



Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

The Cumulative Aquatic Effects Monitoring Program for the Coppermine River Basin

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The Coppermine River Basin, the eighth largest in the Northwest Territories and Nunavut, is experiencing resource development pressures from diamond mining in its headwaters in Lac de Gras. Further downstream, the potential exists for world class base metal mining, increased recreational use, and all weather roads to the arctic coast. At its mouth, the residents of Kugluktuk rely on the river as a source for drinking water, and have emphasized that the resource developments are located in their “water tank.” The Water Resources Division of the Department of Indian Affairs and Northern Development currently maintains a network of water quantity and water quality station on the river. While this network provides essential information for assessing trends in quantity and quality conditions, it is not comprehensive enough to detect subtle changes in this resource as a result of multiple developments and other ecosystem stresses. The Water Resources Division, in conjunction with other federal government agencies, universities and aboriginal organizations has developed a cumulative effects monitoring program for the Coppermine River Basin to detect any aquatic ecosystem that may result from natural variations or industrial development (Map 1.). A key component of the program is the continuous monitoring of water quality at the outlet of Lac de Gras.

Lac de Gras Continuous Monitoring

A Hydrolab Datasonde 4a™ was installed at the outflow of Lac de Gras (Map 2) in January of 2000 and will remain in place for at least a two-year period to collect data on seasonal variations in water quality parameters. This instrument allows for the hourly collection of data for pH, Conductivity, Turbidity, Dissolved Oxygen, Temperature and Depth (Table 1). The total water depth at the site is six metres and the instrument is installed at an approximate depth of four metres. During the winter months it is suspended from a cable under the ice and during summer months from a weighted float. Data stored in the Datasonde are downloaded monthly and analyzed. During these trips, all sensors are re-calibrated.

Map of the Coppermine River Basin

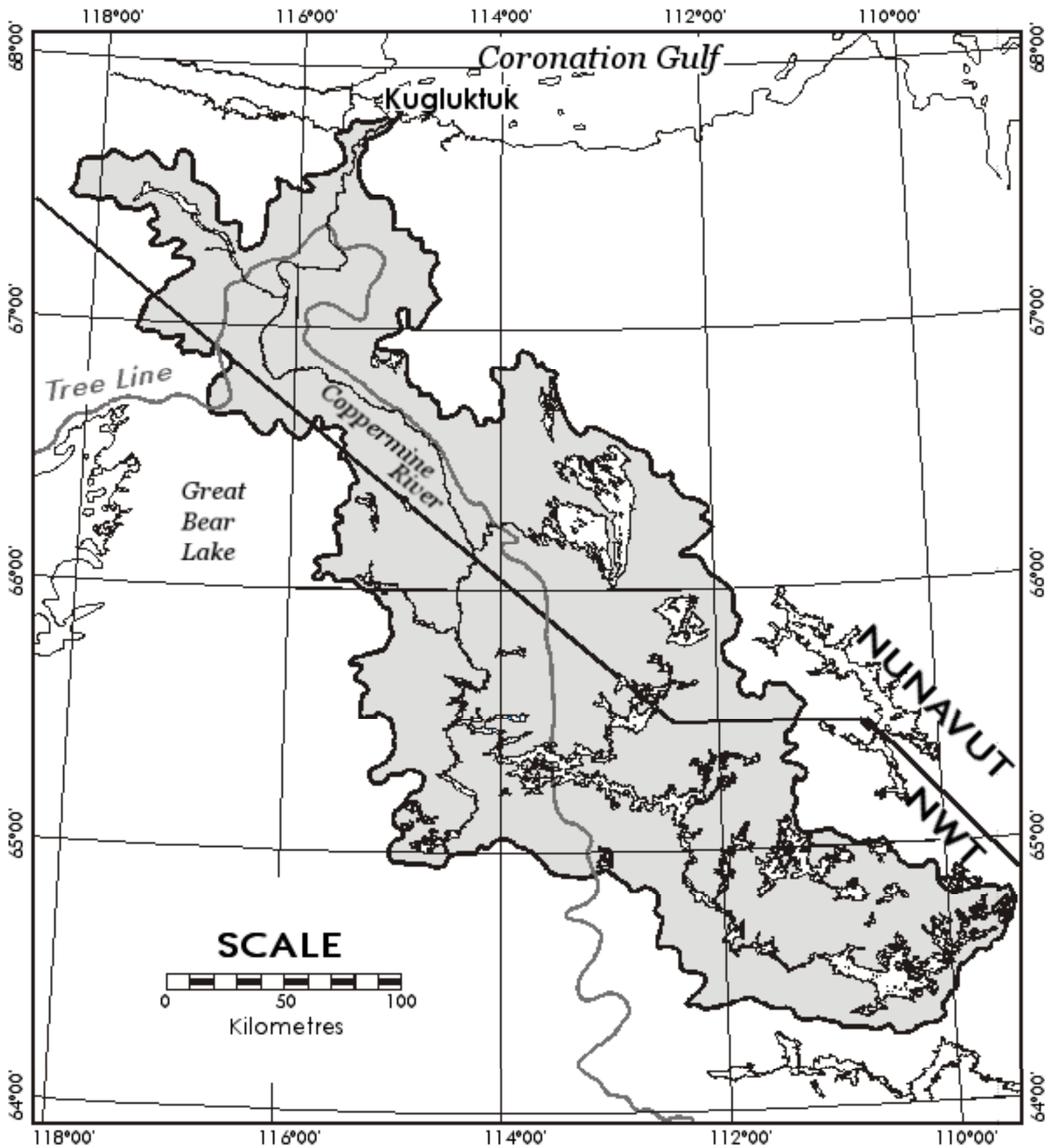


Table 1. Parameter sensors and detection ranges

Parameter:	Range:	Accuracy:	Resolution:
Temperature	-5 to 50 °C	0.10 °C	0.01 °C
Specific Conductance	0 to 100 mS/cm	1% of reading 0.001 mS/cm	4 digits
pH	0 to 14 units	0.2 units	0.01 units
Dissolved Oxygen	0 to 20 mg/L	0.2 mg/L	0.1 mg/L
Depth (0-100m)	0 to 100 m	0.3 m	0.1 m
Turbidity (shuttered)	0 to 100 NTU or 100 to 1000 NTU	2.6 % of range	0.1 or 1 NTU

Daily Data Reports

Problems encountered during the winter months, included such things as sensor malfunctions due to the extreme conditions, readings which were at or near detection limits causing variation in sensor readings and calibration error. In addition to hourly data collected by the Hydrolab, grab samples were taken at four meter depth using a Vertical Van Dorin Water Sampler during each site visit.

Lac de Gras Hydrolab and Continual Monitoring Site

