
**GEOLOGICAL SURVEY OF CANADA OPEN FILE 2365
(NTS 116B; PARTS OF 116C, 116F and 116G)
CANADA-YUKON ECONOMIC PROGRAMMING AGREEMENT (1989-1990)**

**REGIONAL STREAM SEDIMENT AND WATER
GEOCHEMICAL RECONNAISSANCE DATA
WEST CENTRAL YUKON**



Recommended citation:

Friske, P.W.B., Hornbrook, E.H.W., Lynch, J.J., McCurdy, M.W., Gross, H., Galletta, A.C., Durham, C.C.

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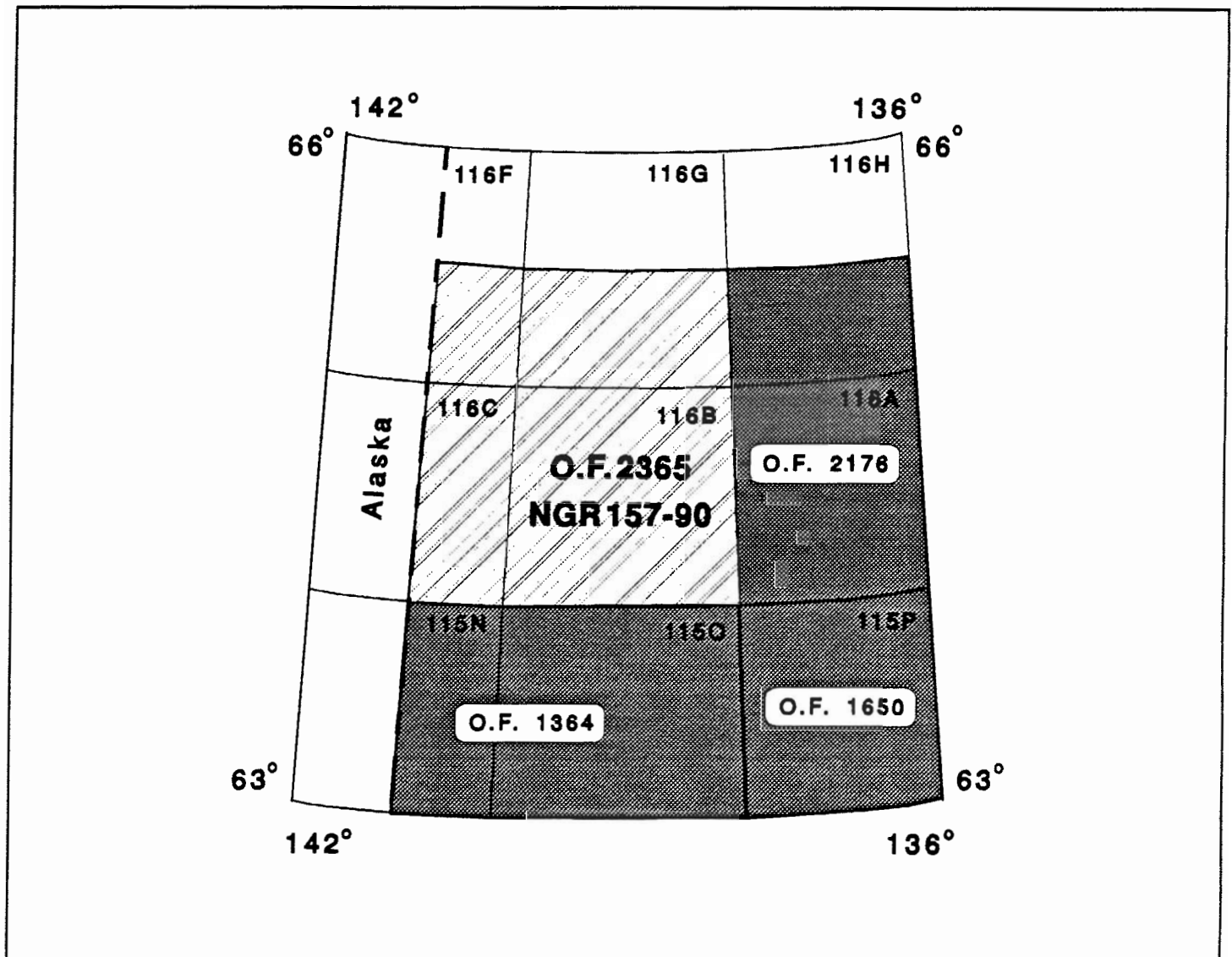
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August 1991

