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BRITISH COLUMBIA REGIONAL GEOCHEMICAL SURVEY

NTS 92I - ASHCROFT

STREAM SEDIMENT AND WATER GEOCHEMICAL DATA

W. Jackaman and P.F. Matysek

BC RGS 40 / GSC OF 2666

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By W. Jackaman and P.F. Matysek

INTRODUCTION

Open File BC RGS 40 / GSC OF 2666 is one of three open files published in January, 1994 as part of the British Columbia Regional Geochemical Survey (RGS) Program. This Open File includes **new** analytical data for 26 elements in stream sediments. These results were obtained by analyzing archived sediment pulps collected during a 1981 joint Federal-Provincial stream sediment and water survey conducted in NTS map sheet 92I - Ashcroft. Also included in this package are the original field and analytical results from Open File BC RGS 8 / GSC OF 866 published in 1982 for 14 elements in stream sediments plus uranium, fluoride and pH in stream waters. Open File BC RGS 40 / GSC OF 2666 supersedes all previous publications.

The 1981 survey was managed and funded by the British Columbia Ministry of Energy, Mines and Petroleum Resources (MEMPR) as part of the Regional Geochemical Survey Program. Data management was provided by the Geological Survey of Canada (GSC).

Initiated in 1990, as part of the Ministry's RGS Archive Program, the sediment samples collected from earlier surveys were retrieved from GSC storage facilities in Ottawa and analyzed by instrumental neutron activation analysis (INAA). This project was funded in part by the *Canada-British Columbia Mineral Development Agreement* (1985-1990).

Analytical results and field observations compiled by the RGS Program are used in the development of a high quality geochemical database suitable for resource assessment, mineral exploration, geological mapping and environmental studies. Sample collection, preparation and analysis are closely monitored to ensure consistency and conformance to national standards (Ballantyne, 1991).

ACKNOWLEDGMENTS

1981 STREAM SEDIMENT and WATER RGS PROGRAM

Contracts were let to the following companies for sample collection, preparation and analysis and were managed by staff of the MEMPR.

COLLECTION :	Rooi Enterprises Ltd., Victoria, B.C.
PREPARATION :	Kamloops Research Assay and Laboratory, Kamloops, B.C.
ANALYSIS :	Chemex Laboratories Ltd., North Vancouver, B.C. (Sediments)
	Novatrack Analysts Ltd., Vancouver, B.C. (U in Sediments)
	Bondar Clegg Ltd., North Vancouver, B.C. (Waters)

1993 RGS ARCHIVE PROGRAM

The 1993 RGS Archive Program was managed by Geological Survey Branch staff of the MEMPR. *P.F. Matysek* and *W. Jackaman* coordinated the operational activities of contract and MEMPR staff. *W. Jackaman* coordinated the production of this open file. *S.J. Cook* assisted with the analysis and interpretation of the data. *K. J. Colbourne* provided production support.

PREPARATION :	Rob Phillips, Ottawa, Ont.
ANALYSIS :	Becquerel Laboratories, Mississauga, Ont.
	Activation Laboratories, Ancaster, Ont.

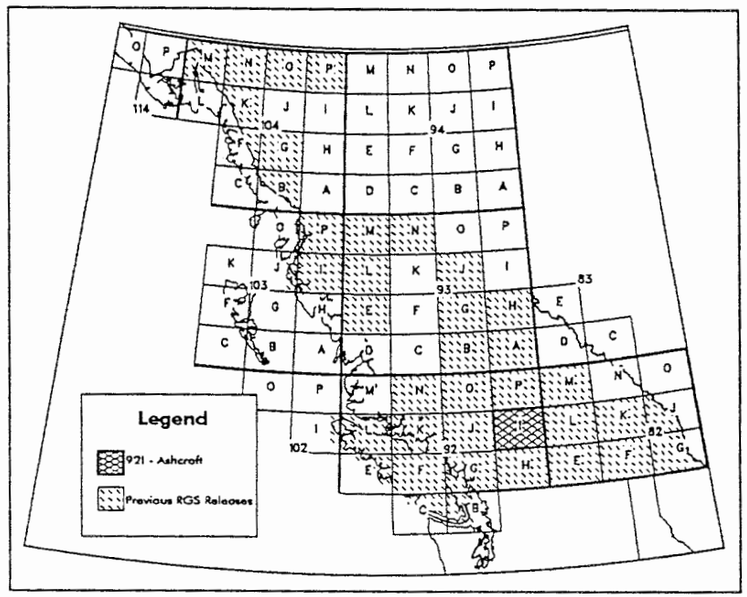

Figure 1. Location map.

OPEN FILE FORMAT

Open File BC RGS 40 / GSC OF 2666 includes a data booklet, a map booklet and a 3.5" floppy diskette.

The data booklet is divided into the following sections. ***Please refer to notes preceding each section for important information on data presentation format.***

- survey details and RGS data evaluation,
- listings of field and analytical data,
- listings of analytical duplicate data,

- threshold tables,
- summary statistics, and
- sample evaluation charts.

The map booklet contains the following maps :

- 4 - 1: 100 000 scale sample location maps,
- 1 - 1: 500 000 scale sample location clear overlay and map,
- 1 - 1: 500 000 scale bedrock geology clear overlay and map,
- 1 - 1: 500 000 scale surficial geology map,
- 43 - 1: 500 000 scale symbol and value maps for individual elements,
- 1 - 1: 500 000 base metal anomaly map, and
- 1 - 1: 500 000 precious metal anomaly map.

Analytical and field data is included as an ASCII file on a 3.5", high-density diskette. Document files detailing data format specifications and survey details are also included.

SURVEY DETAILS

PHYSIOGRAPHY and GEOLOGY

The Ashcroft map sheet covers an area of approximately 15 500 square kilometres and includes the Coast Mountains, Clear Range and Thompson Plateau physiographic subdivisions (Holland, 1976). The Thompson Plateau covers the majority of the survey area and is characterized by rolling hills of low relief covered by a thick layer of glacial drift. The western half of the map area represents a transition zone between the Coast Mountains and the Thompson Plateau. This region consists of smooth and gently sloping mountains. The Coast Mountains extends into the southwest corner of the map area and are characterized by relatively rugged peaks and high ridges. Rock with discontinuous deposits of colluvium, talus and till are present on the mountain slopes and thick deposits of fluvial and glaciofluvial sediments are found within the valleys (Map 3, after Fulton *et al.*, 1982).

The majority of the survey area is situated east of the Fraser Fault and is underlain by the Intermontane Tectonic Belt. To the west of the Fraser Fault, successions of Upper Jurassic to Lower Cretaceous volcanic and sedimentary rocks of the Methow Terrane and Permian to Middle Jurassic chert, argillite, basalt and alpine-type ultramafic rocks of the Bridge River Terrane mark the transition between the Coast and Intermontane belts (Wheeler *et al.*, 1988). Within the Intermontane Belt, the Stikine Terrane 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. These rocks are intruded by comagmatic plutonic rocks. To the east, the Cache Creek Terrane is comprised of Mississippian to Upper Triassic oceanic volcanics and sediments. In the southeast, the Quesnel Terrane includes Upper Triassic to Lower Jurassic arc volcanics, volcaniclastic and comagmatic rocks overlain by Jurassic arc-derived clastic rocks. The bedrock geology base map (MAP 2) used in this Open File is Roddick *et al.*, 1979.

The British Columbia mineral deposits database lists 563 mineral occurrences for map sheet 92I (MINFILE 092ISE, 092ISW, 092INE, 092INW). The major types of metallic deposits include copper porphyries, gold-bearing skarns, precious metal epithermal deposits and precious metal bearing quartz veins. Currently, Highland Valley is the only operating metal mine located in the survey area.

