



Wolverine Project

Surveillance Network Monitoring Report January 2006

Type B Water Licence QZ01-051
Conditions 41 to 45

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1 Introduction

This report has been prepared to satisfy requirements contained within Type “B” Water Licence Approval QZ01-051. The structure and content of this report is based upon details provided in the Environmental Assessment Act Screening Report (Application No. LQ00026), as authorized by Yukon Government Energy, Mines and Resources and the Yukon Water Board. This report provides information with respect to Water Licence Conditions 41-45 for the monitoring period October 2005 to January 2006.

The 2005 Advanced Exploration Program included the construction of a 300 m long underground decline that extended from surface (1345 m elevation) to 1300 m elevation. Underground test mining activities were completed on November 10, 2005, and details pertaining to the seasonal shutdown (from December 1, 2005 to March 15, 2006) were outlined in the *Temporary Closure Plan Report* submitted to the Yukon Water Board on November 17, 2005.

As outlined in the *Temporary Closure Plan Report*, water treatment will not be required during the period of inactivity due to frozen conditions. Monitoring of the Surveillance Network stations will continue through this period, with sampling intensity increasing in the spring. Although the portal entrance is above the groundwater table (and predicted to be dry), regular inspections at the portal opening will be conducted to confirm that there is no portal discharge.

This report contains the following information:

- Section 2 - Surveillance Network Monitoring Program requirements
- Section 3 - information pertaining to onsite and underground water collection, monitoring and treatment
- Section 4 - a summary baseline data for October 1995 to September 2005
- Section 5 - monthly monitoring data for the period of October 2005 to January 2006.

2 Surveillance Network Monitoring Program

Water management activities for the test mining program consist of the collection of groundwater in the underground workings, and the collection of surface runoff from the temporary waste rock facility. As outlined in Water Licence QZ01-051, no discharge shall exceed the limits summarized in Table 2.1.

Surveillance Network Monitoring (SNM) locations and water quality sampling frequency as listed in B Licence Appendix A are summarized in Table 2.2. Samples were analyzed for physical parameters, ICP metals scan dissolved and total metals, total suspended solids, as well as dissolved organic carbon for creek sampling locations.

Table 2.1. B Licence Maximum Authorized Concentration Grab Sample Discharge Quality Criteria

Parameter	Limit
Arsenic	0.10 mg/l
Cadmium	0.02 mg/l
Copper	0.20 mg/l
Lead	0.20 mg/l
Nickel	0.50 mg/l
Zinc	0.50 mg/l
TSS	15 mg/l
Ammonia	2.5 mg/l
Selenium	0.015 mg/l

Table 2.2. Surveillance Network Monitoring Sampling Requirements

Station No.	Sampling Frequency
W-9: Wolverine Creek	Quarterly
W-12: Go Creek above Pup Creek	Quarterly
W-16: Go Cr. 15 m upstream of Hawkowl Cr.	Monthly
AWP-SP – Aggregate wash plant settling pond (not required)	Monthly
UTMD – Underground test mine discharge (now DS)	Weekly
WRSS – Waste rock stockpile seepage	Weekly
C-PS – Clean sump decant (now CS)	Weekly
WTSP – Water treatment plant settling pond (now TS)	Weekly

A discharge must also meet a fish bioassay standard. The methodology for conducting fish bioassays will follow Environment Canada Method EPS 1/RM/13 for a 96 hour LC₅₀.

Flow monitoring is required quarterly for W9 and W12, monthly for W16, and weekly for the remaining sites. Both water quality and flows were sampled typically more frequently than required. Not all infrastructure-related stations have been monitored as onsite requirements changed at the onset of the program in May 2005. An aggregate wash plant was not constructed and therefore there is no station AWP-SP, and three sumps were constructed at the portal as detailed below. Station UTMD samples were collected from the dirty water sump (DS), and WTSP samples were either collected from the clean sump (CS) or the treatment sump (TS).

Sediment sampling is also required in triplicate at the creek stations annually, during summer low flows.

The intent of the SNM Program is to monitor changes to the receiving environment compared to baseline conditions. This is the first SNM report submitted under the Program, however, an update was provided to YTG Water Inspections on October 11, 2005 (Appendix A) before any scheduled discharges were conducted.

This report also provides information for two accidental releases that occurred in mid October and early November. As such, this monitoring report baseline data from October 1995 to September 2005, and monitoring results for October and November 2005, and January 2006.

