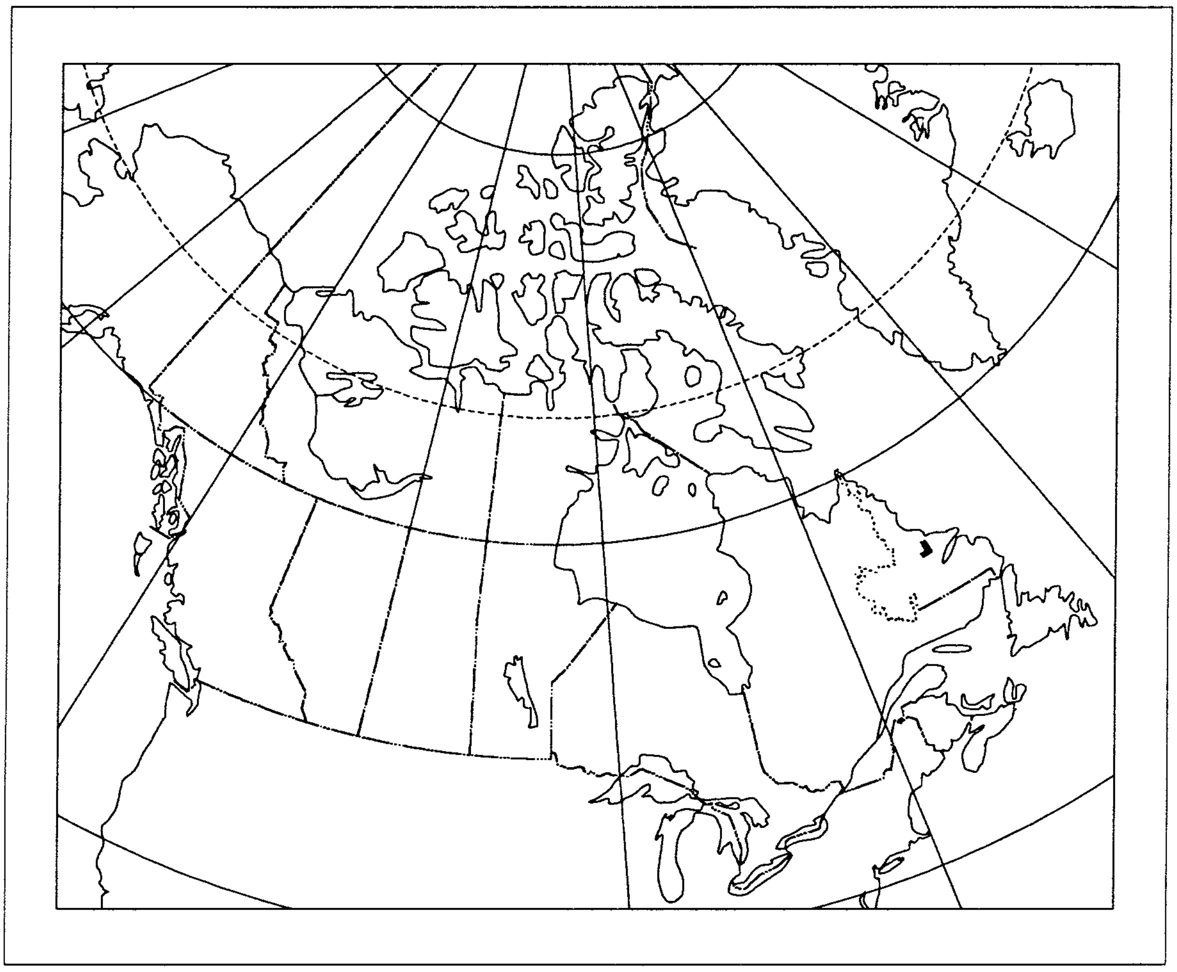
GEOLOGICAL SURVEY OF CANADA COMMISSION GÉOLOGIQUE DU CANADA

GEOLOGICAL SURVEY OF CANADA OPEN FILE 2650
(NTS 13K/6, 13K/7, 13K/10, 13K/15)

CANADA - NEWFOUNDLAND COOPERATION AGREEMENT ON MINERAL DEVELOPMENT (1990-1994)

