



**REGIONAL GEOCHEMICAL SURVEY PROGRAM:
REVIEW OF 1996 ACTIVITIES**

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INTRODUCTION

Since 1976, the B.C. Regional Geochemical Survey (RGS) program has completed over forty reconnaissance-scale stream sediment and water surveys. At present, the RGS database contains analytical determinations, field observations and sample location information for 40 485 samples and covers 70 per cent of the province (Figure 1). Baseline geochemical data derived from the RGS program is used in the exploration and development of British Columbia's mineral resources. All components of sample collection, preparation and analysis are closely monitored to ensure consistency and conformance to standards set by the National Geochemical Reconnaissance Program.

The 1996 field season was one of the most active in the history of the RGS Program. Program activities included the release of new stream sediment and water geochemical data from the Cry Lake map area, the release of new stream sediment, stream water, spring water and spring sediment geochemical data from the Gataga Mountain region, and the completion of two reconnaissance-scale stream sediment and water surveys in north-central British Columbia. Additionally, two focused lake sediment surveys and a hydrogeochemical survey were conducted as part of multi-disciplinary mineral resource programs in the Babine, Gataga and Eagle Bay regions (Figure 1).

STREAM SEDIMENT SURVEYS

CRY LAKE RGS DATA RELEASE

A reconnaissance-scale RGS program was completed in the Cry Lake map area (NTS 104I) in September, 1995. Stream sediment samples, stream water samples and field observations were systematically collected from 1159 sites over a total area of 13 200 square kilometres. Survey results were released as Open File B.C. RGS 44 on July 4, 1996. Immediately following the release over 1400 claim units were staked by exploration companies and prospectors targeting the numerous base and precious

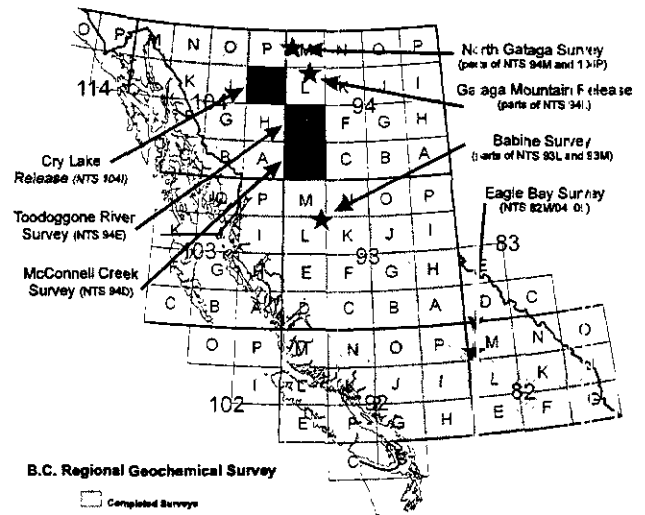


Figure 1. Location Map

metal anomalies identified in the data package (Jackaman, 1996).

GATAGA MOUNTAIN RELEASE

The Gataga Mountain stream sediment and water survey was conducted over seven 1:50 000 NTS map areas (NTS 94L/7, 8, 9, 10, 11, 14, 15) as part of a multi-disciplinary examination of the Kechika Basin (Fetti *et al.*, 1996). Samples were collected from 174 sites and covered an area of 1200 square kilometres. In addition to the routine sediment and water analysis, water samples were also analyzed for trace and major elements by ICP-MS. Data from this survey (Jackaman *et al.*, 1996) plus results of detailed spring water and spring sediment geochemistry studies (Lett *et al.*, 1996) were released in August, 1996.

McCONNELL CREEK and TOODOGGONE RIVER SURVEYS

During July and August, a helicopter supported sample collection program was conducted in the McConnell Creek (NTS 94D) and Toodoggone River (NTS 94E) 1:250 000 map areas. Over the 18 500 square kilometre survey area stream sediment, stream water and field observations were collected from 1835 sample sites at an average density of 1 site every 10 square kilometres.

Samples were not collected in the Spatsizi and Tatlatui parks.

Stream sediment samples will be analyzed for precious and base metals, pathfinder and rare earth elements (Table 1). Water samples are being analyzed for pH, fluoride, uranium and sulphate. Survey results are scheduled to be released in July, 1997.

