INVESTIGATION OF ANOMALOUS RGS STREAM SEDIMENT SITES IN CENTRAL BRITISH COLUMBIA (92N, O and P)

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KEYWORDS: Regional Geochemical Survey, reconnaissance stream sampling, stream sediment, Mount Waddington, Taseko Lakes, Bonaparte Lake.

INTRODUCTION

Multi-element data for three Regional Geochemical Surveys covering approximately 45 000 square kilometres of central British Columbia were released on July 7, 1992. These data comprise the re-release of data from two previous surveys in NTS map sheets Taseko Lakes (92O) and Bonaparte Lake (92P), new data based on the analysis (by neutron activation) of archived stream sediment from these surveys, and the results of a new survey conducted in NTS map sheet Mount Waddington (92N) during the 1991 field season (Jackaman *et al.*, 1992a, b, c). Over 121 000 analytical determinations on samples from 2568 sites are represented in these three map areas.

Sampling densities for the Regional Geochemical Survey program are designed to provide information on regional geochemical trends. Identification of individual drainages hosting mineralization, although proven through years of use, is not the primary goal of the program. Rather, geochemical data from these surveys are a tool to direct detailed geological and geochemical investigations into geochemically favourable regions. The rapid and efficient evaluation of large multi-element geochemical databases, such as the RGS, poses a significant problem to explorationists. Further, the validity of geochemical anomalies generated by a survey of this type can be cast into doubt by the failure to detect mineralization expeditiously. As part of the Regional Geochemical Survey program, significant stream sediment anomalies which are not associated with known mineralization or in areas of exploration activity are evaluated in order to:

- Determine the effectiveness of the RGS program to detect regions of high mineral potential;
- Document the tendency of the RGS program to generate false anomalies, and;
- Define the geological and geochemical controls on anomaly generation.

Cook *et al.* (1992) conducted an analysis of data from the 1991 Regional Geochemical Survey release (NTS map sheets 82E, F, G, J, K and M). Their results indicated that a large number of gold and multi-element base and precious metal anomalies found within the release area remained unstaked and probably unexplored. Although nine of the ten highest gold concentrations (470-3530 ppb) were staked, seven of the next ten highest gold values (335-446 ppb) remained unstaked or partially staked. As the majority of these watersheds contain no known mineralization, the source of these anomalies is either due to the presence of undiscovered mineralization or they are false anomalies resulting from a variety of mechanical, chemical and physiographic variables within the watershed.

This study details the investigation of seven watersheds hosting anomalous RGS sample sites within the 1992 Regional Geochemical Survey release area which host no known mineralization and were unstaked (save one) as of July 7, 1992 (release day). The objective of the study was to determine the origin of the anomalies and, if not attributable to a bedrock source, assess their impact on the Regional Geochemical Survey program.

INVESTIGATION OF ANOMALOUS SITES

SITE SELECTION

Selection of watersheds for investigation was based primarily upon four criteria: magnitude of the base or precious metal RGS anomaly; number of coincident anomalies in the surrounding drainages; lack of recent staking activity; absence of known mineralization; and the location and geologic setting of the watershed.

In its present form, the base and precious metal anomaly rating system developed for the Regional Geochemical Survey program has been included in all RGS releases since 1989 as both map and hardcopy output. A thorough description of this interpretive method is included in each Regional Geochemical Survey release. In summary, the method involves calculating the 90th, 95th and 98th percentile for each metal in each geological formation containing ten or more sample sites in the survey area. Samples exceeding the 98th percentile for a particular metal are assigned an anomaly rating of 3. Samples with concentrations between the 95th and 98th percentiles are given a value of 2, and samples between the 90th and 95th percentiles are assigned a rating of 1. Samples falling below the 90th percentile are given a rating of 0. Precious metal (Sb-As-Au-Ag) and base metal (Cu-Pb-Zn-Ag) scores are then summed for each sample. Anomaly ratings are not calculated for lithologies with less than 10 sites.

All watersheds selected for investigation are in regions characterized by multiple RGS sites with elevated or anomalous levels of metals. Of the seven sites, six were chosen based upon the magnitude of their base or precious metal rating (Table 4-7-1). The seventh site, Marmot Towers (92O/04 RGS site 795211), was chosen because of its unusual combination of anomalous, well-reproducing gold values (234 and 201 ppb), concentrations of uranium, zirconium, hafnium and several rare-earth elements (Ce, La, Sm) above the 95th percentile, and thorium and tungsten above the 90th percentile (Table 4-7-1).

Only one site, Kloaqut Lake (92O/11 RGS Site 5045) had been staked before the release.

Sampling, Preparation and Analytical Methodology

Where possible, the original RGS site was resampled at each drainage. Sampling programs within each drainage basin varied depending upon orientation of the stream, local topography, presumed style(s) of mineralization, and access. Investigation of each drainage was directed toward locating the mineral showings presumed to exist within the watershed. Stream sediment samples were taken above the confluence of streams, at 500-metre intervals, or at locations deemed appropriate. Samples were taken of rocks suspected to be mineralized or altered. Till samples were taken in areas of where drift cover thoroughly masked the underlying bedrock. In total, 25 stream sediments, 22 till and 69 rock samples were collected during the course of the project.

Sample preparation was carried out at the Analytical Sciences Laboratory of the British Columbia Geological Survey Branch. Stream sediment and till samples were dried at room temperature and dry sieved to -177 microns (-80 mesh). Rock samples were pulverized and ground in a tungsten carbide mill. Analytical duplicates and standards were inserted at the laboratory before analysis. Stream sediment and till samples were analyzed by aqua regia extraction and inductively coupled plasma emission spectrography analysis (ICP-ES) for 30 elements and gold by fire assay and ICP-ES at Eco-Tech Laboratories, Kamloops. Rock samples were analyzed by aqua regia extraction and ICP-ES for 30 elements and gold by fire assay and ICP-ES at Acme Analytical Laboratories, Vancouver.

TABLE 4-7-1
ELEMENT CONCENTRATIONS AND BASE AND PRECIOUS METAL ANOMALY RATINGS USED IN SITE SELECTION

Location	NTS Map	RGS Site	Precious Metals						Base Metals				
			Sb	As	Au	Ag	Hg	Rating	Cu	Pb	Zn	Ag	Rating
Barney Creek	92P/04	1250	**4.0**	**12.0**	**28**	0.2	110	5	106	9	260	0.2	6
	92P/04	1251	**3.1**	7.5	**15**	0.2	90		76	7	220	0.2	3
Kloaqut Lake	92O/11	5045	**3.3**	**7.0**	**68**	0.1	**150**	10	18	2	**78**	0.1	
Bidwell Creek	92N/16	9017	0.3	3.0	**12**	0.5	**80**	5	**86**	2	**58**	0.5	5
Valleau Creek	92N/10	7025	**37.0**	43.0	5	0.2	**730**	6	**54**	3	**91**	0.2	
Trophy Lake	92N/12	1229	0.2	**6.0**	2	**1.5**	20	6	**131**	3	**210**	**1.5**	6
		5253	0.2	1.5	2	**1.0**	10	3	**101**	3	**406**	**1.0**	9
Dorothy Creek	92N/05	5125	0.2	**9.0**	**31**	**0.7**	10	9	51	**33**	**208**	**0.7**	9
			Au	W	La	Ce	Th	Zr	U	Hf			
Marmot Towers	92O/04	5211	**234**	**15**	**34**	**49**	**7.2**	**1200**	**7.1**	**32**			
			231 [repeat]										

Note: All elements listed in ppm except Au and Hg (ppb); Values in bold are above the 90th percentile, Ratings <3 not listed

RESULTS AND INTERPRETATION

Barney Creek (92P/04; RGS sites 791250, 791251)

Barney Creek is located approximately 25 kilometres west of Clinton and 16 kilometres downstream from Big Bar Creek on the Fraser River (Figure 4-7-1). It is accessible from Clinton via the Big Bar Creek road. The creek decends 450 metres over its length of 5 kilometres as it drains westwards into the Fraser River. Most of the elevation loss takes place in the final 2 kilometres as the creek decends the steep valley walls of the Fraser River. RGS sites 791250 and 791251 were sampled above the Big Bar Creek road at an approximate elevation of 460 metres. Sample site 791250 is on Barney Creek whereas site 791251 is in a dry creek 500 metres to the south. No trace of the original 1979 RGS sample sites was found during the investigation. Sample locations for this investigation are shown in Figure 4-7-2.