**NATIONAL GEOCHEMICAL RECONNAISSANCE
STREAM SEDIMENT AND WATER GEOCHEMICAL DATA
YUKON 1991**

**GEOLOGICAL SURVEY OF CANADA OPEN FILE 2365, NGR 157-1990
NTS 116B; PARTS OF 116C, 116F and 116G**



National Topographic System reference and index to adjoining GSC geochemical reconnaissance surveys

Open File 2365 represents a contribution to the Canada - Yukon Economic Programming Agreement. This project was managed by the Geological Survey of Canada.

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REGIONAL STREAM SEDIMENT AND WATER GEOCHEMICAL DATA, YUKON 1991, GSC OPEN FILE 2365, NGR 157-1990; NTS 116B, PARTS OF 116C, 116F and 116G

INTRODUCTION

Open File 2365 is of three open files released in 1991 covering areas in the Yukon. This open file contains data for gold and 25 other elements obtained by re-analyzing stream sediments collected in 1976 and 1977 from an area of west central Yukon. Original analytical data selected from Open File 520 (published in 1978) for 13 elements in sediments are also included in this report. Corresponding waters are analyzed for uranium, fluoride and pH.

The original reconnaissance surveys were carried out by the Geological Survey of Canada under the Federal Uranium Reconnaissance Program. Fisheries and Environment Canada provided funds for the original determination of mercury. Analyses of archive samples were undertaken under the Canada-Yukon Economic Programming Agreement (1989-1990).

Analytical results and field observations are used to build a national geochemical data base for resource assessment, mineral exploration, geological mapping and environmental studies. Sample collection and preparation procedures and analytical methods are strictly specified and carefully monitored to ensure consistent and reliable results regardless of the area, the year or the analytical laboratory.

CREDITS

E.H.W. Hornbrook directed the original surveys.

P.W.B. Friske coordinated the activities of contract and Geological Survey of Canada staff under the reanalysis program.

Contracts were let to the following companies for sample preparation and analysis and were managed by the following staff of the Regional Geochemical Studies section:

Collection: Stokes Exploration Management
(1976/1977) Vancouver, British Columbia
E.H.W. Hornbrook, W. Goodfellow

Preparation: Golder Associates
(1976/1977) Ottawa, Ontario
J.J. Lynch

Analysis: Chemex Labs, Limited
(1976/1977) North Vancouver, British Columbia

Atomic Energy of Canada, Limited
Ottawa, Ontario

Barringer Research, Limited
Rexdale, Ontario (1976)

Bondar-Clegg & Company
Ottawa, Ontario (1977)
J.J. Lynch

Reanalysis: Activation Laboratories Ltd.
(1990) Ancaster, Ontario
J.J. Lynch

M. McCurdy edited open files and coordinated production.

H. Gross and A.C. Galletta provided computer processing support.

Pat Doyle, C.C. Durham and Helena Karam provided technical assistance.

DESCRIPTION OF SURVEY AND SAMPLE MANAGEMENT

Helicopter-supported sample collection was carried out during the summer of 1976 and 1977. Stream sediment and water samples were collected at an average density of one sample per 13 square kilometres throughout the 23 800 square kilometres of the west-central Yukon survey.

Sample site duplicate samples were routinely collected in each analytical block of twenty samples.

Field observations were recorded on standard forms used by the Geological Survey of Canada (Garrett, 1974).

The sample site positions were marked on appropriate 1:250 000 scale NTS maps in the field. These maps were digitized at the Geological Survey in Ottawa to obtain the sample site UTM coordinates.

In Ottawa, field-dried samples were air-dried and sieved through a minus 80 mesh (177 micron) screen before ball-milling and analysis. At this time, control reference and blind duplicate samples were inserted into each block of twenty sediment samples. Additional sample material required for reanalysis was prepared by milling sieved sediments in ceramic-lined puck mills. For the water samples, only control reference samples were inserted into the block. There were no blind duplicate water samples.

The sample site coordinates were checked as follows: a sample location map was produced on a Versatec plotter using the digitized coordinates; the original sample location map produced in the field was then overlain on the Versatec map; the two sets of points were checked for coincidence. The dominant rock types in the stream catchment basins were identified on appropriate geological maps used as the bedrock geological base on NGR maps.

