REGIONAL GEOCHEMICAL SURVEYS RGS 18–ISKUT RIVER (104B) RGS 19–SUMDUM (104F) AND TELEGRAPH CREEK (104G) RGS 20–TULSEQUAH (104K)*

By J. Gravel and P. F. Matysek

KEYWORDS: Regional geochemical surveys, stream sediments, stream waters, Iskut River, Sumdum, Telegraph Creek, Tulsequah.

INTRODUCTION

During July and August 1987 the British Columbia Ministry of Energy, Mines and Petroleum Resources conducted three regional geochemical stream sediment and water sampling surveys (RGS 18, 19 and 20) covering the Iskut River, Sumdum, Telegraph Creek and Tulsequah map sheets (Figure 5-2-1).

Since 1976, the Geological Survey Branch, in cooperation with the Geological Survey of Canada, has carried out regional geochemical surveys as part of the National Reconnaissance Program.

To date, twenty-eight 1:250 000 map areas, covering approximately 40 per cent of the province (approximately 390 000 square kilometres), have been sampled at a density

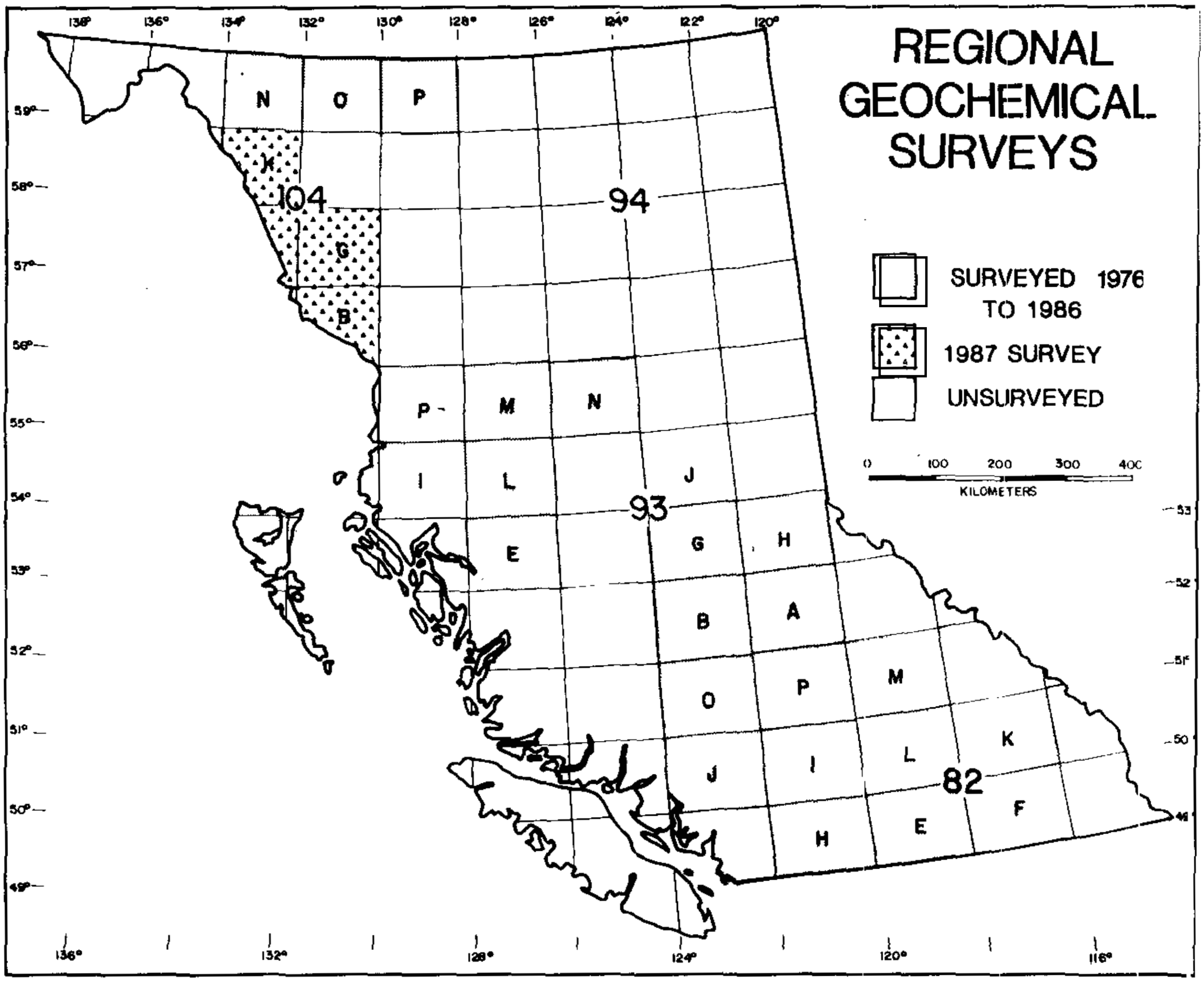

Figure 5-2-1. Present status of the British Columbia Regional Geochemical Surveys (RGS).

* This project is a contribution to the Canada/British Columbia Mineral Development Agreement.

British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork, 1987, Paper 1988-1.

of one sample per 13 square kilometres (31 000 samples). Complete reconnaissance coverage of the province will not be attained before 1997 at current rates.

The objectives of these surveys are to provide:

- High quality geochemical data at the reconnaissance level in regions of active exploration.
- A regional geochemical database conforming to national standards.
- Information of environmental and mineral potential importance for provincial land status evaluations.

The ministry organized and supervised all components of RGS 18 and 20. Sampling, analysis, data processing and floppy diskette production were funded in part from the third year of the Canada/British Columbia Mineral Development Agreement (MDA). For RGS 19 the ministry funded organization, supervision, sample collection, data processing and floppy diskette production while Energy, Mines and Resources Canada (E.M.R.) funded sample preparation and analysis. Field supervision for all three surveys was provided by J. Gravel under the direction of P. Matysek. Open file production for all surveys will be handled by E.M.R.