Barney Creek is underlain along its length by massive black to dark green argillites and cherty argillites of the Permian-Triassic lower Pavillion Group (Trettin, 1961). These rocks contain quartz-filled tension fractures and gash veins; joint and bedding planes in outcrop are often iron stained and gossanous. Gash veins and tension fractures are occassionally iron stained. Sulphides are not evident with the exception of sample BN-RX-09 where fine-grained authigenic(?) pyrite was observed. Malachite was visible along the edge of a quartz vein 2 to 4 millimetres thick (sample BN-RX-10) in argillite, and a minor amount of malachite was noted on a talus fragment of argillite on a scree slope draining into Barney Creek below sample site BN-RX-15. This sample reported a copper concentration of 1454 ppm (Table 4-7-2). A series of recessively weathering parallel shear zones is exposed on the northern slope of the creek within 500 metres of the Big Bar Creek road over a north-south width of approximately 100 metres (samples BN-RX-15, BN-RX-16 and BN-RX-17). They are subvertical, strike at 238°, and consist of crushed argillite and clay gouge with abundant limonite, lesser jarosite and irregular white quartz veins which are generally subparallel to the strike of the shear. Molybdenum, copper and arsenic concentrations were anomalous in sample BN-RX-15. Another shear was noted along the roadcut farther up Barney Creek (sample BN-RX-08). Similar to the shears near the base of Barney Creek, this subvertical shear zone is approximately 10 metres wide and strikes at approximately 285°. Material in this shear varies from strongly jointed black argillite to hematitic argillite with fault gouge and minor quartz veining. Anomalous levels of molybdenum, zinc and cadmium together with elevated levels of copper were detected in this sample (Table 4-7-2). Another shear is exposed south of Barney Creek on the Big Bar Creek road switchback (samples BN-RX-11 and BN-RX-12). It is 9 metres wide, subvertical, strikes at 220° and consists of argillite fragments in a limonitic-jarositic clay gouge matrix. Anomalous concentrations of molybdenum and arsenic were found in these samples (Table 4-7-2).

In general, elevated to anomalous levels of molybdenum, copper, zinc, silver, cadmium and arsenic are associated with the shear or fault gouge zones discovered within the watershed. Trettin (1961) has noted the presence of shear zones throughout the lower Pavillion Group and attributes their existence to regional folding events, possibly related to emplacement of the Coast intrusions.

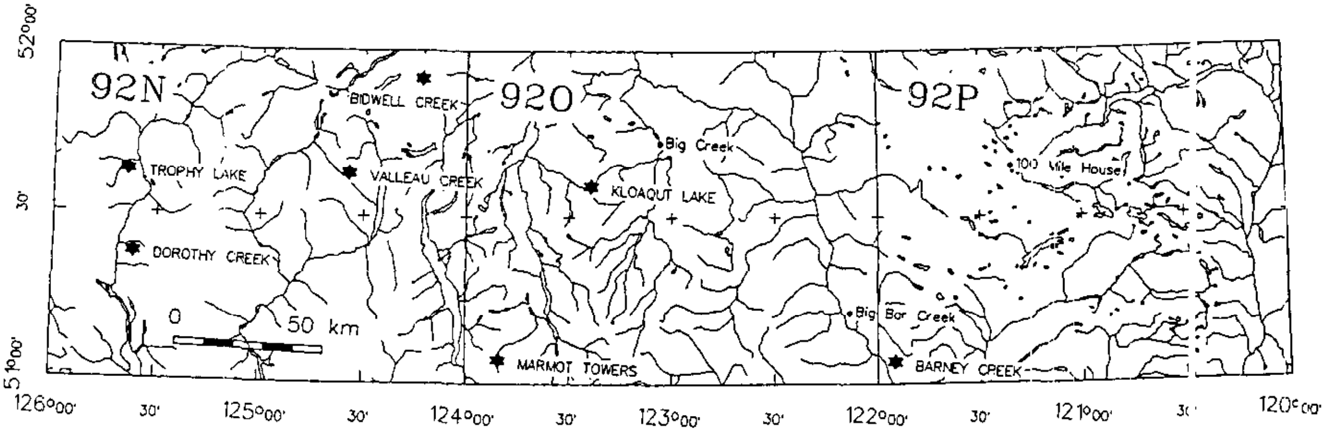

Figure 4-7-1. Anomalous RGS sites investigated within the 1992 release area.

Stream sediments sampled along the length of Barney Creek (Figure 4-7-2) indicate that anomalous values of molybdenum, copper, zinc, silver, arsenic and gold are present downstream from sample site BN-SS-04 (Table 4-7-3). These concentrations are comparable to the anomalous metal contents reported from the original RGS site (Table 4-7-1). The source of the anomalies at RGS sites 791250 and 791251 is undoubtedly the shear zones which outcrop in the creek and contribute altered, mineralized rock fragments and fault gouge directly to the stream.

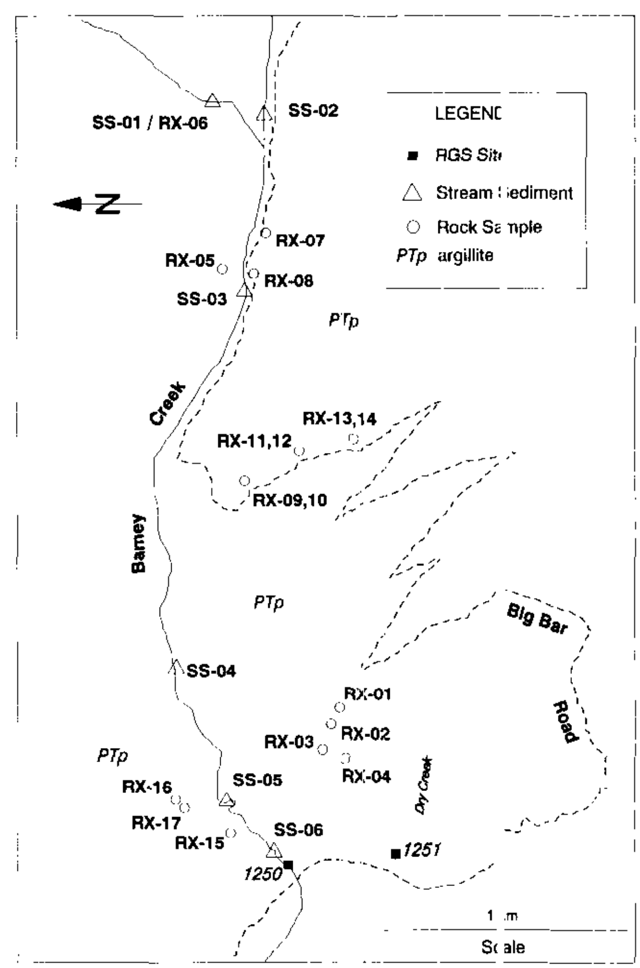

Figure 4-7-2. Sample locations, Barney Creek site.

KLOAQUT LAKE (92O/11; RGS SITE 795045)

Kloaqut Lake is located on the Chilcotin Plateau approximately 40 kilometres southwest of Hanceville and is accessible by logging road (Figure 4-7-1). RGS site 795045 is on a creek draining a low, forested ridge south of the lake (Figure 4-7-3). Glacial drift (till) covers most of the slope between Kloaqut Lake and the ridge crest. This cover thins towards the ridge, permitting the limited exposure of Kamloops Group basalt and mid-Jurassic granodiorite. Outcrop of granodiorite is restricted to the ridge crest and upper slopes separating the anomalous creek (795045) from the adjoining creeks. An outcrop of silicified quartz feldspar dacite porphyry was found along this ridge. Mineralized float is evident in the till covering the slope; most abundant is an angular light grey-green aphanitic silicified greenstone with up to 5 per cent disseminated pyrite, abundant limonite and lesser jarosite staining along surfaces and fractures (sample VL-RX-09). Analysis of this sample reported an exceptionally high concentration of zinc (12 795 ppm or 1.28%) and an anomalous level of cadmium (36 ppm; Table 4-7-2). Other mineralized float samples consist of a subangular silicified diorite (sample VL-RX-01) containing approximately 1 per cent pyrite, an intensely silicified, sheared felsite (sample VL-RX-02) and an angular pyritic mudstone (sample VL-RX-04). One fragment of gossanous silicified dacite (sample VL-RX-06), uncovered from the till, contains 821 ppm zinc and 56 ppm arsenic. Generally, however, metal concentrations in bedrock and float samples are within background limits.

