062	0.064		BD - 3.89	0.005 - 0.1
Antimony	mg/L	<0.005	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	0.00006	<0.0002	<0.0002		BD - 0.00006	
Arsenic	mg/L	<0.02	<0.05	**0.12**	<0.04	<0.04	<0.05	<0.02	0.0006	0.0005	0.0005		BD - 0.12	0.005
Barium	mg/L	0.031	0.049	0.057	0.078	0.11	0.175	0.03	0.0354	0.043	0.034	0.064	0.03 - 0.175	
Beryllium	mg/L	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	<0.001	----	----	----	----	----	----	0.004	0.009	0.006		BD - 0.009	
Cadmium	mg/L	<0.0002	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.00005	<0.00001	<0.00001		BD	0.000017
Calcium	mg/L	40.5	32.7	63.4	15.6	27.7	46.4	25	35.9	40.7	35.1	36.3	15.6 - 63.4	
Chromium	mg/L	<0.0002	**0.012**	**0.006**	0.002	**0.006**	0.002	<0.001	<0.0005	<0.0005	0.0005		BD - 0.012	0.001[2]
Cobalt	mg/L	<0.0005	<0.001	0.002	0.003	0.002	0.003	<0.001	0.0002	<0.0001	<0.0001		BD - 0.003	
Copper	mg/L	<0.0005	<0.001	<0.001	**0.01**	**0.014**	**0.008**	**0.016**	0.0011	0.001	0.002		BD - 0.016	0.002 - 0.004
Iron	mg/L	**0.519**	**1.11**	**0.349**	**3.68**	**6.6**	**0.709**	**0.39**	**0.48**	**0.4**	0.3	1.454	0.3 - 6.6	0.3
Lead	mg/L	<0.002	<0.004	<0.004	<0.004	**0.005**	<0.005	<0.01	<0.00005	<0.0001	0.0003		BD - 0.005	0.001 - 0.007
Lithium	mg/L	0.35	<0.05	<0.05	<0.05	<0.05	<0.05	<0.002	<0.001	0.001	0.002		BD - 0.35	
Magnesium	mg/L	10.7	8.47	16.1	5.2	7.7	13	6.5	9.5	10.6	8.6	9.6	5.2 - 16.1	
Manganese	mg/L	0.077	0.058	0.1	0.136	0.191	0.166	0.069	0.0477	0.031	0.031	0.091	0.031 - 0.191	
Mercury	mg/L	<0.005	----	----	----	----	----	----	<0.00005	----	----		BD	0.0001
Molybdenum	mg/L	<0.001	<0.005	0.01	<0.003	<0.003	<0.004	<0.005	0.00242	0.003	0.002		BD - 0.01	0.073
Nickel	mg/L	0.0014	0.002	0.005	<0.001	0.014	0.005	0.003	0.001	0.001	0.0008		BD - 0.014	0.025 - 0.15
Phosphorous	mg/L	<0.05	0.05	0.04	0.03	0.2	0.03	<0.05	<0.3	----	----		BD - 0.2	
Potassium	mg/L	0.8	0.48	1.14	1.41	1	0.95	1	<2	0.5	0.5		BD - 1.41	
Selenium	mg/L	<0.005	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.001	<0.0002	<0.0002		BD	0.001
Silicon	mg/L	4.86	13.4	5.5	9.71	16.3	11	5.1	8.54	8.25	8.18	9.08	4.86 - 16.3	
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00001	<0.0001	<0.0001		BD	0.0001
Sodium	mg/L	11.2	9.93	14.9	2.77	6.58	12.6	6.58	9	10.1	8.7	9.24	2.77 - 14.9	
Strontium	mg/L	0.372	0.26	0.42	0.142	0.24	0.4	0.229	0.273	0.393	0.317	0.30	0.142 - 0.42	
Sulfur	mg/L	----	----	----	----	----	----	5.39	----	9.7	8.3	7.80	5.39 - 9.7	
Tin	mg/L	----	----	----	----	----	----	<0.01	<0.0001	<0.001	<0.001		BD	
Thallium	mg/L	----	----	----	----	----	----	----	<0.00005	<0.00005	<0.00005		BD	0.0008
Thorium	mg/L	<0.01	<0.02	<0.02	<0.005	<0.005	<0.01	<0.01		----	----		BD	
Titanium	mg/L	<0.001	0.016	0.002	0.146	0.192	<0.001	0.002	<0.01	0.0031	<0.0005		BD - 0.192	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	0.00031	<0.0005	<0.0005		BD - 0.00031	
Vanadium	mg/L	<0.0002	0.0049	<0.0005	<0.001	0.016	0.01	<0.002	<0.001	0.0014	0.0011		BD - 0.016	
Zinc	mg/L	**0.0578**	0.004	<0.001	0.019	0.018	0.008	<0.005	0.003	<0.001	0.016		BD - 0.0578	0.03
Zirconium	mg/L	----	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	----	<0.001	<0.001		BD - 0.002	
Dissolved Metals														
Aluminum	mg/L	----	0.007	<0.005	0.03	0.043	0.018	<0.01	0.021	0.014	0.019		BD - 0.043	
Antimony	mg/L	----	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	0.00006	<0.0002	<0.0002		BD - 0.00006	
Arsenic	mg/L	----	<0.05	0.11	<0.04	<0.04	<0.05	<0.02	0.0006	0.0006	0.0005		BD - 0.11	
Barium	mg/L	----	0.04	0.053	0.01	0.041	0.054	0.03	0.0343	0.046	0.034	0.038	0.01 - 0.054	
Beryllium	mg/L	----	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	----	----	----	----	----	----	----	0.004	0.009	0.005	0.006	0.004 - 0.009	
Cadmium	mg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.00005	<0.00001	<0.00001		BD	
Calcium	mg/L	----	30.7	61.3	7.49	27.3	43.4	24.5	35.9	39.2	34.1	33.8	7.49 - 61.3	
Chromium	mg/L	----	0.002	0.004	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005		BD - 0.004	
Cobalt	mg/L	----	<0.001	0.002	<0.001	<0.001	0.003	<0.001	0.0003	<0.0001	<0.0001		BD - 0.003	
Copper	mg/L	----	<0.001	<0.001	<0.001	<0.001	0.002	0.021	0.0011	0.001	<0.001		BD - 0.021	
Iron	mg/L	----	0.472	0.252	0.12	0.396	0.628	0.245	0.34	0.27	0.23	0.328	0.12 - 0.628	
Lead	mg/L	----	<0.004	<0.004	<0.004	<0.004	<0.005	<0.01	<0.00005	<0.0001	<0.0001		BD	
Lithium	mg/L	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.002	<0.001	0.001	0.001		BD	
Magnesium	mg/L	----	8.11	15.3	2.24	7.66	12	6.43	9.63	11.1	9.7	9.13	2.24 - 15.3	
Manganese	mg/L	----	0.037	0.098	0.014	0.033	0.165	0.068	0.0351	0.016	0.019	0.054	0.014 - 0.165	
Molybdenum	mg/L	----	<0.005	0.009	<0.003	<0.003	<0.004	<0.005	0.00239	0.003	0.002		BD - 0.009	
Nickel	mg/L	----	<0.001	0.004	<0.001	0.002	0.004	0.004	0.0011	<0.0005	<0.0005		BD - 0.004	
Phosphorous	mg/L	----	0.03	0.02	0.02	0.03	0.02	<0.05	<0.3	----	----		BD - 0.03	
Potassium	mg/L	----	0.48	0.97	0.61	0.54	0.99	1.2	<2	<0.4	0.4		BD - 1.2	
Selenium	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.001	<0.0002	<0.0002		BD	
Silicon	mg/L	----	10.5	4.8	2.73	14	10	5.09	8.64	9.05	9.22	8.23	2.73 - 14	
Silver	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00001	<0.0001	<0.0001		BD	
Sodium	mg/L	----	9.2	13.8	1.74	6.37	12.5	6.55	9	9.9	8.5	8.62	1.74 - 13.8	
Strontium	mg/L	----	0.26	0.41	0.063	0.24	0.36	0.229	0.279	0.422	0.317	0.287	0.063 - 0.422	
Sulfur	mg/L	----	----	----	----	----	----	5.39	----	9.7	8.9	8.00	5.39 - 9.7	
Tin	mg/L	----	----	----	----	----	----	<0.01	<0.0001	<0.001	<0.001		BD	
Thallium	mg/L	----	----	----	----	----	----	----	<0.00005	<0.00005	<0.00005		BD	
Thorium	mg/L	----	<0.02	<0.02	<0.005	<0.005	<0.01	<0.01	----	----	----		BD	
Titanium	mg/L	----	0.002	<0.001	<0.001	0.002	<0.001	0.002	<0.01	0.0012	<0.0005		BD - 0.002	
Uranium	mg/L	----	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	0.00031	<0.0005	<0.0005		BD - 0.00031	
Vanadium	mg/L	----	0.003	<0.0005	<0.001	<0.001	0.014	<0.002	<0.001	0.0011	0.0011		BD - 0.014	
Zinc	mg/L	----	0.003	<0.001	0.004	0.007	0.008	<0.005	0.002	<0.001	0.016		BD - 0.016	
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----	----	<0.001		BD	

Note: < Denotes that sample is below the laboratory detection limit

[1] Range is based on a average pH of 8.0 and a temperature range of 0 to 10 ^{o}C

[2] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-5 (South East Tributary to Williams Creek) from 1989 to 1994