1987 SAMPLING PROGRAM

The 1987 sampling program represents the ministry's largest and most ambitious regional geochemical survey to date. Systematic sediment sampling over 35 000 square kilometres of rugged and remote northwestern British Columbia required helicopter-supported sampling in 97 per cent of the survey area. Truck and floatplane support was used in the remainder of the area. McElhanney Engineering Services Ltd. of Vancouver, the sampling contractor, employed a crew of seven and successfully operated two shifts to optimize use of long daylight hours. Frontier Helicopters Ltd. provided a Bell 206B helicopter with long-range fuel tanks, two experienced pilots and an on-site mechanic. Operations were staged out of the Tel Air Services base in Telegraph Creek which provided occasional floatplane transportation, meals and sample handling and drying facilities (Plate 5-2-1).

Considerable interaction and cooperation between the ministry, McElhanney Engineering Services and Frontier Helicopters in the project planning and personnel training aspects of the program resulted in definite improvement in the production and efficiency from previous programs. In total, 2726 sites were sampled in 34 days giving an average of over 80 sites per day (Table 5-2-1). Productivity averaged 7.5 samples per hour of helicopter work.

Sampling crews, comprising a pilot, sampler and sampler-navigator, proved to be the optimum configuration for rapid sampling and site access. To guide sample collection, the ministry provided 1:50 000 topographic maps identifying preferred sample sites and alternative site locations. Dressed in neoprene waders to allow comfortable sampling in glacial meltwater streams (Plate 5-2-2), samplers collected 200 millilitres of water and 2 to 4 kilograms of sand-sized sediment from active portions of selected stream channels. Sample sites were marked by highly visible aluminum tags (5 by 10 centimetres) bearing a unique RGS sample number to aid in follow-up surveys.