Stream sediment and till samples taken upstream from the original RGS sample site contained background or near background concentrations of all elements (Table 4-7-3). Abnormally high concentration of manganese (2700 ppm) from the original RGS site suggests that iron-manganese oxides may have precipitated and concentrated antimony, arsenic, mercury, zinc and, possibly, gold to anomalous levels. However, the presence of mineralized clasts in till within the drainage basin implies that the source of the RGS anomaly may have been glacially transported from outside

TABLE 4-7-2
SELECTED GEOCHEMICAL RESULTS FOR ROCKS FROM BARNEY CREEK (BN), KLOAQUT LAKE (VD), BIDWELL CREEK (BW), VALLEAU CREEK (VL), TROPHY LAKE (DB) AND DOROTHY CREEK (DY)

Sample	Type	Description	Sulphide Minerals	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Mn ppm	Fe %	As ppm	Cd ppm	Sb ppm	Bi ppm	Ba ppm	Au ppb
BN-RX-01	Outcrop	Fe-stained argillite		1	115	8	70	0.6	339	2.55	5	0.4	2	2	103	13
BN-RX-02	Outcrop	Argillite		1	43	6	41	0.3	365	2.02	4	0.2	2	2	62	4
BN-RX-03	Outcrop	Quartz vein		1	1	3	7	0.1	144	0.39	2	0.2	2	2	49	1
BN-RX-04	Float	Argillite w. quartz vein stockwork		1	25	9	74	0.2	595	1.84	3	0.9	2	2	26	5
BN-RX-05	Outcrop	Fe-stained argillite		1	62	5	45	0.2	282	1.86	3	0.2	2	2	89	7
BN-RX-06	Float	Dacite		1	29	2	78	0.3	690	5.13	3	0.4	3	2	240	1
BN-RX-07	Outcrop	Argillite w. Fe-stained qtz veins		1	35	8	234	0.4	538	2.61	9	1	2	2	115	14
BN-RX-08	Outcrop	Sheared argillite		19	112	11	354	0.6	2451	3.86	8	9.2	2	2	243	4
BN-RX-09	Outcrop	Fe-stained argillite w. quartz veins		4	45	11	145	0.4	623	3.47	5	1.6	2	2	53	3
BN-RX-10	Outcrop	Malachite stained argillite		1	1454	9	85	1	553	2.84	12	0.2	2	2	53	20
BN-RX-11	Outcrop	Sheared argillite		66	45	9	104	0.6	222	1.6	18	0.7	6	2	149	8
BN-RX-12	Outcrop	Limonitic-jarositic fault gouge		36	31	9	41	0.7	19	1.77	24	0.2	8	2	131	12
BN-RX-12D	Outcrop	Limonitic-jarositic fault gouge		31	28	9	39	0.8	26	1.68	23	0.2	6	2	124	10
BN-RX-13	Outcrop	Gossanous argillite		6	34	6	20	0.2	158	1	3	0.2	2	2	108	5
BN-RX-14	Outcrop	Silicified argillite		1	16	6	45	0.1	462	0.96	2	0.2	2	2	179	13
BN-RX-15	Outcrop	Sheared Fe-stained argillite		11	123	5	154	0.1	41	6.56	37	0.2	2	2	62	6
BN-RX-16	Outcrop	Sheared Fe-stained argillite		1	52	4	97	0.1	347	2.89	2	0.7	2	2	163	2
BN-RX-17	Outcrop	Sheared Fe-stained argillite		20	30	7	47	0.9	24	1.51	13	0.2	4	2	157	8
VD-RX-01	Float	Silicified diorite	py	1	6	4	106	0.1	1225	2.83	2	0.2	2	2	108	2
VD-RX-02	Float	Silicified, sheared felsite	py	11	1	2	18	0.1	246	3.18	2	0.2	2	2	75	1
VD-RX-03	Float	Silicified porphyritic dacite		1	2	3	21	0.1	211	1.5	2	0.2	2	2	9	1
VD-RX-04	Float	Silicified Fe-stained mudstone	py	1	9	4	112	0.2	1031	2.67	2	0.3	2	2	73	2
VD-RX-05	Float	Limonitic silicified breccia tuff		1	1	2	53	0.1	1275	2.59	4	0.2	2	2	80	1
VD-RX-06	Float	Gossanous silicifed dacite		2	39	4	821	0.1	1186	16.8	56	1.5	8	2	273	1
VD-RX-07	Outcrop	Quartz-feldspar dacite porphyry		1	6	6	72	0.1	771	2.45	2	0.2	2	2	164	1
VD-RX-08	Outcrop	Quartz-feldspar dacite porphyry		2	11	3	61	0.2	671	2.45	7	0.2	2	2	159	1
VD-RX-09	Float	Silicified greenstone	py	1	66	5	12795	0.2	1432	3.93	8	36.1	2	2	26	1
VD-RX-10	Float	Fe-stained granodiorite		1	1	2	23	0.1	297	1.28	12	0.2	4	2	55	1
BW-RX-01	Outcrop	Intensely silicified felsite	py	21	11	4	15	0.1	24	1.43	2	0.2	2	2	41	3
BW-RX-02	Outcrop	Silicified schist	py	1	12	7	65	0.1	154	3.04	2	0.2	2	3	44	2
BW-RX-03	Outcrop	Fe-stained quartz vein		1	1	3	12	0.1	7	0.48	2	0.2	2	2	10	1
BW-RX-04	Float?	Intensely silicified felsite	py	6	1	2	1	0.1	2	1.01	2	0.2	2	2	72	1
BW-RX-05	Outcrop	Clay altered schist		1	20	4	67	0.1	284	3.83	2	0.3	2	2	108	1
BW-RX-06	Outcrop	Intensely silicified felsite	py	24	16	3	20	0.1	36	1.05	5	0.2	2	2	31	2
BW-RX-06D	Outcrop	Intensely silicified felsite	py	26	10	2	21	0.1	36	1.09	2	0.2	2	2	36	2
BW-RX-07	Float	Fe-stained felsic volcanic		5	8	6	34	0.1	79	2.18	4	0.2	2	2	94	1
VL-RX-01	Float	Malachite-stained basalt	py	1	2262	2	205	2.1	886	4.36	9	0.8	2	20	50	5
VL-RX-02	Float	Silicified(?) basalt		1	26	2	44	0.1	220	1.22	2	0.2	2	2	25	1
VL-RX-03	Outcrop	Granodiorite w. limonite vein		2	24	2	18	0.1	203	1.20	2	0.2	2	2	344	1
VL-RX-04	Subcrop	Fe-stained quartz diorite		1	5	3	5	0.1	81	0.48	2	0.2	2	2	66	1
VL-RX-05	Subcrop	Fe-stained quartz diorite		1	1	4	20	0.1	292	1.07	2	0.2	2	2	96	8
VL-RX-06	Float	Limonitic calcite breccia		1	1	12	41	0.1	1279	1.65	2	0.2	2	2	452	1
VL-RX-07	Outcrop	Limonitic hornfelsed basalt		1	14	7	162	0.1	1302	5.23	4	0.2	2	7	37	1
VL-RX-08	Subcrop	Skarned granodiorite	py, po	1	459	4	125	0.2	849	6.48	5	0.4	2	2	60	6
VL-RX-09	Outcrop	Limonitic quartz vein gouge		5	24	9	186	0.1	1086	5.30	43	0.9	21	2	160	1
VL-RX-10	Outcrop	Intensely limonitic argillite		1	41	29	128	0.4	794	4.35	12	0.5	10	2	159	3
VL-RX-11	Outcrop	Gossanous pyritic argillite	py	2	70	2	33	0.1	559	3.73	27	0.2	2	2	7	3
DB-RX-01	Outcrop	Garnitiferous pelitic gneiss		1	28	2	88	0.3	562	3.82	3	0.2	2	2	501	1
DB-RX-02	Outcrop	Quartz-feldspar pegmatite		5	12	5	55	0.1	736	0.66	2	0.2	2	2	115	1
DB-RX-03	Outcrop	Fe-stained schist		38	88	2	7	0.5	192	2.87	2	0.2	2	2	33	1
DB-RX-04	Outcrop	Fe-stained schist		3	22	3	1	0.7	37	1.73	2	0.2	2	2	41	1
DB-RX-05	Outcrop	Fe-stained schist		6	13	4	4	0.4	179	1.15	2	0.2	2	2	34	1
DB-RX-06	Outcrop	Silicified metasediment		1	2	2	26	0.1	334	0.46	2	0.2	2	2	12	1
DB-RX-07	Outcrop	Silicified metasediment		4	36	6	20	0.2	82	1.47	2	0.2	2	2	78	1
DB-RX-08	Float	Fe-stained gneiss		4	35	2	13	0.1	120	0.83	2	0.2	2	2	109	1
DY-RX-01	Float	Brecciated epithermal(?) vein	gn	1	113	17511	235	146	93	1.26	264	0.5	11	4	53	565
DY-RX-02	Outcrop	Pegmatitic q.v. in granodiorite	py	2	133	21	15	2	24	1.5	2	0.2	2	6	101	9
DY-RX-03	Talus	Silicified pyritiferous schist	py	2	248	6	72	1.2	326	3.07	3	0.5	2	8	17	11
DY-RX-04	Float	Silicified pyritiferous schist	py	1	184	7	256	0.5	431	3.16	8	0.8	2	2	73	2
DY-RX-05	Float	Silicified, sheared pyritic schist	py	2	189	6	42	0.8	163	3.8	3	0.2	2	2	26	4
DY-RX-06	Float	Silicified granodiorite	py	1	259	15	210	0.9	448	6.02	7	1.3	2	7	39	2
DY-RX-07	Float	Silicified granodiorite(?) breccia	py, cpy	1	51	550	3472	49.8	48772	6.84	109	21.4	14	10	28	65
DY-RX-07D	Float	Silicified granodiorite(?) breccia	py, cpy	1	49	523	3409	48.3	46843	6.59	102	21.1	12	15	31	60
DY-RX-08	Float	Silicified granodiorite(?) breccia	gn,cpy	1	152	24341	6927	147	44232	9.61	292	35.4	15	9	20	487
DY-RX-09	Outcrop	V. altered silicified breccia (vein)		1	129	5568	1586	209	17598	4.22	21	9.1	2	5	32	69
DY-RX-10	Float	Intensely silicified breccia	gn,cpy	4	3235	25875	99999	96.9	9472	4.71	57	894	4	40	15	15528