SAMPLE COLLECTION - 1981

Helicopter and truck-supported sample collection was carried out during the summer of 1981. A total of 606 stream sediment and 596 stream water samples were systematically collected from 572 sites. Average sample site density was 1 site per 27 square kilometres over the 15 500 square kilometre survey area. Sample density within the Thompson Plateau was restricted due to the regions flat terrain and semi-arid climate. As a result, only a limited number of appropriate stream drainage basins were available to be sampled. Field duplicate samples were routinely collected in each analytical block of twenty samples.

Fine grained stream sediment material (< 1mm) weighing 1-2 kg was obtained from the active (subject to annual flooding) stream channel and placed in kraft bags. Unfiltered water samples were collected in 250 ml bottles, precautions were taken to exclude suspended solids when possible. Field observations regarding sample media, sample site and local terrain were also recorded.

SAMPLE PREPARATION - 1981

Field dried sediment samples were shipped to Kamloops Research Assay and Laboratory for final sample preparation. The samples were air-dried and the -80 mesh (<177 microns) fraction was obtained by dry sieving. Quality control reference standards and analytical duplicate samples were inserted into each analytical block of twenty sediment samples. Any -80 mesh sediment remaining after analyses was archived for future analyses.

SAMPLE ANALYSIS - 1981

Chemex Laboratories (North Vancouver) analyzed the sediment samples for: antimony, arsenic, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, silver, tin, tungsten and zinc. Uranium in stream sediments was determined by Novatrack Analysts Ltd. (Vancouver). Water samples were analyzed for fluoride, uranium, and pH by Bondar Clegg Ltd. (North Vancouver). Concentrations reported below the detection limit are presented in the data listings as a value equivalent to one-half of the detection limit. Detection limits for each element are listed in Table 1.

For the determination of copper, cobalt, iron, lead, manganese, nickel, silver, and zinc, a 1 gram sample was reacted with 3 ml of concentrated HNO_3 for 30 minutes at 90°C. Concentrated HCl (1 ml) was added and the digestion was continued at 90°C for an additional 90 minutes. The sample solution was then diluted to 20 ml with metal free water and mixed. Concentrations were determined by atomic absorption spectroscopy (AAS) using an air-acetylene flame. Background corrections were made for Pb, Ni, Co and Ag.

Antimony was determined using a 2 gram sample digested with concentrated HCl in a hot water bath. The iron was reduced to Fe(II) and the antimony extracted with trioctyl phosphine oxide MIBK and measured by AAS with background correction.

Arsenic was determined by hydride generation/atomic absorption spectroscopy (AAS-H) on an aliquot of solution taken from the sample solution prepared for the base metal analyses.

Molybdenum was determined by AAS using nitrous oxide acetylene flame. A 0.5 gram sample was reacted with 1.5 ml concentrated HNO_3 at 90°C for 30 minutes. At this point 0.5 ml of concentrated HCl was added and the digestion continued for an additional 90 minutes. After cooling, 8 ml of 1250 ppm Al solution was added and the sample solution diluted to 10 ml before aspiration by AAS.

Element		Detection Limit	Method	Element		Detection Limit	Method
Antimony	Sb	0.2 ppm	AAS	Cerium	Ce	10 ppm	INAA
Arsenic	As	0.5 ppm	AAS-H	Cesium	Cs	0.5 ppm	INAA
Cobalt	Co	2 ppm	AAS	Chromium	Cr	5 ppm	INAA
Copper	Cu	2 ppm	AAS	Cobalt	Co	5 ppm	INAA
Iron	Fe	0.02 %	AAS	Hafnium	Hf	1 ppm	INAA
Lead	Pb	2 ppm	AAS	Iron	Fe	0.20 %	INAA
Manganese	Mn	5 ppm	AAS	Lanthanum	La	5 ppm	INAA
Mercury	Hg	10 ppb	AAS-F	Lutetium	Lu	0.2 ppm	INAA
Molybdenum	Mo	2 ppm	AAS	Molybdenum	Mo	1 ppm	INAA
Nickel	Ni	2 ppm	AAS	Nickel	Ni	10 ppm	INAA
Silver	Ag	0.2 ppm	AAS	Rubidium	Rb	5 ppm	INAA
Tungsten	W	2 ppm	COLOR	Samarium	Sm	0.5 ppm	INAA
Uranium	U	0.2 ppm	NADNC	Scandium	Sc	0.5 ppm	INAA
Zinc	Zn	2 ppm	AAS	Sodium	Na	0.10 %	INAA
Fluoride - water	FW	20 ppb	ION	Tantalum	Ta	0.5 ppm	INAA
Uranium - water	UW	0.05 ppb	LIF	Terbium	Tb	0.5 ppm	INAA
pH - water	pH	0.1	GCE	Thorium	Th	0.5 ppm	INAA
Gold	Au	2 ppb	INAA	Tungsten	W	2 ppm	INAA
Antimony	Sb	0.1 ppm	INAA	Uranium	U	0.2 ppm	INAA
Arsenic	As	0.5 ppm	INAA	Ytterbium	Yb	2 ppm	INAA
Barium	Ba	100 ppm	INAA	Zirconium	Zr	200 ppm	INAA
Bromine	Br	0.5 ppm	INAA				

TABLE 1 ANALYTICAL SUITE OF ELEMENTS: NTS 92I

Mercury was determined using a 0.5 gram sample reacted with 20 ml concentrated HNO_3 and 1 ml concentrated HCl in a test tube for 10 minutes at room temperature and for 2 hours in a 90°C water bath. After digestion the sample was cooled and diluted to 100 ml with metal free water. The Hg present was reduced to the elemental state by the addition of 10 ml of 10% weight per volume $SnSO_4$ in H_2SO_4. The Hg vapor was flushed by a stream of air into an absorption cell mounted in the light path of an atomic absorption spectrometer (AAS-F). Measurements were made at 253.7 nm. This method is described in detail by Jonasson, *et al.* (1973).

Uranium in sediments was determined using a neutron activation method with delayed neutron counting (NADNC). A 1 gram sample was weighed in a seven dram polyethylene vial, capped and sealed. Irradiation was provided by the Triumf Cyclotron with an operating flux of 10^{12} neutrons/cm²/second. Each sample was irradiated for 60 seconds. Following a 20 second delay, the sample was counted for 60 seconds with six BF3 detector tubes embedded in paraffin.

Tungsten was determined colourimetrically after a pyrosulfate fusion and a dithiolcarbonate complexing for the generation of the colour (COLOR).

Uranium in waters was determined by a fluorometric method (LIF). The U was initially preconcentrated by evaporation. The residue was fused with a mixture of Na_2CO_3, K_2CO_3 and NaF in a platinum dish. After cooling the fluorescence of the fused pellet was measured using a Turner Fluorometer.

The determination of fluoride in waters involved an aliquot of sample being mixed with an equal volume of total ionic strength adjustment buffer (TISAB II solution). The fluoride was measured using a Corning 101 Electrometer with an Orion Fluoride Electrode (ION).

pH in waters was measured using an aliquot of sample in a clean dry beaker by a Fisher Accumet pH Meter (GCE).

SAMPLE PREPARATION - 1993 RGS Archive Program

Of the 606 sediment samples collected during the original survey, 594 samples contained sufficient material to be analyzed by instrumental neutron activation analysis (INAA). New quality control reference standards were inserted into each analytical block of twenty samples and existing analytical and field site duplicate samples were checked and verified.

SAMPLE ANALYSIS - 1993 RGS Archive Program

The determination of antimony, arsenic, barium, bromine, cerium, cesium, chromium, cobalt, gold, hafnium, iron, lanthanum, lutetium, molybdenum, nickel, rubidium, samarium, scandium, sodium, tantalum, terbium, thorium, tungsten, uranium, ytterbium and zirconium by INAA was conducted by Becquerel Laboratories (Mississauga). Instrumental neutron activation analysis involves irradiating the sediment samples, which range from 1 to 50 grams (average 21 grams), for 20 minutes in a neutron flux of 10^{11} neutrons/cm²/second. After a decay period of approximately 1 week, gamma-ray emissions for the elements were measured using a gamma-ray spectrometer with a high resolution, coaxial germanium detector. Counting time was approximately 15 minutes per sample. Table 1 lists the associated detection limits reported by this analytical technique.