A DETAILED LAKE SEDIMENT AND WATER GEOCHEMICAL SURVEY
CENTRAL LABRADOR



Friske, P.W.B., McCurdy, M.W., Gross, H., Day, S.J., Lynch, J.J., Durham, C.C. (1993): A Detailed Lake Sediment and Water Geochemical Survey, Central Labrador (NTS 13K/6, 13K/7, 13K/10, 13K/15); Geological Survey of Canada Open File 2650

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29 June 1993

Energy, Mines and Resources, Canada Energie, Mines et Ressources, Canada

Canada

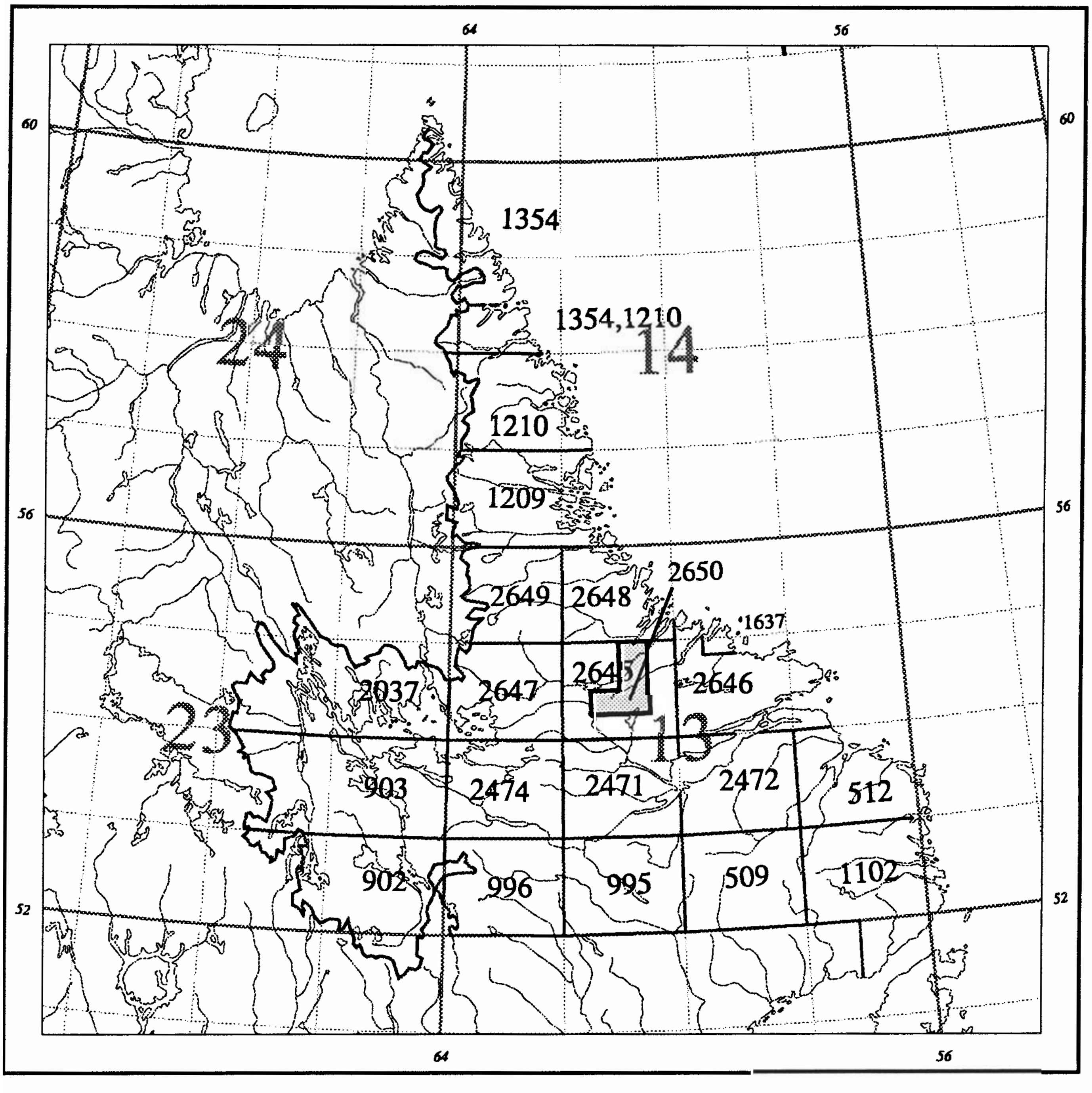
NATIONAL GEOCHEMICAL RECONNAISSANCE

LAKE SEDIMENT AND WATER GEOCHEMICAL DATA

NEWFOUNDLAND 1993

GEOLOGICAL SURVEY OF CANADA OPEN FILE 2650

NTS 13K/6, 13K/7, 13K/10, 13K/15



National Topographic System reference and index to adjoining geochemical reconnaissance surveys

Open File 2650 represents a contribution to the Canada - Newfoundland Cooperation Agreement on Mineral Development (1990-1994), a subsidiary agreement under the Economic and Regional Development Agreement. This project was managed by the Geological Survey of Canada.

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GSC OPEN FILE 2650
A DETAILED LAKE SEDIMENT AND WATER GEOCHEMICAL SURVEY, LABRADOR NTS 13K/6, 13K/7, 13K/10, 13K/15

INTRODUCTION

Open File 2650 presents analytical and statistical data for 40 elements in sediments from 404 sites in central Labrador. Uranium, fluoride, and pH values in waters from these sites are also included in this report.

A high-density lake sediment survey (helicopter-supported) around Florence Lake, Labrador (NTS 13K), under the direction of P.W.B. Friske and C.C. Durham, was completed between 26 June and 7 July 1992. The survey was carried out with the assistance of John McConnell and his assistants from the Newfoundland Department of Mines and Energy. Funds for field and analytical work for Open File 2650 were provided through the Canada - Newfoundland Cooperation Agreement on Mineral Development (1990-1994).

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, 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.