LAKE SEDIMENT SURVEYS

Two regional lake sediment and water geochemistry surveys were conducted in central and north-central B.C. during 1996, one in the Babine porphyry belt and a second in the North Gataga River area of the Kechika Trough. The surveys were undertaken in conjunction with Geological Survey Branch bedrock mapping projects and are a contribution to the ongoing Regional Geochemical Survey (RGS) lake sediment coverage of central British Columbia (Cook and Jackaman, 1994; Cook *et al.*, 1997). These surveys provide baseline geochemical data for mineral exploration and environmental studies. Complementary lake sediment geochemistry and bedrock mapping surveys have proven highly effective in stimulating mineral exploration in low-lying drift-covered regions of the northern Interior Plateau. For example, prior surveys in the Nechako River map area (NTS 93F) to the south were successful in delineating several areas of known mineralization (Cook *et al.*, 1995) and in revealing locations of new mineralized zones such as the Tsacha (MINFILE 093F 055) epithermal gold prospect. Mineral exploration in both the Babine and Gataga regions has been hindered by an extensive drift cover and poor bedrock exposure, and results of the survey are expected to provide useful new data to stimulate further exploration.

Lake sediments were analyzed for the standard RGS analytical suite of elements (Table 1). Unfiltered lake water were analyzed for the routine suite of pH, uranium, fluoride and sulphate. However, an expanded lake water analytical suite, initiated last year for the Pinchi Lake survey in the Fort Fraser map area (Cook *et al.*, 1997) was incorporated into the two 1996 surveys. An additional surface water sample was collected at approximately every second site and analyzed for trace and major elements by ICP-MS. Conductivity and total dissolved solids were also determined on RGS lake waters for the first time. In total, expanded water geochemistry data will be available for more than 400 sites over the two survey areas.

BABINE PORPHYRY BELT SURVEY

Conducted in June, 1996, the Babine regional lake sediment and water geochemistry survey covers all or part of six 1:50 000 NTS map areas (93L/9, 16; 93M/1, 2, 7, 8) in the Smithers and Hazelton map areas of central British Columbia. The survey is a contribution to the Nechako NATMAP Project, a joint project of the

TABLE 1. ROUTINE STREAM SEDIMENT and WATER ANALYTICAL SUITE

Element	Analytical		Detection	Unit
	Symbol	Method	Limit	
Antimony	Sb	AAS-H/INAA	0.2/0.1	ppm
Arsenic	As	AAS-H/INAA	0.2/0.5	ppm
Barium	Ba	INAA	50	ppm
Bismuth	Bi	AAS-H	0.2	ppm
Bromine	Br	INAA	0.5	ppm
Cadmium	Cd	AAS	0.2	ppm
Cerium	Ce	INAA	3	ppm
Cesium	Cs	INAA	1	ppm
Chromium	Cr	INAA	5	ppm
Cobalt	Co	AAS/INAA	2/1	ppm
Copper	Cu	AAS	2	ppm
Fluorine	F	ION	40	ppm
Gold	Au	INAA	2	ppb
Hafnium	Hf	INAA	1	ppm
Iron	Fe	AAS/INAA	0.02/0.01	%
Lanthanum	La	INAA	0.5	ppm
Lead	Pb	AAS	2	ppm
Loss on Ignition	LOI	GRAV	0.1	%
Lutetium	Lu	INAA	0.05	ppm
Manganese	Mn	AAS	5	ppm
Mercury	Hg	AAS	10	ppb
Molybdenum	Mo	AAS/INAA	2/1	ppm
Nickel	Ni	AAS/INAA	2/20	ppm
Rubidium	Rb	INAA	5	ppm
Samarium	Sm	INAA	0.1	ppm
Scandium	Sc	INAA	0.1	ppm
Silver	Ag	AAS	0.2	ppm
Sodium	Na	INAA	0.01	%
Tantalum	Ta	INAA	0.5	ppm
Terbium	Tb	INAA	0.5	ppm
Thorium	Th	INAA	0.2	ppm
Tungsten	W	INAA	1	ppm
Uranium	U	INAA	0.5	ppm
Vanadium	V	AAS	5	ppm
Ytterbium	Yb	INAA	0.2	ppm
Zinc	Zn	AAS	2	ppm
pH (Waters)	pH	GCE	0.1	
Uranium (Waters)	UW	LIF	0.05	ppb
Fluoride (Waters)	FW	ION	20	ppb
Sulphate (Waters)	SO 4	TURB	1	ppm