Thorough inspections of the field and analytical data were made to check for any missing information and/or gross errors.

Quality control and monitoring of the analytical data were undertaken by a standard method used by the Exploration Geochemistry Subdivision at the Geological Survey of Canada.

ANALYTICAL PROCEDURES

Instrumental Neutron Activation Analysis (INAA)

Weighed and encapsulated samples are packaged for

irradiation along with internal standards and international reference materials. Samples and standards are irradiated together with neutron flux monitors in a two-megawatt pool type reactor. After a seven day decay period, samples are measured on a high resolution germanium detector. Computer control is achieved with a Microvax II computer. Typical counting times are 500 seconds. Elements determined by INAA include: Au, Ag, As, Ba, Br, Ca, Co, Cr, Cs, Fe, Hf, Hg, Ir, Mo, Na, Ni, Rb, Sb, Sc, Se, Sn, Sr, Ta, Th, U, W, Zn, La, Ce, Nd, Sm, Eu, Tb, Yb and Lu. The sample weight is also reported. Data for Ag, Ca, Hg, Ir, Mo, Ni, Se, Sn, Sr and Zn are not published because of inadequate detection limits and/or precision.

Atomic Absorption Spectroscopy (AAS) and Other Analyses

For the determination of Zn, Cu, Pb, Ni, Co, Ag, Mn, and Fe, a 1 gram sample is reacted with 3 mL concentrated HNO_3 in a test tube overnight at room temperature. After digestion, the test tube is immersed in a hot water bath at room temperature and brought up to 90°C and held at this temperature for 30 minutes with periodic shaking. One mL of concentrated HCl is added and heating continues for another 90 minutes. The sample solution is then diluted to 20 mL with metal-free water and mixed. Zn, Cu, Pb, Ni, Co, Ag, Mn, and Fe are determined by atomic absorption spectroscopy using an air-acetylene flame. Background corrections are made for Pb, Ni, Co, and Ag.

Molybdenum is determined by atomic absorption spectroscopy using a nitrous oxide acetylene flame. A 0.5 gram sample is reacted with 1.5 mL concentrated HNO_3 at 90°C for 30 minutes. At this point, 0.5 mL concentrated HCl is added and the digestion continued at 90°C for an additional 90 minutes. After cooling, 8 mL of 1250 ppm Al solution are added and the sample solution diluted to 10 mL before aspiration.

Mercury is determined by the Hatch and Ott procedure with some modifications. The method is described by Jonasson *et al.* (1973). A 0.5 gram sample is reacted with 20 mL concentrated HNO_3 and 1 mL concentrated HCl in a test tube for 10 minutes at room temperature prior to two hours of digestion with mixing at 90°C in a hot water bath. After digestion, the sample solutions are cooled and diluted to 100 mL with metal-free water. The Hg present is reduced to the elemental state by the addition of 10 mL 10% w/v SnSO_4 in $\text{M H}_2\text{SO}_4$. The Hg vapour is then flushed by a stream of air into an absorption cell mounted in the light path of an atomic absorption spectrophotometer. Absorption measurements are made at 253.7 nm.

Barium is determined by atomic absorption spectroscopy using a nitrous oxide-acetylene flame. A 0.5 g sample is decomposed with 5 mL concentrated HF, 5 mL concentrated HClO_4 , and 2 mL concentrated HNO_3 . The sample is then heated to fumes of perchloric acid and then to dryness. Three mL concentrated HClO_4 are added to the residue, heated to light fumes and then 5 mL of water are added. The sample solution is then transferred to a test tube calibrated at 25 mL containing 0.5 mL ionization buffer solution (0.5 g NaCl/mL). The sample solution is diluted to 25 mL, mixed, and analyzed.

Tungsten is determined as follows: a 0.2 g sample of lake sediment is fused with 1 g $\text{K}_2\text{S}_2\text{O}_7$ in a rimless test tube at 575°C for 15 minutes in a furnace. The cooled melt is then leached with 10 mL concentrated HCl in a water bath heated to 85°C . After the soluble material has completely dissolved, the insoluble material is allowed to settle and an aliquot of 5 mL transferred to another test tube. 5 mL of 20% SnCl_2 solution are then added to the sample aliquot, mixed and heated for 10 minutes at 85°C in a hot water bath. A 1 mL aliquot of dithiol solution (1% dithiol in iso-amyl acetate) is added to the test solution and the test solution then heated for 4 - 6 hours at $80^\circ - 85^\circ\text{C}$ in a hot water bath. This solution is removed from the hot water bath, cooled and 2.5 mL of kerosene added to dissolve the globule. The colour intensity of the kerosene solution is measured at 630 nm using a spectrophotometer. The method is described by Quin and Brooks (1972).