Parameter	Units	Sample Date							Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Aug-91 (dupl)	Dec-91	May-92	Jul-92	Oct-92	May-94			
Physical Parameters											
pH		7.5	7.2	8.1	7.2	7.2	7.5	7.8	7.5	7.2 - 8.1	6.5 - 9.0
Conductivity	umho/cm	157	91	280	91	89	228	135	153	89 - 280	
Total Suspended Solids	mg/L	<5	1825	34	103	800	<5	6		BD - 1825	
TotalDissolved Solids	mg/L	----	----	----	----	----	----	129			
Turbidity	NTU	----	120	17	11	27	3	2	30	2 - 120	
Hardness as $CaCO_3$	mg/L	84	51.8	139	38	135	93.7	52.8	84.9	38 - 139	
Anions											
Alkalinity as $CaCO_3$	mg/L	88	58	145	44	66	100	112	88	44 - 145	
Hydroxide as $CaCO_3$	mg/L	----	----	----	----	----	----	<5			
Carbonate as $CaCO_3$	mg/L	----	----	----	----	----	----	<5			
Bicarbonate as $CaCO_3$	mg/L	----	----	----	----	----	----	112			
Chloride	mg/L	1.01	----	----	----	----	----	0.59	0.80	0.59 - 1.01	
Fluoride	mg/L	<1	----	----	----	----	----	<1		BD	
Sulphate	mg/L	3.29	3.2	3.8	2	2.7	9.4	11.6	5.14	2 - 11.6	
Nutrients											
Ammonia-Nitrogen	mg/L	<0.05	0.08	<0.05	<0.05	0.11	0.2	<0.05		BD - 0.2	1.04 - 2.33[1]
Nitrate-Nitrogen	mg/L	<0.1	<0.05	<0.2	<0.05	<0.03	<0.2	<0.05		BD	
Nitrite-Nitrogen	mg/L	<0.003	0.003	<2.0	<0.03	<0.05	<2.0	<0.5		BD - 0.003	0.06
Total Phosphorous	mg/L	----	----	0.132	0.022	0.24	0.027	0.009	0.086	0.009 - 0.24	
Total Metals											
Aluminum	mg/L	<0.02	**9.58**	<0.005	**1.71**	**8.02**	0.037	**0.25**		BD - 9.58	0.005 - 0.1
Antimony	mg/L	<0.005	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02		BD	
Arsenic	mg/L	<0.02	**0.11**	**0.11**	0.04	<0.04	<0.05	<0.02		BD - 0.11	0.005
Barium	mg/L	0.013	0.455	0.035	0.051	0.239	0.037	0.024	0.122	0.013 - 0.455	
Beryllium	mg/L	<0.0001	0.00065	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002		BD - 0.00065	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02		BD	
Boron	mg/L	<0.001	----	----	----	----	----	----			
Cadmium	mg/L	<0.0002	**0.0006**	<0.0003	<0.0003	<0.0003	**0.0004**	<0.0005		BD - 0.0006	0.000017
Calcium	mg/L	18.8	29.5	39.6	13.1	25.3	30.3	15.2	24.5	13.1 - 39.6	
Chromium	mg/L	**0.0016**	**0.05**	**0.007**	<0.001	**0.014**	**0.002**	0.001		BD - 0.05	0.001[2]
Cobalt	mg/L	<0.0005	0.016	0.001	<0.001	0.007	0.003	<0.001		BD - 0.016	
Copper	mg/L	<0.0005	**0.059**	<0.001	**0.007**	**0.034**	**0.004**	**0.023**		BD - 0.059	0.002 - 0.004
Iron	mg/L	**0.458**	**31.4**	**1.48**	**2.2**	**14.4**	**0.664**	**0.447**	7.293	0.447 - 31.4	0.3
Lead	mg/L	<0.002	**0.015**	<0.004	<0.004	**0.009**	<0.005	<0.01		BD - 0.015	0.001 - 0.007
Lithium	mg/L	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.002		BD - 0.36	
Magnesium	mg/L	4.16	8.95	10.1	4.09	6.9	7.62	3.55	6.48	3.55 - 10.1	
Manganese	mg/L	0.046	0.62	0.191	0.098	0.419	0.304	0.014	6.481	0.014 - 0.62	
Mercury	mg/L	<0.005	----	----	----	----	----	----			0.0001
Molybdenum	mg/L	<0.001	<0.005	<0.005	<0.003	<0.003	<0.004	<0.005		BD	0.073
Nickel	mg/L	0.0029	0.04	0.007	<0.001	0.025	0.004	0.002		BD - 0.04	0.025 - 0.15
Phosphorous	mg/L	<0.05	1.64	0.16	0.08	0.82	0.03	<0.05		BD - 1.64	
Potassium	mg/L	<0.2	3.28	1.65	1.61	1.21	0.52	1.2		BD - 3.28	
Selenium	mg/L	<0.005	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02		BD	0.001
Silicon	mg/L	5.53	19.8	5.9	7.84	22.2	13	5.26	11.36	5.26 - 22.2	
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		BD	0.0001
Sodium	mg/L	5.57	6.56	9.7	2.85	6.28	8.65	5.25	6.41	2.85 - 9.7	
Strontium	mg/L	0.089	0.22	0.159	0.083	0.15	0.157	0.086	0.135	0.083 - 0.22	
Sulfur	mg/L	----	----	----	----	----	----	2.99			
Tin	mg/L	----	----	----	----	----	----	<0.01			
Thorium	mg/L	<0.01	<0.02	<0.02	<0.005	<0.005	<0.01	<0.01		BD	
Titanium	mg/L	<0.001	1.07	0.005	0.084	0.364	<0.001	0.016		BD - 1.07	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06		BD	
Vanadium	mg/L	<0.0002	0.126	<0.0005	0.008	0.043	0.007	<0.002		BD - 0.126	
Zinc	mg/L	**0.0661**	**0.072**	0.004	0.015	**0.043**	0.01	<0.005		BD - 0.072	0.03
Zirconium	mg/L	----	0.005	<0.001	<0.001	0.003	<0.001	<0.001		BD - 0.005	
Dissolved Metals											
Aluminum	mg/L	----	0.037	<0.005	0.058	0.06	0.034	0.01		BD - 0.06	
Antimony	mg/L	----	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02		BD	
Arsenic	mg/L	----	<0.05	0.09	<0.04	<0.04	<0.05	<0.02		BD - 0.09	
Barium	mg/L	----	0.037	0.032	0.017	0.041	0.031	0.023	0.030	0.017 - 0.041	
Beryllium	mg/L	----	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02		BD	
Cadmium	mg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005		BD	
Calcium	mg/L	----	23.7	39.4	10	19	26.1	15.1	22.2	10 - 39.4	
Chromium	mg/L	----	0.007	0.006	<0.001	<0.001	<0.001	<0.001		BD - 0.007	
Cobalt	mg/L	----	0.001	0.001	<0.001	<0.001	0.003	<0.001		BD - 0.003	
Copper	mg/L	----	0.001	<0.001	0.006	<0.001	0.001	0.009		BD - 0.009	
Iron	mg/L	----	0.987	0.748	0.392	0.63	0.322	0.076	0.526	0.076 - 0.987	
Lead	mg/L	----	<0.004	<0.004	<0.004	<0.004	<0.005	<0.01		BD	
Lithium	mg/L	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.002		BD	
Magnesium	mg/L	----	5.82	9.83	2.88	4.37	6.6	3.51	5.50	2.88 - 9.83	
Manganese	mg/L	----	0.142	0.224	0.053	0.194	0.271	0.007	0.149	0.007 - 0.271	
Molybdenum	mg/L	----	<0.005	<0.005	<0.003	<0.003	<0.004	<0.005		BD	
Nickel	mg/L	----	0.0045	0.005	<0.001	0.002	0.003	0.004		BD - 0.005	
Phosphorous	mg/L	----	<0.02	0.11	0.03	0.03	0.03	<0.05		BD - 0.11	
Potassium	mg/L	----	0.23	1.25	1.12	0.28	0.5	1.1	0.75	0.23 - 1.25	
Selenium	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02		BD	
Silicon	mg/L	----	10.6	5.5	4.3	14.3	11.4	4.97	8.51	4.3 - 14.3	
Silver	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		BD	
Sodium	mg/L	----	5.38	7.95	2.47	5.44	6.96	5.22	5.57	2.47 - 7.95	
Strontium	mg/L	----	0.074	0.156	0.06	0.11	0.136	0.085	0.104	0.06 - 0.156	
Sulfur	mg/L	----	----	----	----	----	----	3.08			
Tin	mg/L	----	----	----	----	----	----	<0.01			
Thorium	mg/L	----	<0.02	<0.02	<0.005	<0.005	<0.01	<0.01		BD	
Titanium	mg/L	----	0.003	0.003	<0.001	0.002	<0.001	0.002		BD - 0.003	
Uranium	mg/L	----	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06		BD	
Vanadium	mg/L	----	0.004	<0.0005	0.001	<0.001	0.006	<0.002		BD - 0.006	
Zinc	mg/L	----	0.004	<0.001	0.008	0.005	0.008	0.008		BD - 0.008	
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		BD	

Note: < Denotes that sample is below the laboratory detection limit

[1] Range is based on a average pH of 8.0 and a temperature range of 0 to 10°C

[2] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

Water Quality Data for Station W-6 (Williams Creek D/S of South East Tributary) from 1989 and 2005

Parameter	Units	Sample Date		Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Oct-05			
In-Situ Parameters						
pH		----	8.06			6.5 - 9.0
Conductivity	umho/cm	----	240			
Physical Parameters						
pH		7.9	7.93	7.9	7.9 - 7.93	6.5 - 9.0
Conductivity	umho/cm	415	242	328.5	242 - 415	
Total Suspended Solids	mg/L	<5	----			
Total Dissolved Solids	mg/L	----	140			
Turbidity	NTU	----	----			
Hardness as $CaCO_3$	mg/L	168.6	120	144.3	120 - 168.6	
Anions						
Alkalinity as $CaCO_3$	mg/L	140	100	120.0	100 - 140	
Chloride	mg/L	1.3	1	1.2	1 - 1.3	
Fluoride	mg/L	<1	----			
Sulphate	mg/L	51	26	38.5	26 - 51	
Nutrients						
Ammonia-Nitrogen	mg/L	0.05	<0.05		BD - 0.05	1.04 - 2.33[1]
Nitrate-Nitrogen	mg/L	<0.1	0.02		BD - 0.02	
Nitrite-Nitrogen	mg/L	0.003	<0.005		BD - 0.003	0.06
Total Phosphorous	mg/L	----	0.1			
Orthophosphate	mg/L	----	0.09			
Total Metals						
Aluminum	mg/L	<0.02	0.048		BD - 0.048	0.005 - 0.1
Antimony	mg/L	<0.005	<0.0002		BD	
Arsenic	mg/L	<0.02	0.0003		BD - 0.0003	0.005
Barium	mg/L	0.034	0.031	0.033	0.031 - 0.034	
Beryllium	mg/L	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.0005			
Boron	mg/L	0.002	0.006	0.004	0.002 - 0.006	
Cadmium	mg/L	<0.0002	<0.00001		BD	0.000017
Calcium	mg/L	43.8	31.5	37.65	31.5 - 43.8	
Chromium	mg/L	0.0012	0.0005	0.0009	0.0005 - 0.0012	0.001[2]
Cobalt	mg/L	<0.0005	<0.0001		BD	
Copper	mg/L	0.001	0.001	0.001	0.0010	0.002 - 0.004
Iron	mg/L	**0.637**	0.3	0.469	0.3 - 0.637	0.3
Lead	mg/L	<0.002	0.0001		BD - 0.0001	0.001 - 0.007
Lithium	mg/L	0.3	0.001	0.151	0.001 - 0.3	
Magnesium	mg/L	13.9	8.4	11.15	8.4 - 13.9	
Manganese	mg/L	0.101	0.032	0.067	0.032 - 0.101	
Mercury	mg/L	<0.005	----			0.0001
Molybdenum	mg/L	<0.001	0.002		BD - 0.002	0.073
Nickel	mg/L	0.0018	0.0009	0.0014	0.0009 - 0.0018	0.025 - 0.15
Phosphorous	mg/L	<0.05	----			
Potassium	mg/L	0.9	0.4	0.65	0.4 - 0.9	
Selenium	mg/L	<0.005	<0.0002		BD	0.001
Silicon	mg/L	5.08	8.05	6.57	5.08 - 8.05	
Silver	mg/L	<0.002	<0.0001		BD	0.0001
Sodium	mg/L	14.3	8.4	11.35	8.4 - 14.3	
Strontium	mg/L	0.426	0.285	0.356	0.285 - 0.426	
Thorium	mg/L	<0.01	----			
Titanium	mg/L	<0.001	<0.0005		BD	
Uranium	mg/L	<0.02	<0.0005		BD	
Vanadium	mg/L	<0.0002	0.0009		BD - 0.0009	
Zinc	mg/L	**0.108**	0.002	0.055	0.002 - 0.108	0.03
Zirconium	mg/L	----	<0.001			
Dissolved Metals						
Aluminum	mg/L	----	0.02			
Antimony	mg/L	----	<0.0002			
Arsenic	mg/L	----	0.0005			
Barium	mg/L	----	0.032			
Beryllium	mg/L	----	<0.0001			
Bismuth	mg/L	----	<0.0005			
Boron	mg/L	----	0.006			
Cadmium	mg/L	----	<0.00001			
Calcium	mg/L	----	31			
Chromium	mg/L	----	<0.0005			
Cobalt	mg/L	----	<0.0001			
Copper	mg/L	----	<0.001			
Iron	mg/L	----	0.23			
Lead	mg/L	----	<0.0001			
Lithium	mg/L	----	0.001			
Magnesium	mg/L	----	9.6			
Manganese	mg/L	----	0.02			
Mercury	mg/L	----	----			
Molybdenum	mg/L	----	0.002			
Nickel	mg/L	----	0.0008			
Potassium	mg/L	----	0.4			
Selenium	mg/L	----	<0.0002			
Silicon	mg/L	----	9.3			
Silver	mg/L	----	<0.0001			
Sodium	mg/L	----	8.5			
Strontium	mg/L	----	0.296			
Titanium	mg/L	----	0.0012			
Uranium	mg/L	----	<0.0005			
Vanadium	mg/L	----	0.001			
Zinc	mg/L	----	<0.001			
Zirconium	mg/L	----	----			

Note: < Denotes that sample is below the laboratory detection limit

[1] Range is based on a average pH of 8.0 and a temperature range of 0 to 10 ^{o}C

[2] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-7 (WRSA Tributary Near Road, U/S of W-3) from 1989 to 2005

