Water Quality Objective Monitoring, Sixty Mile River Watershed, 2009

Sixty Mile River Watershed

This basin has been extensively monitored for the past 5 years providing us with a vast amount of information regarding the state of the water quality in a historically mined watershed. The Sixty Mile River basin is a heavily diverse watershed, with vast areas of active mining as well as inactive, reclaimed and partially reclaimed, sections. Placer gold was discovered in the Sixty mile River area in 1892 by C. Miller. The principal creeks mined were Miller, Glacier, Big Gold, Little Gold and Bedrock creeks. In 1915 and 1916, the North American Trading and Transportation Co. dredged near the mouth of Miller Creek.

The dredge was refurbished by the Holbrook Dredging Co., which mined in the Sixty Mile Valley below Miller Creek between 1929 and 1941. A new dredge was constructed by Yukon Exploration sand Yukon Placer Mining Co., which mined the lower reaches of Glacier and Big Gold Creeks and part of the Sixty Mile River from 1947 to 1959. Mining in the basin still continues to date and has been very active over the last decade.

In 2009, water samples were collected at 16 different sites in the Sixty Mile River basin. Sampling commenced on June 12th, 2009 and a total of 450 samples were collected up until the end of the season on September 21st, 2009. A combination of automatic composite sampling and grab sampling methods were used in the basin. An additional 13 samples were collected by E.M.R staff during routine mine inspections.

Atmospheric data was collected using three portable weather stations, one located near the mouth of the Sixty Mile River, the other at an Upper Sixty Mile River background site and the last at the mouth of Matson Creek.

Blitz sampling events took place in the Sixty Mile River Watershed on June 4th, August 7th and September 21st, 2009. Samples were taken every five kilometres along the main stem of the Sixty Mile River and at the mouth of the major tributaries.

Basin total flow data was provided to us by the Water Survey of Canada station located near the mouth of the Sixty Mile River. Flow data for the individual tributaries to the Sixty Mile River was collected at the time of sampling by the staff of E.M.R CS&I using the methodology outlined in the Yukon Placer Secretariats, Water Quality Monitoring Protocol.

Site Codes and Global Position of Water Quality Sampling Locations in the Sixty Mile River Watershed

SITE CODE	LOCATION	LAT_Y	LONG_X
60M 01	Sixty Mile River at Mouth	63.54735	-139.79333
60M 01A	Sixty Mile River d/s Twenty Mile Creek	63.60892	-140.03517
60M 02	Lower Sixty Mile River u/s of Water Survey Station	63.69286	-140.16948
60M 02A	Sixty Mile River u/s confluence with Matson Creek	63.71880	-140.19047
60M 03	Sixty Mile River u/s of Fifty Mile Creek	63.79314	-140.19731
60M 04	Sixty Mile River d/s of California Creek	64.02219	-140.34203
60M 05	Sixty Mile River	64.03903	-140.61754
60M 06	Sixty Mile River d/s of Big Gold Creek	64.01604	-140.69462
60M 07	Sixty Mile River u/s of Big Gold Creek	64.01576	-140.69718
60M 08	Sixty Mile River d/s Miller Creek	63.98712	-140.78941
60M 09	Sixty Mile River u/s Miller Creek	63.98687	-140.79218
60M 10	Sixty Mile River d/s of Bedrock Creek	63.96442	-140.85784
60M 11	Sixty Mile River Above All Mining (AAM)	63.96247	-140.86173
60M BED 01	Bedrock Creek mouth	63.96424	-140.86285
60M BIG 01	Big Gold Creek mouth	64.01657	-140.69893
60M BIG 02	Big Gold Creek u/s of confluence with Glacier Creek	64.02708	-140.74985
60M CAL 01	California Creek mouth	64.02017	-140.35150
60M FIF 01	Fifty Mile Creek mouth	63.79360	-140.20285
60M GLA 01	Glacier Creek mouth	64.01418	-140.72046
60M GLA 02	Glacier Creek at road crossing	64.02293	-140.74994
60M MAT 01	Matson Creek mouth	63.71928	-140.19861
60M MAT 02	Upper Matson Creek	63.70507	-140.29218
60M MIL 01	Miller Creek mouth	63.98746	-140.79268
60M TEN 01	Ten Mile Creek mouth	63.54755	-139.79327
60M TWEL 01	Twelve Mile Creek mouth	63.60890	-140.03750
60M TWEN 01	Twenty Mile Creek mouth	63.60890	-140.03750

Water Quality Objective monitoring, Sixty Mile River Watershed – Summary

Due to the great interest in the area, and recent changes in mining locations and levels of activity, the Sixty Mile Watershed was once again designated a '*major*' watershed for monitoring in 2009. This meant that a major proportion of our monitoring efforts were spent in the basin, and that our monitoring schedule included many repeat visits throughout the season. Five automatic water sampling station and three weather stations were set up and maintained from June 17th until shutdown on September 16th.

From the data obtained by these instruments and through on site visits and sampling conducted by CS&I staff, the following observations regarding the water quality in the basin can be made:

> The overall water quality in the basin, met the minimum objectives set under the *Fish Habitat Management System* throughout the monitoring season. On average, the Total

Suspended Solids concentrations, from water samples collected at our water quality monitoring sites were well below 25 mg/L TSS all season.

Low stream flows resulting in less suspension / resuspension of sediment in the water combined with below average seasonal rainfall which led to a decrease in the amount of additional sediment entering the watercourse through runoff, helped to reduce the Total Suspended solids concentration in the basins waters. This in conjunction with already reduced effluent discharge volumes and effluent sediment concentrations improved the overall water quality in the Sixty Mile River watershed for 2009

The Fish Habitat Management System - Sixty Mile River Watershed (Category B)
Sample Results that Exceed Water Quality Objectives for 2009

Sampling Station	60M 01	60M 02	60M MAT 01	60M 03	60M 05	60M 07	60M BIG 02	60M MIL 01	60M 09	60M BED 01	60M 11
Location Description	Mouth	lower 60M u/s WSC station	Mouth	u/s Fifty Mile Creek	d/s Eldorado Placers	u/s 60M BIG 01	u/s 60M GLA 01	Mouth	u/s 60M MIL 01	Mouth	AAM
Sample Type	Auto/Grab	Auto/Grab	Auto/Grab	Auto/Grab		Grab		Grab	Grab	Grab	Auto/Grab
Lat Y	63.54735	63.69286	63.71928	63.79314	64.03903	64.01576	64.02708	63.98746	63.98687	63.96424	63.96247
Long X	-139.79333	-140.16948	-140.19861	-140.19731	-140.61754	-140.69718	-140.74985	-140.79268	-140.79218	-140.86285	-140.86173
Habitat Classification	Area of special consideration	Moderate-L	Area of special consideration	Moderate-L	Low	Low	Low	Low	Low	Low	Low
Water Quality Objective (mg/L)	100	200	200	200	300	300	300	300	300	300	300
Date of Sampling											
	No samples exceeded the Water Quality Objectives										
Total Seasonal Average TSS (mg/L) by site	2.8	5.5	4.2	5.6		6.5		10.8	2.7	5.5	6.0
Number of days sampled	28	92	95	77		3		3	2	2	91

Legend Not continuously monitored

Water Samples that are: Above / Below the Water Quality Objective