THE REGIONAL GEOCHEMICAL SURVEY PROGRAM: SUMMARY OF ACTIVITIES

By W. Jackaman, P.F. Matysek and S.J. Cook

KEYWORDS: Regional Geochemical Survey, reconnaissance, multi-element, stream sediment, stream water, anomalies, claim status, Mount Waddington, Hope, Ashcroft, Pemberton, Taseko Lakes, Bonaparte Lake.

INTRODUCTION

The British Columbia Regional Geochemical Survey (RGS) program marked the completion of its fifteenth year with the successful release of seven RGS Open File data packages on June 27, 1991. Unprecedented in size, this release included results from two 1990 surveys conducted in NTS map sheets Fernie (82G) and Kananaskis Lakes (82J) and, as part of the RGS Archive Program, new analytical data from five previously released joint federal-provincial surveys from map sheets Penticton (82E), Nelson (82F), Lardeau (82K), Vernon (82L) and Seymour Arm (82M). To date, over 250 map and digital data packages have been purchased by mineral explorationists and other earth scientists. These packages present multi-element determinations for stream sediments and waters, field observations, sample location information, bedrock associations, statistics and data analyses for 8431 sample sites covering 100 000 square kilometres in southeastern British Columbia. Contact with companies involved in the release has determined that new mineralized showings have already been discovered in the

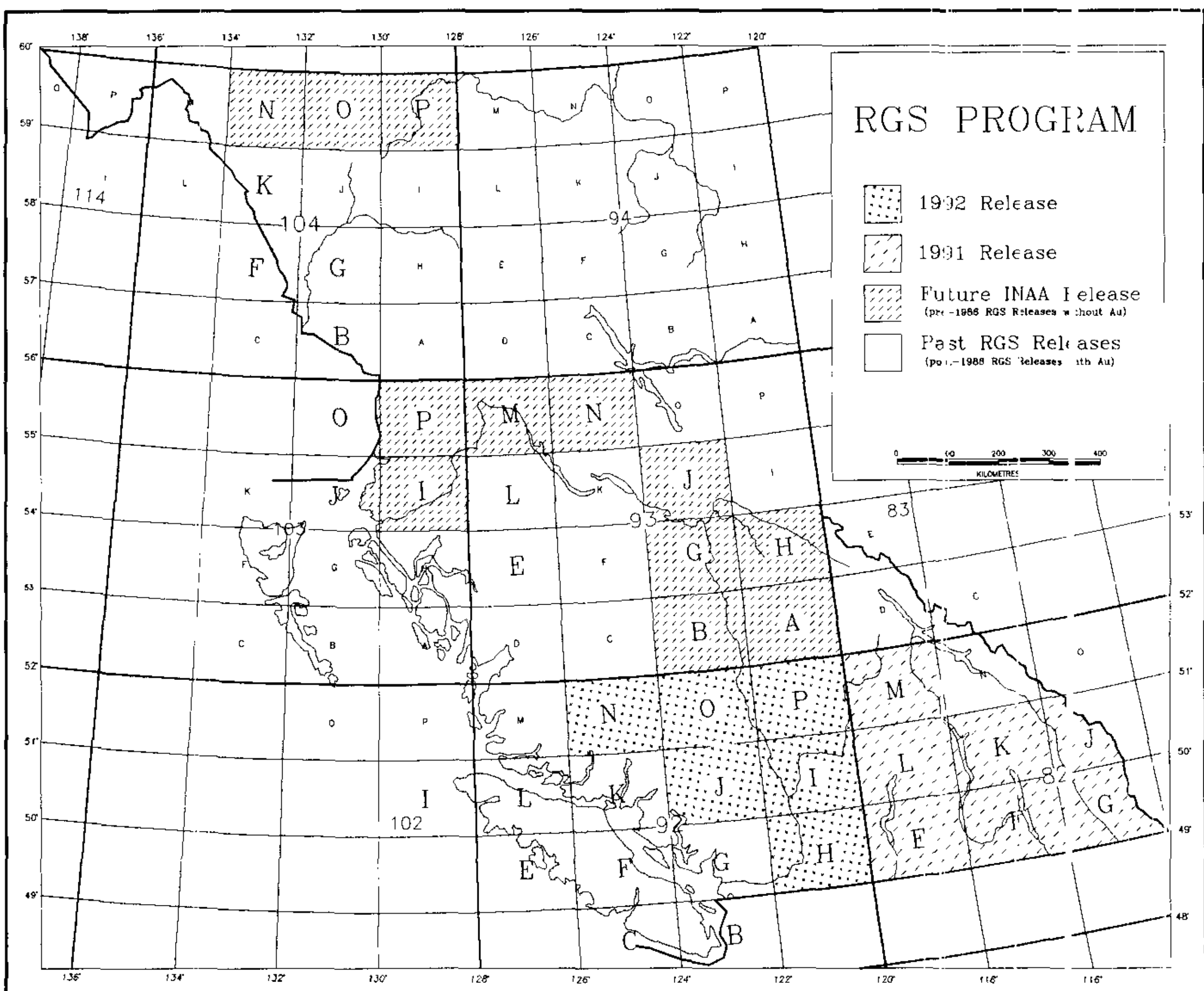

Figure 3-2-1. Current status of RGS program.

Coyote Creek watershed (82J/3) near Invermere and Howell Creek (82G/2) in the Flathead district. The Mineral Titles Branch has noted that claim staking throughout the survey area increased with over 1000 new claim units being recorded immediately after the release.

During the past five years, the RGS program has significantly increased the rate at which survey results have been disseminated. Consequently, the RGS database has quickly expanded to its present size of over 1.4 million analytical determinations for 38 000 sample sites (Figure 3-2-1, Table 3-2-1). Due to the amount of data contained within this extensive data set, explorationists are faced with the formidable challenge of screening the data for sites that reflect mineralization. To assist in the assessment of the data, and to ensure that *bona fide* anomalies are not being overlooked or forgotten, this report will re-evaluate precious and base metal results from the 1991 release, and provide survey information and preliminary data evaluation for the forthcoming 1992 release. Specifically this paper will:

- Identify and determine the claim status of precious-metal (Au-Ag-As-Sb), base-metal (Cu-Pb, Zn-Ag), single-element gold and single-element zinc anomalies from the 1991 RGS release.