Regional geochemical surveys have been carried out by the GSC in Labrador since 1977. With the release of this report, a total of 22 open files are available that provide complete coverage of Labrador. Areas surveyed, with associated open file numbers, are shown in Figure 1. Figure 2 illustrates geochemical coverage across Canada. Data from all open files are available on 3.5 or 5.25 inch diskettes, or in the original published form.

CREDITS

P.W.B. Friske directed the survey, coordinating the activities of contract and GSC staff .

Contracts were let to the following companies for sample preparation and analysis and were managed by Geological Survey of Canada staff as follows:

Preparation:	Bondar-Clegg & Company, Ltd. Gloucester, Ontario *J.J. Lynch (GSC)*
Analysis:	Barringer Laboratories (Alberta), Ltd. Calgary, Alberta
	Becquerel Laboratories, Ltd. Mississauga, Ontario
	Chemex Labs, Ltd. North Vancouver, British Columbia
	J.J. Lynch (GSC)

M. McCurdy edited open files and coordinated open file production.

H. Gross provided computer processing support.

C.C. Durham, S.J. Day, S. Carberry, and R. Balma provided technical assistance.

DESCRIPTION OF SURVEY AND SAMPLE MANAGEMENT

Helicopter-supported sample collection was carried out during the summer of 1992. Lake sediment and water samples were collected at an average density of one sample per 8.9 km^2 throughout the 3,600 square kilometres covered by the 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).

Site positions were marked on 1:50 000 scale NTS maps in the field and later digitized at the Geological Survey in Ottawa to obtain Universal Transverse Mercator (UTM) coordinates. The dominant rock types in the lake catchment basins were identified on appropriate geological maps used as the bedrock geological base on NGR maps.

In Ottawa, field dried samples were air-dried and crushed: particle reduction was accomplished using a ceramic puck mill. The minus 80 mesh (177 micron) fraction was obtained and used for subsequent analyses. At this time, control reference and blind duplicate samples were inserted into each block of twenty sediment samples. For the water samples, only control reference samples were inserted into the block. There were no blind duplicate water samples.