Parameter	Units	Sample Date											Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Aug-91	Dec-91	May-92	Jul-92	Oct-92	May-94	May-94 (Dupl)	Aug-05	Aug-05 (Dupl)	Oct-05			
In-Situ Parameters															
pH		----	----	----	----	----	----	----	----	----	----	7.6			6.5 - 9.0
Conductivity	umho/cm	----	----	----	----	----	----	----	----	190	----	180	185	180 - 190	
Physical Parameters															
pH		7.7	7.6	7.3	7.4	7.6	7.5	7.7	7.7	7.64	----	7.71	7.6	7.3 - 7.71	6.5 - 9.0
Conductivity	umho/cm	325	192	435	81	166	345	145	143	206	----	177	222	81 - 435	
Total Suspended Solids	mg/L	<5	<5	23	<5	<5	<5	<5	<5	----	----	----		BD - 23	
Total Dissolved Solids	mg/L	----	----	----	----	----	----	145	147	120	----	96	127	96 - 147	
Turbidity	NTU	----	1	6	2	4	<1	1	1	----	----	----		BD - 6	
Hardness as $CaCO_3$	mg/L	123.6	114	188	39.4	122	158	62.2	62.6	100	----	92	106.2	39.4 - 188	
Anions															
Alkalinity as $CaCO_3$	mg/L	120	111	230	41	110	141	73	74	100	----	85	109	41 - 230	
Hydroxide as $CaCO_3$	mg/L	----	----	----	----	----	----	<5	<5	<5	----	<5		BD	
Carbonate as $CaCO_3$	mg/L	----	----	----	----	----	----	<5	<5	<6	----	<6		BD	
Bicarbonate as $CaCO_3$	mg/L	----	----	----	----	----	----	73	74	121	----	104	93.0	73 - 121	
Chloride	mg/L	2.6	----	----	----	----	----	<0.3	<0.3	0.9	----	<0.4		BD - 2.6	
Fluoride	mg/L	<1	----	----	----	----	----	<1	<1	----	----	----		BD	
Sulphate	mg/L	15.1	10.9	0.83	1.1	11	29.6	4.6	4.6	12	----	6.7	9.6	0.83 - 29.6	
Nutrients															
Ammonia-Nitrogen	mg/L	0.05	<0.05	0.05	<0.05	<0.05	0.06	<0.05	<0.05	0.1	----	0.05		BD - 0.1	1.04 - 2.33[1]
Nitrate-Nitrogen	mg/L	<0.1	<0.1	<0.05	<0.05	<0.1	<0.2	<0.05	<0.05	<0.01	----	<0.01		BD	
Nitrite-Nitrogen	mg/L	<0.003	<0.003	<0.5	<0.03	<1	<2.0	<0.5	<0.5	<0.005	----	<0.005		BD	0.06
Total Phosphorous	mg/L	----	----	0.3	0.016	0.015	<0.005	<0.005	<0.005	0.1	----	0.1		BD - 0.3	
Orthophosphate	mg/L	----	----	----	----	----	----	----	----	0.07	----	0.09	0.08	0.07 - 0.09	
Total Metals															
Aluminum	mg/L	<0.02	<0.005	<0.005	0.084	**0.192**	0.035	<0.01	<0.01	0.035	0.034	0.096		BD - 0.192	0.005 - 0.1
Antimony	mg/L	<0.005	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	<0.02	<0.05	**0.16**	<0.04	<0.04	<0.05	<0.02	<0.02	0.0004	0.0004	0.0005		BD - 0.16	0.005
Barium	mg/L	0.037	0.036	0.091	0.012	0.039	0.062	0.024	0.024	0.03	0.03	0.024	0.037	0.012 - 0.091	
Beryllium	mg/L	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	0.007	----	----	----	----	----	----	----	0.004	0.004	0.003	0.005	0.003 - 0.007	
Cadmium	mg/L	<0.0002	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.0005	<0.00001	<0.00001	<0.00001		BD	0.000017
Calcium	mg/L	38.2	36.2	68.3	11.5	37	54.4	19.2	19.4	31.4	----	28.1	34.4	11.5 - 68.3	
Chromium	mg/L	**0.0081**	**0.007**	**0.007**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	0.0007		BD - 0.0081	0.001[2]
Cobalt	mg/L	<0.0005	<0.001	0.007	<0.001	<0.001	0.002	<0.001	<0.001	<0.0001	<0.0001	<0.0001		BD - 0.007	
Copper	mg/L	**0.009**	<0.001	<0.001	**0.01**	**0.004**	**0.005**	**0.014**	**0.014**	0.002	0.002	0.002		BD - 0.014	0.002 - 0.004
Iron	mg/L	0.195	0.267	**11.6**	0.072	0.266	0.219	0.172	0.175	0.2	----	0.1	1.327	0.072 - 11.6	0.3
Lead	mg/L	0.003	<0.004	<0.004	<0.004	<0.004	<0.005	<0.01	<0.01	<0.0001	<0.0001	<0.0001		BD - 0.003	0.001 - 0.007
Lithium	mg/L	0.36	<0.06	<0.05	<0.05	<0.05	<0.05	<0.002	<0.002	<0.001	<0.001	<0.001		BD - 0.36	
Magnesium	mg/L	8.84	6.83	12.6	2.83	7.2	11.3	3.54	3.57	5.9	----	5.3	6.8	2.83 - 12.6	
Manganese	mg/L	0.026	0.03	3.62	0.004	0.007	0.073	0.069	0.069	0.014	----	0.006	0.392	0.004 - 3.62	
Mercury	mg/L	<0.005	----	----	----	----	----	----	----	----	----	----		BD	0.0001
Molybdenum	mg/L	<0.001	<0.005	0.008	<0.003	<0.003	<0.004	<0.005	<0.005	<0.001	<0.001	<0.001		BD - 0.008	0.073
Nickel	mg/L	0.002	0.002	0.009	<0.001	0.007	0.002	0.003	0.001	0.0011	0.001	0.0012		BD - 0.009	0.025 - 0.15
Phosphorous	mg/L	<0.05	<0.02	0.34	0.03	0.03	0.03	<0.05	<0.05	----	----	----		BD - 0.34	
Potassium	mg/L	0.3	0.25	0.5	1.54	0.35	0.44	1	1.2	<0.4	----	<0.4		BD - 1.54	
Selenium	mg/L	<0.005	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0002	<0.0002	<0.0002		BD	0.001
Silicon	mg/L	4.69	13.9	5.8	4.14	13.9	14.8	5.42	5.46	8.72	----	9.76	8.66	4.14 - 14.8	
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001		BD	0.0001
Sodium	mg/L	7.21	5.56	6.45	1.74	6.09	9.93	3.48	3.6	6.1	----	5.5	5.57	1.74 - 9.93	
Strontium	mg/L	0.161	0.14	0.23	0.053	0.18	0.26	0.086	0.088	0.136	0.132	0.111	0.143	0.053 - 0.26	
Sulfur	mg/L	----	----	----	----	----	----	1.31	1.38	3.2	----	2	1.973	1.31 - 3.2	
Tin	mg/L	----	----	----	----	----	----	<0.01	<0.01	<0.001	<0.001	<0.001		BD	
Thorium	mg/L	<0.01	<0.02	<0.02	<0.005	<0.005	<0.01	<0.01	<0.01	----	----	----		BD	
Titanium	mg/L	<0.001	<0.001	0.005	0.002	0.008	<0.001	0.002	0.002	0.0014	0.0014	<0.0005		BD - 0.008	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	<0.06	<0.0005	<0.0005	<0.0005		BD	
Vanadium	mg/L	<0.0002	0.0008	<0.0005	<0.001	<0.001	0.006	<0.002	0.002	0.0007	0.0007	0.0008		BD - 0.006	
Zinc	mg/L	0.0185	0.01	0.003	0.005	0.007	0.014	<0.005	<0.005	<0.001	0.001	0.002		BD - 0.0185	0.03
Zirconium	mg/L	----	0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		BD - 0.002	
Dissolved Metals															
Aluminum	mg/L	----	<0.005	<0.005	0.059	0.017	0.035	<0.01	<0.01	0.016	----	0.028		BD - 0.059	
Antimony	mg/L	----	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0002	----	<0.0002		BD	
Arsenic	mg/L	----	<0.05	0.12	<0.04	<0.04	<0.05	<0.02	<0.02	0.0005	----	0.0004		BD - 0.12	
Barium	mg/L	----	0.036	0.09	0.01	0.039	0.061	0.027	0.025	0.03	----	0.024	0.038	0.01 - 0.09	
Beryllium	mg/L	----	<0.0005	0.003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	----	<0.0001		BD - 0.003	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0005	----	<0.0005		BD	
Cadmium	mg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.0005	<0.00001	----	<0.00001		BD	
Calcium	mg/L	----	34.5	60.3	11.1	37	44.6	18.8	18.9	29.6	----	27.5	31.4	11.1 - 60.3	
Chromium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	----	<0.0005		BD	
Cobalt	mg/L	----	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	----	<0.0001		BD - 0.007	
Copper	mg/L	----	<0.001	<0.001	0.009	<0.001	0.002	0.01	0.021	0.001	----	0.001		BD - 0.021	
Iron	mg/L	----	0.199	9.4	0.07	0.054	0.161	0.166	0.175	0.15	----	0.08	1.162	0.054 - 9.4	
Lead	mg/L	----	<0.004	<0.004	<0.004	<0.004	<0.005	<0.01	<0.01	<0.0001	----	<0.0001		BD	
Lithium	mg/L	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.002	<0.002	<0.001	----	<0.001		BD	
Magnesium	mg/L	----	6.63	9	2.73	7.24	11.1	3.41	3.44	6.6	----	5.7	6.21	2.73 - 11.1	
Manganese	mg/L	----	0.024	2.59	0.002	0.004	0.066	0.012	0.011	<0.005	----	<0.005		BD - 2.59	
Molybdenum	mg/L	----	<0.005	<0.005	<0.003	<0.003	<0.004	<0.005	<0.005	<0.001	----	<0.001		BD	
Nickel	mg/L	----	0.004	0.005	<0.001	0.002	0.001	0.004	0.005	<0.0005	----	0.0011		BD - 0.005	
Phosphorous	mg/L	----	<0.02	0.2	0.02	<0.02	<0.02	<0.05	<0.05	----	----	----		BD - 0.2	
Potassium	mg/L	----	0.19	0.45	1.46	0.23	0.4	1	1	<0.4	----	<0.4		BD - 1.46	
Selenium	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0002	----	<0.0002		BD	
Silicon	mg/L	----	11	5.3	3.9	13.5	9.9	5.25	5.27	10.5	----	10.4	8.34	3.9 - 13.5	
Silver	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	----	<0.0001		BD	
Sodium	mg/L	----	6.86	6.35	1.69	6.06	9.92	3.48	3.54	6.4	----	5.4	5.52	1.69 - 9.92	
Strontium	mg/L	----	0.138	0.16	0.051	0.176	0.2	0.082	0.084	0.133	----	0.116	0.127	0.051 - 0.2	
Sulfur	mg/L	----	----	----	----	----	----	1.32	1.35	4	----	2.2	2.22	1.32 - 4	
Tin	mg/L	----	----	----	----	----	----	<0.01	<0.01	<0.001	----	<0.001		BD	
Thorium	mg/L	----	<0.02	<0.02	<0.005	<0.005	<0.01	<0.01	<0.01	----	----	----		BD	
Titanium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	0.0013	----	0.0011		BD - 0.002	
Uranium	mg/L	----	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	<0.06	<0.0005	----	<0.0005		BD	
Vanadium	mg/L	----	0.0007	<0.0005	<0.001	<0.001	0.003	<0.002	<0.002	0.0012	----	0.0006		BD - 0.003	
Zinc	mg/L	----	0.003	0.002	0.004	0.006	0.009	<0.005	<0.005	<0.001	----	<0.001		BD - 0.009	
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----	----	----		BD	

Note: < Denotes that sample is below the laboratory detection limit

[1] Range is based on a average pH of 8.0 and a temperature range of 0 to 1^{o}C

[2] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-9 (Williams Creek U/S of Access Road) from 1989 to 2005