TABLE 3-2-1
SUMMARY OF RGS DATABASE

MAP	RGS OF	GSC OF	YEAR	SAMPLES	ROUTINE	INAA	ADDITIONAL ANALYSES	RELEASE YEAR
82E	RGS 29	OF 409	1976	1631	•	•		1991 INAA RELEASE
82F	RGS 30	OF 514	1977	1394	•	•	Sn,Hg	1991 INAA RELEASE
82G	RGS 27		1990	922	•	•	Sn,W,Hg,As,Sb,Cd,V,LOI,F,Bi,Cr	1991 RGS RELEASE
82J	RGS 28		1990	583	•	•	Sn,W,Hg,As,Sb,Cd,V,LOI,F,Bi,Cr	1991 RGS RELEASE
82K	RGS 31	OF 515	1977	1297	•	•	Sn,W,Hg	1991 INAA RELEASE
82L	RGS 32	OF 410	1976	1385	•	•		1991 INAA RELEASE
82M	NGR 33	OF 516	1977	1219	•	•	Hg	1991 INAA RELEASE
92B/C	RGS 24	OF 2182	1989	599	•		Sn,W,Hg,As,Sb,Cd,V,LOI,F,Bi,Cr,Au	1990 RGS RELEASE
92E	RGS 21	OF 2038	1988	386	•		Sn,W,Hg,As,Sb,Ba,Cd,V,LOI,F,Bi,Cr,Au	1989 RGS RELEASE
92F	RGS 25	OF 2183	1989	909	•		Sn,W,Hg,As,Sb,Cd,V,LOI,F,Bi,Cr,Au	1990 RGS RELEASE
92G	RGS 26	OF 2184	1989	922	•		Sn,W,Hg,As,Sb,Cd,V,LOI,F,Bi,Cr,Au	1990 RGS RELEASE
92H	RGS 07	OF 865	1981	995	•	•	Hg,W,As,Sb	1992 INAA RELEASE
92I	RGS 08	OF 866	1981	606	•	•	Hg,W,As,Sb	1992 RGS RELEASE
92J	RGS 09	OF 867	1981	853	•	•	Hg,W,As,Sb	1992 INAA RELEASE
92K	RGS 22	OF 2039	1988	1216	•		Sn,W,Hg,As,Sb,Ba,Cd,V,LOI,F,Bi,Cr,Au	1989 RGS RELEASE
92L/102I	RGS 23	OF 2040	1988	1144	•		Sn,Hg,W,As,Sb,Ba,Cd,V,LOI,F,Bi,Cr,Au	1989 RGS RELEASE
92N	RGS 34		1991	874	•	•	Sn,W,Hg,As,Sb,Cd,V,LOI,F,Bi,Cr	1992 INAA RELEASE
92O	RGS 03	OF 774	1979	935	•	•	Hg,W,AS	1992 INAA RELEASE
92P	RGS 04	OF 775	1979	914	•	•	Hg,W,AS	1992 INAA RELEASE
93A	RGS 05	OF 776	1980	1299	•	•	Hg,W,As,Sb	FUTURE INAA RELEASE
93B	RGS 06	OF 777	1980	757	•	•	Hg,W,As,Sb	FUTURE INAA RELEASE
93E	RGS 16	OF 1360	1986	1112	•		Hg,W,As,Sb,Ba,Cd,LOI,Au	1987 RGS RELEASE
93G	RGS 13	OF 1214	1984/85	1095	•		Sn,W,Hg,As,Sb,Ba,Cd,V,LOI	FUTURE INAA RELEASE
93H	RGS 14	OF 1215	1984/85	1119	•		Sn,W,Hg,As,Sb,Ba,Cd,V,LOI	FUTURE INAA RELEASE
93J	RGS 15	OF 1216	1985	1088	•		Sn,W,Hg,As,Sb,Ba,Cd,V,LOI	FUTURE INAA RELEASE
93L	RGS 17	OF 1361	1986	1093	•		Sn,W,Hg,As,Sb,Ba,Cd,V,LOI,F,Au	1987 RGS RELEASE
93M	RGS 10	OF 1000	1983	1100	•	•	Hg,W,As,Sb	FUTURE INAA RELEASE
93N	RGS 11	OF 1001	1983	1124	•	•	Hg,W,As,Sb	FUTURE INAA RELEASE
103I/J	RGS 01	OF 772	1978	2234	•	•	Hg,W,AS	FUTURE INAA RELEASE
103O/P	RGS 02	OF 773	1978	1883	•	•	Hg,W,AS	FUTURE INAA RELEASE
104B	RGS 18	OF 1645	1987	661	•		Sn,W,Hg,As,Sb,Ba,Cd,V,LOI,F,Bi,Cr,Au	1988 RGS RELEASE
104F/G	RGS 19	OF 1646	1987	1218	•		Sn,W,Hg,As,Sb,Ba,Cd,V,LOI,F,Bi,Cr,Au	1988 RGS RELEASE
104K	RGS 20	OF 1647	1987	847	•		Sn,W,Hg,As,Sb,Ba,Cd,V,LOI,F,Bi,Cr,Au	1988 RGS RELEASE
104N	NGR 28	OF 517	1977	936	•	•	Sn,W,Hg	FUTURE INAA RELEASE
104O	NGR 41	OF 561	1978	946	•	•		FUTURE INAA RELEASE
104P	NGR 42	OF 562	1978	848	•	•		FUTURE INAA RELEASE
TOTAL				38144				

ROUTINE SEDIMENT ANALYTICAL SUITE : Zn, Cu, Pb, Ni, Co, Ag, Mn, Fe, Mo, U

ROUTINE WATER ANALYTICAL SUITE : U, F, pH

INAA SEDIMENT ANALYTICAL SUITE : Au, Sb, As, Ba, Br, Ce, Cs, Cr, Co, Hf, Fe, La, Lu, Mo, Ni, Rb, Sm, Sc, Na, Ta, Tb, Th, W, U, Yb, Zr

- Detail the forthcoming 1992 RGS release, including the 1991 reconnaissance stream-sediment and water survey of NTS map sheet Mount Waddington (92N), and new analytical data from five previously released joint federal-provincial surveys of NTS map sheets Hope (92H), Ashcroft (92I), Pemberton (92J), Taseko Lakes (92O) and Bonaparte Lake (92P). A summary of survey parameters (sample collection, preparation and analytical procedures), physiography, geology, mineral potential and exploration targets in the survey areas will be presented.
- Statistically evaluate gold, copper, lead and zinc data from the surveys conducted in map sheets 92H, I, J, O and P, and breakdown the number of anomalous sites found within key lithological units.

1991 RGS RELEASE

IDENTIFICATION AND CLAIM STATUS OF RGS ANOMALIES

METHODOLOGY

The seven 1:250 000-scale regional geochemical surveys (NTS 82/E, F, G, J, K, L and M) in southeastern British Columbia released in 1991 cover 8060 stream-sediment sites with over 300 000 analytical determinations. Systematic evaluation of such large multi-element geochemical databases presents a challenge to explorationists in identifying samples related to economic mineralization, as considerable variation in background metal concentrations may exist between geological units. This study develops a methodology to distinguish sites reflecting potential economic mineralization in the combined survey areas (RGS 27, 28, 29, 30, 31, 32 and 33), and identifies those sites on which no mineral claims have been staked, in order to guide and stimulate exploration activity in the region. An interpretive technique developed by Matysek *et al.* (1991a, b, c, d, e, f, g; Figure 3-2-2) rates individual samples and identifies those sites characterized by multi-element signatures associated with particular mineral deposit types. Stream-sediment geochemistry typically reflects the underlying geology of the watershed, and natural background metal variations must be taken into account to distinguish anomalous samples. Briefly, the method consists of calculating 90th, 95th and 98th percentile threshholds for each metal in each geological unit containing ten or more sample sites in the adjoining survey areas; and then assigning metal anomaly ratings to individual samples exceeding these thresholds. Those samples exceeding the 98th percentile for any given geological unit are assigned an anomaly rating of 3. Those samples having concentrations between the 95th and 98th percentiles for a geological unit are assigned an anomaly rating of 2, while those between the 90th and 95th percentiles are assigned a rating of 1. Element ratings for base metal (Cu-Pb-Zn-Ag) and precious metal (Au-Sb-As-Ag) associations are summed for each site, and anomalous samples are deemed to be those with a top rating of at least 10 of a possible 12 in either association. Threshold tables and evaluation charts for anomalous samples are provided in data booklets for individual RGS releases (Matysek *et al.*, 1991a, b, c, d, e, f, g).

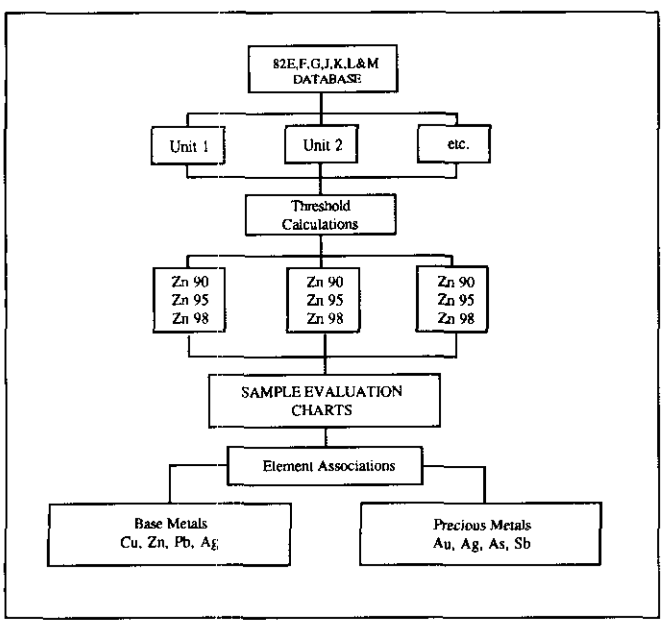

Figure 3-2-2. Flow chart for anomaly identification.

RESULTS

Eighteen base metal and twenty precious metal top-rated anomalies were identified in the combined survey areas (Table 3-2-2; Figure 3-2-3). In addition, zinc and gold concentrations in sediments were ranked and the highest 20 sites of each (Table 3-2-3) arbitrarily identified as anomalous. Upon elimination of coincident anomalies, 51 sites were identified as anomalous. Of these, one site lies within the Purcell Wilderness Conservancy and will not be further considered. A breakdown of the remaining 50 sites by anomaly type (base metals, precious metals, zinc and gold) and mineral claim status (Table 3-2-4) shows that only two of the sites are anomalous in all four categories, and only six sites for three categories. Fifteen of the eighteen base metal anomalies are coincident with precious metal anomalies. However, the majority of gold anomalies are unrelated to either of these associations; 18 of the 20 highest gold values are anomalous for gold alone. Similarly, half of the top 20 zinc values are anomalous for zinc only.