TABLE 4-7-3
SELECTED GEOCHEMICAL RESULTS FOR STREAM SEDIMENTS AND TILLS FROM BARNEY CREEK (BN), KLOAQUT LAKE (VD), BIDWELL CREEK (BW), VALLEAU CREEK (VL), TROPHY LAKE (DB) AND DOROTHY CREEK (DY)

Sample	Type	Mo	Cu	Pb	Zn	Ag	Mn	Fe	As	Cd	Sb	Bi	Ba	W	Au
		ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppb
BN-SS-01	Stream sed.	1	47	4	113	0.8	596	3.10	<5	<1	<5	<5	160	<10	10
BN-SS-02	Stream sed.	1	37	4	110	<.2	599	3.22	5	<1	<5	<5	120	<10	15
BN-SS-03	Stream sed.	2	42	4	111	0.4	643	3.02	5	<1	5	<5	140	20	5
BN-SS-04	Stream sed.	7	115	8	238	0.4	798	4.02	15	1	5	<5	125	<10	25
BN-SS-05	Stream sed.	10	116	8	272	0.4	802	4.41	20	2	5	<5	125	<10	40
BN-SS-06	Stream sed.	8	105	8	225	0.4	744	4.20	15	1	5	<5	105	<10	45
VD-SS-01	Stream sed.	1	20	2	64	<.2	1940	3.68	10	<1	<5	<5	135	<10	5
VD-SS-02	Stream sed.	<1	18	4	59	<.2	692	3.48	10	<1	<5	<5	80	<10	<5
VD-SS-03	Stream sed.	<1	43	4	56	<.2	449	3.43	<5	<1	<5	<5	125	<10	5
VD-SS-04	Stream sed.	<1	21	<2	38	<.2	733	3.66	5	<1	<5	<5	305	<10	<5
VD-SS-05	Stream sed.	1	33	4	47	<.2	575	4.62	5	<1	<5	<5	95	<10	5
VD-SS-06	Stream sed.	<1	17	<2	57	<.2	728	3.41	<5	<1	<5	<5	95	<10	<5
VD-TL-01	Till	<1	14	<2	36	<.2	429	3.22	5	<1	<5	<5	90	<10	<5
VD-TL-02	Till	<1	17	2	45	<.2	448	3.44	10	<1	<5	<5	75	<10	5
VD-TL-03	Till	1	36	4	122	<.2	1529	5.69	20	<1	5	5	145	<10	5
VD-TL-04	Till	<1	17	4	44	<.2	411	3.31	5	<1	<5	<5	90	<10	5
VD-TL-04D	Till	<1	17	6	43	<.2	399	3.27	5	<1	<5	<5	90	<10	5
VD-TL-05	Till	<1	27	8	60	<.2	501	3.94	<5	<1	5	<5	75	<10	5
VD-TL-06	Till	<1	32	6	81	<.2	818	4.21	5	<1	5	<5	100	<10	10
VD-TL-07	Till	<1	26	2	54	<.2	525	3.69	5	<1	<5	<5	90	<10	5
BW-SS-01	Stream sed.	1	142	<2	42	0.6	1069	4.18	5	<1	<5	<5	180	<10	5
BW-BK-01	Bank sed.	<1	19	4	49	<.2	206	2.23	<5	<1	<5	<5	50	<10	<5
BW-TL-01	Till	1	46	2	31	<.2	154	1.84	<5	<1	<5	<5	90	<10	<5
BW-TL-02	Till	6	60	<2	45	0.2	137	2.56	<5	<1	<5	<5	110	<10	<5
BW-TL-03	Till	3	50	2	36	<.2	170	2.15	<5	<1	<5	<5	100	<10	<5
BW-TL-04	Till	<1	20	2	27	<.2	151	1.62	<5	<1	<5	<5	65	<10	<5
BW-TL-05	Till	4	56	2	62	<.2	162	2.30	<5	<1	5	<5	115	<10	15
BW-TL-06	Till	1	33	8	49	<.2	167	1.86	<5	<1	<5	<5	65	<10	5
BW-TL-07	Till	1	32	<2	27	<.2	131	1.59	5	<1	<5	<5	55	<10	10
BW-TL-08	Till	<1	27	2	52	<.2	236	2.06	5	<1	5	<5	140	<10	5
BW-TL-09	Till	<1	20	2	39	0.2	195	2.00	5	<1	<5	<5	95	<10	5
BW-TL-10	Till	<1	21	<2	37	<.2	179	1.92	5	<1	<5	<5	95	<10	5
BW-TL-11	Till	<1	16	<2	22	<.2	127	1.65	5	<1	<5	<5	60	<10	5
BW-TL-12	Till	<1	11	<2	35	<.2	169	1.57	<5	<1	<5	<5	65	<10	5
VL-SS-01	Stream sed.	1	48	2	69	<.2	694	3.37	10	<1	5	<5	125	<10	5
VL-SS-02	Stream sed.	<1	43	<2	61	<.2	580	3.00	10	<1	5	<5	50	<10	<5
VL-SS-03	Stream sed.	1	35	2	60	<.2	549	2.03	<5	<1	<5	<5	45	<10	5
VL-SS-04	Stream sed.	1	61	2	80	<.2	880	5.29	80	<1	25	<5	85	<10	10
VL-SS-04D	Stream sed.	1	53	2	75	<.2	885	5.38	80	<1	20	<5	85	<10	10
VL-SS-05	Stream sed.	1	47	2	64	<.2	720	3.61	<5	<1	5	<5	110	<10	5
VL-SS-06	Stream sed.	1	56	2	72	<.2	945	5.14	80	<1	30	<5	85	<10	15
DB-TL-01	Till	3	82	2	68	<.2	368	3.44	5	<1	5	<5	185	<10	5
DB-TL-01D	Till	3	82	2	67	<.2	366	3.43	5	<1	5	<5	190	<10	5
DB-TL-02	Till	2	52	<2	33	<.2	205	1.80	5	<1	<5	<5	105	<10	5
DY-SS-01	Stream sed.	<1	29	4	61	<.2	304	1.56	5	<1	<5	<5	35	<10	15
DY-SS-02	Stream sed.	1	52	88	282	1.4	1258	2.08	20	2	<5	<5	60	<10	40
DY-SS-03	Stream sed.	<1	57	52	195	1.4	907	1.89	10	1	<5	<5	55	<10	140
DY-SS-04	Stream sed.	<1	71	10	225	0.8	492	1.64	5	1	<5	<5	55	<10	30