Repeat analysis by INAA have been performed by Activation Laboratories on the original split for samples returning gold values exceeding 20 ppb and are reported as Au2 in Appendix A. This level represents the 95th percentile for gold based on the total RGS data set for map sheets 92H, 92I and 92J.

RGS Data Evaluation

The ability to discriminate real trends, related to geological and geochemical conditions, from those that result from spurious factors such as sampling and analytical errors is of considerable importance in the success of geochemical data interpretation. An estimate of precision allows sampling and analytical variation to be quantified, and is an integral part of the evaluation of geochemical data. Estimates of analytical precision and element variability within and between sample sites can be determined by utilizing control reference, analytical duplicate and field duplicate data.

Control reference standards, analytical duplicates and field duplicates are routinely inserted to monitor and assess accuracy and precision of analytical results. Each analytical block of twenty sediment samples consists of :

- 17 routine samples,
- 1 field duplicate sample collected adjacent to one of the 17 routine samples (Listed in Appendix A),
- 1 analytical duplicate sample; a subsample taken from one of the 17 routine samples prior to analysis (Listed in Appendix B), and
- 1 control reference standard sample containing sediment of known element concentrations.

Analytical blocks of corresponding water samples differ slightly in that they contain two control reference standard samples but no analytical duplicate samples.

ANALYTICAL REPRODUCIBILITY

Scatterplots of analytical results of field duplicate pairs and analytical duplicate pairs are presented for Cu, Pb, Ni, Zn (AAS sediment data) and Au, As (INAA sediment data). A total of 125 field and analytical duplicate pairs from the 1994 data set (NTS map sheets 92H, 92I and 92J) were included in this analysis. Field duplicate data and analytical duplicate data (Figures 2a and 2b) show very good reproducibility, particularly for those trace elements with concentration levels well above detection limits. This gives a high degree of confidence in the quality of both the field sampling and the analytical methods. Poor reproducibility for gold is primarily due to the influence of the particle sparsity effect (see section : Interpretation of Gold Data).

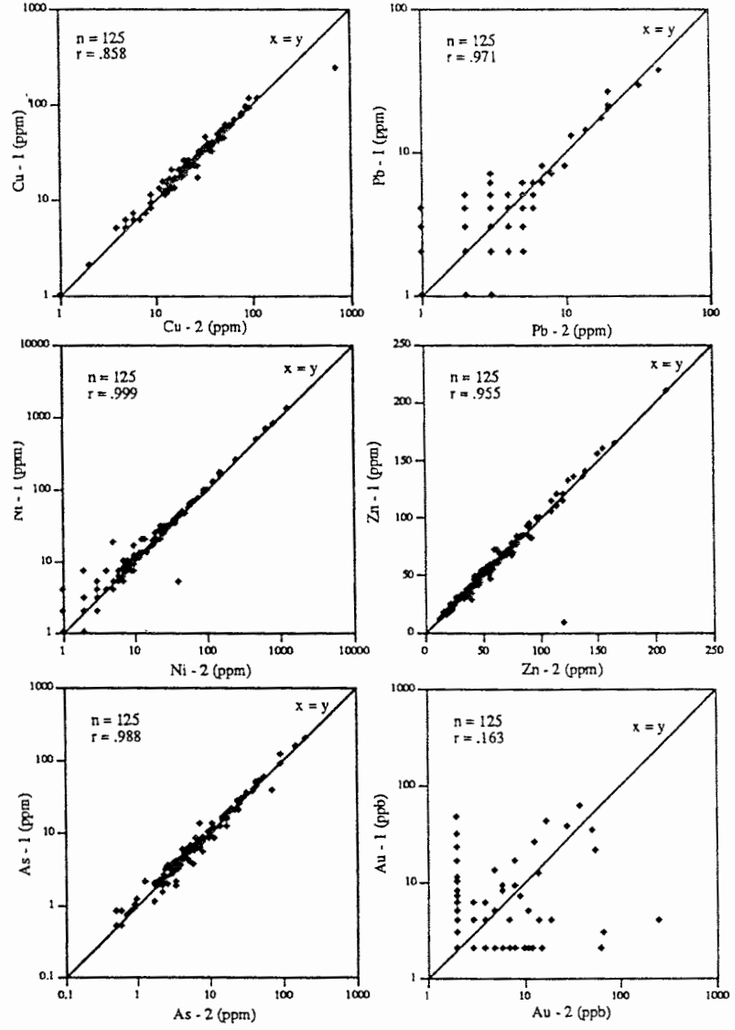

Figure 2a. Scatterplots showing field duplicate pairs for Cu. Pb, Ni, Zn (1981 data) and As, Au (1993 data).

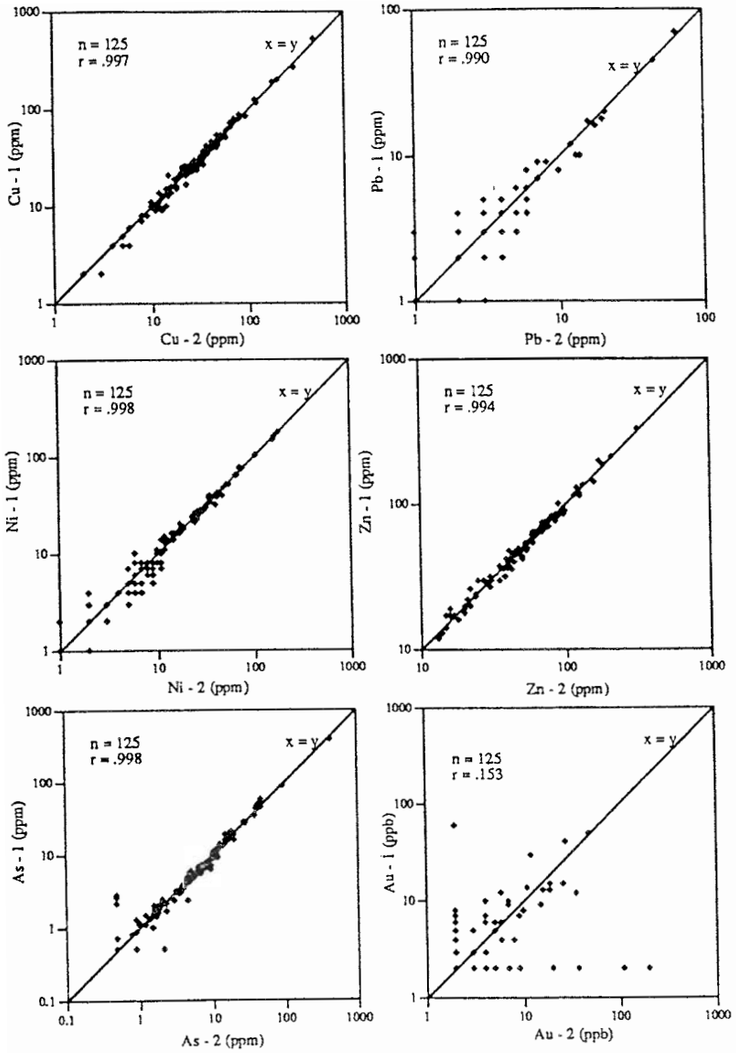

Figure 2b. Scatterplots showing analytical duplicate pairs for Cu. Pb, Ni, Zn (1981 data) and As, Au (1993 data).

PRECISION ESTIMATES

Precision estimates for selected elements were calculated using 125 analytical duplicate pairs from the total 1994 analytical data set using the Thompson and Howarth (1973, 1976, 1978) method.