3 Water Management Site Infrastructure

In order to conduct activities associated with this test mine program, the underground workings were dewatered and discharged to a dirty water sump located at the portal entrance, and waste rock and ore was transported to the temporary waste rock pad. Details pertaining to the portal and waste rock pad infrastructure are contained in reports previously submitted on November 17, 2005 entitled *Water Management and Treatment Plan* and *Temporary Waste Rock and Ore Storage Facility As-Constructed Report and Drawings*.

3.1 Portal Sumps

The location of infrastructure required to manage water from the portal area is shown in Picture 3.1 and Picture 3.2 and as-built drawings provided in Appendix B (based on surveys conducted at the end of the test mine program). The clean and dirty sump volumes are 285 m³ and 308 m³, respectively.



Picture 3.1. Portal Infrastructure (Sept. 19, 2005).

The portal sumps were in use from mid July until mid November. The underground discharge was pumped into the DS and the overflow from the DS flowed to the CS. Drainage from the temporary stockpile outside the portal was also directed to the DS. The dual sump arrangement allows for the control of water movement between sumps and for sump cleaning. Drill water was pumped from the well at Wolverine Creek, or from the CS, depending on sump water volume and quality. A third sump, the treatment sump, was constructed in October to provide additional retention time for settling and storage capacity (123 m³) while water treatment options were being assessed.



Picture 3.2. Sump water pipeline and discharge route (green line) to bladder (green square) and receiving end point at Wedge Pond (red circle)

Physical parameters and water quality at the portal sumps were monitored regularly. Appendix C provides a summary the routine (almost daily) monitoring at each sump and water quality results through the summer and fall period. As summarized in Table 3.1, the contaminants of concern are total suspended solids (TSS), selenium, ammonia nitrogen and cadmium, when compared with the discharge standards (numbers bolded and underlined are higher than the standard).

In the summer, the primary constituents of concern were TSS and ammonia nitrogen. A clean water sample was submitted to EVS labs in August for bioassay tests, and at 68% concentration (32% dilution), the rainbow trout LC50 passes (Appendix D).

For the clean sump in September, flocculent and coagulant were used to reduce total suspended solids, from 72 mg/L to 8mg/L. The coagulant was Ipafloc 16 at a concentration of 0.5% and the flocculent was Powerfloc 163, at a concentration of 0.2%.

Once, the ore deposit was encountered in the underground development in mid September, selenium and cadmium were also elevated. With the changing water chemistry, water treatment requirements required re-assessment. Bench scale testwork is near and a revised *Water Management and Treatment Plan Report* will be submitted in early spring. All sump water was pumped to the underground working at the end of the test mine program in November.

Table 3.1. Summary of Water Quality Analyses for the Portal Sumps

Dirty Water Sump Water Quality (mg/L)	13-Jul-05	At Inlet 18-Jul-05	At Outlet 18-Jul-05	22-Jul-05	15-Aug-05	08-Sep-05	26-Oct-05	Discharge Standard
Total Suspended Solids				<u>25</u>	7	<u>34</u>	<u>170</u>	15
Ammonia (N)	2.31			<u>3.83</u>	<u>2.51</u>	<u>7.67</u>	<u>5.29</u>	2.5
Total Arsenic (As)	<0.20	0.002	0.001	0.002	0.002	0.001	0.0503	0.10
Total Cadmium (Cd)	<0.010	<0.0001	<0.0001	0.004	<0.0001	< 0.0002	<u>0.030</u>	0.02
Total Copper (Cu)	0.014	0.022	0.012	0.006	0.008	0.002	<u>0.727</u>	0.2
Total Lead (Pb)	<0.050	0.0008	<0.0005	0.0049	<0.0005	< 0.001	<u>0.592</u>	0.2
Total Nickel (Ni)	<0.050	<0.008	<0.008	<0.008	<0.008	0.007	<0.050	0.5
Total Selenium (Se)	<0.20	0.0122	<u>0.1</u>	0.007	0.0016	0.009	<u>0.283</u>	0.015
Total Zinc (Zn)	0.0189	<0.005	<0.005	0.021	<0.005	0.005	<u>3.10</u>	0.5