Uranium is determined using a neutron activation method with delayed neutron counting. A detailed description of the method is provided by Boulanger *et al.* (1975). In brief, a 1 gram sample is weighed in a 7 dram polyethylene vial, capped and sealed. The irradiation is provided by the Slowpoke reactor with an operating flux of 10^{12} neutrons/cm²/second. The samples are pneumatically transferred from an automatic loader to the reactor, where each sample is irradiated for 60 seconds. After irradiation, the samples are again transferred pneumatically to the counting facility where, after a 10 second delay, the sample is counted for 60 seconds with six BF_3 detector tubes embedded in paraffin. Following counting, the samples are automatically ejected into a shielded storage container. Calibration is carried out twice a day as a minimum, using natural materials of known uranium concentration.

Water Analyses

Fluoride in water samples is determined using a specific ion electrode. Prior to measurement an aliquot of the sample is mixed with an equal volume of TISAB buffer solution (total ionic strength adjustment buffer). The fluoride is measured initially with a Chemtrix and subsequently with a Fisher Accumet expanded scale meter, using an Orion fluoride electrode.

For the determination of pH, an aliquot of the water sample is transferred to a clean dry beaker. The pH is measured using a Chemtrix expanded scale meter with a Corning combination electrode.

Uranium in waters is determined by a fluorometric method. The uranium is initially preconcentrated by evaporation. The residue after evaporation is fused with a mixture of NaF and LiF in a platinum dish. After cooling, the fluorescence of the fused pellet is measured using a Jarrel-Ash Fluorometer Model 26-000.

A summary of analytical methods and detection limits is provided in Table 1.

PRESENTATION AND INTERPRETATION OF GOLD DATA

The following discussion reviews the format used to present the gold geochemical data and outlines some

TABLE 1. Summary of Analytical Data and Methods

ELEMENT	DETECTION LEVEL	METHOD
SEDIMENTS:		
Zn Zinc	2 ppm	AAS
Cu Copper	2 ppm	AAS
Pb Lead	2 ppm	AAS
Ni Nickel	2 ppm	AAS
Co Cobalt	2 ppm	AAS
Ag Silver	0.2 ppm	AAS
Mn Manganese	5 ppm	AAS
Mo Molybdenum	2 ppm	AAS
Fe Iron	0.02 pct	AAS
Hg Mercury	10 ppb	CV-AAS
W Tungsten	4 ppm	COL
U Uranium	0.2 ppm	NADNC
Ba Barium	40 ppm	AAS
Au Gold	2 ppb	INAA
As Arsenic	0.5 ppm	INAA
Ba Barium	50 ppm	INAA
Br Bromine	0.5 ppm	INAA
Co Cobalt	1 ppm	INAA
Cr Chromium	5 ppm	INAA
Cs Cesium	1 ppm	INAA
Fe Iron	0.01 pct	INAA
Hf Hafnium	1 ppm	INAA
Na Sodium	0.01 pct	INAA
Rb Rubidium	5 ppm	INAA
Sb Antimony	0.1 ppm	INAA
Sc Scandium	0.1 ppm	INAA
Ta Tantalum	0.5 ppm	INAA
Th Thorium	0.2 ppm	INAA
U Uranium	0.5 ppm	INAA
W Tungsten	1 ppm	INAA
La Lanthanum	0.5 ppm	INAA
Ce Cerium	3 ppm	INAA
Nd Neodymium	5 ppm	INAA
Sm Samarium	0.1 ppm	INAA
Eu Europium	0.2 ppm	INAA
Tb Terbium	0.5 ppm	INAA
Yb Ytterbium	0.2 ppm	INAA
Lu Lutetium	0.05 ppm	INAA
WATERS:		
F Fluoride	20 ppb	ISE
pH Hydrogen ion activity	-	GCM
U Uranium	0.05 ppb	MF

- AAS - atomic absorption spectrometry
- COL - colorimetry
- CV-AAS - cold vapour (flameless) atomic absorption spectrometry
- GCM - glass Calomel electrode and pH meter
- GRAV - gravimetry
- INAA - Instrumental Neutron Activation Analysis
- ISE - ion selective electrode
- MF - molecular fluorescence
- NADNC - neutron activation - delayed neutron counting

important points to consider when interpreting this data. This discussion is included in recognition of the special geochemical behaviour and mode of occurrence of gold in nature and the resultant difficulties in obtaining and analyzing samples which reflect the actual concentration level at a given site.