Analytical data from labs were monitored for reliability with standard methods used by the Applied 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

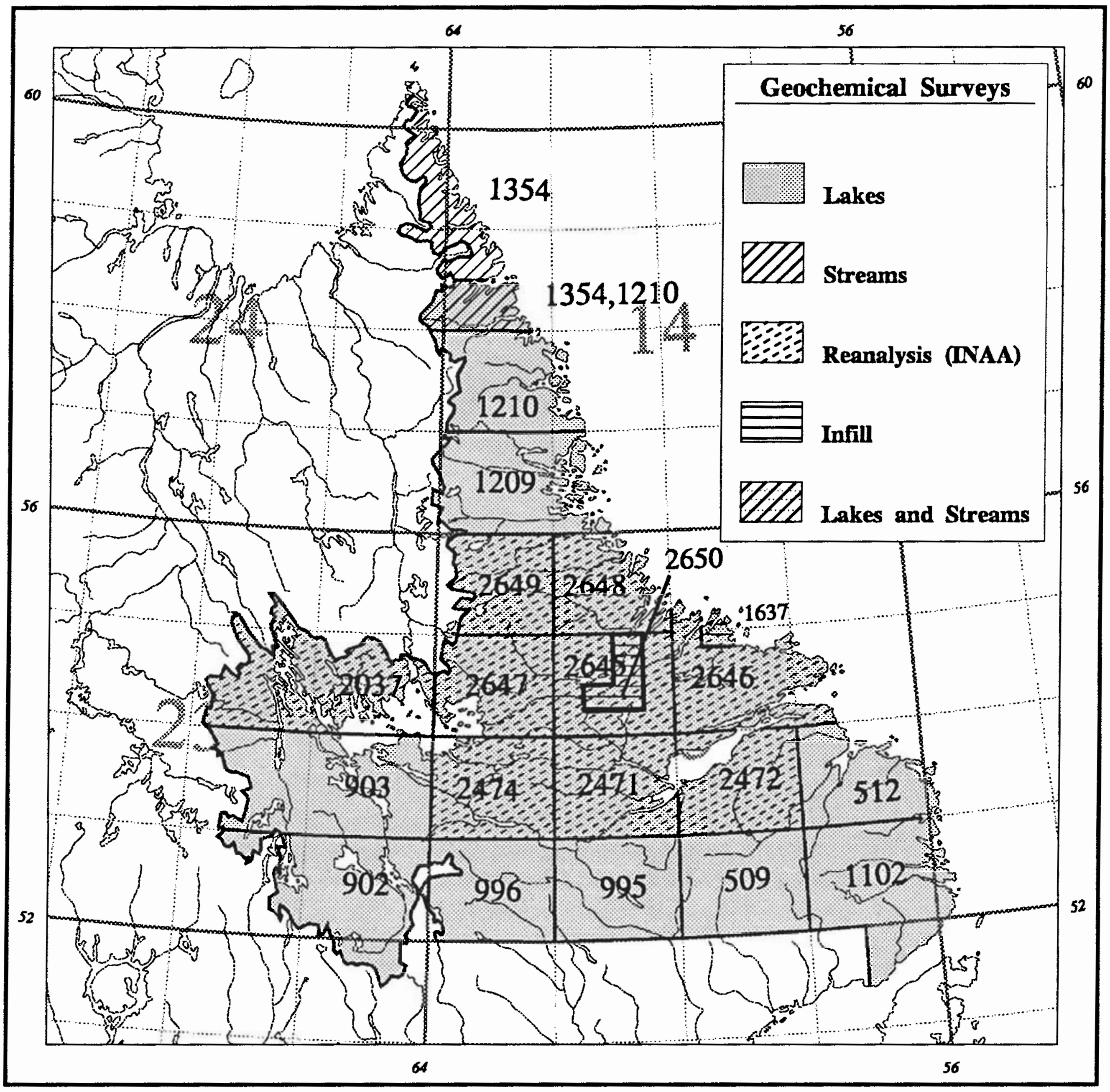

Fig. 1. Areas of Labrador covered by geochemical surveys, showing current GSC open file numbers.