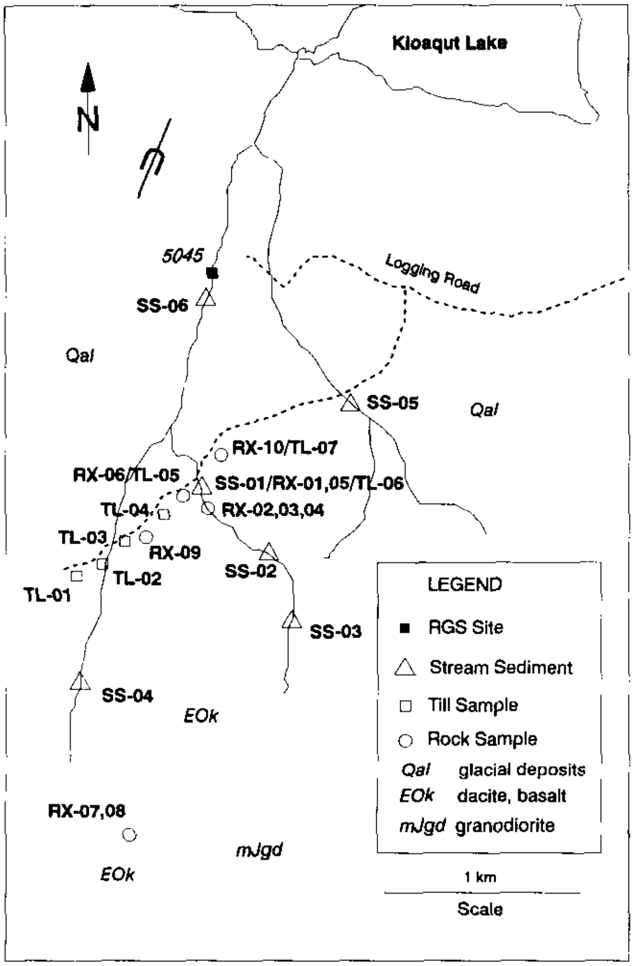

Figure 4-7-3. Sample locations, Kloaqut Lake site.

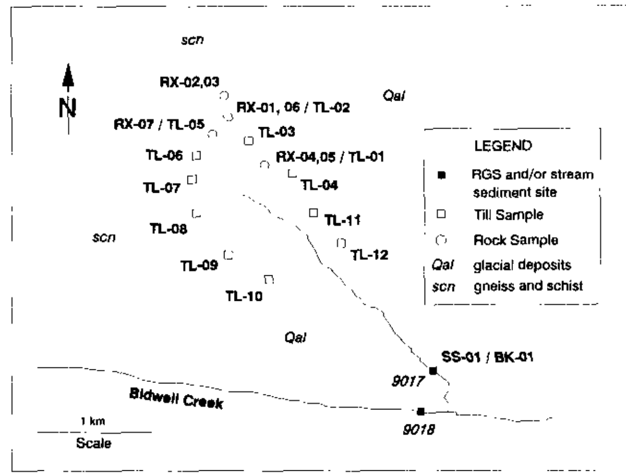

Figure 4-7-4. Sample locations, Bidwell Creek site.

the watershed. Glacial striae mapped in the area (Tipper, 1971) indicate that ice flow during the last glaciation was from the south-southwest in the vicinity of Kloaqut Lake.

BIDWELL CREEK (92N/16; RGS SITE 919017)

RGS site 919017 is on a tributary of Bidwell Creek 5 kilometres southeast of Eagle Lake and 12 kilometres east of Tatla Lake (Figure 4-7-1). Access to the site is by logging road. Gneissic to schistose rocks are exposed along a north-trending ridge at the headwaters of a tributary of Bidwell Creek. Granodiorite outcrop is exposed on the lower, southern ridge slope. Contact between the metamorphic and intrusive rocks, in most cases, is relatively sharp, with gradational changes in the texture of both rock types over several metres. Dikes of granodiorite are commonly observed cutting both the gneissic and schistose units. Fine-grained granodiorite to aplitic dikes crosscut both the granodiorite and metamorphic rocks. Metamorphic rocks range from a coarse-grained, mafic granitoid gneiss near the granodiorite contact to a fine-grained, felsic pelitic schist distal to the intrusive. Outcrop of an aphanitic, silicified rock containing 3 to 5 per cent pyrite (samples BD-RX-01 and BD-RX-06) was discovered along an old logging trail at approximately 1585 metres elevation on the east-facing slope of the drainage (Figure 4-7-4). Clasts and boulders of this material are found along the logging trail for a distance of approximately 100 metres south of the outcrop. Significant amounts of this pyritic rock were found as float (sample BD-RX-04) near the outcrop of a barren quartz vein approximately 250 metres from the pyritic outcrop. A limited amount of trenching in the area by the authors failed to establish whether the pyritic float is derived from the pyritic outcrop 250 metres away or if it is related to the barren quartz vein in the immediate vicinity. One hundred and fifty metres north of the pyritic outcrop, a rusty coloured, limonitic subcrop of felsic pelitic schist (sample BD-RX-02) has been exposed by stripping. A rusty stained, glassy textured quartz vein 10 centimetres wide (sample BD-RX-03) is exposed in the outcrop over a length of approximately 2 metres. No visible sulphides were observed. Element concentrations in these outcrop and float samples are generally very low; however, elevated concentrations of up to 26 ppm molybdenum are found in the silicified, pyritic outcrop (samples BD-RX-01 and BD-RX-06) (Table 4-7-2).

Sediment at the original RGS site (sample BD-SS-01) consists of a fine-grained organic-rich muck which appears to be derived from the organic-rich, vegetated banks of the stream. Water flow was negligible. Poor quality (due to increasing organic content) of stream sediment upstream from this site prevented further sampling. Analysis of sample BD-SS-01 reported an anomalous copper concentration of 142 ppm whereas a bank sample from an exposure 15 metres away (sample BD-BK-01) contained only 19 ppm copper (Table 4-7-3). Contour till samples taken within the watershed (Figure 4-7-4) also reported background concentrations of copper and other elements. Anomalous concentrations of iron (4.50%), manganese (4810 ppm) loss on ignition (25.8%) and sulphate (17 ppm) from the original RGS site data (Jackaman *et al.*, 1992a) suggest that the anomalous levels of copper and mercury are the result of the precipitation and concentration of these elements from groundwater onto iron-manganese oxides and/or organic complexes.

VALLEAU CREEK (92N/10; RGS SITE 917025)

RGS site 917025 is on a tributary of Valleau Creek, 8 kilometres southeast of Bluff Lake (Figure 4-7-1). The lower reach of the stream is accessible by logging road and foot trail, while the upper section is best reached by helicopter. Approximately 4 kilometres long, the stream descends from 2450 metres elevation to its confluence with Valleau Creek at 1400 metres. Talus and felsenmeer predominate above treeline at 2000 metres elevation. In the upper reaches of the creek, Lower Cretaceous andesitic to basaltic rocks are intruded by quartz diorite. Dark green to black Lower Cretaceous argillite is exposed in the lower kilometre of the stream. These sediments are bounded on the east by the quartz diorite intrusion along the Tchaikazan fault (Roddick and Tipper, 1985). Near the headwaters of the stream, a hornfelsed contact between the volcanics and quartz diorite is exposed in the creek bed. This contact is occupied by an irregularly shaped limonitic pod (sample VL-RX-07) bounded by hornfelsed quartz diorite and basalt (Figure 4-7-5). Fifty metres to the north, quartz diorite with minor irregular pods of hornfels and/or skarn minerals crops out along the banks of a stream. Boulders and cobbles of pyrite and pyrrhotite-bearing skarn altered quartz diorite occur as talus or felsenmeer Sample VL-RX-08, a talus clast of skarn-altered granodiorite, contains 459 ppm copper (Table 4-7-2). A large (1x1x0.5 m) boulder of pyritic, malachite-stained altered basalt (sample VL-RX-01), is located on a saddle between two peaks at 2400 metres elevation and has a reported copper content of 2262 ppm (Table 4-7-2). Although similar to nearby outcrop, no evidence of mineralization or alteration was found. This boulder is believed to be a glacial erratic; although it bears similarities to mineralization at the Math copper-silver occurrence (MINFILE 092N 021) located approximately 3 kilometres to the northeast, the source of this boulder is unknown.