The correct interpretation of geochemical gold data from regional stream sediment or lake sediment surveys requires an appreciation of the unique chemical and physical characteristics of gold and its mobility in the surficial environment. Key properties of gold that distinguish its geochemical behaviour from most other elements (Harris, 1982) include :

- 1) Gold occurs most commonly in the native form which is chemically and physically resistant. A significant proportion of the metal is dispersed in a micron-sized particulate form, and the high specific gravity of gold results in a heterogeneous distribution, especially in stream sediment and clastic-rich (low LOI) lake sediment environments. Gold distribution appears to be more homogeneous in organic-rich fluvial and lake sediments.
- 2) Gold typically occurs at low concentrations in the ppb range. Whereas gold concentrations of only a few ppm may represent economic deposits, background levels in stream and centre-lake sediments seldom exceed 10 ppb, and commonly are near the detection limit of 2 ppb.

These factors result in a particle sparsity effect wherein very low concentrations of gold are heterogeneously enriched or depleted in the surficial environment. Hence, a major problem facing the geochemist is to obtain a representative sample. In general, areas where concentrations of gold in sediments are low, and/or grain sizes of the gold present relatively high require proportionally larger samples to reduce the uncertainty between subsample analytical values and actual values. Conversely, as actual gold concentrations increase or grain size decreases, the number of gold particles to be shared in random subsamples increases and variability of results decreases (Clifton *et al.*, 1969; Harris, 1982). The limited amount of material collected during the rapid, reconnaissance-style regional surveys and the need to analyze for a broad spectrum of elements, precludes the use of a significantly large sample weight for the gold analyses. Therefore, to obtain representative samples, grain size is reduced by sieving and ball milling of the dried sediments.

The following control methods are currently employed to evaluate and monitor the sampling and analytical variability which are inherent in the analysis of gold in geochemical media:

- (1) For each block of 20 samples:
 - (a) random insertion of a standard reference sample to control analytical accuracy and long-term precision;
 - (b) collection of a field duplicate (two samples from one site) to measure sampling and analytical variance;

- (c) analysis of a second subsample (blind duplicate) from one sample to measure and control short-term precision or analytical variance.
- (2) For both stream and lake sediments, routine repeat analyses on a second subsample are performed for all samples having values that are statistically above approximately the 90th percentile of the total data set.
- (3) For lake sediments only, a routine repeat analysis on a second subsample is performed on those samples with LOI values below 10%, indicating a large clastic component. Ongoing studies suggest that the gold distribution in these samples is more likely to be variable than in samples with a higher LOI content.

The presentation of gold data, statistical treatment and the value map format are different than for other elements. Gold data listed in the open file may include initial analytical results, values determined from repeat analyses, together with sample weights and corresponding detection limits for all analyzed samples. The gold, statistical parameters and regional symbol-trend plots are determined using only the first analytical value. Gold values less than the detection limit are set to half that limit. On the value map, initial values are followed by a comma and a value obtained by a second analysis, where determined. Sample weights used can be found in the text. Following are possible variations in data presentation on a value map.

+ *	No data
+27	Single analysis
+27,14	Repeat analysis
+ < 1	Single analysis, less than detection limit

In summary, geochemical follow-up investigations for gold should be based on a careful consideration of all geological and geochemical information, and especially a careful appraisal of gold geochemical data and its variability. In some instances, prospective follow-up areas may be indirectly identified by pathfinder element associations in favourable geology, although an analogous gold response due to natural variability may be lacking. Once an anomalous area has been identified, field investigations should be designed to include detailed geochemical follow-up surveys and collection of large representative samples. Subsequent repeat subsample analyses will increase the reliability of results and permit a better understanding of natural variability which can then be used to improve sampling methods and interpretation.

FIELD DATA LEGEND

Table 2 describes the field and map information appearing on the following pages preceding the analytical data for each sample site.