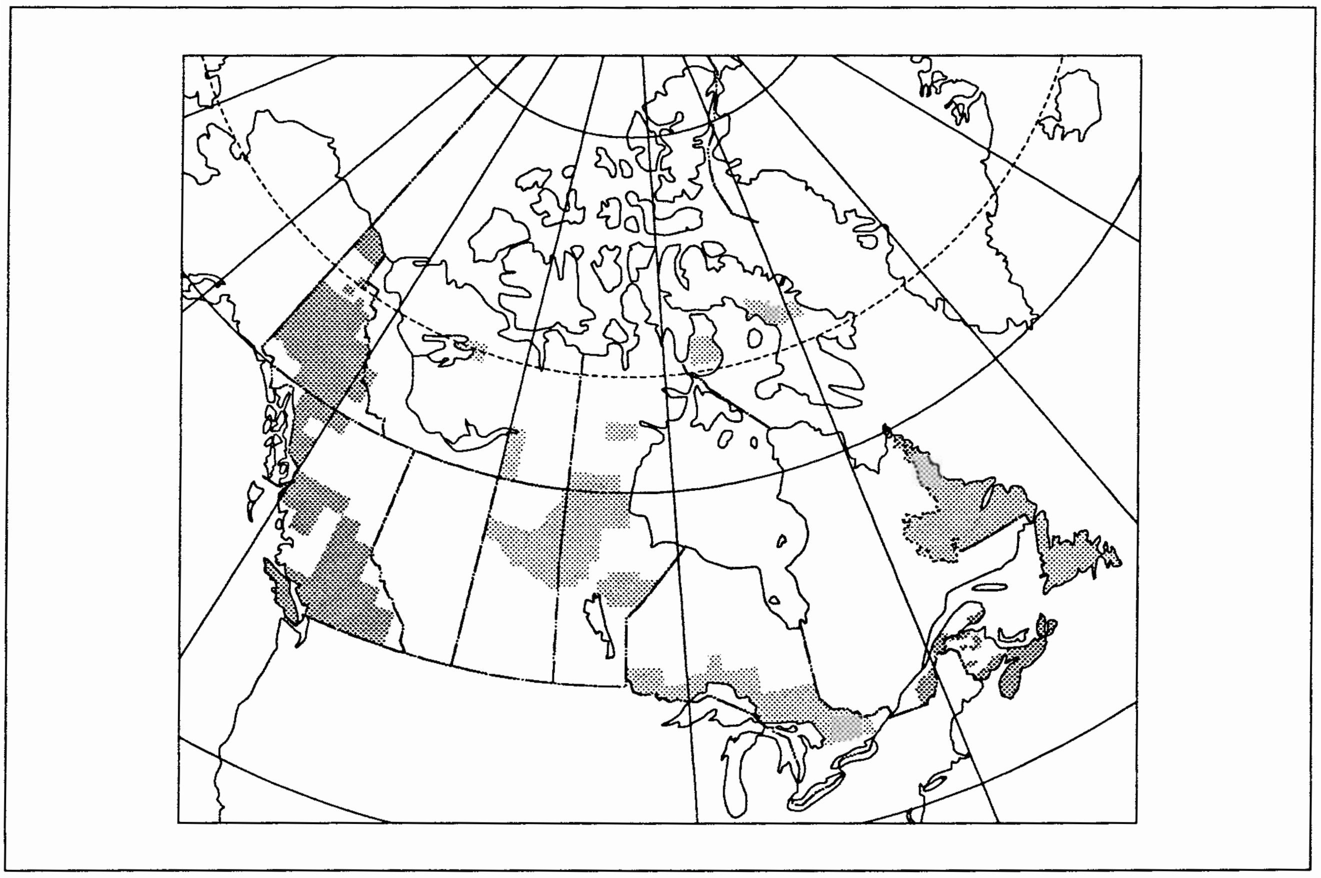

Fig. 2. Drainage surveys to National Geochemical Reconnaissance standards.

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: Ag, As, Au, Ba, Br, Cd, Ce, Co, Cr, Cs, Eu, Fe, Hf, Ir, La, Lu, Mo, Na, Ni, Rb, Sb, Sc, Se, Sm, Sn, Ta, Tb, Te, Th, U, W, Yb, Zn, and Zr. The sample weights are also reported. Data for Ag, Cd, Ir, Se, Sn, Te, Zn, and Zr 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, Fe, and Cd, a 1 g sample is reacted with 6 mL of a mixture of 4M HNO_3 and M HCl in a test tube over night 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 2 hours with periodic shaking. The sample solution is then diluted to 20 mL with metal-free water and mixed. Zn,Cu, Pb, Ni, Co, Ag, Mn, Fe and Cd are determined by atomic absorption spectroscopy using an air-acetylene flame. Background corrections are made for Pb, Ni, Co, Ag and Cd.