Parameter	Units	Sample Date											Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Aug-91	Dec-91	May-92	Jul-92	Oct-92	May-94	Sep-97	Oct-99 [1]	Aug-05	Oct-05			
In Situ Parameters															
pH		----	----	----	----	----	----	----	7.6	----	----	----			6.5 - 9.0
Conductivity	umho/cm	----	----	----	----	----	----	----	160	----	240	180	193	160 - 240	
Physical Parameters															
pH		7.8	8.2	7.9	7.5	7.9	7.6	7.8	7.63	----	7.82	7.91	7.8	7.5 - 8.2	6.5 - 9.0
Conductivity	umho/cm	505	275	635	85	130	475	200	195	----	271	225	300	85 - 635	
Total Suspended Solids	mg/L	<5	<5	15	<5	<5	<5	<5	72	----	----	----		BD - 72	
Total Dissolved Solids	mg/L	----	----	----	----	----	----	160	----	----	150	130	147	130 - 160	
Turbidity	NTU	----	<1	7	2	<1	<1	1	----	----	----	----		BD - 7	
Hardness as $CaCO_3$	mg/L	185.3	142	297	31.2	95.6	194	78.1	135	----	127	110	139.5	31.2 - 297	
Anions															
Alkalinity as $CaCO_3$	mg/L	170	157	255	38	84	188	102	127	----	125	100	135	38 - 255	
Hydroxide as $CaCO_3$	mg/L	----	----	----	----	----	----	<5	<1	----	<5	<5		BD	
Carbonate as $CaCO_3$	mg/L	----	----	----	----	----	----	<5	<1	----	<6	<6		BD	
Bicarbonate as $CaCO_3$	mg/L	----	----	----	----	----	----	102	127	----	152	122	126	102 - 152	
Chloride	mg/L	2	----	----	----	----	----	0.5	1.4	----	1.4	0.7	1.2	0.5 - 2	
Fluoride	mg/L	<1	----	----	----	----	----	<1	0.23	----	----	----		BD - 0.23	
Sulphate	mg/L	54	17	50.8	1.8	6.2	47.8	14.4	21	----	18	17	24.8	1.8 - 54	
Nutrients															
Ammonia-Nitrogen	mg/L	0.08	<0.05	0.44	<0.05	<0.05	0.06	<0.05	----	----	<0.05	<0.05		BD - 0.44	1.04 - 2.33 [2]
Nitrate-Nitrogen	mg/L	<0.1	<0.1	<0.05	<0.05	<0.1	<0.2	<0.05	0.007	----	<0.01	<0.01		BD - 0.007	
Nitrite-Nitrogen	mg/L	<0.003	<0.003	<5.0	<0.03	<1	<2.0	<0.5	0.002	----	0.006	<0.005		BD - 0.006	0.06
Total Phosphorous	mg/L	----	----	0.29	0.012	0.009	0.009	<0.005	----	----	0.1	0.1		BD - 0.29	
Orthophosphate	mg/L	----	----	----	----	----	----	----	----	----	0.07	0.09	0.08	0.07 - 0.09	
Total Metals															
Aluminum	mg/L	<0.02	<0.005	<0.005	0.088	0.057	0.026	0.01	**0.569**	<0.06	0.023	0.029		BD - 0.569	0.005 - 0.1
Antimony	mg/L	<0.005	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	0.00007	<0.02	<0.0002	<0.0002		BD - 0.00007	
Arsenic	mg/L	<0.02	<0.05	**0.16**	<0.04	<0.04	<0.05	<0.02	0.0011	<0.04	0.0005	0.0004		BD - 0.16	0.005
Barium	mg/L	0.043	0.049	0.082	0.013	0.034	0.067	0.028	0.0556	0.04	0.041	0.03	0.044	0.013 - 0.082	
Beryllium	mg/L	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.02	<0.0005	<0.0005		BD	
Boron	mg/L	0.004	----	----	----	----	----	----	0.006	<0.04	0.009	0.006		BD - 0.009	
Cadmium	mg/L	<0.0002	<0.0003	<0.0003	**0.0004**	<0.0003	<0.0004	<0.0005	<0.00005	<0.002	<0.00001	<0.00001		BD - 0.0004	0.000017
Calcium	mg/L	44.2	35.6	83	9.8	25.7	48.5	20.9	34.3	46.8	34.6	29.2	37.51	9.8 - 83	
Chromium	mg/L	0.0005	**0.008**	**0.007**	<0.001	<0.001	<0.001	<0.001	0.0009	<0.002	<0.0005	<0.0005		BD - 0.008	0.001 [3]
Cobalt	mg/L	<0.0005	<0.001	0.004	<0.001	0.001	0.003	<0.001	0.0005	<0.004	<0.0001	<0.0001		BD - 0.004	
Copper	mg/L	<0.0005	<0.001	<0.001	0.002	**0.004**	0.003	**0.027**	0.0025	<0.003	0.001	0.002		BD - 0.027	0.002 - 0.004
Iron	mg/L	0.199	0.138	**3.17**	0.117	0.137	0.197	0.137	**0.91**	0.08	0.1	0.1	0.480	0.08 - 3.17	0.3
Lead	mg/L	<0.002	<0.004	<0.004	<0.004	<0.004	<0.005	<0.01	0.00049	<0.03	<0.0001	<0.0001		BD - 0.00049	0.001 - 0.007
Lithium	mg/L	0.29	<0.06	<0.05	<0.05	<0.05	<0.05	<0.002	0.001	----	0.001	0.002		BD - 0.29	
Magnesium	mg/L	18.2	13.8	22.7	3.1	7.5	19.2	6.6	11.1	11.2	10	8.2	12.0	3.1 - 22.7	
Manganese	mg/L	0.015	0.016	1.3	0.003	<0.001	0.044	0.023	0.0713	0.007	0.01	0.006		BD - 1.3	
Mercury	mg/L	<0.005	----	----	----	----	----	----	<0.00005	<0.00005	----	----		BD	0.0001
Molybdenum	mg/L	<0.001	<0.005	0.007	<0.003	<0.003	<0.004	<0.005	0.00049	<0.005	<0.001	<0.001		BD - 0.007	0.073
Nickel	mg/L	0.0012	0.005	0.007	<0.001	0.006	0.003	0.002	0.0018	<0.01	0.0008	0.0008		BD - 0.007	0.025 - 0.15
Phosphorous	mg/L	<0.05	<0.02	0.37	0.03	<0.02	0.02	<0.05	<0.3	<0.1	----	----		BD - 0.37	
Potassium	mg/L	1.3	0.82	1.91	0.85	0.45	1.64	1.1	<2	<0.5	0.5	0.4		BD - 1.91	
Selenium	mg/L	<0.005	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.001	<0.03	<0.0002	<0.0002		BD	0.001
Silicon	mg/L	4.92	9.9	4.3	3.66	13	12	4.8	8.94	----	8.31	8.17	7.80	3.66 - 13	
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00001	<0.03	<0.0001	<0.0001		BD - 0.00001	0.0001
Sodium	mg/L	19.1	14.2	7	2.13	5.98	22.9	6.72	11	10	9.8	8.8	10.69	2.13 - 22.9	
Strontium	mg/L	0.583	0.4	0.56	0.078	0.28	0.54	0.238	0.294	0.47	0.347	0.266	0.369	0.078 - 0.583	
Sulfur	mg/L	----	----	----	----	----	----	3.71	----	14.8	5.9	5.2	7.40	3.71 - 14.8	
Tin	mg/L	----	----	----	----	----	----	<0.01	<0.0001	<0.02	<0.001	<0.001		BD	
Thallium	mg/L	----	----	----	----	----	----	----	<0.00005	<0.03	<0.00005	<0.00005		BD	0.0008
Thorium	mg/L	<0.01	<0.02	<0.02	<0.005	0.01	<0.01	<0.01	----	----	----	----		BD - 0.01	
Titanium	mg/L	<0.001	<0.001	0.007	0.004	0.002	<0.001	0.003	<0.01	<0.003	0.0012	<0.0005		BD - 0.007	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	0.00061		<0.0005	<0.0005		BD - 0.00061	
Vanadium	mg/L	<0.0002	0.0038	<0.0005	0.001	<0.001	0.016	0.002	0.003	<0.003	0.0009	0.0006		BD - 0.016	
Zinc	mg/L	0.0064	0.008	<0.001	0.007	0.003	0.017	<0.005	0.005	<0.01	<0.001	0.001		BD - 0.017	0.03
Zirconium	mg/L	----	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	----	<0.003	<0.001	<0.001		BD - 0.002	
Dissolved Metals															
Aluminum	mg/L	----	<0.005	<0.005	0.035	0.022	0.022	<0.01	0.018	<0.02	0.013	0.018		BD - 0.035	
Antimony	mg/L	----	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	0.00006	<0.015	<0.0002	<0.0002		BD - 0.00006	
Arsenic	mg/L	----	<0.05	0.16	<0.04	<0.04	<0.05	<0.02	0.0008	<0.04	0.0006	0.0004		BD - 0.16	
Barium	mg/L	----	0.049	0.066	0.009	0.029	0.064	0.027	0.0406	0.042	0.041	0.031	0.040	0.009 - 0.066	
Beryllium	mg/L	----	<0.0005	<0.0005	<0.0002	<0002	<0.0002	<0.0002	<0.0005	<0.001	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.02	<0.0005	<0.0005		BD	
Boron	mg/L	----	----	----	----	----	----	----	0.006	0.012	0.01	0.006	0.009	0.006 - 0.012	
Cadmium	mg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.00005	<0.002	<0.00001	<0.00001		BD	
Calcium	mg/L	----	35.5	81.9	8.15	25.5	46.3	20.1	35.1	50.8	33.4	31.5	36.83	8.15 - 81.9	
Chromium	mg/L	----	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	<0.0005	0.002	<0.0005	<0.0005		BD - 0.005	
Cobalt	mg/L	----	<0.001	0.004	<0.001	<0.001	0.003	<0.001	0.0001	<0.003	<0.0001	<0.0001		BD - 0.004	
Copper	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	0.022	0.0009	<0.001	0.001	<0.001		BD - 0.022	
Iron	mg/L	----	0.094	1.24	0.043	0.379	0.161	0.098	0.23	0.075	0.11	0.09	0.252	0.043 - 1.24	
Lead	mg/L	----	<0.004	<0.004	<0.004	<0.004	<0.005	<0.01	<0.00005	<0.02	<0.0001	<0.0001		BD	
Lithium	mg/L	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.002	<0.001	----	0.001	0.001		BD - 0.001	
Magnesium	mg/L	----	13	22.5	2.58	7.54	18.9	6.3	11.5	12.2	10.6	8.7	11.4	2.58 - 22.5	
Manganese	mg/L	----	0.016	1.26	0.001	<0.001	0.042	0.021	0.058	0.008	0.009	0.007		BD - 1.26	
Molybdenum	mg/L	----	<0.005	0.006	<0.003	<0.003	<0.004	<0.005	0.0005	<0.00005	<0.001	<0.001		BD - 0.006	
Nickel	mg/L	----	0.005	0.004	<0.001	0.004	0.003	0.002	0.0009	<0.004	<0.0005	0.0006		BD - 0.005	
Phosphorous	mg/L	----	<0.02	0.23	0.02	<0.02	<0.02	<0.05	<0.3	0.008	----	----		BD - 0.23	
Potassium	mg/L	----	0.81	1.83	0.62	0.38	1.41	1.1	<2	<0.04	<0.4	<0.4		BD - 1.83	
Selenium	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.001	<0.4	<0.0002	<0.0002		BD	
Silicon	mg/L	----	9.9	4	2.95	12.6	11.6	4.6	8.6	<0.03	9.17	8.8		BD - 12.6	
Silver	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00001	<0.01	<0.0001	<0.0001		BD	
Sodium	mg/L	----	13.9	6.7	1.84	5.91	22.7	6.72	12	10.8	9.1	9.2	9.89	1.84 - 22.7	
Strontium	mg/L	----	0.4	0.55	0.065	0.232	0.53	0.222	0.304	0.501	0.373	0.271	0.345	0.065 - 0.55	
Sulfur	mg/L	----	----	----	----	----	----	3.6	----	16.1	6.1	5.6	7.9	3.6 - 16.1	
Tin	mg/L	----	----	----	----	----	----	<0.01	<0.0001	<0.02	<0.001	<0.001		BD	
Thallium	mg/L	----	----	----	----	----	----	----	<0.00005	<0.02	<0.00005	<0.00005		BD	
Thorium	mg/L	----	<0.02	<0.02	<0.005	<0.005	<0.01	<0.01	----	----	----	----		BD	
Titanium	mg/L	----	<0.001	0.002	<0.001	<0.001	<0.001	0.002	<0.01	<0.003	0.0009	0.001		BD - 0.002	
Uranium	mg/L	----	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	0.00054	----	<0.0005	<0.0005		BD - 0.00054	
Vanadium	mg/L	----	0.0037	<0.0005	<0.001	<0.001	0.011	<0.002	<0.001	<0.003	0.0008	0.0007		BD - 0.011	
Zinc	mg/L	----	0.004	<0.001	0.003	0.002	0.008	<0.005	0.001	<0.002	<0.001	<0.001		BD - 0.008	
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----	<0.003	----	----		BD	

