

## **Yukon River North Watershed**

The Yukon River is a major watercourse of north western North America. Over half of the river lies in the U.S. state of Alaska, with most of the other portion lying in and giving its name to Canada's Yukon Territory, and a small part of the river starts near the rivers source in British Columbia. The river is 3,700 km long and empties into the Bering Sea at the Yukon-Kuskokwim Delta. The average flow is 6,430 m<sup>3</sup>/s. The total drainage area is 832,700 km<sup>2</sup> of which 323,800 km<sup>2</sup> is in Canada. By comparison, the total area is more than 25% larger than the province of Alberta.

The Yukon River is divided into two sections, the North Yukon section, downstream from the Yukon Rivers confluence with the White River and the South Yukon, the section of the Yukon River upstream from its confluence with the White River. The average water quality of the North Yukon River is much more turbid and higher in suspended solids concentrations than that of the South Yukon due to the huge contribution of sediment and glacial material entering the Yukon River from the White River drainage. Total suspended solids concentrations in the North Yukon can be 10-25 times higher than those found in the South Yukon. Many large tributary rivers and streams flow into the catchment area of the Yukon River basin.

In 2008, 57 grab samples were taken by inspection staff on behalf of the Water Quality Team at 57 different locations in the Yukon River North basin. Basin total flow data was provided to us by the Water Survey of Canada station located on the Yukon River above the White River. Flow data for the individual tributaries to the Indian 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 Yukon River North 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 Yukon River North, 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 Yukon River North Watershed**

<b>SITE CODE</b>	<b>LOCATION</b>	<b>LAT_Y</b>	<b>LONG_X</b>
08-0702	unknown LL Creek	63.26939	-139.47041
08-0737	Yukon River u/s Stewart River	63.27946	-139.41748
08-0741	Yukon River u/s Swede Creek	64.02007	-139.57184
08-0742	Yukon River u/s OK Creek	64.02329	-139.52451
08-0745	Yukon River u/s Cliff Creek	64.52887	-140.47661
08-0747	Yukon River u/s Shell Creek	64.49828	-140.42120
08-0749	Yukon River u/s Coal Creek	64.47665	-140.43954
08-0751	Yukon River u/s Forty Mile River	64.42408	-140.52603

08-0754	Yukon River u/s Cassiar	64.32884	-140.16194
08-0756	Yukon River u/s Wood Chopper Creek	64.32170	-140.00537
08-0758	Yukon River u/s Fifteen Mile River	64.28041	-139.81335
08-0760	Yukon River u/s Fresno Creek	64.27250	-139.79930
08-0762	Yukon River u/s Quebec Creek	64.17162	-139.54102
08-0765	Yukon River u/s Deadwood Creek	64.10433	-139.46320
08-0766	Yukon River u/s Clear Creek	64.10801	-139.45413
08-0768	Yukon River u/s Moosehide	64.09351	-139.43628
YN 01	Yukon River d/s of Cassiar Creek	64.33194	-140.21059
YN 02	Yukon River u/s of Klondike River	64.02574	-139.46721
YN 03	Yukon River d/s Ensley Creek	63.92620	-139.70016
YN 04	Yukon River u/s Ensley Creek	63.73400	-139.68927
YN 05	Yukon River u/s Reindeer Creek	63.69801	-139.73257
YN 06	Yukon River d/s Sixtymile River left Bank	63.57132	-139.74707
YN 07	Yukon River d/s of Sixty Mile right limit	63.57077	-139.74094
YN 08	Yukon River u/s of Sixtymile River	63.55500	-139.75714
YN 09	Yukon River d/s Rosebute Creek	63.51890	-139.70337
YN 10	Yukon River u/s of Rosebute Creek	63.50501	-139.69879
YN 11	Yukon River d/s Sestak Creek	63.49162	-139.72768
YN 12	Yukon River u/s Sestak Creek	63.47845	-139.73273
YN 13	Yukon River d/s of Stewart River	63.34033	-139.49336
YN 14	Yukon River d/s Frisco, u/s Stewart River	63.24504	-139.49696
YN 15	Yukon River d/s of White River, u/s Frisco Creek	63.21980	-139.54309
YN 16	Yukon River u/s of the White River	63.17187	-139.56998
YN BAL 01	Ballarat Creek North mouth	64.28518	-139.64308
YN BEL 01	Bell Creek mouth	63.95970	-139.74794
YN CAS 01	Cassiar Creek mouth	64.32935	-140.16624
YN CHA 01	Chandindu River mouth	64.25319	-139.71492
YN CHR 01	Chris Creek mouth	63.34833	-139.62254
YN CLF 01	Cliff Creek mouth	64.52947	-140.47823
YN CLR 01	Clear Creek mouth	64.11076	-139.45007
YN COA 01	Coal Creek mouthh	64.47765	-140.42995
YN DAWSON	Yukon River at Dawson City ferry landing	64.07402	-139.42513
YN DEA 01	Deadwood Creek mouth	64.10506	-139.46524
YN ENS 01	Ensley Creek mouth	63.89738	-139.71614
YN ENS 02	Ensley Creek u/s mouth	63.89693	-139.71489
YN EXC 01	Excelsior Creek mouth	63.37097	-139.79335
YN FIF 01	Fifteen Mile River mouth	64.79417	-139.81349
YN FOR 01	Forty Mile River mouth	64.42268	-140.56477
YN FRE 01	Fresno Creek mouth	64.27278	-139.80246
YN FRS 01	Frisco Creek mouth	63.21962	-139.54034
YN GAL 01	Galena Creek mouth	63.79417	-139.77724
YN HEN 01	Henderson Creek Below All Mining (BAM)	63.35162	-139.41206

YN JOE 01	Lucky Joe Creek mouth	63.57226	-139.72383
YN MOS 01	Moosehide Creek mouth	64.09401	-139.43771
YN OK 01	OK Creek mouth	64.02760	-139.52306
YN QUE 01	Quebec Creek mouth	64.17254	-139.54402
YN REN 01	Reindeer Creek mouth	63.71360	-139.68056
YN ROS 01	Rosebute Creek Below All Mining (BAM)	63.50066	-139.68410
YN SES 01	Sestak Creek mouth	63.48120	-139.73581
YN SHL 01	Shell Creek mouth	64.49932	-140.41846
YN SWE 01	Swede Creek mouth	64.02510	-139.57346
YN WOD 01	Wood Chopper Creek mouth	64.31986	-140.00548

### **Water Quality Objective monitoring, Yukon River North Watershed – Summary**

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.