Highest gold values in stream sediments are concentrated in Intermontane Belt and Kootenay Arc lithologies in southern NTS 82E and F, particularly Paleozoic-Mesozoic metasedimentary and metavolcanic rocks in the vicinity of the Rossland and Greenwood gold camps. Combined base and precious metal anomalies are associated with both Triassic-Jurassic and Lower Paleozoic Kootenay Arc metasedimentary rocks. The greatest concentrations of combined anomalies and zinc anomalies is in the New Denver area. Most precious metal anomalies, however, occur in Proterozoic metasedimentary rocks of the Purcell anticlinorium, and associated felsic intrusions. Two high zinc values are the only anomalies associated with sedimentary rocks of the Foreland Belt.

TABLE 3-2-2
TOP-LEVEL BASE AND PRECIOUS METAL ANOMALY LISTINGS: NTS 82E, F, G, J, K, L AND M (N=8060 SITES)

Anomaly Type	NTS	Sample	UTM Zone	UTM East	UTM North	Geological Unit	Site Contamination	Zn ppm	Cu ppm	Pb ppm	Ag ppm	Au-1 ppb	Au-2 ppb	Sb ppm	As ppm	Hg ppb
Base Metal	82E06	767296	11	351007	5475967	EKgd	Possible	278	26	90	5.8	53	-	2.2	50.9	-
(Cu-Pb-Zn-Ag)	82F03	773064	11	481982	5435428	TJv	None	7800	330	2450	2.8	624	-	22.8	1450.0	220
Anomalies	82K01	771055	11	559097	5541834	HSL	None	174	44	650	2.8	38	-	26.1	115.0	40
(n=18)	82K11	773155	11	473356	5611360	lPs	Probable	875	136	355	7.8	209	281	13.0	95.0	110
	82K13	773173	11	457892	5624788	lPs	None	580	66	345	3.6	49	-	16.6	50.3	180
	82K11	773208	11	467169	5616823	lPs	None	2620	182	1120	6.0	110	-	24.4	91.1	300
	82K15	773300	11	505142	5645061	Hs	None	11200	210	2500	4.8	99	-	56.6	1740.0	40
	82K15	773303	11	501611	5644065	Hs	Probable	88000	1200	20000	29.0	446	-	566.0	5370.0	310
	82K11	775230	11	489279	5612332	lEs	None	320	50	140	1.3	15	-	3.6	40.0	30
	82K01	775386	11	549862	5559138	HSL	None	800	42	270	3.6	67	-	18.4	370.0	50
	82K03	775546	11	499803	5542966	Ms	None	1175	116	565	2.6	25	-	6.8	160.0	50
	82K03	777009	11	488813	5539481	TJs	Probable	7000	134	4500	5.2	39	-	19.1	90.6	150
	82K03	777010	11	490723	5543459	TJs	Probable	1980	78	1300	8.0	73	-	18.3	104.0	70
	82K03	777012	11	488339	5543137	TJs	Probable	3080	70	1500	8.4	27	-	9.2	44.0	60
	82K03	777016	11	483510	5540765	TJs	Probable	9400	148	1750	5.8	27	-	20.6	1330.0	140
	82K03	779090	11	478346	5538642	EKgd	Probable	2800	56	2450	3.0	200	-	10.2	25.0	70
	82M04	763047	11	301802	5665253	lPs	Possible	2600	328	1060	3.6	110	-	131.0	77.2	-
	82M04	767042	11	316121	5660510	lPs	Possible	580	92	840	2.0	16	-	4.1	195.0	-
Precious Metal	82E06	767296	11	351007	5475967	EKgd	Possible	278	26	90	5.8	53	-	2.2	50.9	-
(Au-Sb-As-Ag)	82F03	773064	11	481982	5435428	TJv	None	7800	330	2450	2.8	624	-	22.8	1450.0	220
Anomalies	82F06	779045	11	478678	5478512	Jg	Mining Activity	156	280	87	2.8	120	-	10.0	20.0	130
(n=20)	82K01	771055	11	559097	5541834	HSL	None	174	44	650	2.8	38	-	26.1	115.0	40
	82K11	773155	11	473356	5611360	lPs	Probable	875	136	355	7.8	209	281	13.0	95.0	110
	82K13	773173	11	457892	5624788	lPs	None	580	66	345	3.6	49	-	16.6	50.3	180
	82K11	773208	11	467169	5616823	lPs	None	2620	182	1120	6.0	110	-	24.4	91.1	300
	82K15	773300	11	505142	5645061	Hs	None	11200	210	2500	4.8	99	-	56.6	1740.0	40
	82K15	773303	11	501611	5644065	Hs	Probable	88000	1200	20000	29.0	446	-	566.0	5370.0	310
	82K09	773250	11	540166	5594320	HSU	None	78	80	130	3.0	13	-	35.6	134.0	100
	82K01	775386	11	549862	5559138	HSL	None	800	42	270	3.6	67	-	18.4	370.0	50
	82K01	775387	11	549540	5562672	HSM	None	495	26	105	1.8	34	-	7.9	122.0	50
	82K03	775528	11	495395	5544067	PTv	None	200	58	31	1.2	110	-	2.4	18.0	30
	82K03	775546	11	499803	5542966	Ms	None	1175	116	565	2.6	25	-	6.8	160.0	50
	82K09	775274	11	539836	5603025	EKqm	None	66	10	33	1.6	14	-	1.5	11.0	60
	82K11	775230	11	489279	5612332	lEs	None	320	50	140	1.3	15	-	3.6	40.0	30
	82K03	777010	11	490723	5543459	TJs	Probable	1980	78	1300	8.0	73	-	18.3	104.0	70
	82K03	777016	11	483510	5540765	TJs	Probable	9400	148	1750	5.8	27	-	20.6	1330.0	140
	82K03	779090	11	478346	5538642	EKgd	Probable	2800	56	2450	3.0	200	-	10.2	25.0	70
	82M04	763047	11	301802	5665253	lPs	Possible	2600	328	1060	3.6	110	-	131.0	77.2	-

UNIT	DESCRIPTION	UNIT	DESCRIPTION
eoTV	Tertiary basalt, andesite, volcaniclastic and flow rocks, minor sediments	lEs	Lower Cambrian quartzite, limestone, phyllite, argillite
TJv	Triassic-Jurassic greenstone, tuff, sediments	Hs	Proterozoic (Hadrynian) sandstone, conglomerate, limestone, grit, volcanic rocks
TJs	Triassic-Jurassic shale, argillite, limestone, conglomerate, schist, sandstone	HSU	Proterozoic (Helikian) quartzite, argillite, dolomite, limestone, siltstone
PTv	Permian-Triassic greenstone, basalt, andesite, lava, tuff, breccia, serpentinite	HSM	Proterozoic (Helikian) limestone, argillite, quartzite, andesite, breccia, tuff
PPT	Carboniferous-Permian argillite, quartzite, greenstone, limestone, conglomerate	HSL	Proterozoic (Helikian) quartzite, argillite, siltstone
Ms	Carboniferous-Permian slate, argillite, chert, schist, conglomerate, limestone	EKgd	Cretaceous granodiorite, quartz diorite; lesser quartz monzonite
DTs	Devonian-Triassic shale, sandstone, limestone, chert	Jg	Jurassic granodiorite, quartz diorite; lesser quartz monzonite
lPs	Lower Paleozoic argillite, limestone, schist, phyllite, greenstone	Dg	Devonian gneissic granitic rocks

(after Okulitch and Woodsworth, 1977)

Figure 3-2-3. Legend of geological units.

A large proportion of RGS anomalies remain open for staking. Stream watersheds of nine of the fifty-one anomalous sites were unstaked as of mid-October, 1991, with an additional eight only partially staked (Table 3-2-4). A summary listing of unstaked or partially staked anomalous sites, including location, lithology, presence or absence of similar mineral occurrences, site contamination status, mineral claim status and selected element concentrations is shown in Table 3-2-5. Single-element gold anomalies comprise the majority (6 of 9) of the unstaked sites; nearly all base metal, zinc and coincident base and precious metal anomalies occur on ground already staked. In two instances, top 10 anomalies of gold and zinc were staked following the Regional Geochemical Survey releases in June, 1991. However, stream sediments with somewhat lower gold concentrations appear to have been overlooked. Watersheds of all but one of the ten highest gold concentrations (470-3530 ppb) have been staked, but 70 per cent of those in the range 335-446 ppb are either unstaked or partially staked. The greatest concentration and variety of unstaked anomalies (5 out of 12) occur in NTS 82K. Four of these (one combined base/precious metals, two precious metal, and one gold anomaly) occur in Purcell Group rocks with associated felsic intrusions.