REFERENCES

- Blussom, S.L.** (1974) Five geological maps of the northern Selwin Basin (Operation Stewart), Yukon Territory and District of Mackenzie, N.W.T. Geological Survey of Canada Open File 205.
- Boulanger, A., Evans, D.J.R. and Raby, B.F.** (1975) Uranium analysis by neutron activation delayed neutron counting; Proceedings of the 7th Annual Symposium of Canadian Mineral Analysts, Thunder Bay, Ontario, September 22-23, 1975.
- Clifton, H.E., Hunter, R.E., Swanson, F.J. and Phillips, R.L.** (1969) Sample size and meaningful gold analysis; U.S. Geological Survey Professional Paper 625-C.
- Garrett, R.G.** (1974) Field data acquisition methods for applied geochemical surveys at the Geological Survey of Canada; Geol. Surv. Can. Paper 74-52.
- Green, L.H.** (1972) Geology of Nash Creek, Larsen Creek and Dawson map areas, Yukon Territory. Geological Survey of Canada Memoir 364, 157 p.
- Harris, J.F.** (1982) Sampling and analytical requirements for effective use of geochemistry in exploration for gold; *in* Levinson, A.A., Editor, Precious Metals in the Northern Cordillera, proceedings of a symposium sponsored by the Association of Exploration Geochemists and the Cordilleran Section of the Geological Association of Canada, pp. 53-67.
- Jonasson, I.R., Lynch, J.J. and Trip, L.J.** (1973) Field and laboratory methods used by the Geological Survey of Canada in geochemical surveys; No. 12, Mercury in Ores, Rocks, Soils, Sediments and Water, Geol. Surv. Can. Paper 73-21.

TABLE 2. Field Observations Legend

FIELD RECORD	DEFINITION	TEXT CODE
MAPSHEET	National Topographic System (NTS); lettered quadrangle (1:250 000 or 1:50 000 scale)	116B, 116C, 116F, or 116G
SAMPLE ID	Remainder of sample number: Year of collection Field crew Sample sequence number	76 or 77 1, 3 or 5 001-999
REP STAT	Replicate status; relationship of the sample to others within the survey: Routine sample site First of a duplicate pair Second of a duplicate pair	00 10 20
UTM	Universal Transverse Mercator UTM co-ordinate system; digitized sample location co-ordinates	
ZN	Zone (7 to 22)	
EASTING	UTM Easting in metres	
NORTHING	UTM Northing in metres	
ROCK UNIT	Major rock type of stream catchment area: glacial material argillite sandstone shale limestone quartzite dolomite siltstone diorite greenstone granodiorite basalt syenite basic extrusive schist biotite gneiss ultramafic unknown	GLCM ARGL SNDS SHLE LMSN QRTZ DLMT SLSN DORT GRNS GRDR BSLT SYNT BEXV SCST BGNS UMFC UKNN
ROCK AGE	Stratigraphic age of dominant rock type in catchment basin: Unknown Quaternary Tertiary Cretaceous Jurassic Triassic Carboniferous Devonian-Mississippian Devonian Silurian Ordovician-Silurian Cambrian-Ordovician Cambrian Proterozoic-Paleozoic Paleozoic (undivided) Proterozoic Precambrian (undivided)	65 64 57 52 47 42 30 93 25 20 19 14 10 92 09 04 01

FIELD RECORD	DEFINITION	TEXT CODE
SAMPLE TYPE	Sample material collected: Stream bed sediment only Spring or sediment seep Heavy mineral concentrate Stream water only Natural groundwater, spring seep Simultaneous stream sediment and water Simultaneous spring or seep water and sediment	SedOnly SpgSedOnly HvMnCn Strm GrWat Sed/Water SpgSep/Sed
STREAM WIDTH	Stream width in feet	
STREAM DEPTH	Stream depth to nearest tenth of foot	
SAMPLE CONT.	Contamination, human or natural: None Possible Probable Definite Mining activity Industrial sources Agricultural Domestic or household Forestry activities Burned areas	- Possible Probable Definite Mining Industry Agricuilt Domestic Forestry Burn
BANK TYPE	Bank type; the general nature of the bank material adjacent to the sample site: Alluvial Colluvial (bare rock, residual or mountain soils) Glacial till Glacial outwash sediments Bare rock Talus scree Organic predominant (debris, peat, muskeg, swamp) ..	Alluv Colluv Till Outwash Bare Rk Talus/Scr Organic
WATER COLOUR	Water colour; the general colour and suspended load of the sampled water: Clear Brown transparent White cloudy Brown cloudy	Clear BnTrans WhCl'dy BnCl'dy
STREAM FLOW	Water flow rate: Stagnant Slow Moderate Fast Torrential	Stagnt Slow Modert Fast Torrnt
SAMPLE COLOUR	Predominant sediment colour: Red-brown White-buff Black Yellow Green Grey, blue grey Pink Buff to brown Brown	Rd-Bn Wh-Bf Black Yellow Green Gy-Blu Pink Bf-Bn Brown