Note: < Denotes that sample is below the laboratory detection limit

[1] Sample collected at the culvert for the access road near the west end of the camp

[2] Range is based on a average pH of 8.0 and a temperature range of 0 to 10 °C

[3] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-10 (Williams Creek U/S of Yukon River) from 1989 to 1999

Parameter	Units	Sample Date							Average	Range	CCME Guidelines Freshwater Aquatic Life
		Aug-91	Dec-91	May-92	Jul-92	Oct-92	Oct-99 [1]	Oct-05			
In Situ Parameters											
pH		----	----	----	----	----	----	8.5			6.5 - 9.0
Conductivity	umho/cm	----	----	----	----	----	----	220			
Physical Parameters											
pH		8.1	8.1	7.6	8	7.7	----	8.08	7.9	7.6 - 8.1	6.5 - 9.0
Conductivity	umho/cm	188	204	97	140	355	----	257	207	97 - 355	
Total Suspended Solids	mg/L	<5	<5	25	20	<5	----	----		BD - 25	
Total Dissolved Solids	mg/L	----	----	----	----	----	----	140			
Turbidity	NTU	2	1	7	6	<1	----	----		BD - 7	
Hardness as $CaCO_3$	mg/L	105	171	58.1	102	156	----	130	120	58.1 - 171	
Anions											
Alkalinity as $CaCO_3$	mg/L	103	166	59	94	144	----	111	113	59 - 166	
Sulphate	mg/L	15.5	12.2	4.9	9.5	34.8	----	22	16	4.9 - 34.8	
Nutrients											
Ammonia-Nitrogen	mg/L	<0.05	0.05	<0.05	<0.05	<0.05	----	<0.05		BD - 0.05	1.04 - 2.33 [2]
Nitrate-Nitrogen	mg/L	<0.1	0.08	<0.05	<0.1	<0.20	----	0.01		BD - 0.08	
Nitrite-Nitrogen	mg/L	<0.003	<0.5	<0.03	<1	<2.0	----	<0.005		BD	0.06
Total Phosphorous	mg/L	----	0.015	0.014	0.04	0.025	----	0.1	0.039	0.014 - 0.1	
Orthophosphate	mg/L	----	----	----	----	----	----	0.08			
Total Metals											
Aluminum	mg/L	<0.005	<0.005	**0.389**	**0.463**	0.043	<0.06	**0.194**		BD - 0.463	0.005 - 0.1
Antimony	mg/L	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	<0.0002		BD	
Arsenic	mg/L	<0.05	**0.08**	<0.04	<0.04	<0.05	<0.04	0.0004		BD - 0.08	0.005
Barium	mg/L	0.026	0.146	0.026	0.034	0.055	0.041	0.034	0.052	0.026 - 0.146	
Beryllium	mg/L	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001		BD	
Bismuth	mg/L	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005		BD	
Cadmium	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	0.002	<0.00001		BD - 0.002	0.000017
Calcium	mg/L	32.1	59	16.3	29.9	47.9	38.2	37.6	37.29	16.3 - 59	
Chromium	mg/L	**0.009**	**0.004**	<0.001	<0.001	<0.001	<0.002	0.0008		BD - 0.009	0.001 [3]
Cobalt	mg/L	<0.001	0.002	<0.001	<0.001	0.002	<0.004	0.0001		BD - 0.002	
Copper	mg/L	<0.001	<0.001	0.001	**0.005**	**0.005**	**<0.003**	0.002		BD - 0.005	0.002 - 0.004
Iron	mg/L	0.163	0.07	**0.454**	**0.824**	0.257	0.1	**0.4**	0.324	0.07 - 0.824	0.3
Lead	mg/L	<0.004	<0.004	<0.004	<0.004	<0.005	<0.03	0.0002		BD	0.001 - 0.007
Lithium	mg/L	<0.06	<0.05	<0.05	<0.05	<0.05	----	0.002		BD	
Magnesium	mg/L	6.79	8.61	4.53	6.71	12	14.6	7.9	8.734	4.53 - 14.6	
Manganese	mg/L	0.004	0.034	0.024	0.027	0.018	0.014	0.039	0.023	0.004 - 0.034	
Molybdenum	mg/L	<0.005	<0.003	<0.003	<0.003	<0.004	<0.005	0.001		BD	0.073
Nickel	mg/L	0.006	0.004	<0.001	0.006	0.003	<0.01	0.0011		BD - 0.006	0.025 - 0.15
Phosphorous	mg/L	<0.02	<0.02	0.02	0.04	0.03	<0.1	----		BD - 0.04	
Potassium	mg/L	0.41	1.24	1.4	0.62	1.3	<0.5	0.6		BD - 1.4	
Selenium	mg/L	<0.01	<0.01	<0.02	<0.02	<0.02	<0.03	<0.0002		BD	0.001
Silicon	mg/L	13.2	1.4	6.18	12.2	10	<0.03	8.37		BD - 13.2	
Silver	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	**15.8**	<0.0002		BD - 15.8	0.0001
Sodium	mg/L	7.77	2.57	3.49	6.02	11.1	0.434	8	5.626	0.434 - 11.1	
Strontium	mg/L	0.24	0.166	0.132	0.29	0.47	<0.03	0.325		BD - 0.47	
Thallium	mg/L	----	----	----	----	----	----	<0.00005		BD	0.0008
Thorium	mg/L	<0.02	<0.02	<0.005	<0.005	<0.01	----	----		BD	
Titanium	mg/L	0.002	0.001	0.017	0.02	<0.001	<0.003	<0.0005		BD - 0.02	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.003	0.0007		BD	
Vanadium	mg/L	0.0021	<0.0005	<0.001	<0.001	0.01		0.0012		BD - 0.01	
Zinc	mg/L	0.003	**0.195**	0.007	0.01	0.008	<0.01	0.001		BD - 0.195	0.03
Zirconium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001		BD	
Dissolved Metals											
Aluminum	mg/L	<0.005	<0.005	0.08	0.042	0.043	<0.02	0.024		BD - 0.08	
Antimony	mg/L	<0.05	<0.05	<0.02	<0.02	<0.02	<0.015	<0.0002		BD	
Arsenic	mg/L	<0.05	0.06	<0.04	<0.04	<0.05	<0.04	0.0004		BD - 0.06	
Barium	mg/L	0.026	0.038	0.017	0.03	0.054	0.043	0.034	0.035	0.017 - 0.054	
Beryllium	mg/L	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.001	<0.0001		BD	
Bismuth	mg/L	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005		BD	
Cadmium	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.002	<0.00001		BD	
Calcium	mg/L	31	57.1	15.8	29.5	43.5	42	37.2	36.59	15.8 - 57.1	
Chromium	mg/L	<0.001	0.004	<0.001	<0.001	<0.001	<0.002	<0.0005		BD - 0.004	
Cobalt	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	<0.003	<0.0001		BD - 0.001	
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	0.001		BD - 0.005	
Iron	mg/L	0.08	0.022	0.171	0.164	0.129	0.094	0.15	0.116	0.022 - 0.171	
Lead	mg/L	<0.004	<0.004	<0.004	<0.004	<0.005	<0.02	<0.0001		BD	
Lithium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05		0.001		BD	
Magnesium	mg/L	6.63	6.92	4.38	6.65	11	16.1	8.3	8.57	4.38 - 16.1	
Manganese	mg/L	0.001	0.002	<0.001	<0.001	0.016	0.016	0.014		BD - 0.016	
Molybdenum	mg/L	<0.005	<0.005	<0.003	<0.003	<0.004	<0.004	0.001		BD	
Nickel	mg/L	0.004	<0.001	<0.001	0.004	0.003	<0.008	0.0008		BD - 0.004	
Phosphorous	mg/L	<0.02	<0.02	0.02	0.04	0.02	<0.04	----		BD - 0.04	
Potassium	mg/L	0.59	0.64	1.25	0.5	1.32	<0.4	<0.4		BD - 1.32	
Selenium	mg/L	<0.01	<0.01	<0.02	<0.02	<0.02	<0.03	<0.0002		BD	
Silicon	mg/L	10.4	1.2	5.21	11.5	8.9	<0.01	8.38		BD - 11.5	
Silver	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	17.4	<0.0001		BD - 17.4	
Sodium	mg/L	7.35	0.89	3.48	5.92	11.1	0.474	7.7	5.273	0.474 - 11.1	
Strontium	mg/L	0.24	0.11	0.131	0.234	0.43	<0.02	0.331		BD - 0.43	
Thorium	mg/L	<0.02	<0.02	<0.005	<0.005	<0.01	----	----		BD	
Titanium	mg/L	0.001	0.001	0.001	<0.001	<0.001	<0.003	0.0013		BD - 0.001	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.003	0.0006		BD	
Vanadium	mg/L	0.0011	<0.0005	<0.001	<0.001	0.004		0.0009		BD - 0.0011	
Zinc	mg/L	0.002	<0.001	0.005	0.01	0.008	<0.002	<0.001		BD - 0.01	
Zirconium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	----		BD	