Clean and Treatment Sump WQ (mg/L)	CS Sept 7/05	CS Sept 13/05	CS Before Floc/Coag Sept 29/05	CS After Floc/Coag Sept 29/05	CS Oct 26/05	TS Oct 27/05
Total Suspended Solids	<u>30</u>	<u>92</u>	<u>72</u>	8	<u>59.9</u>	7.4
Ammonia Nitrogen N	<u>10.4</u>	<u>7.28</u>	<u>5.91</u>	<u>5.49</u>	<u>5.96</u>	<u>9.51</u>
Total Arsenic As	0.002	0.002	0.0069	0.0011	0.0124	0.0085
Total Cadmium Cd	< 0.0002	< 0.0002	0.004	0.00054	<0.010	<0.010
Total Copper Cu	0.003	0.005	0.093	0.0094	0.102	0.022
Total Lead Pb	< 0.001	< 0.001	0.075	0.0006	0.068	<0.050
Total Nickel Ni	0.005	0.002	0.0073	0.0009	<0.050	<u>0.363</u>
Total Selenium Se	0.012	0.007	<u>0.208</u>	<u>0.198</u>	<u>0.303</u>	0.105
Total Zinc Zn	< 0.005	< 0.005	0.37	0.005	0.463	7.4

3.2 Waste Rock Sump

Infrastructure at the temporary waste rock pad is shown in Picture 3.3 and as-built drawings are provided in Appendix B. Appendix C provides a summary the routine (almost daily) monitoring at the sump and water quality results through the summer and fall period.

A collection sump located at the southern end of the pad collects drainage from the pad. Based on the average daily flow, the collection sump was originally designed with a capacity of 24 m³, but was enlarged during construction to accommodate 221 m³. The sump was constructed from local compacted till and lined with Enviro Liner®. Ditches and berms have been constructed to collect or divert surface runoff away from the pad (note in Picture 3.3 that rainwater has collected from the entrance).

As summarized in Table 3.2, the contaminants of concern are total suspended solids (TSS), ammonia nitrogen and selenium, when compared with the discharge standards (numbers bolded and underlined are higher than the standard).



Picture 3.3. Waste Rock Pad and Collection Sump (Sept. 19, 2005)

Table 3.2. Summary of Water Quality Analyses for the Waste Rock Sump

Waste Rock Sump WQ (mg/L)	July 27	Sept 7	Before Floc/coag Sept 27	After Floc/coag Sept 27	Rainwater on Pad Sept 27	Oct 26	Discharge Standard
Total Suspended Solids	316	2	4	5	57500*	4.4	15
Ammonia Nitrogen N	0.034	11.8	6.38	5.88	2.16	9.06	2.50
Total Arsenic As	0.0099	0.003	0.0014	0.0012	0.0014	0.00098	0.10
		<					
Total Cadmium Cd	0.000397	0.0002	0.0003	0.00024	0.00022	<0.010	0.02
Total Copper Cu	0.112	0.002	0.0027	0.0022	0.0021	<0.010	0.20
Total Lead Pb	0.0376	< 0.001	< 0.0002	< 0.0002	0.0009	<0.050	0.20
Total Nickel Ni	0.0564	0.007	0.0054	0.0047	0.007	<0.050	0.50
Total Selenium Se	<0.0020	0.066	0.041	0.041	0.023	0.0634	0.015
Total Zinc Zn	0.095	< 0.005	0.051	0.059	0.003	0.0323	0.50

**The pooling surface water had high TSS concentrations due to the haul truck traffic.*

4 Baseline and Monitoring Results

Baseline water quality information for the three SNM creek stations is provided in Appendix E. Appendix E also contains the original ALS Environmental water quality analyses for the three monitoring periods covered by this report. Concentrations for the contaminants of concern as well as monthly flows and sediment quality are summarized below.

4.1 Water Quality Monitoring Results

To date, water has not been treated and discharged to Wedge Pond as water treatment process testwork has been underway. However, there were two accidental releases to the receiving environment in fall 2005. The first incident occurred at the temporary waste rock pad where approximately 58.5 m³ of water was discharged to a vegetated area within the Go Creek watershed. Appendix F provides additional information pertaining to this release.

The second incident occurred in November at the onset of extremely cold temperatures. A gasket on the sump water line connecting the clean water sump to the underground drills ruptured causing the release of water into the upper Wolverine Creek watershed. The Spill Report (dated November 14, 2005) is contained in Appendix F and additional details are provided in Section 4.1.1.