FIELD RECORD	DEFINITION	TEXT CODE
SAMPLE COMP.	<p>Sediment composition; description of the bulk mechanical composition of the collected sample on a scale of 1 to 3, the total of the column must add up to 3 or 4 or 5: Size fractions are divided as follows:</p> <p>Column 1 >0.125 mm (sand) Column 2 <0.125 mm (fines - organic silt, clay) Column 3 organic material</p> <p>Amount of size fraction: sum of amounts = 3 4 5</p> <p>Absent 0 0 0</p> <p>Minor <33% 25% 20%</p> <p>Medium 33-67% 50% 40%</p> <p>Major >67% 75% 60%</p>	<p>0</p> <p>1</p> <p>2</p> <p>3</p>
BOTTOM PCPT	<p>Precipitate or stain; the presence of any coatings on pebbles, boulders or stream bottoms:</p> <p>None</p> <p>Red-brown</p> <p>White or buff</p> <p>Black</p> <p>Yellow</p> <p>Green</p> <p>Grey</p> <p>Pink</p> <p>Buff to brown</p>	<p>-</p> <p>Rd-Bn</p> <p>Wh-Bf</p> <p>Black</p> <p>Yellow</p> <p>Green</p> <p>Grey</p> <p>Pink</p> <p>Bf-Bn</p>
BANK PCPT	<p>Distinctive precipitate, stains or weathering on rocks in immediate area of catchment basin or stream bank:</p> <p>None</p> <p>Red, brown (eg. Fe)</p> <p>White, buff (eg. CO₃, Zn)</p> <p>Black (e.g. Fe, Mn, sulphides)</p> <p>Yellow (e.g. Pb, U, Fe, Mo, REE)</p> <p>Green (Cu, Ni, U, Mo, As, Fe)</p> <p>Bluish (Zn, P)</p> <p>Pink (Co, As)</p>	<p>-</p> <p>Rd-Bn</p> <p>Wh-Bf</p> <p>Black</p> <p>Yellow</p> <p>Green</p> <p>Blue</p> <p>Pink</p>
STREAM PHYSIOG	<p>General physiography of the drainage basin:</p> <p>Plain</p> <p>Muskeg, swampland</p> <p>Penplain, plateau</p> <p>Hilly, undulating</p> <p>Mountainous, mature</p> <p>Mountainous, youthful (precipitous)</p>	<p>Plain</p> <p>Swamp</p> <p>Penpln</p> <p>Hill</p> <p>Moun/M</p> <p>Moun/Y</p>
STREAM DRAINAGE	<p>Drainage pattern:</p> <p>Poorly defined, haphazard</p> <p>Dendritic</p> <p>Herringbone</p> <p>Rectangular</p> <p>Trellis</p> <p>Discontinuous shield type (chains of lakes)</p> <p>Basinal</p> <p>Others</p>	<p>Poor</p> <p>Dendrc</p> <p>Herrbn</p> <p>Rectln</p> <p>Trellis</p> <p>Discnt</p> <p>Closed</p> <p>Other</p>
STREAM TYPE	<p>Stream type:</p> <p>Undefined</p> <p>Permanent, continuous</p> <p>Intermittent, seasonal</p> <p>Re-emergent, discontinuous</p>	<p>Undfnd</p> <p>Permnt</p> <p>Intermit</p> <p>Re-emerg</p>

FIELD RECORD	DEFINITION	TEXT CODE
STREAM CLASS	Classification based on proximity to source: Undefined Primary Secondary Tertiary Quaternary	Undfnd Pri'ary Sec'ary Ter'ary Qua'ary
STREAM SOURCE	Source of water: Unknown Groundwater Snow melt or spring run-off Recent precipitation Ice-cap or glacier meltwater	Unknown Ground Sp'gMelt RecRain Glacier
Miscellaneous	Missing data in any field no sample material for analysis parts per million parts per billion percent weight (of sample) gram	* ns ppm ppb pct Wt gm