Note: < Denotes that sample is below the laboratory detection limit

[1] Sample collected at the mouth of Williams Creek

[2] Range is based on a average pH of 8.0 and a temperature range of 0 to 1^{0}C

[3] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

Water Quality Data for Station W-11 (Nancy Lee Creek) from 1989 to 2005

Parameter	Units	Sample Date				Average	Range	CCME Guidelines Freshwater Aquatic Life
		Dec-91	May-92	Oct-92	Oct-05			
In Situ Parameters								
pH		----	----	----	7.45			6.5 - 9.0
Conductivity	umho/cm	----	----	----	210			
Physical Parameters								
pH		8.1	7.4	7.8	8.05	7.8	7.4 - 8.1	6.5 - 9.0
Conductivity	umho/cm	350	84	320	232	247	84 - 431	
Total Suspended Solids	mg/L	<5	8	<5	----		BD - 8	
Total Dissolved Solids	mg/L	----	----	----	130			
Turbidity	NTU	1	5	<1	----		BD - 5	
Hardness as $CaCO_3$	mg/L	169	47	151	120	122	47 - 169	
Anions								
Alkalinity as $CaCO_3$	mg/L	135	50	143	106	109	50 - 143	
Chloride	mg/L	----	----	----	1.2		1.3 - 3.6	
Fluoride	mg/L	----	----	----	----		BD - 1.1	
Sulphate	mg/L	49.2	2.6	29.2	15	24.0	2.6 - 76	
Nutrients								
Ammonia-Nitrogen	mg/L	<0.05	<0.05	<0.05	<0.05		BD - 0.06	1.04 - 2.33[1]
Nitrate-Nitrogen	mg/L	<0.2	<0.05	<0.2	0.02		BD	
Nitrite-Nitrogen	mg/L	<2	<0.03	<2.0	<0.005		BD - 0.003	0.06
Total Phosphorous	mg/L	0.01	0.012	0.006	0.1	0.032	0.006 - 0.1	
Orthophosphate	mg/L	----	----	----	0.08			
Total Metals								
Aluminum	mg/L	<0.005	**0.13**	0.055	**0.129**		BD - 0.13	0.005 - 0.1
Antimony	mg/L	<0.05	<0.02	<0.02	<0.0002		BD	
Arsenic	mg/L	**0.12**	<0.04	<0.05	0.0006		BD - 0.12	0.005
Barium	mg/L	0.04	0.016	0.046	0.029	0.033	0.016 -0.046	
Beryllium	mg/L	<0.0005	<0.0002	<0.0002	<0.0001		BD	
Bismuth	mg/L	<0.01	<0.02	<0.02	<0.0005		BD	
Boron	mg/L	----	----	----	0.006		BD - 0.002	
Cadmium	mg/L	<0.0003	<0.0003	<0.0004	<0.00001		BD	0.000017
Calcium	mg/L	53.9	13.8	42.6	34.5	36.2	13.8 - 53.9	
Chromium	mg/L	**0.004**	<0.001	<0.001	0.0006		BD - 0.004	0.001[2]
Cobalt	mg/L	<0.001	<0.001	0.002	0.0001		BD - 0.002	
Copper	mg/L	<0.001	**0.003**	**0.005**	0.002		BD - 0.005	0.002 - 0.004
Iron	mg/L	<0.005	0.161	0.268	**0.4**		BD - 0.637	0.3
Lead	mg/L	<0.004	<0.004	<0.005	<0.0001		BD	0.001 - 0.007
Lithium	mg/L	<0.05	<0.05	<0.05	0.002		BD - 0.3	
Magnesium	mg/L	11.3	3.4	11.5	6.5	8.2	3.4 - 13.9	
Manganese	mg/L	0.003	0.007	0.083	0.067	0.040	0.003 - 0.101	
Mercury	mg/L	----	----	----	----		BD	0.0001
Molybdenum	mg/L	<0.05	<0.003	<0.004	<0.001		BD - 0.003	0.073
Nickel	mg/L	0.002	<0.001	<0.02	0.0013		BD - 0.002	0.025 - 0.15
Phosphorous	mg/L	<0.02	<0.02	<0.02	----		BD	
Potassium	mg/L	1.13	1.3	1	0.5	0.98	0.9 - 1.3	
Selenium	mg/L	<0.01	<0.02	<0.02	<0.0002		BD	0.001
Silicon	mg/L	3.6	4.92	10	8.31	6.71	3.6 -10	
Silver	mg/L	<0.001	<0.001	<0.001	<0.0001		BD	0.0001
Sodium	mg/L	9.29	2.78	9.69	7	7.19	2.78 - 14.3	
Strontium	mg/L	0.39	0.088	0.33	0.23	0.260	0.088 - 0.444	
Thorium	mg/L	<0.02	<0.005	<0.01	----		BD	
Titanium	mg/L	0.002	0.003	<0.001	<0.0005		BD - 0.003	
Uranium	mg/L	<0.02	<0.02	<0.02	0.0005		BD	
Vanadium	mg/L	<0.0005	<0.001	0.008	0.001		BD - 0.008	
Zinc	mg/L	0.004	0.007	0.007	0.001	0.005	0.004 - 0.108	0.03
Zirconium	mg/L	<0.001	<0.001	<0.001	<0.001		BD	
Dissolved Metals								
Aluminum	mg/L	<0.005	0.084	0.05	0.029		BD - 0.084	
Antimony	mg/L	<0.05	<0.02	<0.02	<0.0002		BD	
Arsenic	mg/L	0.1	<0.04	<0.05	0.0005		BD - 0.1	
Barium	mg/L	0.035	0.014	0.045	0.028	0.031	0.014 - 0.045	
Beryllium	mg/L	<0.0005	<0.0002	<0.0002	<0.0001		BD	
Bismuth	mg/L	<0.01	<0.02	<0.02	<0.0005		BD	
Boron	mg/L	----	----	----	0.005			
Cadmium	mg/L	<0.0003	<0.0003	<0.0004	<0.00001		BD	
Calcium	mg/L	50.1	13.2	41.4	35.3	35.0	13.2 - 50.1	
Chromium	mg/L	0.003	<0.001	<0.001	<0.0005		BD - 0.003	
Cobalt	mg/L	<0.001	<0.001	0.001	<0.0001		BD - 0.001	
Copper	mg/L	<0.001	<0.001	0.004	0.001		BD - 0.004	
Iron	mg/L	----	0.115	0.2	0.22	0.178	0.115 - 0.2	
Lead	mg/L	<0.004	<0.004	<0.005	<0.0001		BD	
Lithium	mg/L	<0.05	<0.05	<0.05	0.001		BD	
Magnesium	mg/L	10.7	3.24	11.4	7	8.09	3.24 - 11.4	
Manganese	mg/L	<0.001	<0.001	0.08	0.028		BD - 0.08	
Mercury	mg/L	----	----	----	----			
Molybdenum	mg/L	<0.005	<0.003	<0.004	<0.001		BD	
Nickel	mg/L	0.002	<0.001	0.003	0.0011		BD - 0.003	
Phosphorous	mg/L	<0.02	<0.02	<0.02	----		BD	
Potassium	mg/L	0.92	1.19	0.99	<0.4		0.92 - 1.19	
Selenium	mg/L	<0.01	<0.02	<0.02	<0.0002		BD	
Silicon	mg/L	3.3	4.47	9.6	8.78	6.54	3.3 - 9.6	
Silver	mg/L	<0.001	<0.001	<0.001	<0.0001		BD	
Sodium	mg/L	8.24	2.74	9.6	6.8	6.85	2.74 - 9.6	
Strontium	mg/L	0.37	0.084	0.33	0.238	0.217	0.084 - 0.37	
Thorium	mg/L	<0.02	<0.005	<0.01	----		BD	
Titanium	mg/L	<0.001	0.001	<0.001	0.0013		BD - 0.001	
Uranium	mg/L	<0.02	<0.02	<0.02	0.0005		BD	
Vanadium	mg/L	<0.0005	<0.001	0.006	0.0009		BD - 0.006	
Zinc	mg/L	<0.001	0.003	0.006	<0.001		BD - 0.006	
Zirconium	mg/L	<0.001	<0.001	<0.001	----		BD	

Note: < Denotes that sample is below the laboratory detection limit

[1] Range is based on a average pH of 8.0 and a temperature range of 0 to 10°C

[2] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-12 (Williams Creek D/S of Confluer

Parameter	Units	Sample Date	CCME Guidelines
		Oct-05	Freshwater Aquatic Life
In Situ Parameters			
pH		8.25	6.5 - 9.0
Conductivity	umho/cm	250	
Physical Parameters			
pH		8.06	6.5 - 9.0
Conductivity	umho/cm	253	
Total Dissolved Solids	mg/L	140	
Hardness as $CaCO_3$	mg/L	130	
Anions			
Alkalinity as $CaCO_3$	mg/L	107	
Chloride	mg/L	1.2	
Sulphate	mg/L	22	
Nutrients			
Ammonia-Nitrogen	mg/L	<0.05	1.04 - 2.33[1]
Nitrate-Nitrogen	mg/L	0.02	
Nitrite-Nitrogen	mg/L	<0.005	0.06
Total Phosphorous	mg/L	0.1	
Orthophosphate	mg/L	0.08	
Total Metals			
Aluminum	mg/L	**0.156**	0.005 - 0.1
Antimony	mg/L	<0.0002	
Arsenic	mg/L	0.0005	0.005
Barium	mg/L	0.033	
Beryllium	mg/L	<0.0001	
Bismuth	mg/L	<0.0005	
Boron	mg/L	0.007	
Cadmium	mg/L	<0.00001	0.000017
Calcium	mg/L	36.8	
Chromium	mg/L	0.0007	0.001[2]
Cobalt	mg/L	0.0001	
Copper	mg/L	0.002	0.002 - 0.004
Iron	mg/L	**0.4**	0.3
Lead	mg/L	0.0001	0.001 - 0.007
Lithium	mg/L	0.002	
Magnesium	mg/L	7.7	
Manganese	mg/L	0.048	
Molybdenum	mg/L	0.001	0.073
Nickel	mg/L	0.0011	0.025 - 0.15
Potassium	mg/L	0.6	
Selenium	mg/L	<0.0002	0.001
Silicon	mg/L	8.26	
Silver	mg/L	<0.0001	0.0001
Sodium	mg/L	7.7	
Strontium	mg/L	0.304	
Titanium	mg/L	<0.0005	
Uranium	mg/L	0.0006	
Vanadium	mg/L	0.0011	
Zinc	mg/L	0.001	0.03
Zirconium	mg/L	<0.001	
Dissolved Metals			
Aluminum	mg/L	0.025	
Antimony	mg/L	<0.0002	
Arsenic	mg/L	0.0005	
Barium	mg/L	0.032	
Beryllium	mg/L	<0.0001	
Bismuth	mg/L	<0.0005	
Boron	mg/L	0.007	
Cadmium	mg/L	<0.00001	
Calcium	mg/L	37.4	
Chromium	mg/L	<0.0005	
Cobalt	mg/L	0.0001	
Copper	mg/L	0.001	
Iron	mg/L	0.18	
Lead	mg/L	<0.0001	
Lithium	mg/L	0.002	
Magnesium	mg/L	8	
Manganese	mg/L	0.016	
Molybdenum	mg/L	0.001	
Nickel	mg/L	0.0009	
Potassium	mg/L	0.5	
Selenium	mg/L	<0.0002	
Silicon	mg/L	8.53	
Silver	mg/L	<0.0001	
Sodium	mg/L	7.6	
Strontium	mg/L	0.319	
Titanium	mg/L	0.0013	
Uranium	mg/L	0.0006	
Vanadium	mg/L	0.0009	
Zinc	mg/L	0.001	

Note: < Denotes that sample is below the laboratory detection limit

[1] Range is based on a average pH of 8.0 and a temperature range of 0 to 10 ^{o}C

[2] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-13 (Williams Creek U/S of Confluer

Parameter	Units	Sample Date	CCME Guidelines
		Oct-05	Freshwater Aquatic Life
In Situ Parameters			
pH		8.4	6.5 - 9.0
Conductivity	umho/cm	280	
Physical Parameters			
pH		8.08	6.5 - 9.0
Conductivity	umho/cm	284	
Total Dissolved Solids	mg/L	159	
Hardness as $CaCO_3$	mg/L	140	
Anions			
Alkalinity as $CaCO_3$	mg/L	114	
Chloride	mg/L	0.6	
Sulphate	mg/L	31.1	
Nutrients			
Ammonia-Nitrogen	mg/L	<0.05	1.04 - 2.33[1]
Nitrate-Nitrogen	mg/L	0.02	
Nitrite-Nitrogen	mg/L	<0.005	0.06
Total Phosphorous	mg/L	<0.1	
Orthophosphate	mg/L	0.09	
Total Metals			
Aluminum	mg/L	**0.232**	0.005 - 0.1
Antimony	mg/L	<0.0002	
Arsenic	mg/L	0.0005	0.005
Barium	mg/L	0.039	
Beryllium	mg/L	<0.0001	
Bismuth	mg/L	<0.0005	
Boron	mg/L	0.008	
Cadmium	mg/L	<0.00001	0.000017
Calcium	mg/L	38.1	
Chromium	mg/L	0.0008	0.001[2]
Cobalt	mg/L	0.0001	
Copper	mg/L	0.002	0.002 - 0.004
Iron	mg/L	0.3	0.3
Lead	mg/L	0.0001	0.001 - 0.007
Lithium	mg/L	0.002	
Magnesium	mg/L	9	
Manganese	mg/L	0.013	
Molybdenum	mg/L	0.002	0.073
Nickel	mg/L	0.0011	0.025 - 0.15
Potassium	mg/L	0.7	
Selenium	mg/L	<0.0002	0.001
Silicon	mg/L	8.08	
Silver	mg/L	<0.0001	0.0001
Sodium	mg/L	9.2	
Strontium	mg/L	0.401	
Titanium	mg/L	<0.0005	
Uranium	mg/L	0.0005	
Vanadium	mg/L	0.0014	
Zinc	mg/L	0.002	0.03
Zirconium	mg/L	<0.001	
Dissolved Metals			
Aluminum	mg/L	0.018	
Antimony	mg/L	<0.0002	
Arsenic	mg/L	0.0004	
Barium	mg/L	0.037	
Beryllium	mg/L	<0.0001	
Bismuth	mg/L	<0.0005	
Boron	mg/L	0.008	
Cadmium	mg/L	<0.00001	
Calcium	mg/L	39.5	
Chromium	mg/L	<0.0005	
Cobalt	mg/L	<0.0001	
Copper	mg/L	0.001	
Iron	mg/L	0.13	
Lead	mg/L	<0.0001	
Lithium	mg/L	0.002	
Magnesium	mg/L	9.9	
Manganese	mg/L	<0.005	
Molybdenum	mg/L	0.002	
Nickel	mg/L	0.0007	
Potassium	mg/L	0.6	
Selenium	mg/L	<0.0002	
Silicon	mg/L	8.21	
Silver	mg/L	<0.0001	
Sodium	mg/L	8.9	
Strontium	mg/L	0.426	
Titanium	mg/L	0.0013	
Uranium	mg/L	0.0005	
Vanadium	mg/L	0.001	
Zinc	mg/L	0.002	

Note: < Denotes that sample is below the laboratory detection limit

[1] Range is based on a average pH of 8.0 and a temperature range of 0 to 10 ^{o}C

[2] Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

WESTERN SILVER CORPORATION

Environmental Monitoring Program Update and Data Summary

Carmacks Copper Project
Yukon Territory

Appendix B

Summary of Sediment Sample Analysis For August and October 2005

Summary of Sediment Metals Concentrations - Carmacks Copper Project, Williams Creek August 2005 Sample Program