Water quality results for parameters of concern for the 2005 baseline monitoring period (May through September) and for the monitoring periods of October and November 2005 and January 2006 are summarized in Tables 4.1, 4.2 and 4.3 for W9, W16, and W12, respectively.

Table 4.1. W9 2005 Baseline and Oct 2005 - January 2006 Water Quality Monitoring Results

W9 Wolverine Creek	2005 Baseline Results						Monitoring Results		
Parameter	May	June	July	July	Aug	Sept	Oct ' 05	Nov '05	Jan '06
Total Suspended Solids		<3.0	<3.0		<3.0	<3.0	<3.0		<3.0
Ammonia Nitrogen	<0.020		<0.020	<0.0050	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.20	<0.00050	<0.00020
Cadmium	0.00146	0.000024	0.00135	0.00139	0.00129	0.00133	<0.010	0.00127	0.00115
Copper	0.0035	0.0011	0.0013	<0.0010	<0.0010	<0.0010	<0.010	<0.0010	0.00044
Lead	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.050	<0.00050	<0.000050
Nickel	0.0064	<0.0010	0.0038	0.0034	0.0032	0.0031	<0.050	0.0030	0.00222
Selenium	0.0020	0.00059	0.0031	0.0027	0.0030	0.0029	<0.20	0.0043	0.00327
Zinc	0.175	<0.0050	0.129	0.140	0.140	0.121	0.122	0.119	0.0933

Table 4.2. W16 2005 Baseline and Oct 2005 - January 2006 Water Quality Monitoring Results

W16 Go Creek	2005 Baseline Results					Monitoring Results		
Parameter	May	June	July	Aug	Sept	Oct ' 05	Nov '05	Jan '06
Total Suspended Solids	4.1	<3.0	<3.0	<3.0	5.8	<3.0		<3.0
Ammonia Nitrogen	<0.020	0.0146	<0.020	0.042	<0.020	<0.020	<0.020	<0.020
Arsenic	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.20	<0.00050	0.00031
Cadmium	0.000050	0.000025	<0.000050	0.000047	0.000045	<0.010	0.000043	0.000040
Copper	0.0022	<0.0010	<0.0010	<0.0010	0.0018	<0.010	<0.0010	0.00038
Lead	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.050	<0.00050	<0.000050
Nickel	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.050	<0.0010	<0.00050
Selenium		<0.00050	<0.0010	<0.0010	<0.0010	<0.20	<0.0010	<0.00050
Zinc	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0017

Table 4.3. W12 2005 Baseline and Oct 2005-January 2006 Water Quality Monitoring Results

W12 Go Creek	2005 Baseline Results				Monitoring Results		
WQ Parameter	May	July	Aug	Sept	Oct ' 05	Nov '05	Jan '06
Total Suspended Solids	6.1	<3.0	<3.0	<3.0	<3.0		<3.0
Ammonia Nitrogen	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic	<0.00050	<0.00050	<0.00050	<0.00050	<0.20	<0.00050	<0.00020
Cadmium	<0.000020	<0.000050	0.000022	0.000017	<0.010	<0.000017	0.000025
Copper	0.0021	<0.0010	<0.0010	<0.0010	<0.010	<0.0010	0.00093
Lead	<0.00050	0.00068	<0.00050	<0.00050	<0.050	<0.00050	0.000097
Nickel	<0.0010	<0.0010	<0.0010	<0.0010	<0.050	<0.0010	<0.00050
Selenium	<0.0010	<0.0010	<0.0010	<0.0010	<0.20	<0.0010	<0.00050
Zinc	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0012

Detection limits for October 2005 were higher than requested due to miscommunication with the laboratory. Water quality comparisons to CCME (Canadian Council of Ministers of Environment) aquatic life guidelines will be provided in the subsequent SNM monitoring report due in March 2006.

4.1.1 Wolverine Creek

Following the release of 131 m³ of water from the clean sump when the flow meter gasket ruptured, water samples were collected of seepage along the clean sump embankment and downstream on November 7th, 8th and 9th. Tables 4.4 and 4.5 summarize the water quality analytical results from these samples plus the results from samples taken prior to the release. The information presented below focuses on the constituents of concern, as per Water Licence QZ01-051. A comparison of the post release results is made to results from previous sample results of the clean sump (sampled October 26, 2005) as well as W9 (sampled October 24, 2005).