Geological Survey Branch, the Geological Survey of Canada, and university researchers (MacIntyre and Struik, 1997). Centred on northern Babine Lake, the survey area covers the entirety of the Babine porphyry belt and corresponds to areas of ongoing bedrock mapping (MacIntyre *et al.*, 1996, 1997) and surficial mapping and till geochemistry (Levson *et al.*, 1997; Huntley *et al.*, 1996). The survey area includes the former Bell (MINFILE 093M 001) and Granisle (MINFILE 093L 146) copper mines, and porphyry copper prospects such as Hearne Hill (MINFILE 093M 006), Nak (MINFILE 093M 010) and Trail Peak (MINFILE 093M 011) remain the primary exploration targets in the region.

Lake sediments and waters were collected from 332 sites. Additional water samples were obtained from 176 sites for supplementary ICP-MS analysis of trace and major elements.

NORTH GATAGA SURVEY

The North Gataga regional lake sediment and water geochemistry survey was conducted in July, 1996 in the Kechika Trough. It covers parts of several 1:50 000 map areas (94M/2, 3, 4, 5, 6, 12; 104P/8, 9, 10, 15, 16) in the Rabbit River and McBride map areas of north-central British Columbia. The survey was conducted jointly by the British Columbia Geological Survey Branch and the Geological Survey of Canada as part of the North Gataga Project, an interdisciplinary Geological Survey Branch bedrock mapping and geochemistry project.

The survey area is coincident with the 1996 bedrock mapping area of Ferri *et al.* (1997), and follows the previously-mapped distribution of Devonian-Mississippian Earn Group rocks within the Kechika Trough. The Earn Group is the most prospective unit in this belt for hosting sedimentary-exhalative (SEDEX) zinc-lead-barite deposits, the primary exploration target in the area.

The survey area is bounded in the southwest by the Rocky Mountain Trench and the Cassiar Mountains, and in the north by the British Columbia-Yukon border. The survey area also bridges the gap between two prior regional geochemical surveys to the north and south. To the south, the survey area is bounded by a Geological Survey Branch stream sediment and water geochemistry survey conducted in 1995 in the more mountainous terrain of the Gataga Mountain area (Jackaman *et al.*, 1996); to the north, it is bounded in the Yukon by the Geological Survey of Canada regional lake sediment survey of the Watson Lake map area (NTS 105A; Friske *et al.*, 1994). RGS stream sediment data for the McBride map area (NTS 104P) has been publicly available for a number of years, but is of limited use in the flat-lying Liard Plain which underlies much of the northwestern part of the North Gataga survey area.

Lake sediments and waters were collected from 444 sites. Additional water samples were obtained from 232 sites for ICP-MS analysis of trace and major elements in the Ottawa laboratories of the Geological Survey of Canada.

EAGLE BAY REGIONAL HYDROGEOCHEMICAL SURVEY

In the Adams Lake region, a regional hydrogeochemical survey was conducted on mapsheets 82M/04 and 05 as part of the Eagle Bay multi-disciplinary project. Details of this survey are reported in Sibbick *et al.*, (1997). The Eagle Bay project area hosts Devonian-Mississippian age rocks of the Eagle Bay Assemblage which are highly similar to rocks hosting the Kuroko-type volcanogenic massive sulphide deposits (Kudz Ze Kayah and Wolverine) recently discovered in the Yukon. However, extensive overburden cover in the Eagle Bay area is an obstacle to new mineral discoveries. Detailed sampling of stream waters may detect subtle groundwater signatures of concealed mineralization. The

Eagle Bay hydrogeochemical survey involved the collection of stream waters from primary and secondary drainages and the in-field measurement of the field parameters pH, redox potential, conductivity and temperature. Filtered and acidified water samples were analysed by ICP-MS for approximately 70 elements; sulphate was also determined on unfiltered sample splits. Results are currently being compiled for release in early 1997.

These activities were co-ordinated with 1:50 000 scale surficial mapping (Dixon-Warren *et al.*, 1997), a regional till geochemistry survey (Bobrowsky, *et al.*, 1997) and mineral deposit studies (Hoy, 1997) and geochemical orientation studies of several key mineral deposits in the area. The project area corresponds to a region of previous Geological Survey Branch bedrock mapping (Schiarizza and Preto, 1987) covering NTS map sheets 82M/04, 05 and 12.

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