Molybdenum and vanadium are determined by atomic absorption spectroscopy using a nitrous oxide acetylene flame. A 0.5 g 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 continues at 90° C for an additional 90 minutes. After cooling, 8 mL of 1250 ppm Al solution are added and the sample solution is 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 g 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 2 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 M H_2SO_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.

Loss-on-ignition is determined using a 500 mg sample. The sample, weighed into 30 mL beaker, is placed in a cold muffle furnace and brought up to 500° C over a period of 2 -3 hours. The sample remains at this temperature for 4 hours and then allowed to cool to room temperature for weighing.

Fluorine is determined in lake sediments as described by Ficklin (1970). A 250 mg sample is sintered with 1 g of a flux consisting of two parts by weight sodium carbonate and one part by weight potassium nitrate. The residue is then leached with water. The sodium carbonate is neutralized with 10 mL 10% (w/v) citric acid and the resulting solution is diluted to 100 mL with water. The pH of the resulting solution is then measured using a fluoride ion electrode. Standard solutions contain sodium carbonate and citric acid in the same quantities as the sample solution.

Water Analyses

Fluoride in lake water samples is determined using a fluoride electrode. Prior to measurement, an aliquot of the sample is mixed with an equal volume of TISAB II buffer solution (total ionic strength adjustment buffer). The TISAB II buffer solution is prepared as follows: to 50 mL metal-free water add 57 mL glacial acetic acid, 58 g NaCl and 4 g CDTA (cyclohexylene dinitrilo tetraacetic acid). Stir to dissolve and cool to room temperature. Using a pH meter, adjust the pH between 5.0 and 5.5 by slowly adding 5 M NaOH solution. Cool and dilute to one liter in a volumetric flask.

Hydrogen ion activity (pH) is measured with a combination glass-calomel electrode and a pH meter.

Uranium in waters is determined by a laser-induced fluorometric method using a Scintrex UA-3 uranium analyser. A complexing agent, known commercially as Fluran and composed of sodium pyrophosphate and sodium monophosphate (Hall, 1979) is added to produce the uranyl pyrophosphate species which fluoresces when exposed to the laser. Since organic matter in the sample can cause unpredictable behaviour, a standard addition method is used. Further, the reaction of uranium with Fluran can be delayed or sluggish; for this reason an arbitrary 24 hour time delay between the addition of the Fluran and the actual reading is incorporated into this method. In practice, 500 microlitres of Fluran solution are added to a 5 mL sample and allowed to stand for 24 hours. At the end of this period fluorescence readings are made with the addition of 0.0, 0.2 and 0.4 ppb U. For high samples the additions are 0.0, 2.0 and 4.0 (20 microlitre aliquots of either 55 or 550 ppb U are used). All readings are taken against a sample blank.

Table 1 provides a summary of analytical data and methods.

COMPARISON OF DATA PRODUCED BY TWO METHODS

The data listing in II-1 to II-33 allows users to make a comparison of data generated by two different analytical methods for a number of elements. Before attempting such a comparison some caution should be exercised.

The 'wet chemical' data for Ni, Co, Mo, and Fe are obtained by AAS using a partial extraction (HNO_3 and HCl). The data for these elements determined by

Table 1. Summary of Analytical Data and Methods

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

AAS	- atomic absorption spectrometry
CV-AAS	- cold vapour extraction - atomic absorption spectrometry
GCM	- glass Calomel electrode and pH meter
GRAV	- gravimetry
INAA	- Instrumental Neutron Activation Analysis
ISE	- ion selective electrode
LIF	- laser-induced fluorescence

INAA, are 'total' data. Hence, in most cases, the original data will likely be somewhat lower than the INAA data

PRESENTATION AND INTERPRETATION OF GOLD DATA

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

Samples that have gold values that are statistically above approximately the 90th percentile, or those with LOI values below 10%, are normally analyzed again in accordance with standard NGR procedures. **There will be no repeat data published in Open File 2650 however, as insufficient material remained after the initial neutron activation analyses.** The correct interpretation of gold geochemical 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. In organic-rich fluviatile and lake sediments, gold distribution appears to be more homogeneous.