The use of percentile thresholds based on geological groupings, and of a multi-element association rating system, facilitates the recognition of multi-element base and precious metal stream-sediment anomalies in the 8060-site adjoining RGS survey areas of southeastern British Columbia. Of the 51 anomalous sites defined by this method and by the top 20 ranked gold and zinc concentrations, stream watersheds of nine sites were available for staking as of October, 1991. Watersheds of an additional eight anomalous sites were only partially staked.

TABLE 3-2-3
TOP 20-RANKED ZN AND AU CONCENTRATIONS: NTS 82E, F, G, J, K, L AND M (N=3060 SITES)

Anomaly Type	NTS	Sample	UTM Zone	UTM East	UTM North	Geological Unit	Site Contamination	Zn ppm	Cu ppm	Pb ppm	Ag ppm	Au-1 ppb	Au-2 ppb	Sb ppm	As ppm	Hg ppb
Zn (Top 20 Sites)	82K15	773303	11	501611	5644065	Hs	Probable	88000	1200	20000	29.0	416	-	566.	5370.0	310
	82K15	773300	11	505142	5645061	Hs	None	11200	210	2500	4.8	59	-	56.	1740.0	40
	82K03	777016	11	483510	5540765	TJs	Probable	9400	148	1750	5.8	27	-	20.	1330.0	140
	82F03	773064	11	481982	5435428	TJv	None	7800	330	2450	2.8	624	-	22.	1450.0	220
	82F14	777317	11	476637	5538211	TJs	Possible	7200	56	1800	5.4	19	-	27.	44.0	250
	82K03	777009	11	488813	5539481	TJs	Probable	7000	134	4500	5.2	39	-	19.	90.6	150
	82K02	779146	11	507313	5563930	lEs	Possible	6000	22	37	0.1	[illegible]	-	0.6	2.6	20
	82J03	901143	11	609924	5541841	DTs	None	5550	27	10	0.5	[illegible]	6	14.	21.0	70
	82F14	779202	11	482233	5538069	TJs	Possible	4200	84	31	0.6	[illegible]	-	8.1	31.0	20
	82K03	777015	11	484844	5541900	TJs	Probable	3680	60	49	1.4	7	-	2.2	17.0	20
	82K08	779151	11	554206	5590335	Hs	Possible	3440	42	1450	8.2	5	-	13.	28.0	760
	82K03	777012	11	488339	5543137	TJs	Probable	3080	70	1500	8.4	27	-	9.2	44.0	60
	82E13	765096	11	300403	5516362	Jg	Possible	2900	66	59	0.1	[illegible]	-	0.5	2.4	-
	82K03	779096	11	478346	5538642	EKgd	Probable	2800	56	2450	3.0	200	-	10.	25.0	70
	82K11	773208	11	467169	5616823	lPs	None	2620	182	1120	6.0	110	-	24.	91.1	300
	82M04	763047	11	301802	5665253	lPs	Possible	2600	328	1060	3.6	110	-	131	77.2	-
	82J06	901034	11	630392	5579867	DTs	Forestry	2480	13	5	0.2	2	-	1.2	1.8	70
	82G05	905249	11	586291	5456692	HSL	None	2300	68	540	0.5	5	-	2.0	8.0	60
	82E12	763100	11	288817	5512648	Jg	None	2025	175	23	1.2	3	-	0.0	3.1	-
	82K03	777010	11	490723	5543459	TJs	Probable	1980	78	1300	8.0	73	-	18.	104.0	70
Au (Top 20 Sites)	82E03	767057	11	341290	5440939	PPT	None	1800	470	790	0.4	3530	-	1.	75.4	-
	82F03	773055	11	490504	5442888	lPs	Possible	82	20	30	0.1	1650	-	0.	6.6	40
	82E05	763040	11	303084	5461434	PPT	None	45	57	24	0.1	1020	1040	0.	2.8	-
	82E02	765120	11	387137	5437312	PPT	Possible	83	780	3	0.6	848	-	5.	130.0	-
	82E03	767043	11	342666	5437494	EKgd	None	306	65	138	0.1	809	-	0.	6.9	-
	82K05	779102	11	431743	5589580	Dg	None	68	16	21	0.1	786	-	0.	1.7	40
	82F06	779074	11	480200	5470445	TJv	None	140	76	12	0.2	626	-	3.	35.0	50
	82F03	773064	11	481982	5435428	TJv	None	7800	330	2450	2.8	624	-	22.	1450.0	220
	82E12	765111	11	299984	5488103	Jg	Possible	35	7	1	0.1	507	-	0.	2.3	-
	82E05	763043	11	302758	5463500	eoTv	Possible	39	31	10	0.1	470	-	0.	2.6	-
	82K15	773303	11	501611	5644065	Hs	Probable	88000	1200	20000	29.0	446	-	566.0	5370.0	310
	82F01	771113	11	551956	5436128	HSL	Possible	40	18	17	0.1	445	-	1.	7.6	20
	82K08	775364	11	539844	5574178	HSU	None	52	26	26	0.1	413	-	2.	26.0	70
	82L01	765279	11	409799	5547468	EKgd	None	88	50	2	0.1	403	-	1.	8.6	-
	82G05	901003	11	573071	5473731	HSL	Mining Activity	27	15	6	0.1	374	318	1.	5.1	30
	82F05	777049	11	427779	5472806	EKgd	Possible	78	32	18	0.2	365	-	1.	10.0	30
	82L01	767268	11	397822	5552168	PPT	None	110	43	6	0.1	361	-	2.	91.9	-
	82M08	775164	11	424619	5683683	lPs	None	112	28	44	0.1	348	2	0.	4.1	30
	82K02	773132	11	503126	5554007	lPs	None	68	42	14	0.1	340	-	0.	13.0	10
	82E12	769387	11	296569	5499432	Jg	None	29	17	1	0.1	335	-	0.	2.7	-

TABLE 3-2-4
ANOMALOUS SITES ACCORDING TO ANOMALY TYPE AND MINERAL CLAIM STATUS
(AS OF MID-OCTOBER, 1991).

Anomaly Type		Sites	Sites Off-Limits to Staking	Sites Staked	Sites Partially Staked	Sites Unstaked
Coincident Anomalies	Base Metals/Precious Metals/Au/Zn	2	-	2	-	-
	Base Metals/Precious Metals/Zn	6	-	5	1	-
	Base and Precious Metals	7	1*	4	2	-
	Base Metals and Zn	2	-	2	-	-
Single Target Anomalies	Base Metals	1	-	1	-	-
	Precious Metals	5	-	2	1	2
	Zn	10	-	7	2	1
	Au	18	-	10	2	6
	Total	*51*	*1*	*33*	*8*	*9*