Sediment samples were initially placed on open air racks to drain excess water, then dried for 4 to 7 days at 50°C in a wooden shelter. Dried samples were sieved to − 18 mesh (<1

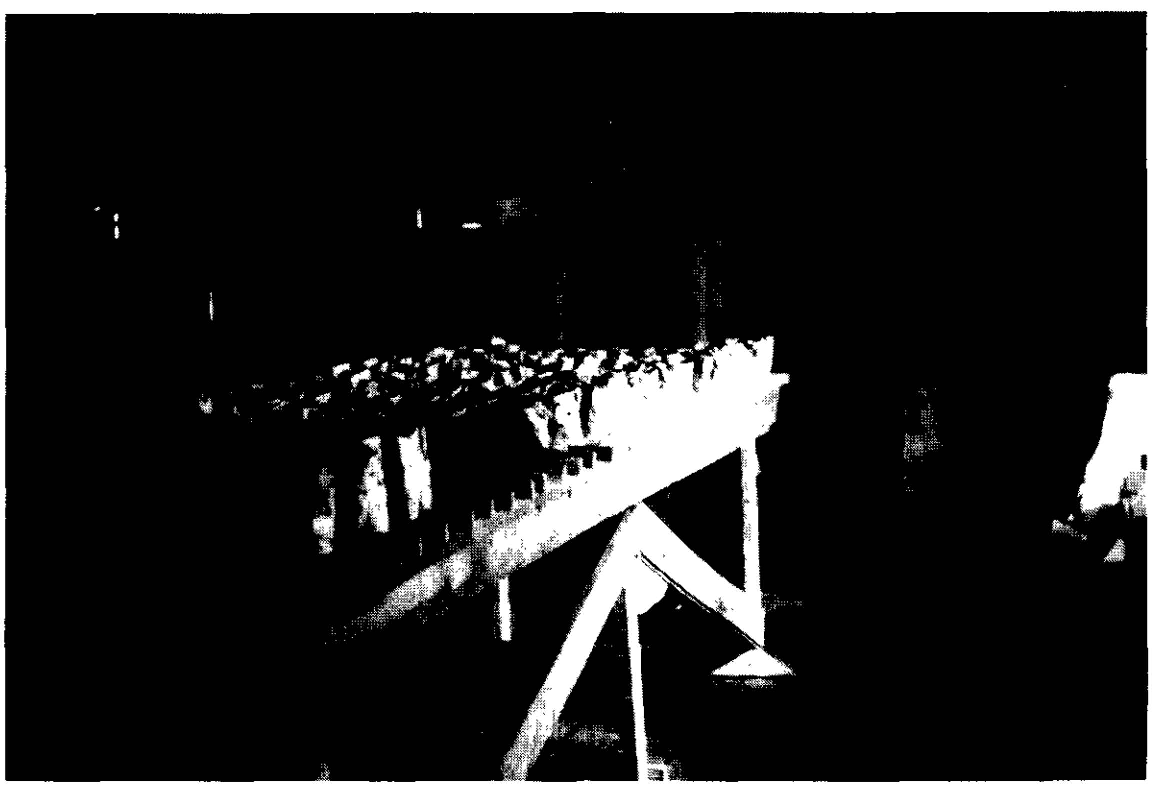

Plate 5-2-1. Stream sediment samples sitting on racks within the drying shack.

TABLE 5-2-1
BREAKDOWN OF SAMPLING ACCORDING TO RGS NUMBER

RGS No.	Map Sheet	Sites Sampled	Area km^2	Density 1 site/km^2
18	104B Iskut River	661	8 200	12.5
19	104F Sumdum and	142	3 750	26.4
	104G Telegraph Creek	1 076	13 100	12.2
20	104K Tulsequah	847	9 900	11.7
	Total	*2 726*	*34 950*	*12.8*

millimetre) to reduce sample weight and assess the fines content. Suspect samples, considered to be organic rich or predominantly gravel, were sieved to −80 mesh (<177 microns); samples deficient in fines (<40 grams) were rejected and those sites resampled. Sample quality was routinely checked by sieving one sample in each block of twenty to −80 mesh.

Field-prepared sediment and water samples were placed in plastic pails and shipped to Kamloops (104B, F and K) or Ottawa (104G) where sediment samples are sieved to −80 mesh and control standards and blind duplicates are inserted as a check on laboratory accuracy and precision. Prepared samples are then shipped to a commercial laboratory for multi-element analysis.