Their method involves dividing 50 or more analytical duplicate pairs (x_1, x_2) into groups with narrow concentration ranges. For each group, the median value of absolute differences between duplicate pairs ($|x_1-x_2|$) is used as an estimation of the standard deviation (s), whereas the mean value of all the duplicate pair means $(x_1+x_2)/2$ is used as an estimation of the average concentration. Repetition of this procedure for successive groups of concentration ranges produces a set of corresponding mean concentration and standard deviation estimates for the entire range of data. Linear regression of the estimates provides slope and intercept values from which precision of the date set can be calculated using the equation:

$$Pc = 200(K/c + S_O)$$

where S_O (coefficient of slope) is the standard deviation at zero concentration and K (intercept) is a constant. This linear function has been determined in practical cases (Matysek and Sinclair, 1984) to be a satisfactory model for the expression of analytical variation.

Precision estimates were calculated as follows:

Step 1. A list of duplicate means and corresponding absolute differences was calculated for each sample pair.

Step 2. The list was sorted in increasing order of concentration means.

Step 3. The mean concentration and the median difference between pairs for the first group of 11 analytical pairs were determined.

Step 4. Step 3 was repeated for each successive group of 11 pairs ignoring any remainder less than 11.

Step 5. The linear regression of the median differences on the means was calculated. The resultant intercept and coefficient of the calculated line are multiplied by 1.048 and were used to estimate precision.

Precision estimates were determined for Cu, Fe and Zn (AAS), and As (INAA). This particular suite of elements was selected on the following basis:

- Their distributions approximated a Gaussian (normal) curve, and
- The majority of their concentrations were well above their detection limits.

This methodology may not be applicable for elements characterized by non-normal distributions. These distributions are recognized when the following conditions arise:

- Element abundance is dependent on rare grains,
- Concentration levels are at or near the detection limit, and/or
- Data contains outliers.

RESULTS

Precision estimates calculated at different concentration levels using the Thompson and Howarth method are presented in Table 2 and Figure 2. Precision estimates for As averaged 16.1% at the 50th percentile (5.3 ppm As), 13.9% at the 80th percentile (14.0 ppm As) and 13.0% at the 95th percentile (44.0 ppm As). Precision estimates for Cu, Fe and Zn were lower, averaging 10.5% at the 50th percentile, 9.7% at the 80th percentile, and 9.0% at the 95th percentile. These estimates are of similar magnitude to those obtained from studies on error evaluation in stream sediment surveys (Plant, 1971; Chork, 1977; Fletcher, 1981). These studies generally concluded that precision ranges of 10 to 15% at the 95% confidence level are often encountered and considered acceptable for laboratory variability in most exploration programs.

Element	r	Intercept	Slope	50th (ppm)	Precision	80th (ppm)	Precision	95th (ppm)	Precision
Copper	0.8116	0.382	0.0426	26	12%	46	11%	80	10%
Iron	0.8194	0.015	0.0397	1.85	10%	2.70	9%	3.95	9%
Zinc	0.7752	0.716	0.0334	55	10%	80	9%	140	8%
Arsenic	0.9043	0.090	0.0600	5.3	16%	14.0	14%	44.0	13%

TABLE 2 THOMPSON AND HOWARTH PRECISION ESTIMATES

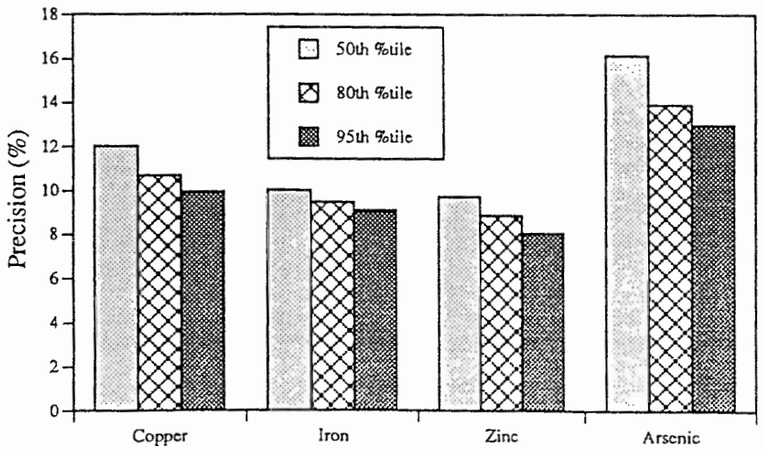

Figure 3. Bar graph showing precision estimates.

COMPARISON of INAA and AAS TECHNIQUES

Several elements (Sb, As, Co, Fe, Mo and Ni) were determined by both atomic absorption spectroscopy (AAS) and by instrumental neutron activation analysis (INAA). Variations observed between original (AAS) and subsequent (INAA) results are due largely to differences in the analytical methods. AAS requires dissolution of the sample with acids prior to analysis. Aqua regia, a combination of hydrochloric and nitric acids, was used to dissolve RGS sediment samples. Gold and sulphide minerals are dissolved, whereas silicates and some oxides (*i.e.* magnetite) are only partially digested. Conversely, INAA does not require sample digestion prior to analysis. Concentrations determined by INAA generally represent the *total* content of that element in the sample. Due to this difference between methods, INAA generally reports slightly higher concentrations than aqua regia AAS.

Using the 92H data set, Figure 4 represents a comparison of the two techniques for iron and nickel. In both cases, INAA gives higher results. A strong correlation is noted for nickel (r = .907). The slightly higher INAA results are probably due to the presence of minute quantities of nickel within the lattices of silicates (i.e. feldspars). Iron demonstrates substantial concentration differences between analytical methods and a weaker correlation (r = .569). These results are probably due to the presence of variable amounts of magnetite and hematite commonly found in stream sediment samples.

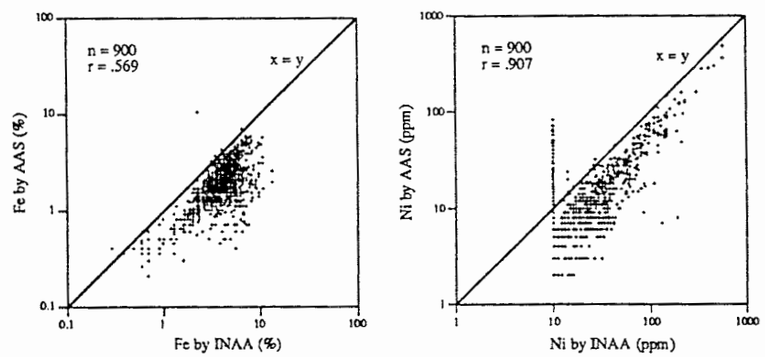

Figure 4. Scatterplots comparing INAA and AAS results for Fe and Ni.

INTERPRETATION OF GOLD DATA

Understanding gold geochemical data from regional stream sediment surveys requires an understanding of the chemical and physical characteristics of gold in the surficial environment.

Gold is a soft, malleable element of high density (19.3 g/cm³). Gold is chemically inert and commonly occurs in native form (pure Au) or as electrum (alloyed with silver). Sub-micron sized gold is often bound to clays, adsorbed onto Fe-Mn oxides or contained within organic colloids. At normal surface

temperatures, gold will dissolve under rare conditions of high oxidation potential and high acidity where ions such as chloride (Cl^-), thiosulphate ($S^2O_3^{-2}$) or cyanide (CN^-) are present. Normal background concentrations for gold in bedrock vary, but are generally less than 5 ppb. Background levels encountered for stream sediments seldom exceed 10 ppb and commonly are near the detection limit of 2 ppb.

Gold generally occurs as rare, discrete particles. In many instances a geochemical subsample may or may not contain a gold grain. This is known as the *'nugget effect'*. Generally, larger geochemical sample sizes are required to minimize the nugget effect and more accurately represent gold concentrations. (Clifton *et al.*, 1969; Harris, 1982). Neutron activation analyses for the RGS Archive program utilized samples weighing on average 20 grams.

Follow-up investigations of gold anomalies should be based on careful consideration of related geological and geochemical information and an understanding of the variability of gold geochemical data. Once an anomalous area has been identified, field investigations should be designed to include detailed geochemical follow-up surveys and collection of large, representative samples. Analysis of field and analytical duplicate samples enables assessment of the reliability of gold results and permits better data interpretation.