* Purcell Wilderness Conservancy

TABLE 3-2-5
UNSTAKED AND PARTIALLY STAKED STREAM SEDIMENT ANOMALIES

Anomaly Type	NTS	Sample	UTM Zone	UTM East	UTM North	Geological Unit	Adjacent Occurrences	Site Contamination	Mineral Claim Status	Zn ppm	Cu ppm	Pb ppm	Ag ppm	Au ppb	Sb ppm	As ppm	Hg ppb
Base Metals, Precious Metals and Au.	82K15	773300	11	505142	5645061	Hs	Yes	None	Partially Staked	11200	210	2500	4.8	99	56.6	1740.0	40
Base Metals and Precious Metals	82K13	773173	11	457892	5624788	lPs	Yes	None	Partially Staked	580	66	345	3.6	49	16.6	50.3	180
	82K03	775546	11	499803	5542966	Ms	Yes	None	Partially Staked	1175	116	565	2 6	25	6.8	160.0	50
	82K01	775386	11	549862	5559138	HSL	No	None	*Staking forbidden**	800	42	270	3.6	67	18.4	370.0	50
Precious Metals	82K09	775274	11	539836	5603025	EKqm	No	None	Unstaked	66	10	33	1.6	14	1.5	11 0	60
	82K01	775387	11	549540	5562672	HSM	No	None	Unstaked	495	26	105	1.8	34	7.9	122.0	50
	82K03	775528	11	495395	5544067	PTv	No	None	Partially Staked	200	58	31	1.2	110	2.4	18.0	30
Zn	82J06	901034	11	630392	5579867	DTs	No	Forestry	Unstaked	*2480*	13	5	0.2	2	1 2	1.8	70
	82K02	779146	11	507313	5563930	lEs	Yes	Possible	Partially Staked	*6000*	22	37	0.1	2	0 6	2.6	30
	82K08	779151	11	554206	5590335	Hs	Yes	Possible	Partially Staked	*3440*	42	1450	8.2	6	13.6	28.0	1760
Au	82E12	765111	11	299984	5488103	Jg	No	Possible	Unstaked	35	7	1	0.1	*507*	0.6	2.3	-
	82F01	771113	11	551956	5436128	HSL	No	Possible	Partially Staked	40	18	17	0.1	*445*	1.3	7.6	20
	82K08	775364	11	539844	5574178	HSU	No	None	Unstaked	52	26	26	0.1	*413*	2.4	26.0	70
	82L01	765279	11	409799	5547468	EKgd	Yes	None	Partially Staked	88	50	2	0.1	*403*	1.0	8.6	-
	82F05	777049	11	427779	5472806	EKgd	No	Possible	Unstaked	78	32	18	0.2	*365*	1 2	10.0	30
	82M08	775164	11	424619	5683683	lPs	No	None	Unstaked	112	28	44	0.1	*348*	0.4	4.1	30
	82K02	773132	11	503126	5554007	lPs	No	None	Unstaked	68	42	14	0.1	*340*	0.6	13.0	10
	82E12	769387	11	296569	5499432	Jg	No	None	Unstaked	29	17	1	0.1	*335*	0.6	2.7	-

* Purcell Wilderness Conservancy

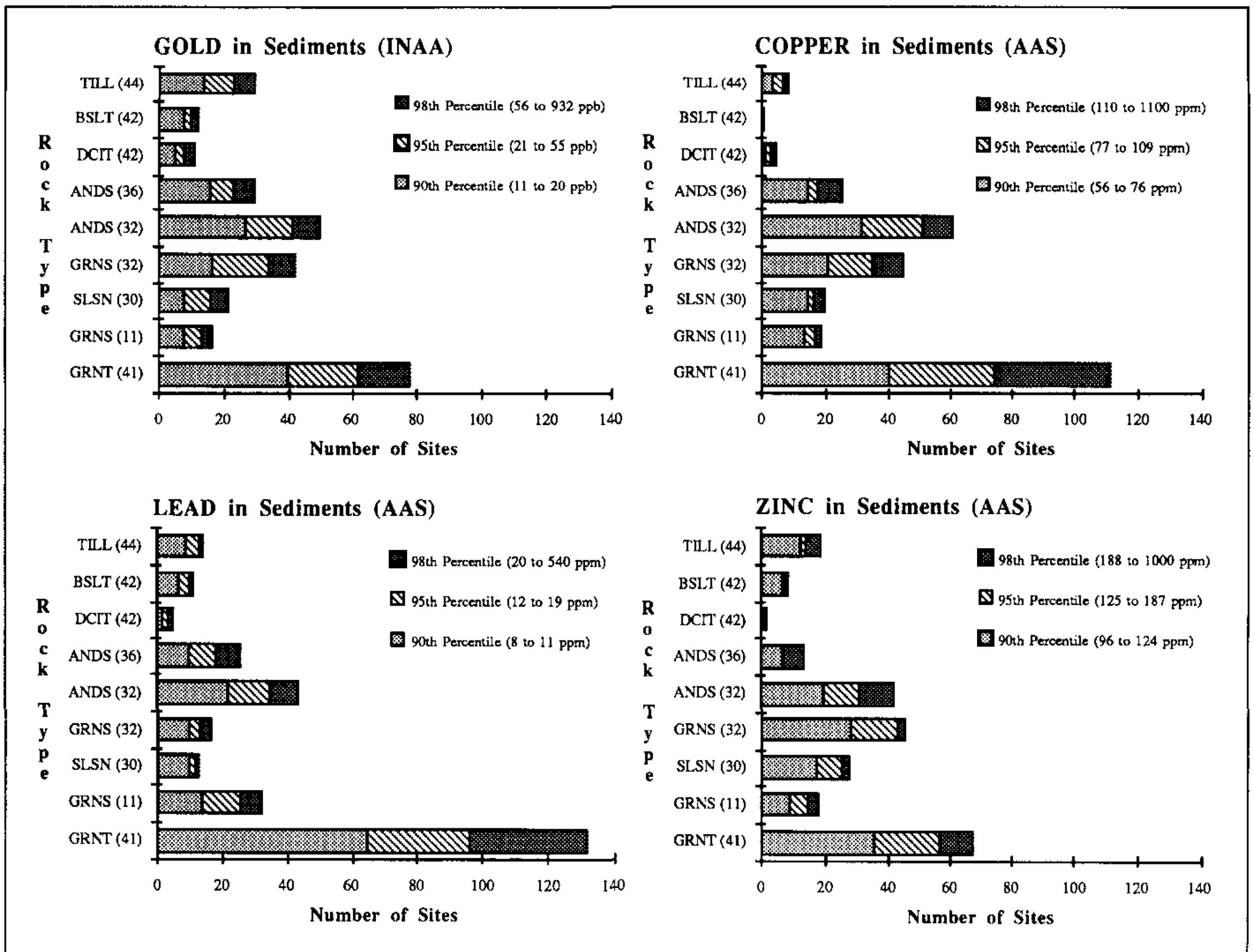

Figure 3-2-4a. Proportion of gold and base metal sample sites within key geological units.

1992 RGS RELEASE

REGIONAL SUMMARY

PHYSIOGRAPHY AND GEOLOGY

The six map areas included in the 1992 RGS release cover a region of over 90 000 square kilometres in south-central British Columbia. The survey areas are located within the the Coast Mountain and Interior Plateau physiographic regions (Holland, 1976), and the diverse geological environments associated with the Coast and Intermontane tectonic belts.

The Coast Mountains are an extremely rugged and heavily glaciated mountain range. Summit elevations commonly exceed 2500 metres and extend above deeply cut U-shaped valley floors that average 1200 metres in elevation. Numerous alpine glaciers and extensive ice fields cover a large proportion of the survey area. The slopes tend to be steep and are typically exposed bedrock or a thin cover of till, colluvium and talus. Thick deposits of glacialfluvial material are found at the lower elevations. Streams at higher elevations tend to form a trellised drainage pattern and braided streams commonly occupy in the valley floors. Stream sediment is primarily composed of fine to course-grained material. The sediment associated with the numerous glacier-fed streams also contains a high glacial flour component.

A narrow transitional zone separates the Coast Mountains from the semi-arid and subdued terrain of the Fraser and Thompson plateaus. These plateau areas consist of flat to gently rolling hills ranging between 1200 and 1500 metres in elevation and are covered by a thick layer of glacial drift. In the southern Thompson Plateau, resistant bedrock occasionally rises above 1800 metres in elevation. Low-energy, glacially deranged stream channels tend to produce sediment material having a moderate to high organic content.

The Coast Plutonic Complex, composed of Cretaceous granites and granodiorites, dominates the western half of the survey area. Within the Coast Complex, roof pendants of gniess, amphibolite, metasediments and metavolcanics represent metamorphosed remnants of volcanic-arc rocks (Roddick and Tipper, 1985).

The boundary between the Coast and Intermontane tectonic belts includes successions of Upper Jurassic to Lower Cretaceous volcanic and sedimentary rocks of the Tyaughton-Methow trough, and Permian to Middle Jurassic chert, argillite, basalt and alpine-type ultramafic rocks of the Bridge River and Hozameen terranes (Wheeler *et al.*, 1988).

The Intermontane Belt to the east is occupied by the Stikine Terrane which is comprised of Devonian to Permian arc volcanics and platform carbonates overlain by Triassic and Lower Jurassic arc volcanics, volcaniclastic, chert and arc-derived clastic rocks which are intruded by comagmatic plutonic rocks. The Cache Creek Terrane comprised of Mississippian to Upper Triassic oceanic volcanics and sediments borders the Stikine Terrane to the south-east. The southeast corner of the survey area is within the Quesnel Terrane which contains Upper Triassic to Lower Jurassic arc volcanics, volcaniclastic and comagmatic intrusive rocks overlain by Jurassic arc-derived clastic rocks (Wheeler *et al.*, 1988).