Table 4.4. Clean Sump Water Quality (Oct. 26, 2005 Pre-release) Compared to Effluent Discharge Limits (as mg/L)

Constituents of Concern (mg/L)	Discharge Criteria	Clean Sump Oct-26-05
Total Suspended Solids	15	<u>59.9</u>
Ammonia Nitrogen	2.50	<u>5.96</u>
Total Arsenic	0.10	0.0124
Total Cadmium	0.02	<0.010
Total Copper	0.20	0.102
Total Lead	0.20	0.068
Total Nickel	0.50	<0.050
Total Selenium	0.015	<u>0.303</u>
Total Zinc	0.50	0.463

The eight sites sampled throughout the November 7th – 9th period are listed below from closest to furthest from the release point:

- Site 1 (Control): Wolverine Creek 20m u/s clean sump area
- Site 2: Closest seep to release
- Site 2B: 10 m downstream of Site 2 (sampled after Site 2 froze)
- Site 3: Natural drainage through seep area
- Site 4: Wolverine Creek well area
- Site 4B: 15m downstream of well area
- Site 5: Midpoint of Wolverine Creek from sumps to Little Wolverine Lake
- W9: 50m upstream of where Wolverine Creek feeds into Little Wolverine Lake

Table 4.5. Water Quality Sampling Data Results Pertaining to the Sump Release

Constituents of Concern (mg/L)	Site 2	Site 2B	Site 2B	Site 3	Site 3	Site 3
	Nov 7-05	Nov 8-05	Nov 9-05	Nov 7-05	Nov 8-05	Nov 9-05
Ammonia Nitrogen	<u>4.34</u>	<u>2.90</u>	<u>3.02</u>	<u>3.11</u>	<u>3.63</u>	<u>3.42</u>
Total Arsenic	0.000450	0.002130	0.003760	0.000200	0.000240	0.000260
Total Cadmium	0.0139	0.0103	0.007650	0.0103	0.0138	0.0122
Total Copper	0.004800	0.0382	<u>8.08</u>	0.007850	0.0140	0.037
Total Lead	<0.00050	0.004220	0.009660	0.000164	<0.00040	<0.00030
Total Nickel	0.0474	0.0158	0.0176	0.0128	0.0309	0.0157
Total Selenium	<u>0.0318</u>	<u>0.0447</u>	<u>0.0358</u>	<u>0.0211</u>	<u>0.0266</u>	<u>0.0264</u>
Total Zinc	<u>2.13</u>	<u>0.621</u>	<u>0.664</u>	<u>1.37</u>	<u>1.69</u>	<u>1.70</u>

Constituents of Concern (mg/L)	Site 4	Site 4	Site 4B	Site 5	Site 5	Site 5
	Nov 7-05	Nov 8-05	Nov 9-05	Nov 7-05	Nov 8-05	Nov 9-05
Ammonia Nitrogen	0.157	0.132	0.023	0.104	0.068	<0.020
Total Arsenic	0.005840	0.0110	<0.00010	0.000280	0.000130	0.000180
Total Cadmium	<u>0.0227</u>	<u>0.0545</u>	0.000486	0.003420	0.002550	0.001220
Total Copper	0.0447	0.0926	0.158	0.003400	0.001550	<0.030
Total Lead	0.0155	0.0316	0.000069	0.000307	0.000148	<0.00005
Total Nickel	0.0281	0.0507	0.001440	0.0123	0.009720	0.002740
Total Selenium	0.0124	<u>0.0229</u>	0.0022	0.0044	0.0047	0.0034
Total Zinc	<u>0.862</u>	<u>1.87</u>	0.0670	0.366	0.314	0.115

Constituents of Concern (mg/L)	Site 1	Site 1	Site 1	W9	W9	W9
	Nov 7-05	Nov 8-05	Nov 9-05	Oct 24-05	Nov 7-05	Nov 9-05
Ammonia Nitrogen	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Arsenic	0.000260	<0.00010	<0.00010	<0.20	0.000190	0.000190
Total Cadmium	0.001090	0.000430	0.000330	<0.010	0.001270	0.001270
Total Copper	0.001760	0.000750	0.119	<0.010	0.000590	<0.030
Total Lead	0.000944	0.000101	<0.00005	<0.050	<0.00005	<0.00005
Total Nickel	0.001830	0.001200	0.001060	<0.050	0.00284	0.00278
Total Selenium	0.0014	0.0013	0.0014	<0.20	0.0036	0.0036
Total Zinc	0.0514	0.0350	0.0323	0.122	0.108	0.106

Although there are constituents of concern above discharge limits along the embankment (**bold underlined** values for Sites 2, 2B and 3), concentrations at SNM Monitoring Location W9 are comparable to the pre-release sample (October 24, 2005) and are below the discharge criteria concentration. Concentrations at Site 5, the midpoint between the W-09 and the release point, are also below the discharge criteria concentration.