ANOMALY RATING PROCEDURE

Stream sediments collected downstream from mineralized sources commonly exhibit enhanced concentrations for ore and pathfinder elements. An interpretive technique has been developed by Matysek *et al.* (1991) to highlight sample sites characterized by anomalous, multi-element signatures (Figure 5). As an example of this methodology, sample evaluation charts (Appendix D) and 1:500 000 scale anomaly maps (Map Booklet) have been produced which outline areas considered to have relatively higher base metal and precious metal potential.

METHODOLOGY

Step 1 - Subset analytical data by lithology.

Element concentrations for stream sediment samples typically reflect the underlying geology found within the sampled drainage basin. Considerable variability in element concentrations are associated with different lithologies and must be considered in order to distinguish samples which most likely reflect mineralized sources from lithological units characterized by high background values. Consequently, analytical data is initially subset on the basis of the underlying lithology found at each sample site.

Step 2 - Calculate 90th, 95th and 98th percentiles (threshold values) for each lithology.

The 90th, 95th and 98th percentiles are calculated for lithologies having 10 or more sample sites. Lithologies having less than 10 sample sites list threshold values determined from the current provincial RGS data set. The results are listed in a threshold table (Appendix D). To better estimate element variability within lithologies, data from adjoining survey areas (NTS map sheets 92H, 92I, 92J, 92N, 92O, and 92P) have been included.

Step 3 - Assign anomaly ratings to each sample.

Element concentrations for each sample are then compared to the calculated threshold values and assigned the following anomaly ratings :

- an anomaly rating of 1 for concentrations >= 90th but < 95th percentile,
- an anomaly rating of 2 for concentrations >= 95th but < 98th percentile, and
- an anomaly rating of 3 for concentrations >= 98th percentile.

Sample evaluation charts graphically display the anomaly rating for individual elements. In addition, the summed element ratings provide a measure of the anomalous multi-element nature of each sample. Anomaly maps produced from the sample evaluation charts highlight the spatial relationships between anomalous samples.

Utilizing the above technique, sample evaluation charts (Appendix D) and anomaly maps (Map Booklet) have been generated to aid the user in identifying potential base metal and precious metal targets. The element suite used for the identification of base and precious metal multi-element anomalies include Cu - Pb - Zn - Ag and Au - Sb - As - Hg - Ag, respectively.

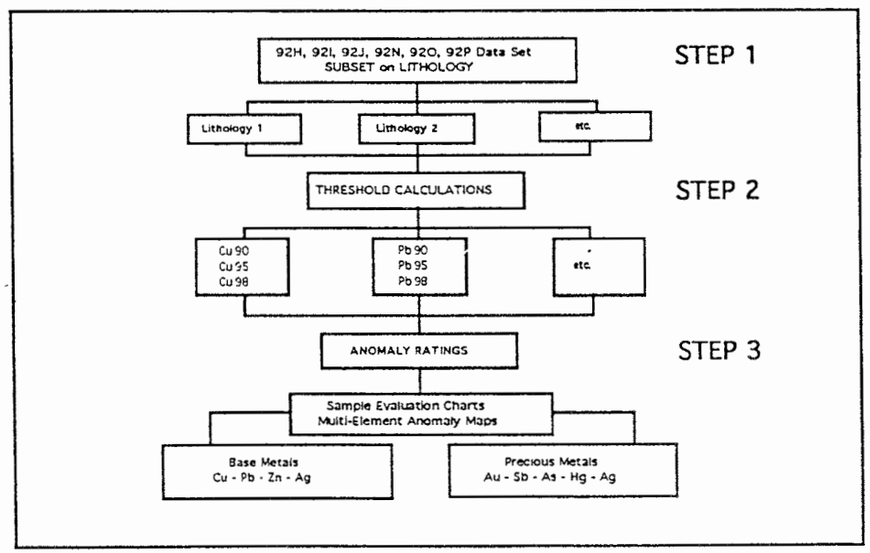

Figure 5. Anomaly Rating Flowchart.

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BRITISH COLUMBIA REGIONAL GEOCHEMICAL SURVEY

NTS 92I ASHCROFT

BC RGS 40 / GSC OF 2666

APPENDIX A

FIELD OBSERVATIONS AND ANALYTICAL DATA

Notes:

- AAS results less then the detection limit are reported as one half the detection limit.
- Repeat analysis of Au by INAA have been performed on the original split for samples reporting Au values exceeding 20 ppb and are reported as Au2. This level represents the 95th percentile for Au based on the total RGS data set for map sheets 92H, 92I and 92J.
- Analytical duplicate results for Au are also reported as Au2.
- Missing data is reported as blanks.

Table A-1. Reference Guide for Geological Formations (Roddick *et al.*, 1979)

STRATIFIED ROCKS

TERTIARY

Miocene and Pliocene
MPvb plateau lava, basalt flows

Miocene
Mp siltstone, shale, minor sand

Eocene and Oligocene
EOK Kamloops Group : dacite, basalt

Eocene
ECB Coldwater Beds : conglomerate, sandstone

CRETACEOUS AND/OR TERTIARY
KTcg sandstone, conglomerate, shale

Upper Cretaceous, Paleocene, Eocene
KTv andesite, basalt, picrite

Upper Cretaceous
uKKW Kingsvale Group : arkose, conglomerate, greywacke
uKKV Kingsvale Group : andesite, breccia, basalt

Lower Cretaceous
IKB Brew Group : argillite, quartzite, conglomerate
lKJM Jackass Mountain Group : greywacke, conglomerate
IKSB Spences Bridge Group : andesite, basalt

JURASSIC
Middle Jurassic
mJcg conglomerate, sandstone, shale
mJp shale, conglomerate, sandstone

TRIASSIC
Upper Triassic
uTN Nicola Group : andesite, basalt, limestone, argillite

PALEOZOIC AND TRIASSIC
PTBR Bridge River Group : chert, argillite, phyllite
PTP Pavilion Group : chert, argillite, siltstone, basalt, andesite

PERMIAN
PMC Marble Canyon : limestone

PENNSYLVANIAN AND PERMIAN
PPCS Cache Creek Group : argillite, basalt, chert, limestone
PPCV Cache Creek Group : greenstone

CARBONIFEROUS AND PERMIAN
CPCC Cache Creek Group : (Eastern) argillite, quartzite, limestone, greenstone

PALEOZOIC
Psm schist, amphibolite

INTRUSIVE ROCKS

TERTIARY
Late Tertiary
LTqm quartz monzonite
LTgd granodiorite
LTqd quartz diorite

CRETACEOUS
Late Cretaceous
LKgd granodiorite

JURASSIC
Jqm quartz monzonite
Jgd granodiorite, quartz diorite
Jgdn gneissic granodiorite

Middle Jurassic
MJgd granodiorite

MESOZOIC
Mp phyllite, schist
Msn schist, gneiss

PENNSYLVANIAN AND PERMIAN
PPub peridotite, pyroxenite, gabbro

Table A-2. Reference Guide for Field Observations

MAP 1:50 000 NTS map sheet number

SAMPLE ID Sample Number

UTM ZONE UTM Zone

UTM EAST UTM East Coordinate

UTM NORTH UTM North Coordinate

STA Replicate Sample Status:
Routine Sample
10 1st Field Duplicate
20 2nd Field Duplicate

MED Sample Media Collected:
1 Stream Sediment
6 Steam Sediment and Water

FORM Geological Formations
(see Table A-1)

WAT COL Water Color:

0	Colorless	2	White Cloudy
1	Brown Clear	3	Brown Cloudy

FLW Water Flow Rate:

0	Stagnant	3	Fast
1	Slow	4	Torrent
2	Moderate		

SED COL Sediment Color:

R	Red	O	Olive-Green
W	White-Buff	G	Grey-Blue
B	Black	P	Pink
Y	Yellow	T	Tan-Brown

SED PPT Sediment Precipitate : N = None
(otherwise, same as SED COL)

CON Site Contamination:

N	None	A	Agricultural
P	Possible	D	Domestic
M	Mining	F	Forestry

SED COMP Sediment Composition : Estimate of Sand-Fines-Organic Content

0	Absent	
1	Minor	(<1/3 of total)
2	Moderate	(>1/3 but <2/3 of total)
3	Major	(<2/3 of total)

STRM WDTH Stream Width (metres)

STRM DPTH Stream Depth (centimetres)

BNK Bank Composition:

U	Unknown	G	Glacial Outwash
A	Alluvium	R	Rock
C	Colluvium	S	Scree, talus
T	Till	O	Organic

BNK PPT Bank Precipitate : N = None
(otherwise, same as SED COL)

PHY Physiography:

L	Lowland	H	Hilly
S	Swamp	M	Mature Mts
P	Plateau	Y	Youthful Mts

DRN Drainage Pattern:

D	Dendritic	I	Interrupted
H	Herringbone	G	Glacially deranged
R	Rectangular		

TYP Stream Type:

P	Permanent	R	Re-emergent
S	Seasonal		

ODR Stream Order:

1	Primary	3	Tertiary
2	Secondary	4	Quaternary

SRC Stream Source:

U	Unknown	S	Spring Runoff
G	Groundwater	M	Meltwater

DATE Sample Collection Date (day-month)

WT Weight of Sample Analyzed by INAA

Field Observations and Analytical Data

								Water												Stream Sediment													
AP	SAMPLE ID	UTM ZONE	UTM EAST	UTM NORTH	STA	MED	FORM	WAT COL	FLW	SED COL	SED PPT	CON	SED COMP	STRM WDTH	STRM DPTH	BNK	BNK PPT	PHY	DRN	TYP	ODR	SRC	DATE	FW 20 ppb ION	UW 0.05 ppb LIF	pH 0.1 GCE	Sb 0.2 ppm AAS	As 0.5 ppm AAS-H	Co 2 ppm AAS	Cu 2 ppm AAS	Fe 0.02 pct AAS	Pb 2 ppm AAS	Mn 5 ppm AAS	Hg 10 ppb AAS-F	Mo 2 ppm AAS	Ni 2 ppm AAS	Ag 0.2 ppm AAS	W 2 ppm AAS	U 0.2 ppm NADNC	Zn 2 ppm AAS	:DL :Unit :Mthd
I03	811002	10	611356	5544449		6	Jgdn	0	3	G	N	N	120	1.0	10	A	N	Y	D	P	3	G	0807	30	0.02	8.0	0.1	1.5	5	11	0.75	1	90	30	1	5	0.1	1	1.5	52	
I03	811004	10	613624	5547562		6	Jgdn	0	3	W	N	N	120	1.0	10	A	N	Y	D	P	3	G	0807	40	0.02	7.1	0.1	1.5	8	33	1.10	1	140	30	1	7	0.1	1	2.0	50	
I03	811005	10	614286	5548413		6	Jgdn	0	3	W	N	N	120	1.0	10	A	N	Y	D	P	3	G	0807	10	0.02	7.2	0.1	2.0	7	15	1.10	1	245	50	1	7	0.1	1	2.0	44	
I03	811006	10	618944	5548060	10	6	Jgdn	0	3	R	N	N	210	5.0	10	A	N	Y	D	P	2	G	0807	10	0.10	7.0	0.1	2.0	13	50	2.20	1	475	70	1	15	0.1	1	1.5	57	
I03	811007	10	618944	5548060	20	6	Jgdn	0	3	R	N	N	210	5.0	10	A	N	Y	D	P	2	G	0807	10	0.05	7.0	0.2	1.5	12	48	2.00	1	425	70	1	14	0.1	1	1.5	55	
I03	811008	10	618382	5547689		6	Jgdn	0	3	R	N	N	210	2.0	10	A	N	Y	D	P	3	G	0807	10	0.02	7.1	0.1	2.5	12	33	2.05	1	440	40	1	19	0.1	1	1.5	59	
I03	811009	10	618421	5550301		6	Jgdn	0	3	W	N	N	130	2.6	10	A	N	Y	D	P	3	G	0807	10	0.02	7.3	0.2	2.5	7	13	1.45	1	245	40	1	10	0.1	1	2.5	39	
I03	811010	10	616113	5550306		6	Jgdn	0	3	R	N	N	120	1.0	10	A	N	Y	D	P	3	G	0807	10	0.05	7.3	0.2	2.0	9	18	1.50	1	480	80	1	12	0.1	1	2.5	49	
I03	811011	10	614254	5549072		6	Jgdn	0	3	W	N	N	220	4.0	20	A	N	Y	D	P	2	G	0807	10	0.02	7.2	0.1	2.5	9	19	1.60	1	290	50	1	12	0.1	1	2.0	52	
I03	811012	10	613752	5549084		6	Jgdn	0	3	W	N	N	220	3.5	20	A	N	Y	D	P	3	G	0807	10	0.05	7.3	0.1	1.5	4	6	0.70	1	150	40	1	5	0.1	1	1.5	36	
I03	811013	10	612168	5547127		6	Jgdn	0	3	W	N	N	220	1.0	10	A	N	Y	D	P	3	G	0807	10	0.10	7.2	0.1	2.5	6	22	1.10	1	136	30	1	7	0.1	1	1.0	50	
I03	811014	10	614195	5550703		6	Jgdn	0	3	W	N	N	130	2.0	10	A	N	Y	D	P	3	G	0807	10	0.02	6.8	0.1	1.0	4	5	0.60	1	174	40	1	14	0.1	1	1.0	35	
I03	811015	10	614856	5553771		6	Jgdn	0	3	R	N	N	120	2.5	10	A	N	Y	D	P	2	G	0807	10	0.02	6.8	0.1	2.5	5	6	0.85	1	145	20	1	9	0.1	1	2.5	25	
I03	811016	10	616510	5559015		6	Jgdn	0	3	W	N	N	220	2.0	10	A	N	Y	D	P	4	G	0807	10	0.02	7.3	0.4	5.0	12	22	2.10	1	500	50	1	24	0.1	1	1.5	58	
I03	811017	10	618898	5559742		6	uKKV	0	3	W	N	N	220	2.2	10	A	N	Y	D	P	3	G	0807	10	0.14	7.5	0.4	4.5	12	21	2.45	1	460	60	1	33	0.1	1	2.0	65	