MINERAL POTENTIAL AND EXPLORATION TARGETS

The number of favourable geological environments found throughout the survey area, combined with a long and successful history of mineral exploration, has established this region as having an excellent potential for a variety of mineral deposits containing high-grade base and precious metal mineralization.

Based on the status of mineral occurrence (Table 3-2-6) and a review of exploration activity from assessment reports filed over the last five years (Table 3-2-7), most exploration activity has been focused on mineral deposits located on map sheets 92H and 92I and to a lesser extent 92J. Although

GEOLOGY LEGEND

SEDIMENTARY AND VOLCANIC ROCKS

QUATERNARY
Pleistocene to Recent

TILL (44)	Till, gravel, silt, clay.

TERTIARY
Miocene and/or Pliocene

BSLT (42)	Varicoloured vesicular valley basalt, brown amygdaloidal plateau basalt.

Eocene to Oligocene

DCIT (42)	Sheba Group, Kamloops Group, Skull Mtn. Formation; dacite, trachyte, basalt, andesite, rhyolite and related breccias.

MESOZOIC
Cretaceous

ANDS (36)	Kingsvale Group, Spences Bridge Group, Gambier Group, Fire Lake Group; varicoloured andesitic, basaltic and acidic pyroclastic and flow rocks.

Triassic to Cretaceous

SLSN (30)	Tyaughton Group, Relay Mtn. Group, Jackass Mtn. Group, Taylor Creek Group and Kingsvale Group; siltstone, greywacke, conglomerate and shale.

Triassic

ANDS (32)	Cadwallader Group, Bridge River Group, Nicola Group, Tulameen Group; andesite, basalt, greywacke, agglomerate, breccia.
GRNS (32)	Cadwallader Group (Pioneer Formation), Bridge River Group, Nicola Group; greenstone, chert, argillite.

PALEOZOIC
Windermere to Permian

GRNS (11)	Cariboo Group, Slide Mtn. Group (Fennell Formation, Eagle Bay Assemblage); greenstone, andesitic and basaltic flow rocks and tuff, schist, chert, argillite, shale, limestone.

PLUTONIC ROCKS

MESOZOIC AND YOUNGER

GRNT (41)	Raft, Baldy Mtn., Thuya, Takomkane, Guichon Creek, Mount Lytton Batoliths; Scuzzy, Spuzzum and Needle Peak Plutons; Coast, Otter, Lightning Creek and Copper Mtn. Intrusions; granite, granodiorite, quartz monzonite, quartz diorite, diorite.

Generalized geology from GSC Open Files 865 (92H), 866 (92I), 867 (92J), 774 (92O) and 775 (92P). The four-letter mnemonic name indicates rock type and the two-digit number refers to age.

Figure 3-2-4b. Legend.

TABLE 3-2-6
MINERAL OCCURRENCE STATUS

Map	Showing	Prospect	Dev. Prospect	Producer	Past Producer	Total
92H	464	61	21	7	41	594
92I	464	26	16	8	45	559
92J	136	48	17	1	22	224
92N	44	3	0	0	0	47
92O	87	16	6	0	8	117
92P	154	5	6	0	5	170

TABLE 3-2-7
SUMMARY OF EXPLORATION ACTIVITY FROM FILED ASSESSMENT REPORTS

	1990 (219)			1989 (209)			1988 (268)			1987 (211)			1986 (283)			
Map	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	Total
92H	14	34	10	16	31	13	10	47	20	9	43	12	19	47	18	343
92I	11	24	22	9	28	14	11	28	19	8	26	11	15	41	13	280
92J	7	21	2	7	19	5	8	35	9	4	26	9	9	44	16	221
92N	0	1	0	1	3	0	5	5	2	1	0	0	0	2	0	20
92O	1	33	2	4	16	10	5	18	7	5	16	7	4	14	5	147
92P	3	26	8	1	19	13	7	23	9	5	20	9	6	20	10	179
Total	36	139	44	38	116	55	46	156	66	32	131	48	53	168	62	

I : Prospecting; minor geological mapping, orientation sampling.
II : Intermediate Exploration Stage; detailed geophysical, silt, soil and rock surveys.
III : Advanced Exploration Stage; drilling, trenching, underground development.
( ) : Total number of Assessment Reports filed for that year.

map sheets 92O and 92P have not received the same level of attention there has been a slight increase in activity during recent years. Map sheet 92N remains relatively unexplored with only 47 known mineral occurrences and 20 filed assessment reports.

Within the Intermontane Belt, porphyry copper deposits containing precious metal values are currently the primary exploration target. During 1990 the majority of active exploration projects located within the survey area were on porphyry copper-gold targets. Gold-bearing skarn mineralization found in the Hedley area, volcanogenic massive sulphide deposits similar to the Chu Chua property and precious metal epithermal deposits such as the Elk property have all been identified as important exploration targets in the eastern half of the survey area.

The Coast Belt portion of the survey area has received a relatively low level of exploration attention. Activity has been concentrated in areas south of Taseko Lake and to the north of Whitesail Lake and only a small number of active exploration properties are located in the survey area between these two districts. Mesothermal and epithermal precious metal vein mineralization has been identified as the most common type of deposit found in the area (McLaren, 1990). Examples of this style of mineralization include properties located in the Bralorne and Gold Bridge areas. Other primary exploration targets include porphyry copper-molybdenum-gold deposits such as the Fish Lake and Poison Mountain properties, and volcanogenic massive sulphide mineralization similar to the Britannia deposit.

RGS Program – Mount Waddington (92N)

STREAM-SEDIMENT AND STREAM-WATER SURVEY

The Mount Waddington map sheet covers one of a few remaining areas in British Columbia which continues to be relatively unexplored. A reconnaissance stream-sediment and water survey was conducted during the 1991 field season in order to develop a greater understanding of the mineral potential of this frontier region and to provide geoscientific information to aid in the resolution of the numerous land-use discussions currently in progress.

McElhanney Engineering Services Limited was selected by competitive bid to carry out the sample collection component of the 1991 RGS program in the Mount Waddington map area. The base camp and dry facility were established at White Saddle Air Services' facility on Bluff Lake and a field camp was located at the head of Bute Inlet on Scar Creek. The vast majority of samples were collected by two teams consisting of a helicopter pilot, one crew chief and one sampler. Both White Saddle Air Services and Vancouver Island Helicopters provided air support for the program. Ministry representation by the senior author was maintained throughout the fast-paced 18-day program to ensure all aspects of the sample collection, data recording, sample drying, packing and shipping were in accordance with standards set by the National Geochemical Reconnaissance Program.

A total of 874 stream-sediment and stream-water samples were collected. The survey covered an area of approximately 15 000 square kilometres at an average density of one sample site every 17.6 square kilometres. The majority of the samples were collected from sites located within the Coast Mountains; less than 100 sites were in the plateau region. Discounting areas such as the large ice fields and the sparsely sampled plateau, the area covered by the survey is actually closer to 12 000 square kilometres and the density was one site every 14 square kilometres. Eighty-seven per cent of the sites were accessed by helicopter, seven per cent by truck and six per cent by boat. The program also included the collection of nine sediment and water samples in the southern tip of Tweedsmuir Provincial Park.

In general, sample sites were restricted to primary and secondary drainage basins having catchment areas of less than 10 square kilometres. Contaminated or poor-quality sample sites were avoided by choosing an alternative stream or by sampling a minimum of 60 metres upstream from the identified problem. At each sample site fine-grained stream sediment weighing 1 to 2 kilograms was collected within the active (subject to flooding) stream channel and placed in kraft-paper bags. In an attempt to minimize the glacial flour component of samples collected from glacial streams, the coarser grained material below the surface layer was sampled. Unfiltered water samples free of suspended materials were collected in 250-millilitre bottles. Field observations regarding sample media, sample site and local terrain were recorded and, to assist follow-up, aluminum tags inscribed with a unique RGS sample identification number were fixed to permanent objects, when available, at each site. Field-site checks were conducted by the Ministry representative to monitor, control and assess sample-collection procedures.