4.2 *Sediment Quality Monitoring Results*

The 2005 sediment sampling program was conducted to provide representative data from riffle habitat. Samples were collected in riffle areas using a 2.5 cm diameter PVC tube to extract fine sediment from below the cobble and boulder substrate. This method was recommended by Environment Canada for consistency with recent sampling programs in the Yukon. Samples were collected September 6 to 11, 2005 from 23 sites, including W9, W12 and W16. Samples were sieved in the laboratory and the <0.053 mm fraction analyzed for total metals using ICPMS.

Results for W9, W12 and W16 are reported in Table 4.6. The full data set is discussed in the Environmental Assessment Addendum report to be submitted later in February 2006. Historic studies (1995, 1996, 2001) used a variety of sample collection methods, so results from historic data are not comparable to the 2005 program.

Results indicate that arsenic, cadmium, copper and zinc were higher than CCME interim sediment quality guidelines in samples from all three sites and that chromium was also higher than the guideline for W12 and W16.

Table 4.6. Total Metal Concentrations in Sediment Collected at Yukon Zinc Monitoring Stations, September 2005.

	ISQG	Units	W9	W12	W16	DL
Total Metals by ICPMS						
Total Aluminum (Al)	-	mg/kg	12400	14500	20500	100
Total Antimony (Sb)	-	mg/kg	1.6	0.3	0.4	0.1
Total Arsenic (As)	5.9	mg/kg	12.8	7.4	8.1	0.2
Total Barium (Ba)	-	mg/kg	383	302	453	0.1
Total Beryllium (Be)	-	mg/kg	0.3	0.2	0.3	0.1
Total Bismuth (Bi)	-	mg/kg	0.9	0.1	<0.1	0.1
Total Cadmium (Cd)	0.6	mg/kg	12.3	1.14	7.53	0.05
Total Calcium (Ca)	-	mg/kg	9170	4720	9820	100
Total Chromium (Cr)	37.3	mg/kg	29.3	38.5	67.3	1
Total Cobalt (Co)	-	mg/kg	11.9	13.5	25.9	0.3
Total Copper (Cu)	35.7	mg/kg	67.9	54	91	0.5
Total Iron (Fe)		mg/kg	28500	30400	38300	100
Total Lead (Pb)	35	mg/kg	32.5	12.2	28.9	0.1
Total Magnesium (Mg)	-	mg/kg	10200	9080	14000	100
Total Manganese (Mn)	-	mg/kg	802	1470	4120	0.2
Total Mercury (Hg)	0.17	mg/kg	<0.05	<0.05	0.06	0.05
Total Molybdenum (Mo)	-	mg/kg	2.7	0.8	1.8	0.1
Total Nickel (Ni)	-	mg/kg	82.5	36.7	53.2	0.8
Total Phosphorus (P)	-	mg/kg	1910	919	1230	10
Total Potassium (K)	-	mg/kg	1580	543	569	100
Total Selenium (Se)	-	mg/kg	2.2	1.2	3.3	0.5
Total Silver (Ag)	-	mg/kg	0.53	0.17	0.21	0.05
Total Sodium (Na)	-	mg/kg	<100	<100	<100	100
Total Strontium (Sr)	-	mg/kg	46.8	20.5	29.7	0.1
Total Thallium (Tl)	-	mg/kg	0.2	0.06	0.06	0.05
Total Tin (Sn)	-	mg/kg	2.3	1.8	10.5	0.1
Total Titanium (Ti)	-	mg/kg	704	712	952	1
Total Vanadium (V)	-	mg/kg	59.3	37.7	56.6	2
Total Zinc (Zn)	123	mg/kg	2860	140	309	1
Total Zirconium (Zr)	-	mg/kg	3.3	3	1.7	0.5

ISQG = interim sediment quality guideline (CCME, 2004);

DL = detection limit

numbers in bold indicate that ISQG is exceeded.