Site Id		W9-Sediment (-10 mesh)	W9-Sediment (-100 mesh)	W2Sediment (-10 mesh)	W2-Sediment (-100 mesh)	W3-Sediment (-10 mesh)	W3-Sediment (-100 mesh)	W4-Sediment (-10 mesh)	W4-Sediment (-100 mesh)	W7-Sediment (-10 mesh)	W7-Sediment (-100 mesh)	Range*	CCME Guideline	
Sample Date		8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005	8/11/2005		Interim Freshwater Sediment Quality Guidelines (ug/g)	Probable Effect Levels (ug/g)
Parameter	Unit													
pH	pH	6.5	6.7	6.7	6.8	6.6	6.8	7	7.2	6.6	6.7	6.5 - 7.2		
Dissolved Metals														
Aluminum	ug/g	8000	8600	3800	6500	5400	6900	3500	7700	5400	6900	3500 -8600		
Antimony	ug/g	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	BD		
Arsenic	ug/g	1.2	0.81	0.66	<0.5	1.1	<0.5	1.1	0.94	<0.5	<0.5	BD - 1.2	5.9	17.0
Barium	ug/g	130	120	49	78	88	100	48	120	60	76	48 - 130		
Beryllium	ug/g	0.36	0.35	0.16	0.23	0.23	0.27	0.17	0.34	0.24	0.31	0.16 - 0.36		
Bismuth	ug/g	<1	<2	<1	<1	<1	<1	<2	<1	<1	<1	BD		
Cadmium	ug/g	0.2	0.2	0.09	0.1	0.1	0.1	0.08	0.2	0.1	0.1	0.08 - 0.2	0.6	3.5
Calcium	ug/g	8500	6900	2300	4400	4800	5700	2300	8000	3700	4700	2300 - 8500		
Chromium	ug/g	18	20	6.8	14	12	16	6.8	21	13	18	6.8 - 21	37.3	90
Cobalt	ug/g	6.2	6.4	3.1	4.6	4	4.8	3.1	6	4	5	3.1 - 6.4		
Copper	ug/g	17	14	3.2	5.9	8.8	8.7	4.2	12	8.4	11	3.2 - 17	35.7	197
Iron	ug/g	16000	16000	8300	12000	12000	15000	8700	19000	11000	14000	8300 - 19000		
Lead	ug/g	4.3	3.9	1.9	2.6	2.7	3	2.4	4.1	3	3.6	1.9 - 4.3	35	91.3
Lithium	ug/g	6.8	7.2	2.9	4.8	4.1	5	2.6	5.6	3.9	5	2.6 - 7.2		
Magnesium	ug/g	4100	4300	1800	2900	2300	2800	1800	3400	2400	3000	1800 - 4300		
Manganese	ug/g	170	160	89	130	220	240	180	480	90	110	89 - 480		
Mercury	ug/g	0.025	0.022	0.0088	0.01	0.014	0.017	0.0056	0.018	0.012	0.016	0.0056 - 0.025	0.17	0.486
Molybdenum	ug/g	<0.2	<0.2	0.2	0.3	<0.2	<0.2	0.3	0.69	<0.2	<0.2	BD - 0.69		
Nickel	ug/g	14	15	5.2	8.9	8.2	9.8	6.7	12	8.1	11	5.2 - 15		
Phosphorus	ug/g	580	660	310	650	520	760	300	890	500	670	300 - 890		
Potassium	ug/g	720	780	320	460	390	440	300	540	420	510	300 - 780		
Selenium	ug/g	<0.48	<0.50	<0.49	<0.49	<0.50	<0.49	<0.51	<0.48	<0.49	<0.50	BD		
Silicon	ug/g	59	44	40	33	40	44	69	120	31	33	31 - 120		
Silver	ug/g	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	BD		
Sodium	ug/g	270	260	140	220	210	230	120	270	170	200	120 - 270		
Strontium	ug/g	100	80	26	45	50	52	26	77	27	34	26 - 100		
Thallium	ug/g	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	BD		
Tin	ug/g	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	BD		
Titanium	ug/g	260	390	230	360	300	350	210	450	320	390	210 - 450		
Vanadium	ug/g	31	33	17	26	27	35	19	44	30	38	17 - 44		
Zinc	ug/g	37	38	16	28	23	28	15	34	21	27	15 - 38	123	315
Zirconium	ug/g	4.8	5.1	2.6	3.4	3	3.2	2.8	4.1	3.4	4	2.6 - 5.1		

* Range includes -10 mesh and -100 mesh results

Summary of Sediment Metals Concentrations - Carmacks Copper Project, Williams Creek October 2005 Sample Program
Sample fraction analyzed: -100 mesh

Site Id	W2-A	W2-B	W2-C	W3-A	W3-B	W3-C	W4-A	W4-B	W4-C	W6-A	W6-B	W6-C	W7-A	W7-B	W7-C	W9-A	W9-B	W9-C	W10-A	W10-B	W10-C	W11-A	W11-B	W11-C	W12-A	W12-B	W12-C	W13-A	W13-B	W13-C	Range	CCME Guideline	
Sample Date	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005		Interim Freshwater Sediment	Probable Effect Levels
Parameter																																	
pH	7.3	7.1	7.3	6.7	6.8	6.9	7.3	7.2	7.3	7.2	7.4	7.3	6.3	7	7.2	7.1	7.2	6.4	7.1	7.2	7.2	7.5	7.6	7.4	7.3	7.3	7.3	7.6	7.9	6.6	6.3 - 7.9		
Carbon (Total Organic %)	3.12			4.52			2.14			1.98			1.24			4.07			2.26			1.18			1.83			3.15			1.18 - 4.52		
Carbon (Total Inorganic %)	0.09			0.09			0.06			<0.05			<0.05			0.1			0.08			0.06			0.07			0.15			BD - 0.15		
Dissolved Metals (ug/g)																																	
Aluminum	9000	7910	8370	10000	9180	8960	5390	8460	6040	8180	7870	6320	11100	7460	7350	9920	10400	9600	6800	9330	7910	7040	4930	8150	5830	7790	6230	10100	10900	9710	4930 - 11100		
Antimony	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	BD		
Arsenic	2.3	0.4	1.3	1.4	3.2	1.8	1.6	2	<0.2	0.72	1.1	0.4	3.5	2.3	3.3	2.1	2.3	1.4	1.2	2.2	2.2	2.2	1.1	1.2	2.1	2.3	2	3.3	3.1	1.1	BD - 3.5	5.9	17.0
Barium	128	92	108	158	165	131	77.1	144	67.3	94	90.1	68	147	88.2	88.4	124	137	125	87.3	132	114	96.6	56	89.6	62.6	110	78.4	180	199	155	56 - 199		
Beryllium	0.27	0.22	0.23	0.32	0.27	0.25	0.17	0.26	0.16	0.23	0.22	0.16	0.37	0.26	0.25	0.31	0.32	0.28	0.24	0.31	0.27	0.22	0.15	0.24	0.19	0.25	0.2	0.41	0.44	0.31	0.15 - 0.44		
Bismuth	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	BD		
Cadmium	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.09	0.2	0.2	0.06	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.3	0.3	0.2	0.06 - 0.3	0.6	3.5
Calcium	9900	7180	8310	11700	9460	8930	4570	9320	4800	8000	7390	4800	4320	4130	4870	8810	10400	7640	4890	7510	6520	5960	4240	7320	4650	6680	4910	8930	10600	11700	4130 - 11700		
Chromium	18.9	16	17.4	21.4	18.6	18	15	19	13.4	20.2	17.4	12.7	25.2	20.6	18.4	20.1	21.2	19.2	16.8	19.7	16.4	15.2	10.6	18.7	13.7	16.2	13	22.9	25.4	19.6	10.6 - 25.4	37.3	90
Cobalt	6.55	5.44	5.85	6.6	5.84	5.7	4.8	6.32	4.4	5.84	5.58	4.4	7.05	5.78	5.84	6.81	7.15	6.45	5.92	7.26	6.26	5.72	4	5.83	4.6	6.3	5.06	8.56	8.87	6.42	4 - 8.87		
Copper	13.8	10.2	11.4	23.5	19.2	16.2	6.85	14.2	6.38	9.94	8.96	5.05	19.7	12.3	13.5	18.3	19.7	17.5	13.4	22.6	19.6	16.8	9.18	16.5	15.4	20.6	15.7	24.4	26	28.9	5.05 - 28.9	35.7	197
Iron	17600	13500	15500	16700	18800	17400	13700	19100	12900	16200	15800	11700	19700	18800	17900	17000	18100	16600	18900	17600	15200	15200	10900	17000	13800	16100	13100	22900	26300	16200	10900 - 26300		
Lead	3.9	3	3.4	4.3	4.5	3.8	2.7	4	2.5	3.3	3.2	2.2	4.6	3.5	3.5	4	4.4	3.8	4	4.4	4	3.5	2.3	3.5	3.1	3.8	2.9	7.02	7.67	4.2	2.2 - 7.67	35	91.3
Lithium	7.59	6.61	6.93	8.5	7.8	7.47	4.3	6.83	4.7	6.56	6.25	4.9	7.34	5.06	5.23	8.97	9.32	8.43	6.14	8.96	7.71	6.19	4	6.97	5.17	6.93	5.35	11.2	11.5	8.3	4 - 11.5		
Magnesium	3960	3480	3610	3830	3410	3430	2450	3560	2580	3470	3360	2700	3830	2840	2950	4500	4690	4170	3350	4440	3830	3310	2330	3770	2880	3620	2930	5600	5910	3700	2330 - 5910		
Manganese	485	165	309	563	699	305	392	846	162	232	215	141	270	277	468	285	374	189	277	526	598	693	250	385	208	769	457	493	582	551	141 - 846		
Mercury	0.038	0.03	0.035	0.044	0.042	0.036	0.022	0.036	0.02	0.027	0.025	0.0524	0.022	0.02	0.022	0.038	0.038	0.034	0.025	0.036	0.04	0.026	0.018	0.027	0.033	0.033	0.025	0.038	0.045	0.042	0.018 - 0.0524	0.17	0.486
Molybdenum	1.2	0.85	1	0.5	0.7	0.2	0.4	0.78	0.3	0.66	0.67	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.68	0.61	0.5	0.2 - 1.2		
Nickel	13.1	11	11.5	14.9	12.8	12.2	9.88	12.5	8.1	11.4	10.5	8	17.4	12.2	11.6	15.1	15.8	13.9	11.2	15.6	13.4	11	7.24	11.8	9.21	12.2	9.52	19.6	20.5	14.2	7.24 - 20.5		
Phosphorus	815	725	832	765	812	789	577	876	667	982	940	796	645	698	724	728	790	763	746	748	620	728	556	889	581	732	627	940	975	725	556 - 982		
Potassium	774	630	685	711	611	603	410	658	500	682	628	460	907	611	610	1020	1070	906	629	897	761	611	400	677	543	725	525	1260	1330	696	400 - 1330		
Selenium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	BD		
Silicon	115	117	110	103	90.2	89.3	138	89.3	131	107	105	133	172	156	138	84.5	98.1	80	139	99.8	94.3	116	103	113	114	84.1	87.2	152	114	85.1	80 - 172		
Silver	0.2	0.2	<0.2	0.3	0.5	0.2	0.4	0.2	0.2	<0.2	0.1	<0.2	0.72	0.4	<0.2	0.1	<0.2	0.1	0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.94	<0.2	BD - 0.94		
Sodium	315	275	291	348	297	306	185	306	228	283	271	205	226	203	222	358	374	355	240	312	256	282	196	331	199	294	232	248	271	394	185 - 394		
Strontium	104	74.6	85.4	107	93.6	89.4	45.7	96.8	46.5	72.5	68	44.7	28.1	24.2	28.9	92.7	109	79.3	47	70	61.8	48	29.6	51.1	45.8	61.3	43.8	88	86.6	104	24.2 - 109		
Thallium	0.67	<0.3	0.5	0.83	1.3	0.52	0.4	1.4	<0.3	<0.3	<0.3	<0.3	0.3	1	0.87	<0.3	0.7	0.54	<0.3	0.88	1.4	1.1	0.3	0.53	<0.3	1.4	0.58	0.67	1	1.2	BD - 1.4		
Tin	0.74	1.1	0.88	0.7	0.5	0.57	3	2	0.67	0.78	0.52	0.3	1.1	0.54	0.65	0.52	0.55	0.58	0.56	23.4	0.4	0.66	0.69	0.5	1	0.62	0.5	2	1.1	0.5	0.3 - 23.4		
Titanium	390	358	381	382	335	340	284	357	323	406	385	293	336	308	292	407	421	391	353	351	286	308	252	354	250	317	277	324	346	372	250 - 421		
Vanadium	34.6	29.7	34.1	37.9	37.6	36.2	29.8	40	31.2	38.2	36.8	26.7	44.8	44.9	39.1	34.4	35.8	34	46.1	37.1	31.5	34.1	26	39.6	31.5	35.6	29.5	48.3	56.5	37.3	26 - 56.5		
Zinc	40.9	36.3	38.5	42.4	36.4	36.1	25.5	39	27.2	36.6	35	27.9	36.8	29.2	30	43.7	46.6	43.6	35.1	45	39.1	32	22.6	34.7	27.6	36.1	28.2	58.2	61.4	41	22.6 - 61.4	123	315
Zirconium	4.4	3.8	3.9	4.8	3.8	3.6	2.7	3.6	2.6	3.9	3.6	2.8	4.4	3.4	3.2	4.7	5.13	4.7	3.1	3.9	3.3	2.9	2.3	3.2	2.6	3.2	2.6	4.5	4.7	4.7	2.3 - 5.13		