FIELD SAMPLE PREPARATION

Samples were field processed at the Bluff Lake base camp. Sediment samples were dried at a temperature less than 50°C and all sediment material finer than 1 millimetre was recovered by seiving each sample through a −18-mesh ASTM screen. Samples were assessed for quality and content of fine-grained sediment and those which appeared deficient in fine-grained material were routinely sieved through a −80-mesh screen (less than 177 microns). Sites yielding organic-rich samples and samples containing less than 40 grams of −80-mesh stream-sediment material were resampled.

LABORATORY SAMPLE PREPARATION

In order to complete sample preparation, the field-processed sediment samples were shipped to Rossbacher Analytical Laboratory in Burnaby and the water samples to the Ministry laboratory in Victoria. Sediment samples were sieved to −80-mesh ASTM fraction and analytical duplicate samples and control reference materials were inserted into each analytical block of 20 sediment samples. At this stage, a quantity of −80-mesh sediment and a representative sample of the +80 to −18-mesh fraction was archived for future studies. Control reference water standards were inserted into each analytical block of 20 water samples.

ANALYTICAL PROCEDURES

The standard methods and specifications for analysis of RGS stream sediments and waters are summarized in Table 3-2-8. Barringer Laboratories (Calgary, Alberta) has been contracted to provide this analytical work. In addition to the routine analytical suite of elements, the 1991 program will also include the analysis of sulphates in stream waters.

The determination of elements (Table 3-2-9) by instrumental neutron activation analysis will be carried out by Activation Laboratories (Ancaster, Ontario). This analytical technique involves irradiating the sediment samples, which on average weigh 10 grams, for 20 minutes in a neutron flux of 1011 neutrons per square centimetre per second. After a decay period of approximately one week, gamma-ray emissions for the elements are measured using a gamma-ray spectrometer with a high resolution, coaxial germanium detector. The counting time is 15 minutes per sample and the results are accumulated on a computer and converted to concentrations.

Field site duplicates, blind analytical duplicates and control reference materials are used in each analytical block of 20 samples to ensure that analytical data satisfy National Geochemical Reconnaissance Program quality control guidelines.

RGS ARCHIVE PROGRAM (92H, I, J, O, P)

The RGS Archive Program involves the analysis by instrumental neutron activation of stream-sediment samples collected during past joint federal-provincial Regional Geochemical Surveys, for gold and other previously undetermined elements of interest. Last year's RGS release represented the initial delivery of new analytical results generated by this program. In a continuing effort to disseminate new analytical results for the over 24 000 stream-sediment samples retrieved from the Geological Survey of Canada storage facilities in Ottawa, the current RGS Archive Program includes the production of RGS Open File reports for surveys which were originally conducted in map sheets 92H, I, J, O and P during 1979 and 1981. Becquerel Laboratories (Toronto, Ontario) has provided the INAA data for map sheets 92H, I, O and P, and under the direction of the Geological Survey of Canada, the INAA data for map sheet 92J samples were provided by Bondar Clegg Laboratories (Ottawa, Ontario).

A total of 4301 stream-sediment and stream-water samples were collected in south-central British Columbia during the 1979 and 1981 surveys. The samples were taken at an average density of one sample every 13 square kilometres and covered an area in excess of 78 000 square kilometres. The field and analytical data from the original programs were co-published by the British Columbia Ministry of Energy, Mines and Petroleum Resources and the Geological Survey of Canada in the early 1980s. These data packages consisted of a data booklet listing raw data and summary statistics, plus a single sample-location map.

The RGS Open Files due for release in 1992 will include the new analytical data as determined by INAA, and the original sample site information and analytical results for Zn, Cu, Pb, Ni, Co, Ag, Mn, Ag, Mo, U, W, Hg, As and Sb

TABLE 3-2-8
ANALYTICAL METHODS AND SPECIFICATIONS FOR ROUTINE RGS SUITE OF ELEMENTS

Element	Detection Limits	Sample Weight	Digestion Technique	Determination Method	
Cadmium	0.2 ppm	1 g	3 mL HNO_3 let sit overnight, add 1 mL HCl in 90°C water bath, for 2 hrs. cool, add 2 mL H_2O, wait 2 hrs.	A A S	atomic absorption spectrophotometry using air-acetylene burner and standard solutions for calibration, background corrections made for Pb, Ni, Co, Ag, Cd
Cobalt	2 ppm				
Copper	2 ppm				
Iron	0.02 %				
Lead	2 ppm				
Manganese	5 ppm				
Nickel	2 ppm				
Silver	0.2 ppm				
Zinc	2 ppm				
Molybdenum	1 ppm	0.5 g	Al added to above solution		
Barium	10 ppm	1 g	HNO_3 - HCl - HF taken to dryness, hot HCl added to leach residue		
Vanadium	5 ppm				
Chromium	5 ppm				
Bismuth	0.2 ppm	2 g	HCl - $KClO_2$ digestion, KI added to reduce Fe, MIBK and TOPO for extraction	A A S - H	organic layer analyzed by atomic absorption spectrophotometry with background correction
Antimony	0.2 ppm				
Tin	1 ppm	1 g	sintered with NH_4I, HCl and ascorbic acid leach	A A S	atomic absorption spectrophotometry
Arsenic	1 ppm	0.5 g	add 2 mL KI and dilute HCl to 0.8M HNO_3 • 0.2M HCl	A A S - H	2 mL borohydride solution added to produce AsH_3 gas which is passed through heated quartz tube in the light path of atomic absorption spectrophotometer
Mercury	10 ppb	0.5 g	20 mL HNO_3 • 1 mL HCl	A A S - F	10% stannous sulphate added to evolve mercury vapour, determined by atomic absorption spectrometry
Tungsten	1 ppm	0.5 g	K_2SO_4 fusion, HCl leach	C O L O R	colorimetric: reduced tungsten complexed with toluene 3, 4 dithiol
Fluorine	40 ppm	0.25 g	$NaCO_3$ - KNO_3 fusion, H_2O leach	I O N	citric acid added and diluted with water, fluorine determined with specific ion electrode
Uranium	0.5 ppm	1 g	nil	N A D N C	neutron activation with delayed neutron counting
LOI	0.1 %	0.5 g	ash sample at 500°C	G R A V	weight difference
pH - water	0.1 pH unit	25 mL	nil	G C E	glass - calomel electrode system
U - water	0.05 ppb	5 mL	add 0.5 mL fluran solution	L I F	place in Scintrex UA-3
F - water	20 ppb	25 mL	nil	I O N	fluorine ion specific electrode

TABLE 3-2-9
ADDITIONAL ELEMENTS ANALYZED BY INNA

Element	Detection Limit	Element	Detection Limit
Gold	2 ppb	Molybdenum	1 ppm
Antimony	0.1 ppm	Nickel	10 ppm
Arsenic	0.5 ppm	Rubidium	5 ppm
Barium	100 ppm	Samarium	0.5 ppm
Bromine	0.5 ppm	Scandium	0.5 ppm
Cerium	10 ppm	Sodium	0.1 %
Cesium	0.5 ppm	Tantalum	0.5 ppm
Chromium	5 ppm	Terbium	0.5 ppm
Cobalt	5 ppm	Thorium	0.5 ppm
Hafnium	1 ppm	Tungsten	2 ppm
Iron	0.2 %	Uranium	0.2 ppm
Lanthanum	5 ppm	Ytterbium	2 ppm
Lutetium	0.2 ppm	Zirconium	200 ppm

in stream sediments and U, F and pH in waters. Data packages will be comprised of a data booklet and a second booklet containing a variety of 1:500 000-scale maps. Data booklets will present survey details, raw data listings, summary statistics and data interpretations. Map booklets will contain sample location maps, bedrock geology and surficial geology maps, symbol and value maps for each element and multi-element anomaly maps. The raw data will also be available as ASCII files on 5.25-inch high-density diskettes.

PRELIMINARY DATA EVALUATION

New analytical data for gold in sediments together with the original analytical results for copper, lead and zinc in sediments have been evaluated in order to:

- Illustrate a method of data evaluation incorporated in recent RGS publications.
- Demonstrate data confidence by showing that gold and base metal anomalies are associated with regions of known mineral potential.
- Provide explorationists with some background information to assist in their follow-up of the 1992 release of archive data.
- Further promote the upcoming release of previously unavailable analytical data for gold as well as other elements of interest.