4.3 *Wolverine and Go Creek Flows*

The mean monthly hydrograph for Wolverine Creek at W9 is provided in Figure 4.1, and for Go Creek at stations W16 and W12 in Figures 4.2 and 4.3, respectively. The Go Creek stations have been plotted at the same scale for comparison purposes. Monthly flows were determined from Water Survey of Canada gauge records and from hydrometric station data within the region, and

subsequently compared to measured flows in July through September 2005 and those from previous onsite measurements taken in 1996 and 1997 (Table 4.7).

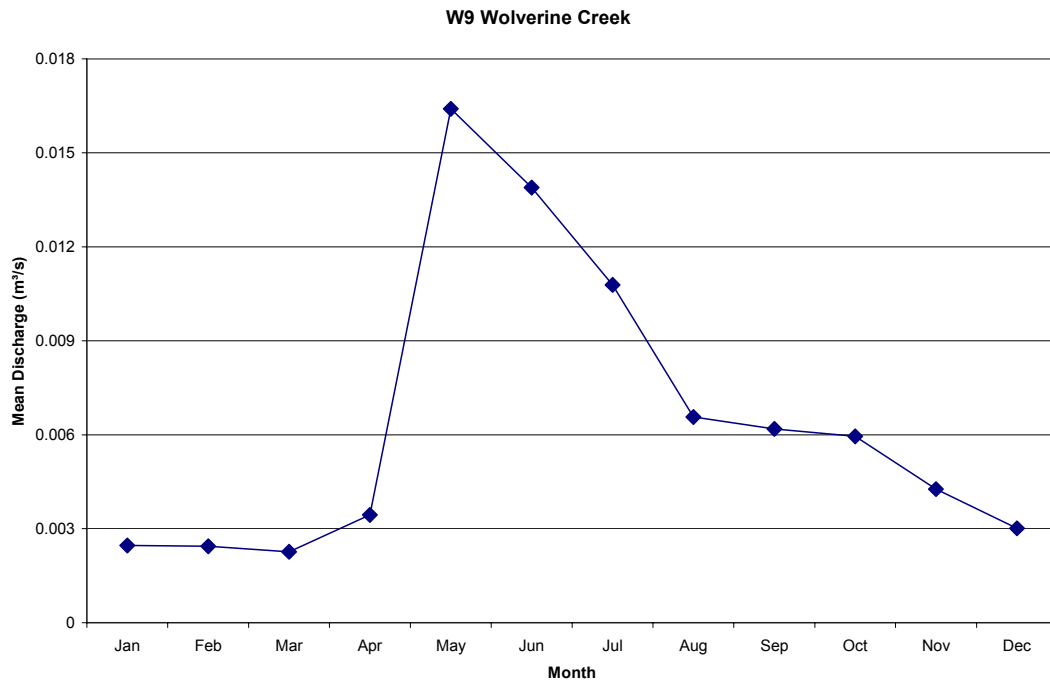


Figure 4.1. Monthly Hydrograph for W9 (Wolverine Creek).