Metal Concentrations in Sediments Collected from Williams and Nancy Lee Creeks - 1992 & 2005 Range Comparison

Parameter	July&August 1992 Williams & Nancy Lee Creeks (ug/g)	August 2005 Williams Creek* (ug/g)	October 2005 Williams Creek (ug/g) -100 mesh	CCME Guideline	
				Interim Freshwater Sediment Quality Guidelines (ug/g)	Probable Effect Levels (ug/g)
Aluminum	6750 - 9980	3500 - 8600	4930 - 11100		
Barium	67 - 201	48 - 130	56 - 199		
Beryllium	0.2 - 0.3	0.16 - 0.36	0.15 - 0.44		
Cadmium	BD - 0.3	0.08 - 0.2	0.06 - 0.3	0.6	3.5
Calcium	6550 - 9770	2300 - 8500	4130 - 11700		
Chromium	16.4 - 22.4	6.8 - 21	10.6 - 25.4	37.3	90
Cobalt	5.2 - 7.4	3.1 - 6.4	4 - 8.87		
Copper	10.1 - 75.8	3.2 - 17	5.05 - 28.9	35.7	197
Iron	13300 - 21800	8300 - 19000	10900 - 26300		
Lead	5.0 - 9.0	1.9 - 4.3	2.2 - 7.67	35	91.3
Lithium	BD - 200	2.6 - 7.2	4 - 11.5		
Magnesium	3730 - 5370	1800 - 4300	2330 - 5910		
Maganese	184 - 412	89 - 480	141 - 846		
Potassium	940 - 1400	300 - 780	400 - 1330		
Selenium	BD	BD	BD		
Silicon	270 - 760	31 - 120	80 - 172		
Sodium	230 - 540	120 - 270	185 - 394		
Strotium	46.6 - 70.7	26 - 100	24.2 - 109		
Titanium	539 - 704	210 - 450	250 - 421		
Vanadium	30 - 52	17 - 44	26 - 56.5		
Zinc	30.8 - 48.0	15 - 38	22.6 - 61.4	123	315

*Ranges includes -10 mesh and -100 mesh results

WESTERN SILVER CORPORATION

Environmental Monitoring Program Update and Data Summary

Carmacks Copper Project
Yukon Territory

Appendix C

Summary Report for
October 2005 Fisheries Investigation

Carmacks Copper Project
Fisheries Investigations October 2005

Introduction/Background

The Carmacks Copper project is located in the upper reaches of Williams Creek, approximately 9 km upstream of the confluence with the Yukon River. Between August 1991 and August 1992 three fisheries investigations, including biophysical inventory, electrofishing, minnow traps, and spawning surveys, were completed to determine the distribution and abundance of fish in the project area. An update of the information collected in 1991 and 1992 is required.

Fishery Investigations

Williams Creek Watershed

Williams Creek has been classified into four reaches based upon differing habitat characteristics. Figure 1 shows the location of reach boundaries and provides descriptions of the physical habitat characteristics for each reach. Fish and fish habitat investigations were conducted on October 16-18, 2005 (under DFO's Scientific Collection Permit No. 05-49) at ten sites within the Williams Creek watershed. Sites included W-2, W-3, W-4, W-6, W-7, W-9, W-10, W-11, W-12 and W-13 (Figure 1).

Methods

Gee traps, using Yukon River origin chinook salmon roe was used as an attractant, were set at various sites throughout the study area. Traps were set for a nominal 24 hour soak. Three traps were set at each site located in the lower Williams Creek watershed while only two traps were set at sites in the upper reaches near the mine site (see Table 1).

Table 1 Fish Sampling Summary

Site	Effort* Gee Traps	CH	SS	Total Fish Captured
W-2	2	0	0	0
W-3	2	0	0	0
W-4	2	0	0	0
W-6	2	0	0	0
W-7	0	0	0	0
W-10	3	20	1	19
W-11	3	0	0	0
W-12	3	0	0	0
W-13	3	0	1	1
Totals	**20**	**20**	**2**	**20**

* Nominal 24 hour soak
CH – Juvenile Chinook Salmon
SS – Slimy Sculpin

All fish captured were identified, and enumerated. Juvenile chinook salmon were measured for fork-length and slimy sculpins for total length before release.

In-situ water quality measurements were conducted for temperature, conductivity, dissolved oxygen (D.O.), and pH. D.O. and pH were measured using Oxyguard meters.

Results

Williams Creek Watershed

Sampling within the watershed resulted in the capture of 21 juvenile chinook salmon (*Oncorhynchus tshawytscha*) and 2 slimy sculpins (*Cottus cognatus)* (Table 2). Of these all chinook salmon were captured at W-10 near the Yukon River confluence. Fork-length for the salmon ranged from 50-71 mm with an average of 62 mm. Slimy sculpins, two in total, were captured at two locations, W-10 and upstream at W-13. No fish were captured upstream of W-13.

Table 2 Fish Assessment

Date	Site	Fish #	Species	Fork-length* (mm)	Capture Method
10/17/2005	W-13	1	SS	NM	G
10/17/2005	W-10	2	SS	NM	G
10/17/2005	W-10	3	CH 1^{+}	65	G
10/17/2005	W-10	4	CH 1^{+}	70	G
10/17/2005	W-10	5	CH 1^{+}	55	G
10/17/2005	W-10	6	CH 1^{+}	62	G
10/17/2005	W-10	7	CH 1^{+}	68	G
10/17/2005	W-10	8	CH 1^{+}	64	G
10/17/2005	W-10	9	CH 1^{+}	62	G
10/17/2005	W-10	10	CH 1^{+}	60	G
10/17/2005	W-10	11	CH 1^{+}	64	G
10/17/2005	W-10	12	CH 1^{+}	58	G
10/17/2005	W-10	13	CH 1^{+}	57	G
10/17/2005	W-10	14	CH 1^{+}	60	G
10/17/2005	W-10	15	CH 1^{+}	58	G
10/17/2005	W-10	16	CH 1^{+}	65	G
10/17/2005	W-10	17	CH 1^{+}	58	G
10/17/2005	W-10	18	CH 1^{+}	65	G
10/17/2005	W-10	19	CH 1^{+}	65	G
10/17/2005	W-10	20	CH 1^{+}	50	G
10/17/2005	W-10	21	CH 1^{+}	71	G
10/17/2005	W-10	22	CH 1^{+}	60	G
10/17/2005	W-10	23	CH 1^{+}	65	G

Legend

Species
SS slimy sculpin * total length measured
CH 1+ chinook salmon over one year

Capture Method
G Gee-type trap

Fork-length
NM no measurement

Water Quality

In situ water quality measurements results are included in Table 3. Temperatures within the Williams Creek watershed ranged from -0.4 to 0.8 ^{o}C on the sampling dates. Conductivity ranged from a low of 180 *uS/cm* at W-7 on Williams Creek to a high of 320 *uS/cm* at W-3, located on an unnamed tributary of Williams Creek. All sites where pH was measured were between 7.45 and 8.5. Dissolved oxygen levels ranged between a low of 7.6 mg/L at W-3 (tributary of Williams Creek) and 13.4 mg/L at W-10.

In-situ Water Quality

Date	Site	T ^{o}C	Cond (uS/cm)	D.O. (mg/L)	pH
10/16/2005	W-10	0.5	220	13.4	8.5
10/16/2005	W-11	0.5	210	13.2	7.45
10/16/2005	W-12	0.1	250	13.1	8.25
10/16/2005	W-13	0.1	280	13.1	8.4
10/17/2005	W-9	0	180	11.9	NM
10/17/2005	W-6	0	240	13	8.06
10/18/2005	W-3	0.8	320	7.6	8.5
10/18/2005	W-4	0	280	13.1	7.73
10/18/2005	W-2	-0.4	260	12.8	8
10/18/2005	W-7	0.4	180	12	7.6

NM – not measured

Water quality and sediment samples were collected from each sample station and sent to Norwest Labs for analysis.

Fisheries Investigation October 2005

Carmacks Copper Project Yukon Territory

WESTERN SILVER CORPORATION

Reach 4: Average channel width of 4 m and gradient of 1.0% Pools - 30%; Riffles - 10%; Runs - 60%. Some undercut banks, some debris, overhanging vegetation. Bed material: fines - 80%; gravels - 20%; larges - 0%. No Fish.

Reach 2: NANCY LEE - Average channel width of 5 m and gradient of 1.5%. Pools - 20%; Riffles - 20%; Runs - 60%. Some debris with extensive overhanging vegetation. Bed material: fines - 20%; gravels - 40%; larges - 30%. No side channels. No Fish.

Reach 1: NANCY LEE - Average channel width of 7 m and gradient of 2.0%. Pools - 10%; Riffles - 10%; Runs - 80%. Some debris with extensive overhanging vegetation. Bed material: fines - 10%; gravels - 20%; larges - 70%. Bed rock out crops. No Fish.

Reach 3: Average channel width of 5 m and gradient of 2.5%. Pools - 20%; Riffles - 10%; Runs - 70%. Moderate undercut banks, some debris, overhanging vegetation. Bed material: fines - 30%; gravels - 20%; larges - 50%. No Fish.

Reach 2: Average channel width of 5 m and gradient of 1.5%. Pools - 20%; Riffles - 20%; Runs - 60%. Some debris with overhanging vegetation. Bed material: fines - 20%; gravels - 40%; larges - 30%. No side channels. No Fish.

Reach 1: Average channel width of 6 m and gradient of 1.5%. Pools - 30%; Riffles - 10%; Runs - 60%. Some undercut banks, some small debris, overhanging vegetation. Bed material: fines - 20%; gravels - 50%; larges - 30%. Chinook, Grayling, Sculpin, Sucker, Pike.

Yukon River Highest habitat capablilites in side channels. Moderate debris accumulations. Some undercut banks in side channels. High fines content. with largel cobble. Suspect low spawning capabilities, near confluence. Chinook, Grayling, Sculpins, Suckers.

R4 W9 Ore Deposit W8 W7 R2 W5 W1 R1 W6 W2 W3 W4 R3 Williams Creek R2 Nancy Lee Creek W11 W13 W12 R1 W10 Yukon River

Merrice Creek

Merrice Lake

McGregor Creek

Klondike Highway #2

Legend:

- Sample Station
- Ore Deposit
- Proposed Access Road
- Exploration Road
- Highway
- Contour
- Water Course
- Reach
- Water Body
- Environmental Assessment Study Area

Reach and Sample Site Locations obtained from:
"Western Copper Holding Williams Creek Copper Oxide Project Volume 1 Biophysical Assessment of the Williams Creek Mine Site"
Figure 3.6.1 Location of reach boundaries and summary of physical habitat chacteristics for the Williams Creek study area.

UTM Zone 8 NAD83 Meters

Reach Boundaries & Fisheries Investigation Sample Stations

Figure Number: **1**

Scale: 1:50,000

ACCESS CONSULTING GROUP

Drawn by: HD/NS	Checked by: DC
Date: December 1, 2005	

Our File: D:\Project\AllProjects\WCH-01\gis\mxd\Fig5_5_Fish.mxd