This data reduction technique involves a statistical assessment of gold and base metal stream-sediment data which have been sorted on the basis of underlying geology (Table 3-2-10). Only those geological units having greater than 100 sample sites have been considered. The geological units utilized are the four-letter mnemonic names indicating rock type and a two-digit number refering to age that are listed in the original Open File publications. In contrast, the forthcoming 1992 release will use the geological formations associated with the 1:1 000 000 Geological Atlas Series compiled by Roddick *et al.* in 1979. Figure 3-2-5 further defines the data set by illustrating the proportion of anomalous (greater than the 90th percentile) gold and base metal samples located within each geological unit. The following summary of this statistical breakdown can be made for the gold and base metal concentrations.

GOLD (NEW DATA)

Stream-sediment samples from 3767 sites provided sufficient material to be analyzed by instrumental neutron activation for gold and 25 other elements. A total of 1285 of these sites (34%) reported gold concentrations greater than the 2 ppb detection limit. The mean gold value is 8 ppb, and the 90th, 95th and 98th percentile concentrations are 11, 21 and 56 ppb, respectively. The maximum gold determination reported was 932 ppb.

With reference to Table 3-2-10 and Figure 3-2-4, anomalous gold values tend to be particularly associated with the Triassic Cadwallader (Bralorne properties), Bridge River (Bridge River gold camp) and Nicola (Highland Valley mining camp) groups. The Paleozoic Fennell Formation (Chu Chua property) and Eagle Bay assemblage (Samatosum mine) are also characterized by a high proportion of anomalous sites. Although the Mesozoic and younger plutonic rocks contain 80 sites with anomalous concentration of gold, the actual number of anomalous sites is less than 7 per cent of the total number of sites found within this extensive geological unit (n=1214). Better resolution of lithologies comprising this unit would assist in the identification of the mineralized host at these anomalous sites.

BASE METALS (1979 AND 1981 DATA)

Original copper, lead and zinc analyses by atomic absorption consisted of a total data set of 4010 sample sites. Over 99 per cent of these sites reported copper concentrations greater than the 2 ppm detection limit. The mean copper value is 33 ppm, and the 90th, 95th and 98th percentile concentrations are 56, 77 and 110 ppm, respectively. The maximum copper determination reported was 1100 ppm. A total of 2458 sample sites (61%) reported lead concentra-

TABLE 3-2-10
SUMMARY STATISTICS

GOLD	ALL	TILL (44)	BSLT (42)	DCIT (42)	ANDS (36)	ANDS (32)	GRNS (32)	SLSN (30)	GRNS (11)	GRNT (41)
N	3767	333	272	232	244	326	150	224	121	1214
MEAN	7.87	7.03	4.61	4.70	9.59	10.49	14.42	12.31	11.94	[illegible]
SD	32.00	26.07	16.89	12.51	31.76	35.50	25.49	56.75	35.20	24.62
CV	4.07	3.71	3.66	2.66	3.31	3.38	1.77	4.61	2.95	4.00
MIN	2	2	2	2	2	2	2	2	[illegible]	2
MAX	932	357	211	130	276	406	170	588	247	348
COPPER	**ALL**	**TILL (44)**	**BSLT (42)**	**DCIT (42)**	**ANDS (36)**	**ANDS (32)**	**GRNS (32)**	**SLSN (30)**	**GRNS (11)**	**GRNT (41)**
N	4010	336	280	234	260	359	150	228	127	1298
MEAN	32.79	21.32	17.75	23.84	39.98	41.97	55.27	35.04	36.87	29.90
SD	44.18	16.00	10.20	19.87	66.19	44.65	39.46	31.68	23.46	53.90
CV	1.35	0.75	0.58	0.83	1.66	1.06	0.71	0.90	0.64	[illegible]
MIN	2	4	4	7	5	3	11	10	[illegible]	2
MAX	1100	130	98	240	920	560	380	400	156	1100
LEAD	**ALL**	**TILL (44)**	**BSLT (42)**	**DCIT (42)**	**ANDS (36)**	**ANDS (32)**	**GRNS (32)**	**SLSN (30)**	**GRNS (11)**	**GRNT (41)**
N	4010	336	280	234	260	359	150	228	127	1298
MEAN	4.79	2.62	4.04	2.57	4.19	4.00	3.70	3.24	6.53	4.59
SD	44.18	2.60	29.78	2.92	8.47	5.04	5.58	2.79	7.88	16.75
CV	1.35	0.99	7.37	1.14	2.26	1.26	1.51	0.86	1.2	3.55
MIN	2	2	2	2	2	2	2	2	[illegible]	2
MAX	540	20	500	26	128	50	45	26	58	330
ZINC	**ALL**	**TILL (44)**	**BSLT (42)**	**DCIT (42)**	**ANDS (36)**	**ANDS (32)**	**GRNS (32)**	**SLSN (30)**	**GRNS (11)**	**GRNT (41)**
N	4010	336	280	234	260	359	150	228	127	1298
MEAN	62.20	50.63	50.13	49.92	68.86	67.68	88.55	72.28	68.78	50.08
SD	50.37	38.05	33.33	23.59	74.26	43.33	37.31	31.48	63.41	45.93
CV	0.18	0.75	0.67	0.47	1.08	0.64	0.42	0.44	0.92	0.92
MIN	7	9	12	16	10	16	25	12	[illegible]	7
MAX	1000	380	445	320	1000	390	255	270	49	800

tions greater than the 2 ppm detection limit. The mean lead value is 5 ppm, and the 90th, 95th and 98th percentile concentrations are 8, 12 and 20 ppm, respectively. The maximum lead determination reported was 540 ppm. All of the sample sites reported zinc concentrations greater than the 2 ppm detection limit. The mean zinc value for the total data set is 62 ppm, and the 90th, 95th and 98th percentile concentrations are 96, 125 and 188 ppm respectively. The maximum zinc value reported was 1000 ppm.

Evaluation of the copper and zinc anomalies produced similar rock-type associations that were identified with the gold data. Although lead also has a similar association, lead anomalies are much more common in the Paleozoic Fennell Formation, Eagle Bay assemblage and plutonic rocks.

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REFERENCES

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

Matysek, P.F., Jackaman, W., Gravel, J.L., Sibbick, S.J. and Feulgen, S. (1991a): British Columbia Regional Geochemical Survey – Fernie (NTS 82G); *B.C. Ministry of Energy, Mines and Petroleum Resources*, RGS 27.

Matysek, P.F., Jackaman, W., Gravel, J.L., Sibbick, S.J. and Feulgen, S. (1991b): British Columbia Regional Geochemical Survey – Kananaskis Lakes (NTS 82J); *B.C. Ministry of Energy, Mines and Petroleum Resources*, RGS 28.

Matysek, P.F., Jackaman, W., Gravel, J.L., Sibbick, S.J. and Feulgen, S. (1991c): British Columbia Regional Geochemical Survey – Penticton (NTS 82E); *B.C. Ministry of Energy, Mines and Petroleum Resources*, RGS 29.

Matysek, P.F., Jackaman, W., Gravel, J.L., Sibbick, S.J. and Feulgen, S. (1991d): British Columbia Regional Geochemical Survey – Nelson (NTS 82F); *B.C. Ministry of Energy, Mines and Petroleum Resources*, RGS 30.

Matysek, P.F., Jackaman, W., Gravel, J.L., Sibbick, S.J. and Feulgen, S. (1991e): British Columbia Regional Geochemical Survey – Lardeau (NTS 82K); *B.C. Ministry of Energy, Mines and Petroleum Resources*, RGS 31.

Matysek, P.F., Jackaman, W., Gravel, J.L., Sibbick, S.J. and Feulgen, S. (1991f): British Columbia Regional Geochemical Survey – Vernon (NTS 82L); *B.C. Ministry of Energy, Mines and Petroleum Resources*, RGS 32.

Matysek, P.F., Jackaman, W., Gravel, J.L., Sibbick, S.J. and Feulgen, S. (1991g): British Columbia Regional Geochemical Survey – Seymour Arm (NTS 82M); *B.C. Ministry of Energy, Mines and Petroleum Resources*, RGS 33.

McLaren, G.P. (1990): A Mineral Resource Assessment of the Chilko Lake Planning Area; *B.C. Ministry of Energy, Mines and Petroleum Resources*, Bulletin 81.

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

Roddick, J.A., Muller, J.E. and Okulitch, A.V. (1979): Fraser River – Sheet 92 – Geological Atlas Series; *Geological Survey of Canada*, Open File 1386A.

Wheeler, J.O., Brookfield, A.J., Gabrielse, H., Monger, J.W.H., Tipper, H.W. and Woodsworth, G.J. (1988): Terrane Map of the Canadian Cordillera; *Geological Survey of Canada*, Open File 1894.