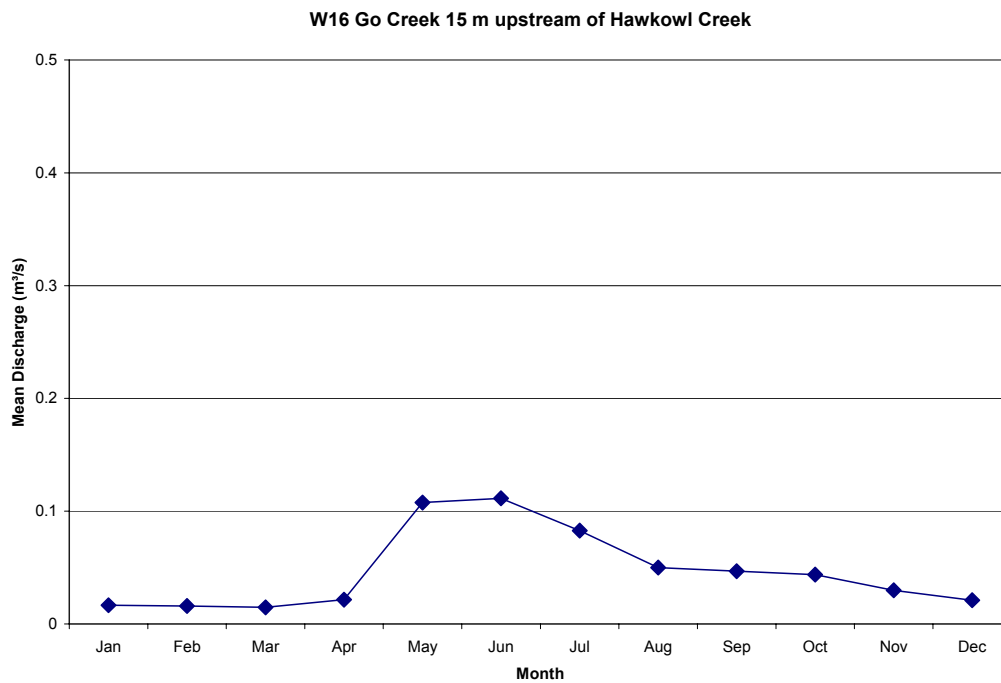


Figure 4.2. Monthly Hydrograph for W16 (Go Creek).

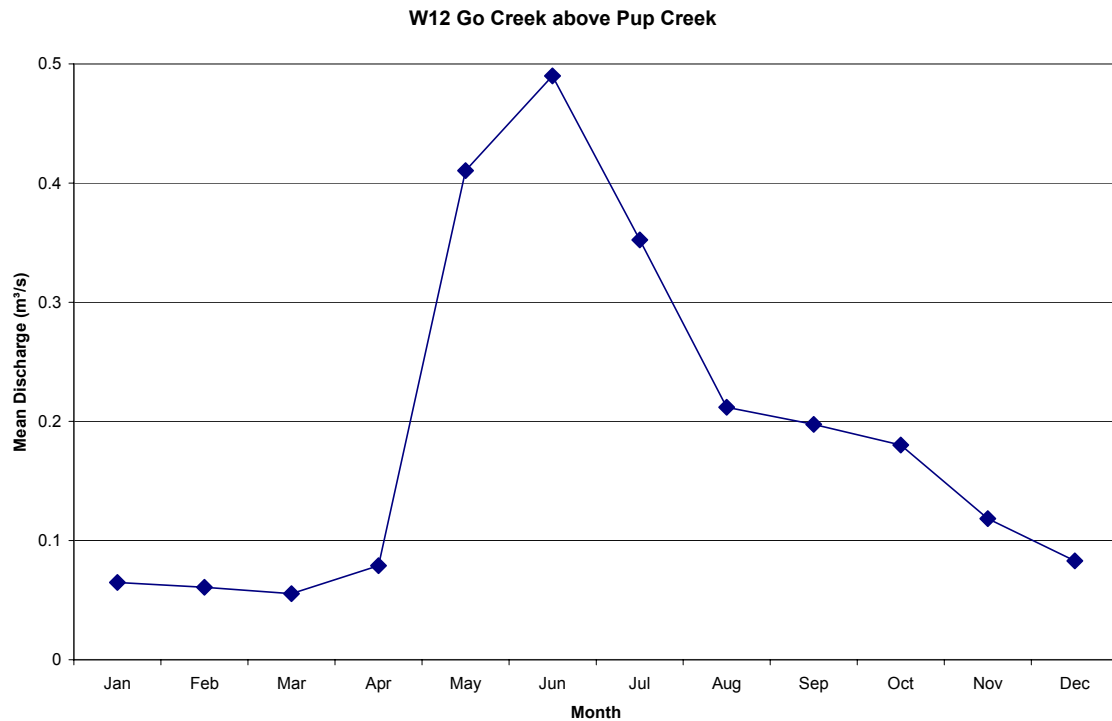


Figure 4.3. Monthly Hydrograph for W12 (Go Creek).

Table 4.7. Measured Flows (m³/s) at W9, W12 and W16 for 2005, 1996 and 1997.

Site	Flow Measured 2005				Flow Measured 1996						Flow Measured 1997		
	May	July	August	Sept	Mar	May	Jun	July	Aug	Nov	May	July	Sept
W9		0.029	0.017	0.013	0.002	0.09		0.01	0.023	0.007			
W12		0.555	0.485	0.24									
W12A		0.452	0.459		0.04	1.18	0.44	0.47	0.78		0.36	0.52	0.32
W16	0.975	0.13	0.166	0.157				0.121			0.111	0.119	0.259

5 Surveillance Network Monitoring Summary

The next sampling period is scheduled for mid February, and the subsequent SNM report will be submitted in late March upon receipt of water quality data.