The Tchaikazan fault is exposed in the bed and slope of the stream at an elevation of approximately 1700 metres. It consists of a rusty orange weathering alteration zone 30 metres wide, marking the contact between argillites and the quartz diorite intrusion. Alteration is most intense within the argillite along the contact, consisting of a strongly limonitic fault gouge with original textures and composition that are nearly destroyed (samples VL-RX-09 and VL-RX-10). Rock samples from this location contain anomalous values of arsenic and antimony (Table 4-7-2). This alteration decreases gradually over 30 metres within the argillite. Argillites along the edge of this zone contain spotty limonitic stains and minor pyrite (sample VL-RX-11). Alteration within the quartz diorite is less intense and restricted to an interval of approximately 5 metres from the fault contact.

Stream sediment data for this creek (Table 4-7-3) indicate a dramatic increase in arsenic and antimony values immediately downstream from the Tchaikazan fault (samples VL-SS-04 and VL-SS-06). Sample sites above the fault report background concentrations in all elements. Skarn mineralization exposed near the headwaters of the creek (samples VL-RX-07 and VL-RX-08) is not reflected in the stream sediment data. Clearly, the RGS anomaly is related to the

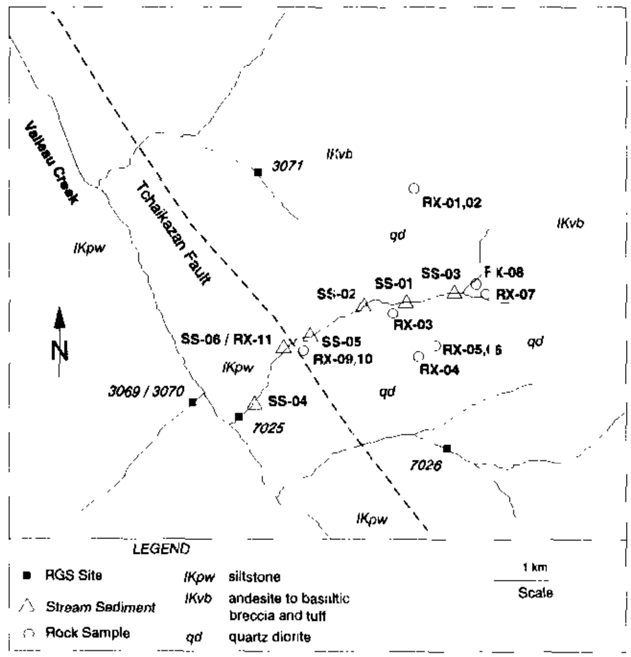

Figure 4-7-5. Sample locations, Valleau C eek site.

altered argillites and quartz d orites along tl e Tchaikazan fault. Fault and intrusive-related copper mir eralization in volcanic and sedimentary rocks has been doci imented 1 to 15 kilometres to the southeast at the Nuit M(untain (MINFILE 092N 020) and Rusty (MINFILE 092N (44) showings and the Fly (MINFILE 092N 056) prospect. I owever, these mineral occurrences are associated with signit cant (133 and 289 ppm) RGS copper anomalies. The lack c f stream sediments or rocks anomalous in copper sugg ests that this alteration zone does not host similar mineral zation.

TROPHY LAKE (92N/12; RGS SITES 91122 9, 915253)

Granitiod gneisses and schistose pelitic netasediments form a ridge extending northwards from th : cirque of an unnamed mountain approximately 5 kilometr :s west of Trophy Lake and the Kliniklini River (Figure 4 7-1). Granitic apophyses cut these rocks near the southe n end of the ridge. Numerous crosscutting pegmatitic c uartz-feldspar veins up to 5 metres wide dissect the metase diments. Iron-stained to gossanous outcrop is prevalent in the valley with the two anomalous RGS sites (911229, 9152 53). Both sites are located on streams which drain the pre ipitous, west-facing slope of the ridge. Elevation change be ween the sites and the ridge crest averages 800 metres ove an interval of 1.5 kilometres, causing the streams to forr near-vertical chutes for most of their length. Due to ti ne and access limitations, investigation of the site was re stricted to the ridge crest and adjacent slope of the cirqu . The original RGS sites were not revisited. Sample sites are shown in Figure 4-7-6.

No clear indication of mineralization was observed. One sample of pelitic schist with abundant iron oxide sta ning (sample DB-RX-03) assayed 38 ppm mo ybdenum and 88 ppm copper (Table 4-7-2). Strongly goss anous gneisses found in talus (sample DB-RX-08) within the cirque contained near-background concentrations of elements, most notably iron and manganese, suggesting that the gossan is only a thin patina on the exterior and on fractures within the sample. Samples of colluviated till downslope from these gossanous gneisses report background element concentrations (Table 4-7-3). RGS data for the two sample locations (Table 4-7-1) indicate that site 911229 is anomalous in arsenic, copper, silver and zinc whereas site 915253 is anomalous in copper, silver and zinc. The spatial proximity of these two similar anomalies is suggestive of mineralization and not an artifact of the stream environment. Anomalous sulphate (SO_4^{2-}) concentrations of 26 ppm at RGS site 911229 (95th percentile for all rock types is 21 ppm) further suggests the presence of oxidizing sulphides within this watershed. Elevation difference between the lowermost sample location and the RGS sample sites was on the order of 500 metres. It is possible that there are mineralized showings at a lower elevation than the area investigated.

DOROTHY CREEK (92N/05; RGS SITE 915125)

RGS site 915125 is approximately 37 kilometres north of Knight Inlet and 5 kilometres east of the Klinaklini River on a north-flowing tributary of Dorothy Creek (Figure 4-7-1). Access to the watershed is by helicopter. The upper half of the watershed is a cirque drained by three tertiary tributaries. Much of the cirque is underlain by a silicious granitiod gniess. A unit of iron-stained black pyritic schist is exposed on the western ridge of the watershed. These schists overlie the siliceous granitiod gniess and are dissected by numerous barren quartz-feldspar veins which grade into the surrounding intrusive. Active glaciers ring the upper part of the drainage basin and a thick layer of boulder-rich talus and drift covers the cirque floor.

The Darlene lead-zinc-copper-silver-gold showing (MINFILE 92N 063) was discovered on August 25, 1992 by the authors. It consists of a vein 50 metres long and 0.3 to 0.5 metre wide on a narrow ridge of siliceous granitiod gniess near the contact with altered pyritic schist at an elevation of 1850 metres (Figure 4-7-7). Vein material (sample DY-RX-09) consists of strongly altered and silicified wallrock with original textures destroyed (Plate 4-7-1). A grab sample of this vein contained 0.5 per cent lead and 0.15 per cent zinc (Table 4-7-2). No sulphides are visible. Weathered open spaces are lined with limonitic material. Limonite and iron-manganese staining is also prevalent along fractures and weathered surfaces. Numerous angular clasts and cobbles of galena-sphalerite-chalcopyrite-bearing vein material were found less than 50 metres away and immediately downslope from the vein, at the foot of a small glacier (samples DY-RX-07, DY-RX-08 and DY-RX-10). These samples are characterised by veins or stringers of galena and/or sphalerite containing occasional grains of chalcopyrite. Sample DY-RX-10 returned an assay of 0.36 per cent copper, 4.58 per cent lead and 15.3 per cent zinc. Similar fragments were found over a distance of several hundred metres down ice (north) from the glacier. A boulder of galena-bearing, brecciated vuggy quartz (sample DY-RX-01) was found on the crest of a lateral moraine approximately 2 kilometres down ice from the vein. Samples of pyritic schist taken along the western ridge of the cirque contained from 1 (samples DY-RX-03 and DY-RX-05) to 10 per cent (sample DY-RX-04) pyrite and elevated concentrations of copper (Table 4-7-2).