I03	811018	10	614738	5556760		6	Jgdn	0	3	R	R	N	220	1.0	10	A	R	Y	D	P	4	G	0807	10	0.10	7.0	0.1	1.0	4	7	0.85	1	180	50	1	6	0.1	1	3.0	34	
I03	811019	10	614740	5559759		6	Jgdn	0	3	W	N	N	210	2.0	10	A	N	Y	D	P	4	G	0807	10	0.05	7.4	0.2	1.5	9	18	1.60	1	475	50	1	12	0.1	1	4.0	63	
I03	811020	10	614428	5562203		6	Jgdn	0	3	R	N	N	030	1.0	10	A	N	Y	D	P	4	G	0807	10	0.05	7.7	0.1	1.5	9	27	1.95	1	310	40	1	9	0.1	1	1.0	57	
I03	811022	10	613683	5562461		6	Jgdn	0	3	R	N	N	220	2.0	10	A	N	Y	D	P	4	G	0807	36	0.05	7.8	0.2	4.5	9	35	2.10	1	360	50	1	10	0.1	1	2.5	55	
I03	811023	10	615852	5564180		6	uKKV	0	3	R	N	F	130	4.0	20	A	N	Y	D	P	4	G	0807	10	0.02	7.6	0.1	2.0	9	16	1.70	1	310	20	1	16	0.1	1	1.5	45	
I04	811024	10	576532	5553402		6	LKgd	0	3	W	N	F	130	5.5	10	R	N	Y	D	P	2	S	0907	10	0.05	7.4	0.1	2.0	1	4	0.50	1	45	10	1	2	0.1	1	1.5	16	
I04	811025	10	578195	5554611		6	LKgd	0	3	R	N	F	130	2.2	10	A	N	Y	D	P	3	G	0907	10	0.02	7.3	0.1	2.5	11	38	2.30	1	188	40	1	45	0.1	1	1.5	60	
I04	811026	10	581135	5554497		6	Mp	0	3	R	N	N	130	2.5	10	A	N	Y	D	P	3	G	0907	36	0.05	7.5	0.4	31.5	10	35	1.90	1	235	30	1	47	0.1	1	3.5	57	
I04	811027	10	582030	5553016		6	LKgd	0	3	G	N	F	120	2.0	10	A	N	Y	D	P	4	G	0907	10	0.10	7.3	0.2	11.5	7	18	1.05	1	112	20	1	31	0.1	1	1.0	34	
I04	811028	10	585862	5553479		6	Mp	0	3	R	N	F	120	1.5	10	A	N	Y	D	P	3	G	0907	36	0.30	8.0	0.2	18.0	8	23	1.55	1	248	20	1	36	0.1	1	1.5	45	
I04	811029	10	590934	5553329	10	6	Mp	0	3	G	N	N	120	2.0	10	A	N	Y	D	P	3	G	0907	10	0.05	8.1	0.8	72.5	22	68	3.10	2	538	20	3	103	0.2	1	2.0	80	
I04	811030	10	590934	5553329	20	6	Mp	0	3	G	N	N	120	2.0	10	A	N	Y	D	P	3	G	0907	10	0.05	7.9	0.8	82.5	23	68	3.20	1	540	30	3	97	0.3	1	1.5	76	
I04	811031	10	593944	5554761		6	LKgd	0	3	R	N	N	120	2.0	10	A	N	Y	D	P	3	G	0907	10	0.02	7.5	0.1	4.5	7	19	1.90	1	230	30	1	14	0.1	1	2.5	75	
I04	811032	10	601248	5551014		1	Mp	0	0	W	N	N	220	1.5		A	N	Y	D	P	3	G	0907				0.2	5.0	16	52	2.90	1	424	10	1	76	0.1	1	1.5	96	
I04	811033	10	601545	5553945		6	lKJM	0	3	R	N	N	210	1.0	10	A	N	Y	D	P	2	G	0907	110	0.16	8.3	0.2	2.5	20	16	2.45	1	360	30	1	198	0.1	1	2.0	69	
I04	811034	10	600563	5559323		6	lKJM	0	3	W	N	N	120	1.5	10	A	N	Y	D	P	2	G	0907	10	0.05	7.5	0.2	2.5	11	24	2.15	1	303	40	1	35	0.1	1	1.0	48	
I04	811035	10	600614	5563270		6	lKJM	0	3	R	N	P	120	3.0	10	A	N	Y	D	P	2	G	0907	10	0.02	7.5	1.8	8.5	11	24	2.75	1	438	200	1	22	0.1	1	1.5	68	
I01	811037	10	705620	5550643		6	MJgd	0	2	W	N	P	031	5.5	20	A	N	H	D	P	4	G	1007	30	0.05	7.3	0.6	4.5	7	33	1.90	1	370	100	1	18	0.1	1	1.5	59	
I01	811038	10	695172	5542390		6	MJgd	0	3	W	N	N	120	5.0	20	A	N	M	D	P	4	G	1207	34	0.02	7.4	0.2	1.5	3	9	0.80	1	173	20	1	6	0.1	1	1.0	25	
I01	811039	10	709826	5560208		6	CPCC	0	3	W	N	N	220	6.0	10	A	N	H	D	P	4	G	1207	38	0.10	7.6	0.2	4.5	7	15	1.75	1	300	30	2	28	0.1	1	2.5	54	
I01	811040	10	713646	5557361		6	CPCC	0	3	W	N	N	120	6.0	10	A	N	H	D	P	4	G	1207	40	0.14	7.7	0.1	2.5	7	16	1.65	1	318	40	1	22	0.1	1	3.0	58	
I01	811042	10	713388	5561007	10	6	CPCC	0	3	R	N	P	121	3.0	10	A	N	H	D	P	4	G	1207	40	0.10	7.8	0.1	1.5	8	9	1.40	1	303	40	1	43	0.1	1	2.0	41	
I01	811043	10	713388	5561007	20	6	CPCC	0	3	R	N	P	121	3.0	10	A	N	H	D	P	4	G	1207	40	0.10	8.8	0.2	1.5	8	9	1.45	1	328	40	1	42	0.1	1	2.0	39	
I01	811044	10	712640	5565998		6	CPCC	0	3	W	N	P	120	3.0	10	A	N	H	D	P	4	G	1207	40	0.10	7.5	0.2	2.5	9	14	1.85	1	320	40	1	54	0.1	1	2.0	48	
I01	811045	10	703612	5562283		6	CPCC	0	1	W	N	N	130	0.1	10	A	N	H	D	S	4	G	1207	190	2.20	8.0	0.4	5.0	12	45	2.15	1	528	70	2	29	0.1	1	1.5	63	