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, in areas where concentrations of gold in sediments are low, and/or grain sizes of the gold present relatively high, proportionally larger samples are required to reduce the uncertainty between subsample analytical values and actual values. Conversely, as actual gold concentrations increase or grain sizes decrease, 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 puck 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.

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 a analogous gold response due to natural variability may be lacking. Once an anomalous area has been identified, field investigations should by 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 by 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

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.

Friske, P.W.B. and Hornbrook, E.H.W. (1991) Canada's National Geochemical Reconnaissance Program; *in* Transactions of the Institution of Mining and Metallurgy, Section B; Volume 100, p. 47-56.

Ficklin, W.H. (1970) A rapid method for the determination of fluoride in rocks and soils, using an ion selective electrode; U.S. Geol. Surv. Paper 700C, pp. 186-188.

Hall, G.E.M. (1979) A study of the stability of uranium in waters collected from various geological environments in Canada; in Current Research, Part A, Geological Survey of Canada Paper 79-1A, pp. 361-365.

Garrett, R.G. (1974) Field data acquisition methods for applied geochemical surveys at the Geological Survey of Canada; Geol. Surv. Can. Paper 74-52.

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
MAP SHEET	National Topographic System (NTS): lettered quadrangle (1:250 000 or 1:50 000 scale) Part of sample number	13K
SAMPLE ID	Remainder of sample number:	
	Year	92
	Field crew	1 or 2
	Sample sequence number	001-999
REP STAT	Replicate status; the relationship of the sample to others within the analytical block of 20:	
	Routine regional sample	00
	First of field duplicate	10
	Second of field duplicate	20
UTM	Universal Transverse Mercator (UTM) Coordinate System; digitized sample location coordinates.	
ZN	Zone (7 to 22)	
EASTING	UTM Easting in metres	
NORTHING	UTM Northing in metres	
ROCK UNIT	Major rock type of catchment area:	
	Quaternary	
	poorly sorted glacial till, boulder fields, and sandy outwash; extensive areas of swamp along Kaipokok River	QT40
	Neohelikian	
	Gabbro,diorite, diabase	
	medium to fine grained, mafic and intermediate intrusive rocks of unknown absolute age	NH39
	Seal Lake Group	
	Whiskey Lake Fm.: Red and grey shale, slate, and argillite; minor red quartzite	NH37
	Wuchusk Lake Fm.: diabase and gabbro sills	NH36b
	Bessie Lake Fm.: amygdaloidal and vesicular basalt	NH35b
	Bessie Lake Fm.: white, grey, and pink quartzite, arkose, and conglomerate	NH35a
	Paleohelikian	
	Nipishish Lake Intrusive Suite	
	Crooked River Granite: Pink to grey, undeformed to gneissose muscovite and biotite-bearing aplite and fine to medium grained pink biotite granite	PH33
	Otter Lake-Walker Lake Granite: pink to grey equigranular and porphyritic, medium to coarse grained, massive to strongly foliated, biotite ± hornblende granite, granodiorite and monzonite	PH32a
	Bruce River Group	
	red to pink quartz-feldspar porphyry	PH31
	grey to black plagioclase porphyry	PH30
	Sylvia Lake Fm.: volcaniclastic mudstone, sandstone, and conglomerate (interbedded with 29b, c, d, e)	PH29f
	Sylvia Lake Fm.: massive to porphyritic red, purple, grey, and black trachyte and rhyolite ignimbrite flows, breccia, agglomerate, and bedded tuff, alternating with PH29d	PH29e
	Sylvia Lake Fm.: undivided sequence of massive to porphyritic, grey and green basalt, andesite, and trachyandesite flows, agglomerate, breccia, and bedded tuff	PH29d
	Sylvia Lake Fm.: mauve to green plagioclase, porphyritic andesite and trachyandesite	PH29c
	Sylvia Lake Fm.: dark green to grey, massive to slightly porphyritic andesite and basalt	PH29b
	Brown Lake Fm.: pink, red, buff, and green volcaniclastic sandstone, cherty dust tuff, minor conglomerate, and subarkose	PH28b
	Heggart Lake Fm.: red and grey, pebble to cobble polymictic conglomerate	PH27b
	Heggart Lake Fm.: massive to well bedded, buff to maroon arkosic sandstone; minor polymictic conglomerate and mudstone	PH27a