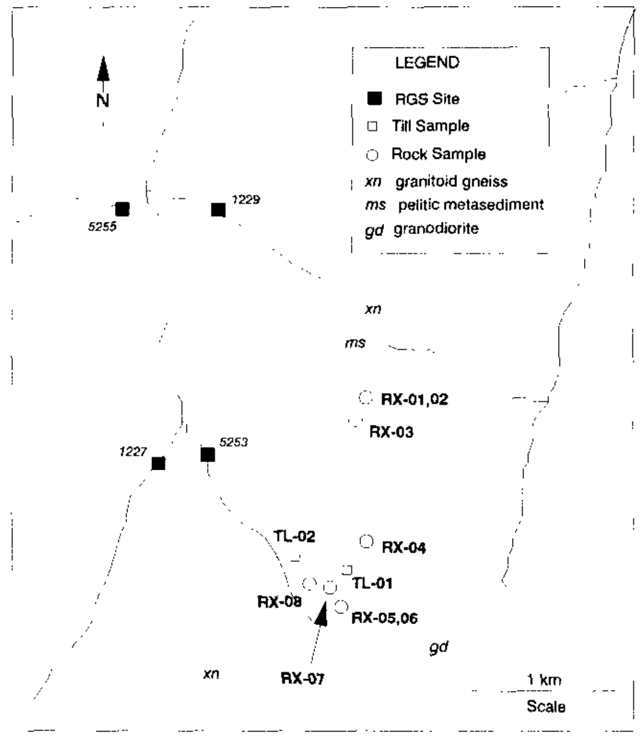

Figure 4-7-6. Sample locations, Trophy Lake site.

Stream sediment samples collected from four locations (Figure 4-7-7) all reported anomalous values of lead, zinc and gold (Table 4-7-3). Data from these samples compares very closely with the results from the RGS site approximately 2 kilometres downstream. In this case, the RGS program has effectively detected a new area of mineralization. The proximity of mineralization at the Hoodoo North occurrence (MINFILE 92N 029) suggests that this occurrence may be related. Hoodoo North is a Tertiary porphyry copper-molybdenum prospect with associated chalcopyrite-sphalerite-galena-bearing quartz veins hosted by Mesozoic gniesses. Lead isotope values were calculated from galena acquired from samples DY-RX-01 and DY-RX-08 (Table 4-7-4). Unfortunately, these values cannot be used to define a unique date (C.I. Godwin, personal communication, 1992); a Mesozoic age is indicated based on similarity to lead from the Iskut area (Godwin *et al.*, 1991) whereas a Tertiary age is interpreted when compared to lead from the Silver Queen and Equity Silver lead isotope data (Godwin, 1988) or to Tertiary gold veins on Vancouver Island (Andrew and Godwin, 1989).

MARMOT TOWERS (92O/04; RGS SITE 795211)

A small tributary creek of the Tchaikazan River drains a cirque on the west-facing slope of a group of peaks known as the Marmot Towers. This site is approximately 20 kilometres southwest of the southern end of Upper Taseko Lake (Figure 4-7-1). Access to the area is by helicopter. The

Plate 4-7-1. Outcropping vein mineralization, Dorothy Creek site.

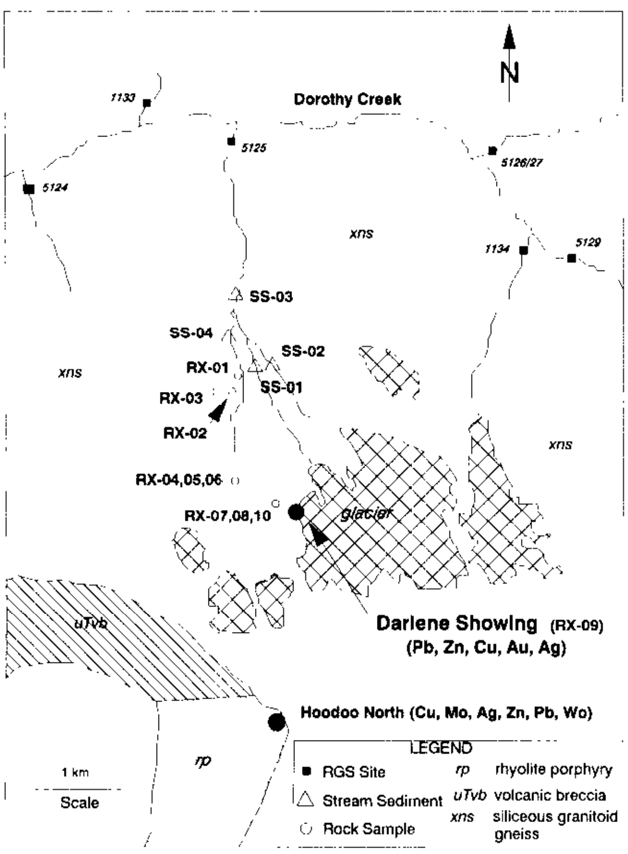

Figure 4-7-7. Sample locations, Dorothy Creek site.

watershed is underlain by granodiorites of the Coast Plutonic Complex (McLaren, 1989). Talus, felsenmeer and glacial drift cover the lower slopes and floor of the cirque. At its confluence with the Tchaikazan River, the creek is underlain by a thick sequence of alluvial sands and gravels. Investigation of this watershed was limited to the examination of a zone of strongly altered granodiorite at 2300 metres elevation and the sampling of the creek near the original RGS site (Figure 4-7-8).

Talus near the base of the alteration zone consists of silicified granodiorite containing hematitic breccia veins (samples TK-RX-02, TK-RX-03 and TK-RX-04), a buff-coloured, pervasively altered, fine-grained rock (granodiorite?) with flecks of limonite (samples TK-RX-05 and TK-RX-06) and a granodiorite cut by pyritic quartz-feldspar and calcite veins (sample TK-RX-01) (Figure 4-7-8). In general, the chemistry of the rock samples does not correspond to the anomalous values detected at the RGS site. Vein material (sample TK-RX-01) carries anomalous values of copper (170 ppm) and arsenic (168 ppm) but does not report elevated levels of gold, lanthanum, uranium or thorium (Table 4-7-5).

No trace of the original RGS site sampled in 1979 was found for resampling. Stream sediment sample TK-SS-01 was taken approximately 300 metres upstream from the confluence with the Tchaikazan River and probably 200 to 250 metres upstream from the original RGS site (Figure 4-7-8). A second stream sediment site (sample TK-SS-02) was sampled at the mouth of the cirque at 2250 metres elevation (Figure 4-7-8). Results from these two sites fall

TABLE 4-7-4
GALENA LEAD ISOTOPE RESULTS FROM THE DARLENE SHOWING

Pb/Pb Ratio	DY-RX-01		DY-RX-08		
206/204	18.808	18.811	18.819	18.811	18.810
207/204	15.578	15.578	15.603	15.589	15.595
208/204	38.326	38.316	38.402	38.346	38.372
207/206	0.8283	0.8282	0.8291	0.8287	0.8291
208/206	2.03780	2.03698	2.04060	2.03860	2.04000

within background concentrations (Table 4-7-6). Analytical results for the RGS site (Table 4-7-1) suggest that the anomaly is the result of the accumulation of the heavy minerals electrum, gold (gold), scheelite (tungsten), monazite (lanthanum, cerium, thorium and uranium) and zircon (zirconium and hafnium) and may not be reflective of mineralization in the watershed. The poor correspondence of stream sediment and lithogeochemical results from this investigation support this hypothesis. Anomalous values at RGS site 795211 may have resulted from the reworking of alluvial material in the bed of the stream to form local concentrations of heavy minerals. However, the presence of pyritic quartz-feldspar veins in granodiorite (sample TK-RX-01) and the proximity of granodiorite-hosted veins at Discord Creek (MINFILE 092O 122) and Twin Creek (MINFILE 092O 121) (McLaren, 1989) suggests that there is potential for similar mineralization near this site.