Field Observations and Analytical Data

Stream Sediment

MAP	SAMPLE ID	UTM ZONE	UTM EAST	UTM NORTH	STA	MED	FORM	Au1	Au2	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	Wt
								2	2	0.1	0.5	100	0.5	10	0.5	5	5	1	0.2	5	0.2	1	10	5	0.5	0.5	0.1	0.5	0.5	0.5	2	0.2	2	200	0.01
								ppb	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	g
								INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA
92I03	811002	10	611356	5544449		6	Jgdn	2		0.4	3.1	340	0.7	56	0.5	68	16	8	4.7	19	0.5	1	10	13	5.5	17.0	3.3	0.5	0.7	2.1	2	1.5	3	270	42.10
92I03	811004	10	613624	5547562		6	Jgdn	2		0.2	1.9	500	1.0	73	0.5	53	12	11	4.0	28	0.5	1	24	23	7.3	15.0	3.6	0.5	0.8	3.8	2	3.0	3	600	41.20
92I03	811005	10	614286	5548413		6	Jgdn	2	2	0.2	2.4	510	3.1	52	0.8	42	11	8	3.9	20	0.4	1	12	18	4.8	12.0	3.1	0.5	0.5	2.9	2	2.3	3	490	36.90
92I03	811006	10	618944	5548060	10	6	Jgdn	2		0.2	2.1	380	7.1	40	0.5	160	28	6	7.6	15	0.9	1	10	32	4.4	32.6	2.1	0.5	0.7	2.4	2	2.0	5	200	3.33
92I03	811007	10	618944	5548060	20	6	Jgdn	3		0.2	1.9	390	6.5	36	1.2	120	25	5	7.3	13	0.6	1	23	16	4.4	29.8	2.0	0.5	0.7	2.3	2	1.5	4	200	12.20
92I03	811008	10	618382	5547689		6	Jgdn	2		0.4	4.0	460	3.0	43	1.0	89	25	5	5.5	15	0.6	1	42	18	4.1	20.0	2.4	0.6	0.5	2.8	2	1.8	4	340	13.50
92I03	811009	10	618421	5550301		6	Jgdn	2		0.5	4.7	500	2.1	56	0.5	85	15	19	5.9	22	0.4	1	19	21	5.4	13.0	2.8	0.5	0.6	3.6	2	2.3	2	720	38.30
92I03	811010	10	616113	5550306		6	Jgdn	2		0.3	3.3	380	6.9	46	1.1	70	19	9	4.5	18	0.2	1	41	16	5.0	13.0	2.0	0.5	0.5	3.2	2	2.5	2	430	8.73
92I03	811011	10	614254	5549072		6	Jgdn	2		0.3	3.3	470	2.9	45	0.5	73	17	8	5.3	18	0.5	2	24	32	5.1	16.0	2.5	0.5	0.5	3.0	2	2.1	2	560	19.70
92I03	811012	10	613752	5549084		6	Jgdn	2		0.2	1.5	470	2.3	47	0.5	34	6	5	2.6	18	0.3	1	10	11	4.1	8.5	3.5	0.5	0.5	2.2	2	1.7	2	200	38.00
92I03	811013	10	612168	5547127		6	Jgdn	2		0.2	3.4	360	2.4	47	0.8	63	16	5	4.4	17	0.4	1	18	17	4.6	15.0	3.2	0.5	0.5	1.8	2	1.2	3	200	27.70
92I03	811014	10	614195	5550703		6	Jgdn	2		0.1	1.0	390	2.8	37	0.5	19	7	5	2.2	15	0.4	1	10	20	3.7	7.9	3.4	0.5	0.5	1.6	2	1.1	2	200	31.00
92I03	811015	10	614856	5553771		6	Jgdn	11		0.3	2.9	440	0.5	60	0.5	55	11	25	5.8	25	0.5	1	16	17	6.0	11.0	3.6	0.5	0.5	4.0	2	3.1	4	1200	46.80
92I03	811016	10	616510	5559015		6	Jgdn	2		0.8	9.3	660	2.5	51	2.2	140	23	5	5.7	21	0.5	2	34	14	5.1	19.0	3.1	0.5	0.6	3.1	2	2.1	2	200	16.50
92I03	811017	10	618898	5559742		6	uKKV	6		0.9	11.0	590	1.3	48	1.9	170	27	5	7.3	21	0.5	2	50	31	5.1	20.9	2.9	0.8	0.5	3.3	2	2.1	3	200	23.20
92I03	811018	10	614738	5556760		6	Jgdn	4		0.2	1.9	460	4.2	51	0.7	48	8	6	3.0	18	0.2	1	13	18	4.3	8.6	3.1	0.5	0.5	2.6	2	3.5	2	320	28.60
92I03	811019	10	614740	5559759		6	Jgdn	2		0.3	2.8	470	12.0	47	0.9	57	14	6	4.1	16	0.3	2	28	23	4.4	14.0	2.5	0.5	0.5	2.2	2	4.3	3	200	11.60
92I03	811020	10	614428	5562203		6	Jgdn	2		0.2	4.1	390	2.0	22	1.6	71	20	3	6.8	11	0.9	1	25	20	4.6	24.2	3.8	0.5	0.8	1.2	2	1.3	3	320	47.80
92I03	811022	10	613683	5562461		6	Jgdn	2		0.3	7.3	420	8.1	31	1.3	84	21	4	7.7	13	0.5	2	10	27	4.2	26.1	2.5	0.5	0.5	1.9	2	3.1	4	200	11.30
92I03	811023	10	615852	5564180		6	uKKV	3		0.4	4.0	540	1.0	55	0.8	160	19	8	5.8	22	0.6	1	31	18	5.2	18.0	3.5	0.7	0.6	3.1	2	1.7	3	260	42.30
92I04	811024	10	576532	5553402		6	LKgd	2	2	0.2	3.2	280	2.7	70	0.5	40	7	17	4.9	26	0.8	1	10	5	8.0	24.6	4.1	0.5	0.8	2.9	2	1.6	3	960	49.10
92I04	811025	10	578195	5554611		6	LKgd	2		0.2	4.1	310	9.4	39	2.1	150	21	5	5.4	16	0.5	1	78	26	4.6	19.0	2.7	0.5	0.5	2.8	2	1.5	2	200	30.60
92I04	811026	10	581135	5554497		6	Mp	4		0.7	39.0	370	11.0	43	2.6	150	16	4	4.2	17	0.3	1	75	32	4.4	18.0	2.3	0.6	0.5	3.3	2	3.6	2	240	26.50
92I04	811027	10	582030	5553016		6	LKgd	2		0.3	15.0	260	1.6	42	1.0	120	18	6	5.1	17	0.6	1	59	13	5.1	24.4	3.0	0.6	0.5	2.8	2	1.2	3	350	43.50
92I04	811028	10	585862	5553479		6	Mp	2		0.3	21.0	290	15.0	37	1.1	150	18	4	3.8	19	0.6	1	59	29	4.5	18.0	2.3	0.6	0.6	3.6	2	1.5	3	380	27.30
92I04	811029	10	590934	5553329	10	6	Mp	29	26	1.1	95.6	550	1.0	56	2.3	240	37	3	5.9	25	0.6	5	180	55	6.7	25.5	1.3	1.8	0.9	4.8	2	2.1	4	200	30.20
92I04	811030	10	590934	5553329	20	6	Mp	37	29	1.3	119.0	610	2.2	75	3.0	280	40	4	7.1	30	0.9	7	190	52	7.9	30.6	1.6	2.0	1.3	5.7	2	2.4	5	200	37.10
92I04	811031	10	593944	5554761		6	LKgd	2		0.1	5.1	520	2.6	52	1.3	62	11	6	3.1	24	0.3	1	14	27	6.4	11.0	2.6	1.0	0.7	4.6	2	2.7	2	330	23.70
92I04	811032	10	601248	5551014		1	Mp	14		0.3	6.9	680	0.8	65	1.9	160	28	4	5.8	26	0.6	3	120	51	6.9	20.0	2.3	1.1	0.8	4.6	2	1.9	3	200	27.40
92I04	811033	10	601545	5553945		6	lKJM	2		0.5	4.2	340	23.0	44	2.0	616	24	7	4.6	19	0.3	1	250	19	5.1	13.0	2.5	0.6	0.5	3.1	2	1.6	2	200	12.60
92I04	811034	10	600563	5559323		6	lKJM	2		0.3	2.6	340	1.1	46	0.6	150	17	5	4.5	21	0.6	1	46	21	5.7	20.2	3.5	0.6	0.7	3.1	2	1.5	3	200	38.40
92I04	811035	10	600614	5563270		6	lKJM	2		2.1	11.0	460	1.0	55	1.7	130	16	6	4.6	22	0.4	1	24	27	5.0	18.0	3.3	0.5	0.5	3.6	2	1.6	2	200	26.20
92I01	811037	10	705620	5550643		6	MJgd	11		0.8	8.0	970	2.4	45	1.5	170	17	3	4.6	19	0.6	1	25	47	4.7	20.0	2.7	0.5	0.5	3.7	2	1.7	3	230	34.40
92I01	811038	10	695172	5542390		6	MJgd	2		0.4	2.0	970	1.6	40	1.0	82	11	4	2.9	16	0.3	1	13	41	4.3	14.0	3.2	0.6	0.5	2.7	2	1.5	2	200	45.30
92I01	811039	10	709826	5560208		6	CPCC	5		0.7	5.3	1100	1.5	72	2.0	999	17	6	6.2	31	0.7	3	54	66	7.3	20.0	2.4	2.0	0.9	7.6	3	3.3	4	420	23.10
92I01	811040	10	713646	5557361		6	CPCC	2		0.6	4.1	1100	4.8	72	1.7	581	13	6	5.3	32	0.8	1	51	78	6.8	20.9	2.6	1.2	0.9	6.9	2	3.1	4	200	35.80
92I01	811042	10	713388	5561007	10	6	CPCC	2		0.4	2.1	990	2.1	60	2.0	576	21	4	4.5	26	0.5	1	84	74	5.5	20.0	2.5	1.0	0.6	5.1	2	2.0	2	200	34.10
92I01	811043	10	713388	5561007	20	6	CPCC	5		0.4	1.9	1000	2.2	65	1.5	641	20	4	4.5	28	0.4	2	74	74	5.6	20.6	2.5	1.0	0.6	5.6	2	2.3	3	230	35.90
92I01	811044	10	712640	5565998		6	CPCC	4		0.6	4.2	870	2.3	73	1.1	944	22	4	5.2	31	0.5	2	89	54	6.3	22.1	2.2	1.4	0.7	6.1	2	2.0	4	330	31.70
92I01	811045	10	703612	5562283		6	CPCC	5		0.8	6.5	920	5.6	48	2.2	140	21	4	4.8	21	0.5	3	38	60	4.5	19.0	2.4	0.7	0.6	4.3	2	1.9	2	200	29.60