FIELD RECORD	DEFINITION	TEXT CODE
ROCK UNIT (continued)	*Southern Kaipokok Valley Intrusive Suite*	
	Junior Lake Granodiorite: undeformed to weakly foliated, medium grained hornblende granodiorite to quartz diorite	PH25
	pink, undeformed to weakly foliated, medium-grained potassic granite	PH23
	Aphebian	
	Undivided supracrustal rocks	
	metasedimentary rocks varying in composition from slate, phyllite, and psammite to garnetiferous muscovite-biotite schist	AP17
	Moran Lake Group	
	Joe Pond Fm.: massive and pillowed basalt, pillow breccia, and bedded tuff; minor dolostone and chert	AP11
	Warren Creek Fm.: grey to black mudstone, slate, siltstone, and sandstone, with minor limestone, dolostone, and chert	AP10a
	Moran Lake Group equivalents	
	schistose mafic metavolcanic rocks of diverse origin; bedded tuffs present east of Island Pond; metagabbro locally present east of Boiteau Lake and north of Island Pond	AP11'
	Archean	
	Kanairiktok Intrusive Suite	
	massive to weakly foliated to gneissose, medium-grained grey to pink granite, granodiorite, and tonalite	AR7
	Ultramafic rocks	
	serpentinized peridotite and talc-carbonate rocks	AR6
	Florence Lake Group	
	Lise Lake Fm.: felsic lapilli tuff, lapillistone, minor chert, and marble	AR5
	Adlatok Fm.: intermediate to felsic tuff, volcanic breccia, porphyritic sills; minor marble	AR4
	Schist Lakes Fm.: massive and pillowed mafic flows and sills, intermediate and felsic tuffs and sills; minor marble	AR3
	Maggo Gneiss and Weekes Amphibolite	
	layered quartzofeldspathic gneiss with numerous amphibolite inclusions, cut by pegmatite and aplite dykes, locally highly migmatized	AR2
	layered amphibolite, locally garnetiferous	AR1
	Kanairiktok Intrusive Suite Equivalents	
	massive to weakly foliated, medium grained grey tonalite and granodiorite	AR7'
	Florence Lake Group Equivalents	
	deformed felsic lapilli tuff, volcanic breccia, and siliceous volcanogenic sediments; minor chert and marble	AR4'
	deformed pillow lava	AR3'
	Maggo Gneiss and Weekes Amphibolite Equivalents	
	partially retrogressed and refoliated layered gneiss and amphibolite	AR2'b
	layered quartzofeldspathic gneiss and amphibolite	AR2'a
	layered amphibolite, locally garnetiferous	AR1'
ROCK AGE	Stratigraphic age of dominant rock type in catchment basin:	
	Quaternary	64
	Helikian	06
	Aphebian	05
	Archean	02
LAKE AREA	The area of the water body sampled:	
	Pond	pond
	1/4 to 1 square kilometre	.25-1
	1 to 5 square kilometres	1-5
	greater than 5 square kilometres	>5
LAKE DEPTH	Distance in meters from the surface of the lake to the bottom	0 - 99
TERRAIN RELIEF	Relief of lake catchment basin:	
	Low	Low
	Medium	Med
	High	Hi
SAMPLE CONT.	Contamination; human or natural:	
	None	-
	Work	Wo
	Camp	Ca
	Fuel	Fu
	Gossan	Go

FIELD RECORD	DEFINITION	TEXT CODE
SAMPLE COLOUR	Sediment sample colour; up to two colours may be selected:	
	Tan	Tan
	Yellow	Yellow
	Green	Green
	Grey	Grey
	Brown	Brown
	Black	Black
SUSP MATL	Suspended matter in water:	
	None	-
	Light	Light
	Heavy	Heavy
Miscellaneous	Refers to missing data in any field	*
	no sample material for analysis	ns
	parts per million	ppm
	parts per billion	ppb
	percent	pct
	weight (of sample)	Wt
	gram	g