

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 and 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 2008, water samples were collected at 16 different sites in the Sixty Mile River basin. Sampling commenced on May 24th, 2008 and a total of 86 samples were collected up until the end of the season on August 27th, 2008. A combination of automatic composite sampling and grab sampling methods were used in the basin.

Atmospheric data was collected using two portable weather stations, one located near the mouth of the Sixty Mile River, the other on the Upper Sixty Mile River downstream of Miller Creek.

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.

In 2008, the effluent discharge standards for the Sixty Mile River Basin were those set under the existing *Yukon Placer Authorization*. Beginning in 2009, the effluent standards for all 19 separate watersheds in the Yukon, including the Sixty Mile, will be set under the *Fish Habitat Management System*. The *Fish Habitat Management System* replaces the YPA with approximately 19 separate watershed authorizations, each of which are class authorizations under Section 35(2), governing placer mining in specific drainage basins.

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 d/s of Eldorado Placers	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 2008. 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.

One automatic water sampling station and two weather stations were set up and maintained from May 24th until shutdown on August 27th. 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 those occasions when the WQO were not met and the Total Suspended Solids levels were greater than the objectives, there is a direct correlation to environmental conditions influencing the amount of solids concentrations in the water.

In all cases, rain fall, either as localised events or basin wide occurrences, increased the amount of surface run off and subsequent soil erosion from the land, increasing the input of sediment into the receiving waters. These increases occurred simultaneously at the time of the rain event or immediately in a period of one or two days after the rain event, as surface water continued draining from the land and ground water infiltrated the water course.

Increases in sediment laden ground and surface water entering the system add to the amount of sediment in the water. The ability of the receiving water to dilute these inputs of sediment is negated by the re-suspension of stream bed material and by the further erosion of the streams banks that occurs along with the increased flows that are generated by the aftermath of these rain events.

All of these factors; precipitation leading to increased sediment input and increased flows from these rain events re-suspending and further eroding material, lead to an increase in suspended solids concentrations and a decrease in water quality.