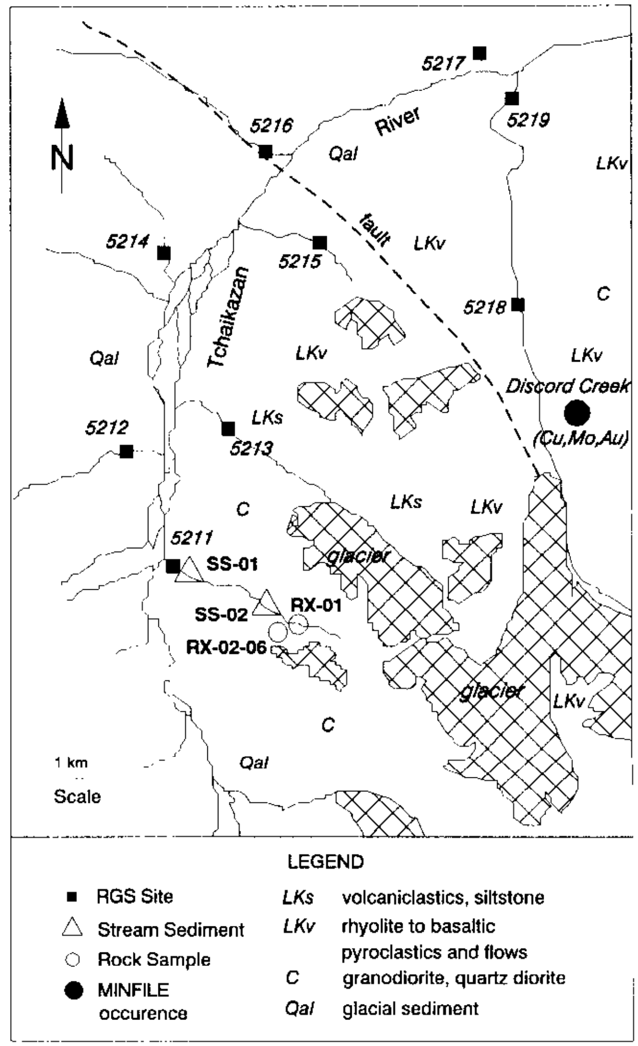

Figure 4-7-8. Sample locations, Marmot Towers site.

CONCLUSIONS

Results of this investigation have shown that anomalous metal concentrations at three of the seven RGS sites (Barney Creek, Valleau Creek and Dorothy Creek) are directly attributable to a bedrock source. Of the remaining four sites, three (Kloaqut Lake, Bidwell Creek and Marmot Towers) do not appear to be directly associated with mineralization. The large precious metal anomaly near Kloaqut Lake appears to be derived from glacially transported material with a source area outside the watershed. Anomalous metal levels in Bidwell Creek may be the result of hydromorphic transport and precipitation whereas high concentrations of elements at Marmot Towers appear to be the consequence of the mechanical concentration of background concentrations of heavy minerals within the streambed. Both Bidwell Creek and Marmot Towers may be classed as false anomalies resulting from unusual chemical or physical conditions which have amplified certain element concentrations to anomalous levels. Interpretation of these anomalous concentrations in light of other analytical or field variables available in the RGS dataset can provide an effective means to filter out false anomalies. The final site, Trophy Lake, is ambiguous; there is not enough information to confirm or deny the presence of mineralization.

Results of this study have shown that the Regional Geochemical Survey program is effective in defining watersheds hosting mineralization. However, the RGS program is designed to provide information on regional geochemical trends; identification of individual drainages hosting mineralization is not the primary goal of the program. Although new mineralization is often pinpointed by following up single RGS sites, geochemical data from these surveys should be utilized to direct detailed geological and geochemical investigations into geochemically favourable regions hosting multi-site anomalies. This approach will minimize the possibility of single-site false anomalies misleading an exploration program. Further, failure to detect mineralization within an individual watershed should not be viewed as a deterrent to a more comprehensive exploration program which includes surrounding watersheds. Successful application of the RGS database to mineral exploration requires an interdisciplinary approach focusing on favourable geological environments and multi-site RGS anomalies.

ACKNOWLEDGMENTS

The authors wish to thank Kathy Colbourne, Ray Lett and Bish Bhagwananai of the Analytical Sciences Laboratory for sample preparation and analysis, Anne Pickering and Colin Godwin at The University of British Columbia for

TABLE 4-7-5
SELECTED GEOCHEMICAL RESULTS FOR ROCKS FROM MARMOT TOWERS (TK)

Sample	Type	Description	Sulphide Minerals	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Mn ppm	Fe %	As ppm	Cd ppm	Sb ppm	Bi ppm	Ba ppm	Au ppb	La ppm	U ppm	Th ppm
TK-RX-01	Float	Quartz vein in granodiorite	py	1	170	2	82	0.2	507	5.4	168	0.2	2	2	20	1	4	5	2
TK-RX-02	Float	Hematitic silicified granodiorite (g.d.)		1	38	3	54	0.1	583	3	13	0.2	4	2	61		7	5	1
TK-RX-03	Float	Hematitic silicified g.d. breccia		1	84	2	62	0.2	716	2.8	6	0.2	2	2	347		4	5	1
TK-RX-04	Float	Hematitic silicified g.d. breccia		1	19	2	64	0.1	1275	3.4	4	0.3	10	2	1132		7	5	1
TK-RX-05	Float	Intensely altered(bleached) g.d.(?)		1	46	2	15	0.1	170	0.2	7	0.2	29	2	57		3	5	1
TK-RX-05D	Float	Intensely altered(bleached) g.d.(?)		1	42	6	14	0.1	157	0.2	7	0.2	31	2	51		3	5	1
TK-RX-06	*Float*	*Silicified variant of TK-RX-05*		*1*	*1*	*6*	*6*	*0.1*	*159*	*0.1*	*2*	*0.2*	*2*	*2*	*212*		*2*	*7*	*1*

TABLE 4-7-6
SELECTED GEOCHEMICAL RESULTS FOR STREAM SEDIMENTS FROM MARMOT TOWERS (TK)

Sample	Type	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Mn ppm	Fe %	As ppm	Cd ppm	Sb ppm	Bi ppm	Ba ppm	La ppm	W ppm	Au ppb
TK-SS-01	Stream sed.	1	63	2	61	<.2	648	3.85	<5	<1	5	<5	100	<10	<10	10
TK-SS-02	Stream sed.	<1	55	<2	56	<.2	544	3.54	<5	<1	5	<5	100	<10	<10	<5

analysis and interpretation of galena lead isotope data and Mike King of Whitesaddle Air. Wayne Jackaman provided advice and assistance with the interpretation of RGS data. Paul Matysek and John Newell provided insightful editorial comments.

REFERENCES

Andrew, A. and Godwin, C.I. (1989): Galena Lead Isotope Model for Vancouver Island; *in* Geological Fieldwork 1988, *B.C. Ministry of Energy, Mines and Petroleum Resources*, Paper 1989-1, pages 75-79.

Cook, S.J., Jackaman, W. and Matysek, P. (1992): Follow-up Investigation of Anomalous RGS Stream Sediment Sites in Southeastern British Columbia: Guide to Potential Discoveries; *in* Exploration in British Columbia 1991, *B.C. Ministry of Energy, Mines and Petroleum Resources*, pages 51-59.

Godwin, C.I. (1988): LEADTABLE: A Galena Lead Isotope Data Base for the Canadian Cordillera, with a Guide to its Use by Explorationists; *B.C. Ministry of Energy, Mines and Petroleum Resources*, Paper 1988-4, 188 pages.

Godwin, C.I., Pickering, A.D.R., Gabities, J.E. and Alldrick, D.J. (1991): Interpretation of Galena Lead Isotopes from the Stewart-Iskut Area; *in* Geological Fieldwork 1990, *B.C. Ministry of Energy, Mines and Petroleum Resources*, Paper 1991-1, pages 235-243.

Jackaman, W., Cook, S.J. and Matysek, P. (1992a): British Columbia Regional Geochemical Survey - Mount Waddington (NTS 92N); *B.C. Ministry of Energy, Mines and Petroleum Resources*, RGS 34.

Jackaman, W., Cook, S.J. and Matysek, P. (1992b): British Columbia Regional Geochemical Survey - Taseko Lakes (NTS 92O); *B.C. Ministry of Energy, Mines and Petroleum Resources*, RGS 35.

Jackaman, W., Cook, S.J. and Matysek, P. (1992c) British Columbia Regional Geochemical Survey - Bonaparte Lake (NTS 92P); *B.C. Ministry of Energy, Mines and Petroleum Resources*, RGS 36.

McLaren, G. P. (1989): A Mineral Potential Assessment of the Chilko Lake Planning Area; *B.C. Ministry of Energy, Mines and Petroleum Resources*, Bulletin 81, 117 pages.

Roddick, J.A. and Tipper, H.W. (1985): Geology, Mount Waddington (92N) Map Area; *Geological Survey of Canada*, Open File 1163.

Tipper, H.W. (1971): Surficial Geology, Taseko Lakes (92O) Map Area; *Geological Survey of Canada*, Map 1292A.

Trettin, H.P. (1961): Geology of the Fraser River Valley between Lillooet and Big Bar Creek; *B.C. Ministry of Energy, Mines and Petroleum Resources*, Bulletin 44, 109 pages.

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