Plate 5-2-2. Samplers wearing neoprene dry suits were able to collect samples from otherwise inaccessable sites.

All stream sediment samples will be analysed for gold, silver, arsenic, barium, cadmium, cobalt, copper, iron, mercury, manganese, molybdenum, nickel, lead, antimony, uranium, tungsten, zinc and organic content by loss on ignition (LOI). Stream waters will be analysed for uranium, fluoride and their pH level.

Survey results will be released in midsummer 1988. A data packet, consisting of a sample location map, detailed listings, statistical summaries and 1:250 000 maps for individual elements showing range symbols and concentrations on a geological and topographic base, will be available for purchase. Due to the size of the survey region, two separate releases are anticipated. To further a more thorough and refined assessment of the RGS data by the exploration community, survey results will also be available on floppy diskettes.

PHYSIOGRAPHY AND GEOLOGY

In the project area, the northwesterly trending contact between the Intermontane Belt and Coast plutonic complex forms a major geologic divide that roughly conforms to the boundary between the Coast Range and the Stikine Plateau physiographic terrains (Holland, 1976).

Within the Coast Range, granodiorite to quartz monzonite plutons of Triassic to Cretaceous age (Souther *et al.*, 1979) form jagged peaks with a mean elevation of 2000 metres, rising to 3160 metres at Mount Ratz. Icefields, covering tens to hundreds of square kilometres, blanket the upper slopes while talus, till and moraines deposited during the final ablation stages of the Pleistocene glaciation, cover the middle to lower slopes. Regionally derived stratified drift covers valley bottoms. Glacial meltwater streams describing a herringbone pattern, flow into either the Taku, Stikine or Iskut rivers which cut through the Coast Range before emptying into the Pacific Ocean.

The Stikine Plateau is largely comprised of sub-provinces of the Intermontane Belt. The Whitehorse belt, Stikine arch and Iskut belt consist of volcanic and sedimentary rocks of the Hazelton, Laberge, Takla and Stuhini groups. These are bounded by Hazelton sediments of the Bowser basin along the eastern margin and by Mississippian metabasalts and ultramafics of the Atlin terrane to the north. Granodiorite to quartz monzonite intrusions of Triassic to late Cretaceous age are exposed throughout the survey area. Flood basalts of Tertiary to recent age formed shield volcanoes at Level Mountain and Edziza Peak. A Tertiary peneplane averaging 1600 metres in elevation is developed on the Stikine Plateau. A variable degree of dissection has produced regional north-trending flat-topped mountain ranges and highland plateaus. Rugged peaks cored by plutonic rocks occasionally rise above 2300 metres. Tills and moraines deposited by the Cordillerian ice sheet indicate north, west and south ice-flow directions controlled by an area of accumulation on the Central Plateau. Thick, exotically derived stratified drift floors the larger valleys like the Taku, Stikine and Iskut. Streams in this region define a dendritic or disturbed pattern.

Sources of the geologic base compiled for the 1988 RGS release are Map 1418A by Souther *et al.* (1979) and Open File 1565 by Wheeler and McFeely (1987) with revisions by

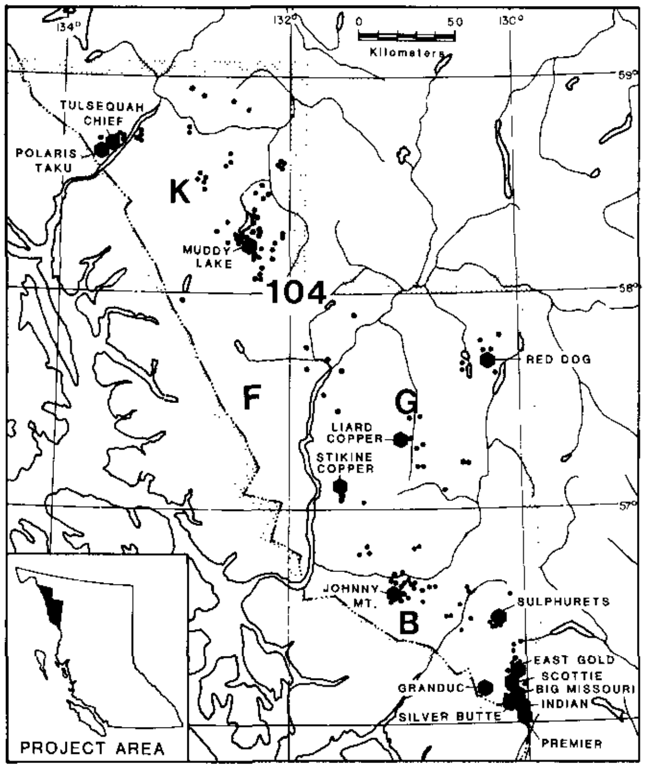

Figure 5-2-2. Activity in the area covered by RGS 18, 19 and 20. Dots represent assessment reports filed between 1981 and 1985; hexagons define mines or major prospects.

D.J. Alldrick. Other large-scale mapping projects are cited in the references.

EXPLORATION POTENTIAL

The present level of exploration activity in the study area is fairly high, centred on mines and known prospects in the region (Figure 5-2-2; Table 5-2-2). Exploration for gold in epithermal, mesothermal and vein replacement deposits is concentrated on the Silbak Premier, Sulphurets, Johnny Mountain, Red Dog, Muddy Lake and Polaris Taku deposits. Porphyry copper has been an important target in the Liard Copper and Stikine Copper areas while volcanogenic massive sulphides are searched for around Tulsequah Chief. The highly favourable response by the exploration industry to gold analyses in the 1987 release has convinced the ministry to include gold in the upcoming releases. The 1988 release, with complete gold coverage, should result in a sharp increase in exploration activity.

TABLE 5-2-2
GOLD-BEARING DEPOSITS IN THE 104B, F, G AND K MAP AREAS

Deposit Name	Au:Ag Ratio	Other Elements	Deposit Type
Tulsequah Chief	1:36	Cu, Pb, Zn	Volcanogenic massive sulphide
Polaris Taku	20:1	Cu	Vein, replacement
Muddy Lake			Vein, unclassified
Red Dog			Vein, unclasssified
Liard Copper	1:9	Cu, Mo, Ag	Porphyry
Stikine Copper	1:20	Cu, Ag	Porphyry
Johnny Mountain	1:2	Cu, Pb, Zn	Vein, replacement
Sulphurets	50:1	Cu, Ag	Vein, replacement and porphyry
East Gold	1:3	Cu, Pb, Zn	Vein, unclassified
Scottie	2:1		Vein, mesothermal
Granduc	1:55	Cu	Volcanogenic massive sulphide
Big Missouri	1:1	Pb, Zn	Vein, unclassified
Silver Butte			Vein, unclassified
Indian	1:40	Pb, Zn	Vein, shear
Premier	1:26	Cu, Pb, Zn, Cd	Vein, epithermal

(After Schroeter and Panteleyev, 1986)

REFERENCES

Holland, S.S. (1976): Landforms of British Columbia, A Physiographic Outline, *B.C. Ministry of Energy, Mines and Petroleum Resources*, Bulletin 48, 138 pages.

Schroeter, T.G. and Panteleyev, A. (1986): Gold in British Columbia, *B.C. Ministry of Energy Mines and Petroleum Resources*, Preliminary Map 64.

Souther, J.G. (1959): Chutine (104F), *Geological Survey of Canada*, Preliminary Map 7-1959.

——— (1970): Tulsequah and Juneau (104K), *Geological Survey of Canada*, Memoir 362.

——— (1972): Telegraph Creek (104G), *Geological Survey of Canada*, Paper 71-44.

Souther, J.G., Brew, D.A. and Okulitch, A.V. (1974): Iskut River (104B), *Geological Survey of Canada*, Open File 214.

Souther, J.G., Brew, D.A. and Okulitch, A.V. (1979): Iskut River (104), *Geological Survey of Canada*, Map 1418A.

Wheeler, J.O. and McFeely, P. (1987): Tectonic Assemblage Map of the Canadian Cordillera and Adjacent Parts of the United States of America, *Geological Survey of Canada*, Open File 1565.